International Journal of Advanced Health Science and Technology e-ISSN:2808-6422; p-ISSN:2829-3037
Homepage: ijahst.org Vol. 5 No. 6, pp. 341-346, Desember 2025

RESEARCH ARTICLE OPEN ACCESS

Manuscript received September 10, 2025; revised November 10, 2025; accepted November 15, 2025; date of publication December 30, 2025
Digital Object Identifier (**DOI**): https://doi.org/10.35882/ijahst.v5i6.496

How to cite: Luditha Dia Anggraeni, Sri Hidayati, and Silvia Prasetyowati, "The Impact of Maternal Knowledge on Dental Caries in Preschool Children", International Journal of Advanced Health Science and Technology, Vol. 5 No. 6, pp. 341-346, December 2025.

The Impact of Maternal Knowledge on Dental Caries in Preschool Children

Luditha Dia Anggraeni, Sri Hidayati, and Silvia Prasetyowati

Depaterment of Dental Health, Poltekkes Kemenkes Surabaya, Surabaya, Indonesia

Corresponding author: Luditha Dia Anggraeni Author (e-mail: ludithaanggraeni@gmail.com)

ABSTRACT Dental caries remains one of the most prevalent oral health problems among preschool children, often linked to inadequate parental understanding of proper dental care. This study addresses the research problem of how maternal knowledge influences the occurrence of dental caries in preschool-aged children at PG/RA Muslimah NU Islamiyah Taman Sidoarjo. The aim was to determine whether maternal knowledge significantly correlates with children's dental caries status. Using an analytical cross-sectional design, data were collected from 36 mother–child pairs selected through total sampling. Maternal knowledge was assessed using a structured questionnaire, while the children's dental caries status was examined with a standardized dental health assessment sheet. Statistical analysis was conducted using the Chi-square test with Fisher's test as the corrective alternative. The results showed that 47.2% of mothers possessed sufficient knowledge, while 50% of children exhibited low levels of dental caries. A significant relationship was found between maternal knowledge and dental caries prevalence ($p = 0.001$), indicating that higher maternal knowledge is associated with a lower incidence of caries in preschool children. These findings confirm that mothers play a central role in promoting healthy oral hygiene behaviors and reducing caries risk during early childhood. In conclusion, maternal knowledge exerts a substantial influence on children's oral health outcomes, highlighting the need for targeted parental education and health promotion programs. Interventions that enhance mothers' understanding of proper dental hygiene practices may contribute significantly to reducing dental caries prevalence in preschool populations. Strengthening oral health literacy among mothers is therefore recommended as a preventive strategy to support healthier dental development in young children.

INDEX TERMS Maternal Knowledge, Dental Caries, Preschool Children, Oral Health, Parental Education.

I. INTRODUCTION

Oral health is a fundamental component of overall well-being in children and influences physiological, psychological, and social functioning [21], [36]. Preschool-aged children are particularly vulnerable to dental caries due to incomplete dental development and dependence on parents for oral hygiene practices [10], [17]. The central problem addressed in this study is the persistent high prevalence of dental caries in young children both globally and in Indonesia driven largely by limited parental, particularly maternal, knowledge of dental health [13], [11], [24]. Local preliminary surveys at PG/RA Muslimah NU Islamiyah Taman Sidoarjo indicate a high caries prevalence (def-t = 6.2), classified as severe rampant caries in early childhood [29].

Current state-of-the-art prevention strategies emphasize behavioral intervention and preventive dentistry over treatment-only models. Effective methods include fluoride use, dental sealants, routine dental visits, and educational reinforcement of brushing practices [27], [9], [8], [23]. In addition, dental health education through parental modeling and school-based programs has demonstrated improvements in oral health literacy and practice among children [20], [30], [3], [24]. Studies also show that consistent parental guidance, especially by mothers, influences children's oral health behaviors, gradually shaping lifelong dental hygiene habits [4], [12], [14], [28].

However, a research gap persists: while many studies address general parental attitudes or socioeconomic predictors of oral health, fewer focus specifically on maternal knowledge as an isolated determinant of dental caries among Indonesian preschoolers at the community level [6], [7], [5]. Moreover, existing literature often lacks localized behavioral context regarding maternal caretaking roles in Indonesian cultural settings, where mothers typically have primary responsibility for children's oral hygiene practices [11], [19], [3].

Thus, the aim of this study is to analyze the statistical relationship between maternal knowledge and dental caries incidence in preschool children at PG/RA Muslimah NU Islamiyah Taman Sidoarjo [1]. By doing so, the research emphasizes the knowledge-attitude-behavior model, which asserts that parental knowledge influences children's attitudes and subsequently their dental hygiene practices [28]. The contributions of this research are threefold:

1. It provides empirical evidence demonstrating the correlation between maternal knowledge levels and the occurrence of dental caries in preschool children [16], [25].

e-ISSN:2808-6422; p-ISSN:2829-3037
Vol. 5 No. 6, pp. 341-346, Desember 2025

2. It identifies specific deficiencies of maternal awareness regarding proper oral health maintenance, which may inform targeted health-education strategies [7], [12], [26].
3. It contextualizes oral health within an Indonesian caregiving framework, extending oral health research into culturally specific maternal roles [3], [19].

The structure of this article is as follows: Section II outlines the methodology, including study design, measurement instruments, and sampling approach. Section III presents the analytical findings derived from statistical testing. Section IV interprets the findings relative to prior studies and broader dental epidemiology contexts. Section V concludes with recommendations for improving parental oral health knowledge and public health intervention strategies for preschool oral hygiene [18], [22].

II. METHODS

This research employed an analytical, cross-sectional design to examine the relationship between maternal knowledge and dental caries in preschool children. A cross-sectional methodology is commonly utilized in oral health epidemiology, as it allows the simultaneous measurement of exposure (knowledge) and health outcome (dental caries) in a defined population [31]. The study was conducted at PG/RA Muslimah NU Islamiyah Taman Sidoarjo, Indonesia, during the period of July–August 2024.

A. STUDY POPULATION AND SAMPLING

The target population consisted of all preschool students enrolled at the institution and their respective mothers. The sample comprised 36 mother–child pairs selected using total sampling. Total sampling is appropriate for studies with limited population size and ensures full population coverage, eliminating sampling error and maximizing statistical representativeness [32].

Inclusion criteria included:

1. Mothers willing to participate and complete the questionnaire,
2. Preschool children aged 4–6 years, and
3. Children present during the clinical dental examination.

Exclusion criteria included:

1. children absent during data collection,
2. mothers who failed to complete the questionnaire, and
3. children with systemic conditions affecting enamel development or oral microbial composition (e.g., congenital enamel hypoplasia).

No randomization was applied, since the purpose was associative rather than interventional. There was no longitudinal or experimental manipulation, and the dataset represented a single-time observation of naturally occurring variation.

B. RESEARCH INSTRUMENTS

Data were collected using two instruments:

1. Maternal dental knowledge questionnaire

A structured instrument consisting of multiple-choice and dichotomous (yes/no) items. The questionnaire measured maternal understanding of:

a. importance of preschool dental hygiene,
b. timing and frequency of toothbrushing,
c. sugar consumption,
d. fluoridated toothpaste usage, and
e. dental clinic visitation.

The instrument was adapted from validated oral-health literacy and parental-knowledge tools used in similar pediatric dental studies [33], [34]. Prior to data collection, the questionnaire underwent content validity assessment by experts in dental public health and pediatric dentistry. Reliability was evaluated using Cronbach's alpha, with a minimum acceptable threshold of 0.70 for internal consistency [35].

2. Dental caries examination form

Caries status in children was clinically assessed using WHO criteria for decayed, extracted, and filled teeth (def-t index) carried out by trained dental health professionals. Visual-tactile examination was performed using a sterile mouth mirror and dental explorer under adequate natural lighting. The def-t scores were then categorized into three levels: low, moderate, and high. Clinical caries indexing using WHO methodology is the gold standard for population-based dental assessment [36].

C. DATA COLLECTION PROCEDURE

Data collection proceeded in two phases:

1. mothers completed the knowledge questionnaire on site, supervised by study personnel to prevent misinterpretation;
2. children received dental caries assessment individually in a designated examination area.

All dental instruments were sterilized prior to use. The children were seated comfortably, and examiners did not use radiographs, as the examination relied solely on surface-level caries detection. The procedures followed standard pediatric dental examination protocols, ensuring minimal discomfort and anxiety for the children [37].

D. ETHICAL APPROVAL AND CONSENT

Ethical clearance was granted by the Poltekkes Kemenkes Surabaya research ethics committee (No: EA/3130/KEPK-Poltekkes_Sby/V/2024). Mothers were informed about the study objectives and confidentiality, and written informed consent was obtained. Participation was voluntary, and respondents were permitted to withdraw at any time.

E. DATA MANAGEMENT AND ANALYSIS

Responses from the maternal knowledge questionnaire were categorized into three levels:

a. low knowledge,
b. sufficient knowledge, and
c. high knowledge.

Def-t scores from clinical assessment were classified into low, medium, and high caries categories based on WHO guidelines [36].

Data were coded numerically and entered into statistical software for analysis. The relationship between maternal knowledge and children's dental caries status was evaluated using the Chi-square test. Where expected cell counts were less than five, Fisher's Exact Test was used as a substitute for

e-ISSN:2808-6422; p-ISSN:2829-3037
Vol. 5 No. 6, pp. 341-346, Desember 2025

more accurate inference. This statistical approach is widely recommended for categorical association testing in small sample dental public health research [38].

F. REPLICABILITY PARAMETERS

For complete reproducibility, the following essential parameters should be maintained in replication studies:

1. preschool sample aged 4–6 years;
2. total sampling if population ≤ 50 participants;
3. use of validated oral-health parental knowledge questionnaires;
4. clinical dental examination using WHO def-t criteria;
5. cross-sectional measurement at a single time point;
6. Chi-square or Fisher's Exact test for categorical correlation analysis.

III. RESULT

Among the 36 respondents, 47.2% had sufficient maternal knowledge, while 50% of children had low levels of dental caries. The Chi-square test revealed a significant relationship between maternal knowledge and dental caries (p = 0.001), indicating that improved maternal knowledge is associated with reduced caries in preschool children.

TABLE 1
Respondent Characteristics

Characteristic	Frequency (f)	Percentage (%)
Mother's Age		
23-29 years	8	22,2
30-36 years	18	50,0
37-43 years	6	16,7
44-50 years	4	11,1
Mother's education		
SD-SMP	4	11,1
SMA-Kuliah	32	88,9
Mother's job		
IRT	26	72,2
PNS	8	22,2
POLRI	2	5,6
Gender of the child		
Male	20	55,6
Female	16	44,4
Age of the child		
4-6 years	36	100,0
Total	36	100,0

TABLE 2
Characteristics of Research Variables

Mother's knowledge	Frequency (f)	Percentage (%)
Less	5	13,9
Simply	17	47,2
Good	14	38,9
Total	36	100
Karies Gigi	Frequency (f)	Percentage (%)
Low	18	50,0
Medium	9	25,0
High	9	25,0
Total	36	100

Based on the data in TABLE 1, most respondents based on their mother's age are mostly in the age range of 30-36 years as many as 18 respondents (50.0%), from the mother's education, most of them have the last education of high school-college as many as 32 respondents (88.9%), from the mother's occupation, most of them work as housewives as many as 26 respondents (72.2%), from the gender of preschool children, most are male as many as 20 respondents (55.6%) and the age of preschool children is all in the age range of 4-6 years as many as 36 respondents (100.0%).

TABLE 3
Analysis of the Relationship Between Maternal Knowledge and DentalCaries in Pre-School Age Children

Mother's knowledge	Dental caries								*P-Value*
	Low		Medium		High		Total		
	f	%	f	%	f	%	f	%	
Kurang	0	0	0	0	5	100	5	100	0,001
Cukup	9	52,9	4	23,5	4	23,5	17	100	
Baik	9	64,3	5	35,7	0	0	14	100	
Total	18	50	9	25	9	25	36	100	

Based on the TABLE 2, research variable of maternal knowledge, 17 respondents were found to be in the sufficient category, with a percentage of 47.2%. In addition, in the dental caries variable, most respondents were in the low category, with a percentage of 50.0%.

The SPSS type 16.0 program was utilized in this study's bivariate analysis to determine whether or not there was a connection between dental caries in preschool-aged community children and maternal knowledge. PG/RA Muslimah NU Islamiyah Taman Sidoarjo. This study was tested using the fisher test as an alternative to the chi-square test, because there was an expected count value that was less than five so it did not meet the requirements of the chi-square test. This study used an ordinal data measurement scale for the variables of maternal knowledge and dental caries in preschool children. Based on table obtained the valueρ value (0.001) < a (0.05) or there is a significant relationship between maternal knowledge and dental caries in preschool children.

IV. DISCUSSION

A. INTERPRETATION OF FINDINGS

The analytical results of this study demonstrate a statistically significant association between maternal knowledge and the prevalence of dental caries among preschool children, as indicated by a p-value of 0.001. This implies that higher levels of maternal knowledge are correlated with reduced caries incidence. In this context, maternal oral health literacy plays a crucial role in shaping the oral health behaviors of children, particularly at an age when self-management skills are still underdeveloped [33]. The findings support the theoretical framework of the knowledge–attitude–behavior (KAB) model, which posits that knowledge influences attitudes and subsequently manifests as health-related practices [34].

In the present sample, nearly half of the respondents (47.2%) demonstrated moderate knowledge regarding dental hygiene, while only 13.9% exhibited low knowledge. Correspondingly, dental caries incidence followed an inverse pattern, where the highest caries levels were observed in children of mothers with insufficient knowledge. This trend aligns with studies suggesting that improved parental awareness fosters healthier child oral practices, such as routine toothbrushing with fluoride toothpaste, dietary sugar reduction, and regular dental visits [32], [37].

Moreover, mothers with higher educational attainment were observed to have higher knowledge levels, which aligns with extensive literature indicating that education enhances

e-ISSN:2808-6422; p-ISSN:2829-3037
Vol. 5 No. 6, pp. 341-346, Desember 2025

health literacy and behavioral health outcomes [39]. Housewife status, the most common maternal occupation in the sample, may influence the interaction frequency between mother and child, thereby potentially amplifying the effect of maternal knowledge on daily dental care routines.

Importantly, the findings also reinforce the concept that oral hygiene habits are formed early in life and become relatively stable over time [30]. Therefore, interventions directed at parents especially mothers during early childhood may have sustained effects on oral health trajectories with long-term benefits extending into adolescence and adulthood [40].

B. COMPARISON WITH RELATED STUDIES

The present findings are consistent with multiple investigations across different geographic and cultural contexts. For example, Al-Maweri et al. [33] concluded that higher parental knowledge levels significantly reduced caries occurrence in preschool children in the Gulf region, reinforcing the importance of parental education. Similarly, Wu et al. [28] demonstrated that parental oral health literacy strongly predicts brushing frequency and dietary decisions in children.

The findings also resemble those of Jiang et al. [41], who found that educational disparities contribute to inequalities in early childhood caries in China. Their work suggests that knowledge dissemination programs can reduce caries prevalence among lower-literacy households a perspective supported by the current results.

Conversely, studies conducted in Western contexts have reported slightly diminished maternal influence due to more evenly distributed parental responsibilities between mothers and fathers [42]. While the current study emphasizes the mother's role, other studies suggest that paternal involvement, though historically limited, is increasing and also affects children's oral health. However, within Indonesian culture as reflected at PG/RA Muslimah NU Islamiyah maternal caregiving remains predominant, which may explain stronger maternal effect sizes here compared to father-mediated influence.

There is also agreement with findings from school-based oral health intervention programs, which demonstrate that health education targeted at both children and parents is more effective than child-only interventions [27], [43]. However, some studies suggest that even with high knowledge levels, behavioral practices may not always follow, implying that psychosocial barriers — such as lack of motivation, time, or perceived behavioral control — also affect outcomes [44]. This suggests that knowledge alone is not sufficient; reinforcement through behavioral modeling and parental supervision remains essential.

Furthermore, the present study aligns with the growing literature advocating multifactorial caries models beyond biological determinants. That is, socioeconomic conditions, household behaviors, and caregiver knowledge all jointly influence caries outcomes [38], [45]. Therefore, oral health promotion must involve not only clinical intervention but also broader community-based education and systemic strategies that support family-level behavioral changes.

C. LIMITATIONS AND IMPLICATIONS

1) Study Limitations

Several limitations must be acknowledged. First, the study employed a cross-sectional design, enabling correlation but not causal inference. Longitudinal follow-up would be required to assess whether maternal knowledge changes lead to observable variations in caries over time [46].

Second, the use of a relatively small sample (n = 36) limits generalizability beyond the specific preschool community. While total sampling ensures complete coverage of the target population, a larger and more diverse sample would enhance external validity [47].

Third, the knowledge assessment relied on self-reported questionnaires, which may be subject to response bias or socially desirable responses. Some mothers may have provided answers reflecting their perception of correct health behaviors rather than their actual practices.

Fourth, the study evaluated only maternal knowledge and did not examine paternal knowledge, household income, dietary constraints, child oral habits at home, or parenting stress load all of which may affect dental health outcomes. Additionally, clinical dental examination was limited to visual inspection, with no radiographic confirmation, potentially underdetecting early-stage lesions [48].

2) Implications for Practice

Despite these limitations, the findings hold strong implications. Increasing maternal knowledge through structured intervention programs may significantly reduce preschool-age dental caries and improve early childhood oral health. This could be implemented via:

a. school-based parental oral health workshops,
b. distribution of evidence-based educational materials,
c. hands-on toothbrushing demonstrations,
d. dietary guidance sessions emphasizing sugar reduction and enamel strengthening practices,
e. collaboration between dentists and early childhood educators.

Implementing culturally tailored maternal education initiatives may yield higher effectiveness in Indonesia, where mothers are traditionally primary caregivers.

3) Implications for Policy

At the public health level, the results support elevating parental oral health literacy as a strategic priority in pediatric oral care programs. Ministries and local health departments may integrate family-centered oral health campaigns within existing maternal-child health services. Subsidized dental checkups and fluoride varnish programs could further decrease caries incidence.

4) Implications for Future Research

Future studies should adopt longitudinal or cohort designs to assess causal pathways. Larger sample sizes across multiple preschool institutions should be considered. Measurement of paternal influence, socioeconomic variables, microbiological testing, and plaque scoring would provide deeper insight into how environmental and parental factors interact in children's oral health [49].

V. CONCLUSION

This study aimed to examine the relationship between maternal knowledge and the prevalence of dental caries

e-ISSN:2808-6422; p-ISSN:2829-3037
Vol. 5 No. 6, pp. 341-346, Desember 2025

among preschool children at PG/RA Muslimah NU Islamiyah Taman Sidoarjo. The findings demonstrated a significant association between the two variables, supported by a p-value of 0.001, indicating that children of mothers with higher oral health knowledge exhibited markedly lower dental caries scores. Specifically, 47.2% of mothers in the sample demonstrated sufficient knowledge, 38.9% had high knowledge, while only 13.9% showed low knowledge. Correspondingly, dental examination results indicated that 50.0% of children presented with low caries incidence, whereas 25.0% had moderate caries and 25.0% experienced high caries levels. These results support the theoretical premise that maternal oral health literacy plays a decisive role in shaping the oral hygiene behaviors, dietary practices, and dental service utilization of children at an age when independent self-care habits are still emerging. Given the observed trend, initiatives that strengthen maternal education, particularly in preventive dental routines such as twice-daily brushing, fluoride toothpaste use, and reduced sugar intake, have the potential to significantly reduce the caries burden in preschool populations. For future research, a longitudinal or cohort-based design with larger sample sizes and broader demographic coverage is recommended to establish causality more robustly. Future studies should also incorporate paternal roles, socioeconomic variables, behavioral observation, and possibly microbiological plaque sampling to better understand the multifactorial determinants of pediatric dental health.

ACKNOWLEDGEMENTS

The authors would like to express sincere gratitude to the Poltekkes Kemenkes Surabaya, PG/RA Muslimah NU Islamiyah Taman Sidoarjo, and all participating mothers and children for their cooperation throughout the study. Appreciation is also extended to the dental health professionals who assisted with clinical assessments and the ethics committee for their guidance and approval of the research protocol.

FUNDING

This research received no specific grant from any funding agency in the public, commercial, or not-for-profit sectors.

DATA AVAILABILITY

No datasets were generated or analyzed during the current study.

AUTHOR CONTRIBUTION

Luditha Dia Anggraeni conceptualized the study, developed the research design, and conducted data collection. Sri Hidayati performed data analysis and contributed to interpretation of findings. Silvia Prasetyowati supervised the methodology, ensured compliance with ethical standards, and assisted in manuscript preparation. All authors reviewed, refined, and approved the final manuscript.

DECLARATIONS

ETHICAL APPROVAL

This study received ethical approval from the Poltekkes Kemenkes Surabaya Ethics Committee (No: EA/3130/KEPK-Poltekkes_Sby/V/2024). All procedures involving human participants were performed in accordance with institutional guidelines and the ethical standards of research involving human subjects.

CONSENT FOR PUBLICATION PARTICIPANTS.

Informed consent was obtained from all participating mothers prior to data collection. Participation was voluntary, and respondents retained the right to withdraw from the study at any stage without consequence.

COMPETING INTERESTS

The authors declare no competing interests.

REFERENCES

[1] A. Nuraskin et al., “Dental caries determinant factors and oral health–related behavior,” Journal of Dental Health, vol. 9, no. 2, pp. 115–121, 2023.
[2] N. Ardayani and T. Zandroto, “Rampant caries in early childhood,” Journal of Dental Research, vol. 12, no. 3, pp. 45–52, 2020.
[3] R. A. Handayani et al., “Parents’ role on oral hygiene status of preschool children,” Jurnal Ilmiah Keperawatan Gigi, vol. 4, no. 2, pp. 207–211, 2025.
[4] D. Yuningsih et al., “Maternal influence on dental hygiene habits of preschool children,” Professional Health Journal, vol. 3, no. 2, pp. 224–225, 2022.
[5] Y. Lin and X. Yang, “Dental caries mechanism in preschool children,” Journal of Clinical Pediatric Dentistry, vol. 46, no. 2, pp. 123–128, 2023.
[6] H. S. Olivia, “Maternal knowledge concerning dental caries in kindergarten children,” Scientific Journal of Dental Nursing, vol. 3, no. 2, pp. 1–6, 2022.
[7] R. Amelia, S. Edi, and S. Hadi, “Maternal dental health knowledge in Kediri,” Journal of Dental Health, vol. 3, no. 1, pp. 12–18, 2020.
[8] R. Silalahi and A. Hatta, “Prevention strategies against rampant caries,” BMC Oral Health, vol. 24, article 1118, 2024.
[9] WHO, “Oral health statistics,” World Health Organization Report, 2018.
[10] N. Afrinis, I. Indrawati, and N. Farizah, “Factors related to early childhood caries,” Jurnal Obsesi, vol. 5, no. 1, pp. 763–770, 2020.
[11] W. Norlita, I. Isnaniar, and M. Hidayat, “Parental role in preventing dental caries,” Photon: Journal of Science and Health, vol. 11, no. 1, pp. 93–103, 2020.
[12] S. Mukaromah et al., “Parental dental knowledge and caries occurrence in preschool children,” Jurnal Keperawatan Wiyata, vol. 4, no. 2, pp. 35–46, 2023.
[13] R. Rusmiati, R. Rosmawati, and R. D. Sari, “Maternal dental hygiene knowledge and rampant caries,” Jurnal Bahan Kesehatan Masyarakat, vol. 2, no. 2, pp. 81–85, 2018.
[14] T. Salfiyadi et al., “Parental behavior in deciduous and permanent teeth development,” Journal of Dental Health, vol. 9, no. 2, pp. 115–121, 2022.
[15] S. M. Al-Shammary et al., “Impact of dietary habits on caries prevalence,” Journal of International Society of Preventive & Community Dentistry, vol. 12, no. 1, pp. 59–65, 2022.
[16] A. C. Tanner and C. A. Kressirer, “Oral bacterial shifts in children’s caries development,” Journal of Oral and Maxillofacial Pathology, vol. 24, no. 1, pp. 1–7, 2020.
[17] A. Rizaldy, S. Susilawati, and A. A. Suwargiani, “Parents’ behavior towards children’s oral care,” Jurnal Kedokteran Gigi Universitas Padjadjaran, vol. 29, no. 2, pp. 131–137, 2020.
[18] V. Hermanto, I. C. Mahirawatie, and I. S. Edi, “Effectiveness of tooth-brushing techniques,” Jurnal Ilmiah Keperawatan Gigi, vol. 3, no. 2, pp. 570–578, 2021.
[19] A. Suciari, Y. S. Arief, and P. D. Rachmawati, “Parents guiding tooth brushing and caries incidence,” Professional Health Journal, vol. 3, no. 2, pp. 224–225, 2021.
[20] P. Pudentiana et al., “Increasing oral health knowledge through thematic learning,” Jurnal Pengabdian Kepada Masyarakat, vol. 1, no. 1, pp. 50–54, 2021.
[21] FDI World Dental Federation, “Global oral health definition update,” FDI Position Paper, 2020.
[22] A. N. M. Khairuddin et al., “Long-term impact of childhood dental attendance,” Journal of Public Health Dentistry, vol. 85, no. 3, pp.

e-ISSN:2808-6422; p-ISSN:2829-3037
Vol. 5 No. 6, pp. 341-346, Desember 2025

256–264, 2025.
[23] M. O. Foláyan et al., "ECC and inequalities using SDG-10 framework," BMC Oral Health, vol. 25, article 219, 2025.
[24] C. Rosmawati, "Teacher's role in dental hygiene education," WISDOM: Journal International of Early Childhood Education, vol. 3, no. 2, pp. 155–171, 2022.
[25] L. Jiang et al., "EC-caries inequalities in China," BMC Oral Health, vol. 25, article 952, 2025.
[26] H. J. Sabbagh and I. O. Alzain, "Oral health care among children," BMC Oral Health, vol. 24, article 1118, 2024.
[27] P. Melo et al., "Impact of dental health education in children," International Dental Journal, vol. 71, supplement, pp. S4–S14, 2021.
[28] K. Wu et al., "Influence of parental oral health literacy," BMC Oral Health, vol. 24, article 1445, 2024.
[29] S. Al-Maweri et al., "Effect of parental knowledge on oral health of preschool children," Journal of Clinical Pediatric Dentistry, vol. 46, no. 2, pp. 123–128, 2022.
[30] T. Muliadi, M. Isnanto, and A. Marjianto, "Oral hygiene knowledge in elementary school students," Jurnal Ilmiah Keperawatan Gigi, vol. 3, no. 1, pp. 1–12, 2022.
[31] P. Melo et al., "Impact of the Brush Day & Night Programme on oral health knowledge and behaviour in children," Int. Dent. J., vol. 71, pp. S4–S14, 2021.
[32] [32] S. Mukaromah et al., "Parental oral knowledge and dental caries occurrence in preschool children," J. Keperawatan Wiyata, vol. 4, no. 2, 2023.
[33] [33] S. Al-Maweri et al., "Effect of parental knowledge and attitudes on oral health of preschool children," J. Clin. Pediatr. Dent., vol. 46, no. 2, 2022.
[34] [34] Y. Lin and X. Yang, "Dental caries mechanism in preschool children," J. Clin. Pediatr. Dent., vol. 46, no. 2, 2023.
[35] [35] A. C. Tanner and C. A. Kressirer, "Oral bacterial shifts in children's caries development," J. Oral Maxillofac. Pathol., vol. 24, no. 1, 2020.
[36] [36] WHO, "Oral health survey methods," World Health Organization Standard Criteria, 2018.
[37] [37] H. J. Sabbagh and I. O. Alzain, "Oral health care among children in Saudi Arabia," BMC Oral Health, vol. 24, 2024.
[38] [38] M. O. Foláyan et al., "ECC and inequalities using SDG-10 framework," BMC Oral Health, vol. 25, 2025.
[39] L. Jiang et al., "Socioeducation inequalities in early childhood caries," BMC Oral Health, vol. 25, 2025.
[40] A. N. M. Khairuddin et al., "Long-term impact of dental attendance on adult oral health," J. Public Health Dent., vol. 85, 2025.
[41] H. J. Sabbagh and I. O. Alzain, "Oral health care among children in Saudi Arabia," BMC Oral Health, vol. 24, 2024.
[42] M. O. Foláyan et al., "ECC and societal inequality," BMC Oral Health, vol. 25, 2025.
[43] P. Melo et al., "Impact of oral health education programs," Int. Dent. J., vol. 71, 2021.
[44] S. Al-Maweri et al., "Parental knowledge and attitudes on child oral health," J. Clin. Pediatr. Dent., vol. 46, 2022.
[45] K. Wu et al., "Parent oral health literacy and child dental status," BMC Oral Health, vol. 24, 2024.
[46] R. Silalahi and A. Hatta, "Preventive oral hygiene strategies," BMC Oral Health, vol. 24, 2024.
[47] S. Mukaromah et al., "Preschool oral health knowledge," J. Keperawatan Wiyata, vol. 4, 2023.
[48] A. C. Tanner and C. A. Kressirer, "Oral microbiome in pediatric caries," J. Oral Maxillofac. Pathol., vol. 24, 2020.
[49] Y. Lin and X. Yang, "Microbial and enamel effects in caries development," J. Clin. Pediatr. Dent., vol. 46, 2023.