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The Inovation of Dental Caries Prevention: The Influence of Maternal Training in Early Caries Risk Detection through Enhancing Knowledge, Attitudes, and Behaviors

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ABSTRACT
Dental and oral health in children is a critical factor that demands attention, as tooth decay during childhood can significantly impact the development of permanent teeth. Parental behavior, particularly maternal involvement, plays a crucial role in influenc-ing children's dental health outcomes. This study aimed to evaluate the impact of maternal training on the early detection of dental caries and to assess changes in maternal knowledge, attitudes, and behaviors. A two-group pretest-posttest quasi-experimental design was employed, utilizing a simple random sampling technique. The study involved 40 mothers and their children (aged 6-8 years) from elementary schools in the Medan Amplas District of North Sumatera. Participants were divided into control and intervention groups (n mothers=20; n children=20). The intervention group received hands-on training in de-tecting childhood caries using oral diagnostic instruments (mirror, explorer, excavator, and forceps), while the control group received only standard dental health education without the training. Knowledge, attitude, and behavior were measured using validated questionnaires. Data were analyzed using an independent t-test (p=0.001).The findings revealed a highly significant difference (p=0.000) in maternal knowledge, attitudes, and behaviors before and after the intervention between the intervention and control groups. Conclusion is maternal training in the early detection of childhood dental caries significantly enhances mothers' knowledge, attitudes, and behaviors regarding oral health. Addressing the knowledge and skill gaps in mothers is vital to advancing Indonesia's dental health performance.

Keywords: Training, Dental caries, Knowledge, Attitudes, Behavior

INTRODUCTION
The prevalence of dental caries in children remains a high public health concern, as it serves as a key indicator of the effective-ness of aimed at maintaining children's dental health. Unfortunately, dental and oral health are often not prioritized and are fre-quently overlooked by the general population.[1] The oral cavity is the gateway to the body, and poor oral hygiene can facilitate the entry of harmful germs and bacteria, potentially compromising the health of other organs.[2] Each year, more than 50 million school hours are lost due to dental and oral health issues, which, if persistent, can negatively impact a child's intellectual devel-opment over time.[3]

In North Sumatra, while 92.9% of the population reportedly brushes their teeth daily, only 1.6% of children aged 5-9 years do so correctly in terms of both technique and timing.[4] This statistic highlights a concerning gap in the knowledge and awareness of the Indonesian population regarding proper oral hygiene practices. One contributing factor to dental and oral problems in children is the behavior and attitudes of mothers who may neglect oral hygiene practices, often due to a lack of knowledge about the importance of maintaining good oral and dental

health.[5].

Dental caries is a progressive process characterized by the demineralization of the tooth's inorganic components and the break-down of its organic matrix. It ranks among the most prevalent diseases globally, primarily resulting from an imbalance between demineralization and remineralization processes. This imbalance is often triggered by the fermentation of refined carbohydrates that adhere to the tooth surface, producing organic acids that damaging the enamel. The initial acid attack on the tooth structure leads to localized damage known as "white spots," which serve as the earliest clinical indicators of caries. These white spot lesions typically develop on the smooth surfaces of the enamel and are critical markers for the early detection of caries. The development of caries is influenced by several factors, including salivary pH and the presence of plaque, often due to inadequate oral hygiene practices. [6]

The factors influencing the development of dental caries in children can be categorized into internal and external factors. Internal factors include bacteria, carbohydrate consumption, the susceptibility of tooth surfaces, and the duration of exposure. External factors encompass age, gender, ethnicity, geographical location, sociocultural aspects, and the role of parents in maintaining oral health.[7] The level of parental knowledge is a crucial determinant of children's oral hygiene status. The active involvement of parents is essential in improving and maintaining children's dental and oral health.[8] However, parental education and knowledge alone do not guarantee that children will engage in proper oral hygiene practices. It is the active participation and attention of parents, particularly during the preschool years, that are critical.[9] Parental involvement is necessary for guiding, educating, reminding, and providing the necessary resources to ensure that children maintain good dental and oral hygiene.[10]

Moreover, parents play a significant role in preventing plaque accumulation and the development of caries in children. A moth-er's knowledge is particularly vital in shaping behaviors that support children's oral health. This knowledge can be acquired either naturally or through structured educational processes.[11] Parents with limited knowledge of oral and dental health are more likely to engage in behaviors that do not support their children's oral health. Key aspects of oral health maintenance at this age include teaching proper tooth-brushing techniques, providing toothpaste, administering topical fluoride, and using mouth-wash. [12]

A few Research has demonstrated a significant relationship between maternal involvement in oral health maintenance and plaque index ($p = 0.001$).[3] However, another study reported no significant relationship between maternal knowledge of oral health maintenance and caries status among children in Al-Hikmah Kindergarten, Jambi City, in 2018.[13] In the aftermath of the COVID-19 pandemic, all Indonesians share the responsibility of helping the government restore public health, including dental health.[14] Early Childhood Caries (ECC) is a widespread condition affecting young children globally, with severe long-term health implications if not addressed promptly. Mothers are pivotal in the prevention, early detection, and management of ECC due to their close interaction with their children. However, many mothers lack the necessary knowledge, attitudes, and behaviors to effectively address this issue. This study aims to explore the potential benefits of maternal training programs designed to enhance the early detection caries teeth and management of ECC.[15].

RESEARCH METHOD

The type of research is quasi-experimental with a cross sectional study design. The population of this study were all students in grades 1-2 totaling 200

people and the sample amounted to 40 students and 40 parents who were obtained by purposive sampling technique and had met the inclusion and exclusion criteria. Samples that according to the inclusion and exclusion criteria were divided into 2 groups, namely the control group and the intervention group. Each group consisting of 20 mothers and 20 children. The inclusion criteria of this study were agreed by the parents by signing the informed consent sheet, while the exclusion criteria were being sick and not willing to be a respondent. The intervention involved the direct use of audiovisual media, and the location of this study was at State Elementary School 064954, located in Siti Rejo Village, Medan Amplas Subdistrict, North Sumatra Province, Indonesia.

The instruments of this study were knowledge, attitude and action questionnaire forms, dental caries examination sheets, informed consent, booklets, disposable diagnostic tools set (mouth glass, explorer, excavator, tweezers, nierbeiken), and personal protective equipment consisting of masks, handscoen, stationery, 70% alcohol, mineral water, dry tissue, antiseptic spray. all these tools and materials were set respectively in a tool and material box and distributed to the community, Data were collected on maternal knowledge, attitude, and behavior using a standardized questionnaire, supplemented by interviews. In addition, data on children's oral diseases were collected through dental examinations conducted by the mothers as part of the training outcomes. Ethical clearance for this study was obtained from the Ethics Commission of the Health Polytechnic of the Ministry of Health Medan (01.0367/KEPK/POLTEKKES MEDAN 2022).

The training was begin by Caries detection starts by taking a brief medical, dental, diet, and socioeconomic history. This helps the clinician to assess the primary and secondary caries risk factors which enable them to develop a patient centric treatment plan.

Data analysis was conducted using descriptive and analytic methods. Variables such as age, education level, and occupation were presented in the form of frequency distribution. Data normality was assessed using the Kolmogorov-Smirnov test. Data on knowledge, attitudes, and behaviors, as well as the level of oral diseases, were analyzed using dependent t-test and independent t-test to compare the intervention group and control group, with 95% confidence level ($p < 0.05$).

RESULT AND DISCUSSION

Table 1. Characteristics of Respondents

Characteristic	n	f
Gender of Parents		
1. Father	10	25
2. Mother	30	75
Gender of Child		
1. Male	22	55
2. Female	18	45
Parent's Work		
1. Housewives/Doesn't work	15	37,5
2. Worker	25	62,5
Parent's Education		
1. Elementary School	8	20
2. Junior High School	12	30
3. Senior High School	20	50
4. College	0	0

The table 1 presents the demographic characteristics of respondens, focusing on the gender of parents and children, parental occupation, and parental education levels. Regarding parental gender, the data show that 75% of the parents involved in the study were mothers (n=30), while only 25% were fathers (n=10). This distribution highlights the predominant role mothers play in managing their children's dental health, which aligns with the broader under-standing that mothers are often more involved in childcare and health-related activities. In terms of the children's gender, the sample was relatively balanced, with 55% of the children being male (n=22) and 45% being female (n=18). This near-equal

distribution ensures that the findings of the study are not biased towards one gender, making the results more generaliza-ble to the broader population of children. The data on parental occupation reveal that 62.5% of the parents were workers (n=25), while 37.5% were housewives or did not work (n=15). This suggests that the majority of the parents are engaged in some form of employment, which might influence the time and resources they can devote to their children's dental care. Working parents might face challenges in maintaining consistent oral hygiene routines for their children due to time constraints. Regarding educational background, the table shows a range of educational attainment among the parents. Half of the parents (50%, n=20) had completed senior high school, while 30% (n=12) had a junior high school education, and 20% (n=8) had only an elementary school education. Notably, none of the parents had attained a college-level education. The education level of the parents is an important factor, as it can influence their knowledge, attitudes, and behaviors regarding their children's dental health. Lower levels of education might be associated with less awareness of proper dental care prac-tices, which could affect the effectiveness of dental health interventions.

This demographic data suggesting that mothers, particularly those with lower educa-tional attainment and who are balancing work, play a crucial role in managing their children's dental health. These factors should be considered when designing and implementing educa-tional programs or interventions aimed at improving children's oral hygiene.

Table2. Brushing and snacking frequency and dental caries index.

Variables	n	%
Brushing teeth frequency		
1 daily	0	0
2 times daily	24	65
3 times daily	16	35
Snacking frequency		
High (> 3 daily)	25	55
Low (≤ 3 daily)	15	45
Dental Caries Index		
$\bar{x}$ def-t	3,03	
$\bar{x}$ DMF-T	0,8	

The table 2 provides a summary of children's oral hygiene practices, snacking habits, and the dental caries index, offering insight into their oral health status. The data show that none of the children reported brushing their teeth only once a day, as brushing once daily is generally insufficient for maintaining good oral health. The majority of the children, 65%, brushed their teeth twice daily, aligning with dental recommendations that suggest brushing at least twice a day to effectively remove plaque and prevent tooth decay. Meanwhile, 35% of the children brushed their teeth three times daily, indicating a higher level of attention to oral hygiene. Regarding snacking habits, 55% of the children had a high snacking frequency, consuming snacks more than three times per day. Frequent snacking, particularly on sugary foods, is linked to a higher risk of dental caries because it provides more opportunities for bacteria in the mouth to produce acid that erodes tooth enamel. In contrast, 45% of the children had a lower snacking frequency, which is generally better for maintaining dental health as it reduces the number of acid attacks on teeth.

The dental caries index is divided into two parts: the mean def-t (decayed, extracted, filled teeth in primary teeth) score, and the mean DMF-T (decayed, missing, filled teeth in permanent teeth) score. The mean def-t score was 3.03, indicating that, on average, each child had slightly more than three primary teeth that were decayed, extracted, or filled due to caries. This relatively high def-t score suggests a significant prevalence of dental caries in primary teeth, which may be related to both oral hygiene practices and dietary habits. On the other hand, the mean DMF-T score for permanent teeth was 0.8,

much lower than the def-t score. This lower score suggests that dental caries is less common in permanent teeth among these children, possibly because these teeth are newer or because of the impact of preventive measures like fluoride treatments.

Base on the table 2, most of children have twice a day of brushing teeth (60%), but the frequency eating snack were higher until 55% (> 3 time a day) with an average number of dmf-t of 3,03 and DMF-T is 0,8 (low category< 4). It means that the respondent have average 3 number of carious teeth inside their oral cavity. The measurement of independent variables mother's knowledge, attitudes and behaviour was carried out using a questionnaire containing 40 questions, and previously tested for validity and reliability. The data was carried out with SPSS version 22.

Table 3. Frequency distribution of knowledge levels, attitudes, and behaviors between the control and intervention groups

No	Knowledge	Control				Intervention				Assessment criteria
		Pre		Post		Pre		Post		Category
		n	%	n	%	n	%	n	%	
1	Bad									Bad : < 5
2	Enough	17	85	17	85	16	80	0	0	Enough : 6 - 10
3	Good	3	15	3	15	4	20	20	100	Good : 11 - 15
	Attitude									
1	Negatif									Negative : < 15
2	Positif	11	55	14	70	11	55	0	0	Positive : 16 – 30
3	Sangat Positif	9	45	6	30	9	45	20	100	Very Positive : 31 – 45
	Total	20	100	20	100	20	100	20	100	
	Behaviour									
1	Negative									Less Active :< 10
2	Positive	11	55	14	70	11	55	0	0	Active : 11 - 20
3	Very Positive	9	45	6	30	9	45	20	100	Very Active : > 20

Based on the table 3 of the Knowledge Level, before the intervention, the majority of participants in both the control and intervention groups fell into the "Enough" category. Specifically, 85% of participants in the control group had a moderate level of knowledge before and after the intervention, with no significant change observed post-intervention. In contrast, while 80% of participants in the intervention group also started with an "Enough" level of knowledge, none remained in this category after the intervention. Instead, there was a significant improvement, with 100% of participants moving to the "Good" category, indicating the effectiveness of the training program in enhancing the knowledge of mothers in the intervention group. There is a need for interventions to improve maternal knowledge on child tooth brushing, dietary practices, and dental visits as part of broader health promotion according to previous research.[16]. Based on the previous research, there is a relationship between mothers' knowledge, attitudes, and actions about oral health and the incidence of dental caries. based on the results of previous studies, it shows that mothers' knowledge about oral health is in the low category. It is recommended that parents, especially mothers, increase knowledge about oral health which includes understanding, benefits, prevention and diseases that can be prevented by maintaining oral health. can be prevented by maintaining oral health.[17]

In terms of attitudes, the control group showed a slight improvement.

Initially, 55% of participants had a "Positive" attitude, and this increased to 70% post-intervention. Meanwhile, the percentage of participants with a "Very Positive" attitude decreased slightly from 45% to 30%. For the intervention group, the attitudes were initially similar to those of the control group, with 55% of participants showing a "Positive" attitude and 45% showing a "Very Positive" attitude. However, after the intervention, all participants (100%) in the intervention group moved to the "Very Positive" category, reflecting a significant shift in attitudes due to the intervention.

Based on the previous research when a child complains of toothache, only 64% of mothers takes care their children to the dentist, 6% of mothers just leave alone, 6% of mothers increase milk consumption and 24% of mothers take general doctor for antibiotics. It was concluded that mother's knowledge and attitude about her child's primery teeth is not good, the willingness to do dental care of her child also has not been proven frequency to dentist only when her child complained of toothache. [18]

Regarding behavior level, the control group displayed a similar trend as seen in attitude changes. Initially, 55% of participants exhibited "Positive" behaviors, which increased to 70% post-intervention. However, the proportion of participants showing "Very Positive" behaviors decreased from 45% to 30%. In the intervention group, the initial distribution was the same as that of the control group, with 55% in the "Positive" category and 45% in the "Very Positive" category. Post-intervention, all participants in the intervention group demonstrated "Very Positive" behaviors, indicating a marked improvement in behavior due to the training.

Table 4. Results of Measurement of Data Normality of Each Parameter

No	Variable	Control	*p Value*	Intervention	*p Value*
		$\bar{x}$ + SD		$\bar{x}$ + SD	
1	Knowledge	8,65 ± 1,56	0,200	9,00 ± 1,74	0,015
2	Attitude	25,90 ± 6,43	0,005	27,10 ± 7,77	0,010
3	Action	20,45 ± 5,26	0,200	21,80 ± 5,77	0,002

* : Significant data

Based on the table data above, in the control group, the mean knowledge score was 8.65 with a standard deviation of 1.56, and the p-value for the normality test was 0.200. This p-value indicates that the data on knowledge in the control group are normally distributed (p> 0.05). In the intervention group, the mean knowledge score was slightly higher at 9.00 with a standard deviation of 1.74 (p-value=0.015), which is below the 0.05 threshold, suggesting that the knowledge data in the intervention group are not normally distributed.

For the attitude variable, the control group had a mean score of 25.90 with a standard deviation of 6.43. The p-value for the normality test was 0.005, indicating that the attitude data in the control group are not normally distributed. In the intervention group, the mean attitude score was 27.10 with a standard deviation of 7.77. Similarly, the p-value was 0.010, also below 0.05, suggesting that the attitude data in the intervention group are not normally distributed.

Regarding to action variable, the control group had a mean score of 20.45 with a standard deviation of 5.26, and the p-value for the normality test was 0.200. This p-value indicates that the action data in the control group are normally distributed. In the intervention group, the mean action score was higher at 21.80 with a standard deviation of 5.77, but the p-value was 0.002, indicating that the action data in the intervention group are not normally distributed.

Table 5. Statistical Test Results of the mean total before / after training using web application like Knowledge, Attitude and Action Parameters with Wilcoxon Test in Control and Intervention Groups

No	Parameter	Control		*p Value*	Intervention			*p Value*
		Pre	Post		Pre	Post	Δ	
		x̄ ± SD			x̄ ± SD			
1	Knowledge	8,65 ± 1,56	8,75 ± 1,48	0,317	9,00 ± 1,74	13,05 ± 1,43	4,05± 0,3	0,000*
2	Attitude	25,90 ± 6,43	25,25 ± 6,33	0,096	27,10 ± 7,77	41,50 ± 3,12	14 ± 4,65	0,000*
3	Action	20,45 ± 5,26	21,10 ± 5,44	0,414	21,80 ± 5,77	27,95 ± 1,79	6,15 ± 3,98	0,000*

* : Significant data

From the table 5 show that the control group showed a minimal increase in knowledge from a mean score of 8.65 ± 1.56 pre-intervention to 8.75 ± 1.48 post-intervention, with a p-value of 0.317. Its indicating that no significant change. In contrast, the intervention group exhibited a substantial improvement, with the mean score rising from 9.00 ± 1.74 to 13.05 ± 1.43 (a mean difference of 4.05), and a p-value of 0.000, indicating a statistically significant increase. For the attitude variable, in the control group, the attitude scores slightly decreased from 25.90 ± 6.43 to 25.25 ± 6.33, with a p-value of 0.096, showing no significant change. The intervention group, however, showed a significant improvement, with the attitude scores increasing from 27.10 ± 7.77 to 41.50 ± 3.12 (a mean difference of 14 ± 4.65), with a p-value of 0.000. Regarding to the action variable, the control group showed a small, non-significant increase in action scores from 20.45 ± 5.26 to 21.10 ± 5.44, with a p-value of 0.414. Conversely, the intervention group displayed a notable increase in action scores from 21.80 ± 5.77 to 27.95 ± 1.79 (a mean difference of 6.15 ± 3.98), with a p-value of 0.000.

From Table 7 indicate that the intervention had a significant positive effect on the knowledge, attitudes, and actions of the participants in the intervention group. While the control group showed no significant changes in any of the parameters, the intervention group demonstrated statistically significant improvements in all three areas—knowledge, attitudes, and actions—after the intervention. This suggests that the maternal training provided as part of the intervention effectively enhanced the mothers' understanding, outlook, and practices related to the early detection and prevention of childhood dental caries.

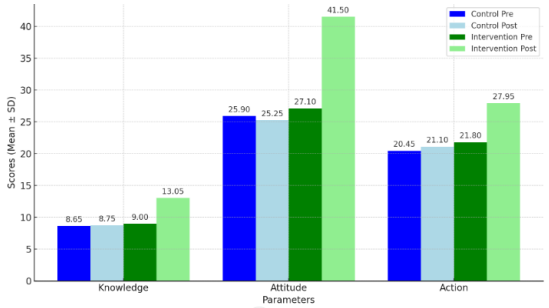

Figure 1. Comparison of Knowledge, Attitude and Actions both of Control and Intervention Group

The histogram above show the comparison of mean scores for three variables—knowledge, attitude, and action—between the control and intervention groups, both before (pre) and after (post) the intervention. For the knowledge variable, the control group shows a slight increase from 8.65 to 8.75, while the intervention group experiences a significant rise from 9.00 to 13.05. In the attitude variable, the control group slightly declines from 25.90 to 25.25, whereas the

intervention group shows a substantial increase from 27.10 to 41.50. Lastly, for the action variable, the control group slightly improves from 20.45 to 21.10, but the intervention group records a larger increase from 21.80 to 27.95. These results indicate that the intervention had a more considerable impact on improving knowledge, attitude, and action compared to the control group.

This study evaluates the impact of maternal training programs on the early detection of childhood caries, emphasizing how such training influences maternal knowledge, attitudes, and behaviors. Early Childhood Caries (ECC) is a significant global public health concern, and mothers play a crucial role in its early detection and prevention. [19] The findings of this study suggest that structured maternal training can significantly enhance mothers' understanding and proactive management of ECC, thereby improving oral health outcomes in children.

Dental caries is a complex and dynamic non-communicable disease influenced by biofilm activity and dietary habits, leading to the demineralization of dental hard tissues.[20] The likelihood of developing or worsening caries, known as caries risk, is determined by a combination of biological, behavioral, psychosocial, and environmental factors, collectively referred to as caries risk factors.[21] Strategies to mitigate the prevalence of dental caries and associated risks include conducting caries risk assessments (CRA) and implementing health promotion efforts that address dental caries risk and its contributing factors. [22]

Parents, especially mothers, are pivotal figures in a child's life, deeply influencing their growth and development.[9] Mothers, as the primary caregivers and first educators within the family, have an indispensable role in maintaining their children's dental health.[18] Parental knowledge, particularly maternal knowledge, is fundamental in shaping behaviors that support or undermine children's oral hygiene.[23] Unfortunately, many mothers still exhibit a lack of awareness and neglect regarding the importance of maintaining their children's dental health.[24] This deficiency often leads to inadequate preventive measures against dental caries, underscoring the need for improved education and awareness among mothers. Mothers must understand the causes of dental caries, the correct timing and technique for brushing teeth, the types of foods that contribute to or prevent caries, and the importance of regular dental visits.[25] However, many mothers allow their children to consume foods without considering their health impacts, particularly sweet foods that are known to cause caries.[26] This points to a gap in knowledge regarding the relationship between sugar consumption and dental caries, highlighting the necessity for effective oral health education programs.[27]

Health promotion training for maternal allows the mother to be able to control the determinants or risk factors of dental caries of their children in order to reduce the caries risk and, ultimately, reduce the prevalence of dental caries. [28] This can be performed using media teaching aids/props to convey and demonstrate information during the educational or teaching process, thus making it easier to understand and more attractive to the student. [29]. The educational material that the intervention respondents (mothers) were given about dental caries risk through media booklet. for the mother, to implement the educational material regarding caries risk in their everyday lives, it is necessary to provide all the information at once in an easily with booklet [21]

Behavioral change, particularly in health-related practices, is a complex process that often requires considerable time. While higher education levels are typically associated with more informed decision-making.[30] This study suggests that maternal education level alone may not

be strongly correlated with knowledge about oral health. In today's digital age, information can be easily accessed through various channels such as electronic media, print media, and social media. For example, advertisements for toothpaste or toothbrushes and public service announcements about dental care are common sources of information that can unconsciously enhance a mother's knowledge about her child's oral health.[31]

Effective oral health promotion requires not only knowledge but also positive attitudes and behaviors. Maintaining oral health involves consistent practices such as brushing teeth twice daily, consuming tooth-friendly foods, reducing intake of cariogenic foods, and regular dental check-ups.[32] In Indonesia, programs to control caries—such as brushing teeth at least twice a day, reducing high carbohydrate consumption, and promoting regular dental visits—have been introduced. However, these initiatives have not been optimally implemented, often due to a lack of parental attention to children's dental health.[3]

The relationship between knowledge, attitudes, and behavior is critical.[33] Even when mothers possess good knowledge, if their attitudes and behaviors are inconsistent or indifferent, this knowledge may not translate into effective action.[34] Changing health behaviors is a multifaceted process that involves a careful consideration of the benefits and risks associated with certain actions. Positive attitudes towards health services, for example, are closely linked to the utilization of these services.[35] This aligns with research indicating that attitudes significantly influence health-seeking behavior, including the use of dental services.

Children's habits, such as frequent consumption of milk from bottles or sweet snacks, are significant risk factors for caries.[1],[36] Encouraging behaviors such as drinking water after eating sugary foods can help reduce the risk of caries.[37] The study underscores the importance of maternal knowledge about the causes, symptoms, risk factors, and prevention of tooth decay. A supportive residential environment that facilitates access to information about oral health, through media, counseling, and advertisements, can significantly enhance maternal knowledge, particularly regarding dental caries.[38]

Dental caries result from the demineralization of tooth tissue due to organic acids produced by sugar-containing foods. [39] If untreated, caries can lead to toothache, which not only affects a child's growth and development but also their appetite, further complicating their health. [40] Effective prevention of cavities involves guiding children in proper brushing techniques and timing, ensuring that their teeth are free from food debris, and fostering good oral hygiene habits.[41]

The results of this study highlight the effectiveness of maternal training programs in improving the early detection of ECC, which is essential for timely intervention and the prevention of more severe dental issues. By enhancing maternal knowledge and behavior, these training programs offer long-term benefits, potentially reducing the prevalence of ECC and promoting sustained oral health among children.

However, the study also faced challenges, including difficulties in participant retention and a short follow-up period, which may have limited the ability to assess long-term outcomes. Future studies should consider extended follow-up periods and larger sample sizes to better understand the sustained impact of maternal training on childhood oral health.

CONCLUSION

The findings of this study underscore the significant impact of maternal knowledge, attitudes, and behaviors on the incidence of dental and oral diseases in children. Maternal training programs have proven to be an effective strategy in combating Early Childhood Caries (ECC).

By equipping mothers with the essential knowledge, positive attitudes, and practical behaviors needed for the early detection and prevention of dental caries, these programs contribute to substantial improvements in children's oral health outcomes.

Future research should focus on evaluating the long-term effects of these training programs and exploring ways to expand their reach to a wider population. This could ensure that more mothers are empowered to play a proactive role in safeguarding their children's oral health, ultimately leading to a reduction in the prevalence of ECC and other dental issues in early childhood.[42].

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