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Appropriate Technology-Based Dental and Oral Health Care Model for Orphanage Children

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ABSTRACT Children living in orphanages are highly vulnerable to dental and oral health problems due to inadequate hygiene practices, lack of parental guidance, and limited access to health services. These factors contribute to a high prevalence of dental caries and poor oral hygiene among this population. To address this issue, this study aimed to develop and evaluate the feasibility and effectiveness of a dental and oral health care service model based on appropriate technology (AT) for children in orphanages. A research and development (R&D) approach with a pre-experimental pretest-posttest design was employed. The intervention involved 20 dental health cadres and 150 children from two orphanages. The development process included expert validation, implementation, and evaluation. Outcomes were measured using knowledge, attitude, and action scores for the cadres, and Oral Hygiene Index Simplified (OHI-S) and Decayed, Missing, Filled Teeth (DMF-T) scores for children. Expert validation yielded a feasibility score of 67.60% ($p = 0.035$), indicating high feasibility. Post-intervention analysis showed significant improvements in cadres' knowledge ($p < 0.001$) and actions ($p = 0.004$), though changes in attitudes were not statistically significant ($p = 0.005$). However, the intervention did not significantly affect children's OHI-S ($p = 0.62$) or DMF-T scores ($p = 0.20$). These results suggest that the AT-based model is effective in enhancing cadre competencies but has limited direct impact on children's dental health in the short term. Future research should investigate long-term implementation outcomes and explore strategies to integrate the model into broader institutional health systems for greater sustainability and impact.

INDEX TERMS appropriate technology, dental health model, orphanage children, health cadres, oral hygiene outcomes

I. INTRODUCTION

Orphaned children represent a vulnerable group facing considerable health disparities, including inadequate access to dental and oral health services. These children often live in institutional settings with limited resources, insufficient hygiene practices, and a lack of parental supervision factors that significantly increase the risk of oral health issues such as dental caries and periodontal disease [1]–[4]. Studies show that oral health is a key component of overall well-being and influences children's quality of life, school attendance, and nutritional status [5], [6]. In Indonesia, the 2018 National Basic Health Research (RISKESDAS) reported that the prevalence of dental caries in children aged 5–9 years was as high as 92.6% [10]. Similar trends have been observed globally, with caries prevalence among institutionalized orphans reaching 96% in Saudi Arabia [13], 49.6% in India [12], and 82.2% in Egypt [5].

One major contributing factor to poor dental health among orphaned children is the lack of tailored, sustainable oral health care programs. While general oral health education and community programs exist, they often fail to address the unique environmental, psychological, and logistical challenges present in orphanages [8], [15]. Current strategies typically rely on external dental visits or sporadic interventions, which are not sufficient for long-term impact. Additionally, limited implementation of cost-effective local solutions such as the use of family medicinal plants (FMP) for preventive care has further constrained progress in this field [14], [19].

To address these issues, innovative, low-cost, and community-based approaches are urgently needed. One promising strategy is the application of appropriate technology (AT), defined as affordable, context-sensitive innovations that are easy to use, maintain, and replicate [20]. In the healthcare domain, AT-based models have proven effective in resource-limited settings by leveraging community participation, local materials, and preventive education [21]. However, limited empirical research has explored the application of such models specifically for improving dental and oral health among orphaned children in Indonesia.

This study addresses the identified research gap by developing and evaluating an AT-based dental and oral health care model designed for implementation in orphanage environments. The proposed model integrates three core strategies: (1) structured education for dental health cadres on oral hygiene and early detection; (2) use of natural remedies such as FMP for basic prevention; and (3) limited curative treatment and referral to nearby health centers when needed. Unlike previous models, which focus solely on service delivery, this model emphasizes sustainability through training, local resource utilization, and community empowerment.

The main objective of this study is to assess the feasibility and effectiveness of an appropriate technology-based dental and oral health care service model for orphanage children in improving the knowledge, attitudes, and actions of dental health cadres, as well as children's oral hygiene status.This study offers three key contributions:

1. It presents a validated, context-sensitive model for oral health service delivery in orphanage settings.
2. It provides empirical evidence on the impact of AT-based interventions on both cadre competency and child health outcomes.
3. It highlights the potential for integrating traditional knowledge (e.g., FMP use) into modern oral health frameworks to achieve sustainable improvements.

II. METHODS

This study employed a research and development (R&D) framework incorporating a pre-experimental pretest-posttest design to evaluate the feasibility and effectiveness of an appropriate technology (AT)-based dental and oral health care model for children in orphanages. The R&D approach was chosen to enable structured model development, iterative expert validation, and quantitative impact assessment. The pre-experimental design allowed measurement of changes in the outcome variables following the intervention without using a control group.

A. STUDY POPULATION AND SAMPLING

The research was conducted at two orphanages located in Yogyakarta, Indonesia. The population comprised two target groups: 150 children residing in the orphanages and 20 dental health cadres responsible for delivering oral health education and assistance. A total sampling technique was adopted to include all children in residence and all available cadres at the time of the study. Total sampling was appropriate given the relatively small and well-defined population and the focus on implementation feasibility.The inclusion criteria for cadres were individuals formally designated by the orphanage or health office to carry out dental health promotion activities. Children aged 6–15 years living in the orphanages were included. Exclusion criteria for children were those with systemic health conditions or special needs that could interfere with oral health assessments.

B. R&D FRAMEWORK AND STAGES

The model was designed to be low-cost, replicable, and context-appropriate, with key features including cadre-based oral hygiene counseling, preventive practices using natural remedies, and structured referral for curative services. The study followed a five-stage R&D procedure as adapted from Borg and Gall:

1. **Preliminary Information Collection**: including literature review and field needs assessment;
2. **Model Design and Development**: formulation of an AT-based service model including educational content, use of Family Medicinal Plants (FMP), and referral procedures;
3. **Expert Validation and Revision**: involving three content experts in community dental health;
4. **Model Testing and Implementation**: conducted with cadres and children over four weeks;
5. **Evaluation and Data Analysis**: using pretest and posttest scores for both groups.

C. DATA COLLECTION INSTRUMENTS

Expert validation of the model content and instruments involved the calculation of Interclass Correlation Coefficient (ICC), resulting in a feasibility score of 67.60% ($p = 0.035$), indicating high validity and agreement among reviewers. Two sets of validated instruments were used:

1. **Cadre instruments**: Structured questionnaires assessing **knowledge**, **attitudes**, and **actions** related to oral health practices. These were developed with reference to WHO and Indonesian Ministry of Health guidelines [29].
2. **Children's instruments**: Clinical indices, including the Oral Hygiene Index Simplified (OHI-S) and Decayed, Missing, Filled Teeth (DMF-T), were used to assess oral health status.

D. PROCEDURE

The study received ethical clearance from the Research Ethics Committee of the Health Polytechnic of the Ministry of Health Yogyakarta. All participants (or their guardians) provided informed consent. All oral examinations were conducted under adequate lighting using sterilized disposable tools by trained dental professionals.

1. **Pretest** measurements were conducted on both cadres (knowledge, attitudes, actions) and children (OHI-S and DMF-T).
2. **Intervention** involved training of cadres through structured modules, demonstrations, and practice. Topics included brushing technique, dental nutrition, plaque control, and FMP use.
3. **Posttest** assessments were conducted four weeks after the intervention.

E. DATA ANALYSIS

A significance level of $p < 0.05$ was considered statistically significant. Quantitative data were analyzed using SPSS version 25. Descriptive statistics were used to summarize demographic characteristics. For inferential analysis:

1. **Wilcoxon signed-rank tests** were applied to compare pretest and posttest scores of cadres.
2. **Linear regression analysis** was conducted to examine the relationship between cadres' knowledge, attitudes, and actions with children's OHI-S and DMF-T scores.

F. LIMITATIONS AND QUALITY CONTROL

To reduce bias, all data collection procedures followed standard operating protocols. However, the absence of a control group is acknowledged as a limitation. Also, the four-

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week intervention period may not capture long-term changes in children's oral health, which generally requires more prolonged observation [30], [31]. Training sessions were monitored by the research team to ensure fidelity. A pilot test was conducted to refine instruments and procedures prior to the main study.

III. RESULTS

This research was conducted in two orphanages with a total of 20 dental health cadres and 150 children from the orphanage as respondents. The group in this study will be given intervention using an appropriate technology-based dental and oral health care service model. Researchers collected information and measured the level of knowledge, attitudes and actions of dental health cadres and the level of dental health of anti-care children. Before the oral health service model was tested on orphans and health cadres, a feasibility test was carried out by experts.

1. EXPERT VALIDATION TEST

The feasibility test was carried out by three experts according to their fields. The results of the feasibility analysis of the appropriate technology-based dental and oral health care model module are as follows (TABLE 1):

TABLE 1
Expert Validation Results

No	Name	Position	Average	*p-Value**	Category
1.	Dwi Suyatmi, S.SiT., M.DSc	Community Dental Health Care Service Expert	0.676	0.035	High
2.	Eldarita, S.SiT., M.Kes				
3.	Silvia Prasetyowati, S.SiT., M.Kes				

Interclass Correlation Coefficient

TABLE 2
Data on Respondent Characteristics

Characteristics	Dental and Oral Cadres	
	N	%
Sex		
Male	7	35.00
Female	13	65.00
Education		
Senior High School	12	60.00
Bachelor degree	7	35.00
Master Degree	1	5.00
Ages		
20-29 years	10	50.00
30-39 years	2	10.00
40-50 years	5	25.00
> 51 years	3	15.00

The results of the module feasibility assessment show that the average value of the three experts is 0.676, meaning that 67.60% of the average of the experts who assessed it is real with a p-value of 0.035 and the feasibility category is "High".

2. DESCRIPTIVE ANALYSIS

This research was conducted on 20 respondents from dental health cadres. A general description of respondents is presented in the following (TABLE 2):

Based on the characteristics results in the table above, it is known that the majority of respondents in the sample in this study were female, namely 13 people (65.00%). Furthermore, based on education, the majority had a high school education, namely 10 people (50.00%) and at least 1 person had a master's degree (5.00%). The majority of respondents in this study were aged 20-29 years, namely 12 people (60.00%).

3. ANALYSIS OF THE RESULTS OF KNOWLEDGE, ATTITUDES AND ACTIONS OF DENTAL HEALTH CADRES BEFORE AND AFTER TREATMENT

Data obtained from respondents directly by collecting data before the test and after treatment. Research data collection techniques using tests (pretest and posttest) using questionnaires filled out by research respondents.

TABLE 3
Results of Analysis of Knowledge of Dental Health Cadres Before and After Providing Intervention

Information	Statistic			
	Before	After	Delta (Δ)	*p-Value**
a. Mean±SD	5.80±5.89	15.15±1.59	**9.35**	**<0.001**
b. Min-Max	0.00-16.00	11.00-16.00		

Wilcoxon

TABLE 3 shows that the results of knowledge analysis with a p-Value of <0.001 means there are significant differences. The average results show that the value after giving the intervention is greater than before giving the intervention with an increase of 9.35.

TABLE 4
Results of Analysis of Dental Health Cadres' Attitudes Before and After Providing Intervention

Information	Statistic			
	Before	After	Delta (Δ)	*p-Value**
a. Mean±SD	17.45±13.53	28.50±3.50	**11.05**	**0.005**
b. Min-Max	0.00-33.00	24.00-40.00		

Wilcoxon

TABLE 4 shows that the results of the knowledge analysis with a p-Value of 0.005 means there is no significant difference or which means that H1 is rejected. The average results show that the value after giving the intervention is greater than before giving the intervention with an increase of 11.05.

TABLE 5 shows that the results of the action analysis with a p-Value of 0.004 means there is a significant difference or which means H1 is accepted. The average results show that the value after giving the intervention is

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greater than before giving the intervention with an increase of 20.70.

4. RESULTS OF ANALYSIS OF THE INFLUENCE OF KNOWLEDGE, ATTITUDES AND ACTIONS OF DENTAL HEALTH CADRES ON OHIS AND DMFT

The results of the regression test to determine the influence of knowledge, attitudes and actions on OHI-S and DMF-T are as follows:

TABLE 6
The Influence of Knowledge, Attitudes and Actions on OHIS

Variable	R	R *Square*	*p-Value**
Knowledge Attitudes Actions	0.320	0.491	0.62

Linear Regression

TABLE 6 show that partially or individually knowledge, attitudes and actions have no effect on OHIS. This is proven by the p-value which is greater than 0.05. The correlation value (R) is 0.320, which indicates that the strength of the relationship between the knowledge, attitudes and actions of cadres and OHIS is included in the weak correlation category. The R square value of 0.491 means that the knowledge, attitudes and actions variables contribute to the OHIS variable by 49.10 % and the remaining 50.90% is influenced by other factors.

TABLE 7
The Influence of Knowledge, Attitudes, and Actions on DMF-T

Variable	R	R *Square*	*p-Value**
Knowledge Attitudes Actions	0.320	0.102	0.20

Linear Regression

TABLE 7 show that partially or individually knowledge, attitudes and actions have no effect on DMFT. This is proven by the p-value which is greater than 0.05. The correlation value (R) is 0.320, which indicates that the strength of the relationship between the variables of knowledge, attitudes and actions of cadres and DMFT is included in the weak correlation category. The R square value of 0.102 means that the knowledge, attitude and action variables contribute to the DMFT variable by 10.02% and the remaining 89.80% is influenced by other factors.

TABLE 5
Results of Analysis of Dental Health Cadre Actions Before and After Providing Intervention

Information	Statistic			
	Before	After	Delta (Δ)	*p-Value**
a. Mean±SD	7.80±6.88	28.50±3.50	**20.70**	**0.004**
b. Min-Max	0.00-20.00	11.00-16.00		

Wilcoxon

IV. DISCUSION

A. INTERPRETATION OF RESULTS

The study's findings demonstrate that the appropriate technology (AT)-based dental and oral health care model was effective in improving the knowledge and actions of dental health cadres, although it showed limited influence on their attitudes and the dental health status of children. Post-intervention, the average knowledge score of cadres increased significantly from 5.80 to 15.15 ($p < 0.001$), while actions improved from 7.80 to 28.50 ($p = 0.004$). However, although attitude scores also rose from 17.45 to 28.50 the result was not statistically significant ($p = 0.005$). This suggests that while training and AT-based interventions can enhance cognitive and behavioral domains, shifting deep-rooted attitudes may require more prolonged engagement and reinforcement [37], [38]. In terms of oral health outcomes among children, the intervention did not significantly improve OHI-S ($p = 0.62$) or DMF-T scores ($p = 0.20$), indicating that cadre-led efforts alone may not suffice to generate clinical changes in a short time span. The regression analysis showed weak correlations ($R = 0.320$) and limited explanatory power ($R^2 = 0.491$ for OHI-S; $R^2 = 0.102$ for DMF-T), reinforcing the view that multiple factors such as children's daily routines, dietary habits, and institutional practices also play crucial roles [39].

B. COMPARISON WITH PREVIOUS STUDIES

These findings align with research conducted by Nubatonis et al. [40], which emphasized the efficacy of cadre training in improving knowledge but noted that translating this knowledge into systemic behavior change requires consistent reinforcement and monitoring. Similarly, Suresan et al. [41] found that short-term interventions improved awareness but did not significantly reduce caries prevalence in orphan populations. Conversely, studies like those by Gamal-AbdelNaser et al. [42] and Ayebameru et al. [43] have shown that integrated health programs that involve school-based dental visits, parent/caregiver involvement, and continuous oral health campaigns result in better long-term outcomes. This contrast underscores the necessity of multifaceted approaches to complement cadre-led interventions. The limited change in children's oral health indicators may also be due to the voluntary nature of cadre participation and their varying commitment levels. Studies have shown that cadres without institutional support or incentives may experience burnout or disengagement [44]. Moreover, infrastructural limitations within orphanages, such as restricted access to clean water or dental supplies, further hinder practical oral hygiene implementation [45].

C. LIMITATIONS AND IMPLICATIONS

This study acknowledges several limitations. First, the absence of a control group restricts causal interpretation. Second, the intervention duration (four weeks) may have been insufficient to yield measurable changes in children's oral health, which typically require longer periods to reflect behavioral or clinical improvements. Third, the scope was limited to two orphanages, which may reduce generalizability. Despite these constraints, the study provides valuable insights. The significant improvements in knowledge and actions among cadres suggest that AT-based educational models are effective capacity-building tools. Future programs should extend the duration and incorporate continuous supervision and refresher training. Furthermore, to impact children's oral health more directly, it is essential to integrate these models with structural changes, including regular dental check-ups, improved oral hygiene facilities, and engagement with caregivers and orphanage management.

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Policies should also consider incentivizing cadre participation to maintain high motivation levels [46], [47].

V. CONCLUSION

This study aimed to develop and evaluate an appropriate technology-based model for improving dental and oral health services among orphanage children. The findings demonstrate that the model is feasible, as indicated by expert validation with a score of 67.60% ($p = 0.035$), and effective in enhancing the knowledge ($p < 0.001$) and actions ($p = 0.004$) of dental health cadres. However, it did not yield significant changes in attitudes ($p = 0.005$), nor did it show statistically significant improvements in the dental health status of the children, as evidenced by OHI-S ($p = 0.62$) and DMF-T ($p = 0.20$) results. These outcomes suggest that while the AT-based model effectively builds cadre competencies, its direct influence on children's dental health remains limited. Future research should consider longitudinal studies with larger sample sizes, integration of family medicinal plant usage, and stronger institutional collaboration to assess sustained behavioral and clinical impacts. Furthermore, incorporating psychosocial support and structured reinforcement strategies could enhance attitude transformation among cadres and contribute to more holistic oral health outcomes for vulnerable child populations.

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DATA AVAILABILITY

No datasets were generated or analyzed during the current study.

AUTHOR CONTRIBUTION

Dwi Eni Purwati was responsible for the conceptualization, methodology design, and supervision of the research process, as well as drafting the initial manuscript. Dwi Suyatmi and Eldarita contributed to data collection, formal analysis, and validation of the model. Silvia Prasetyowati conducted the literature review, curated relevant data, and provided critical revisions to the manuscript. Filanti Kusuma Dewi supported visualization, managed resources, and conducted field investigations. Luci Fitriyanti was in charge of statistical analysis, data interpretation, and final proofreading. All authors have read and approved the final version of the manuscript.

DECLARATIONS

ETHICAL APPROVAL

Ethical approval was obtained from the institutional ethics board, and informed consent was secured from all participants.

CONSENT FOR PUBLICATION PARTICIPANTS.

Consent for publication was given by all participants.

COMPETING INTERESTS

The authors declare no competing interests.

REFERENCE

[1] Y. Zukmadini, B. Karyadi, and K. Kasrina, "Edukasi Perilaku Hidup Bersih dan Sehat (PHBS) dalam Pencegahan COVID-19 Kepada Anak-Anak di Panti Asuhan," *J. Pengabdi. Magister Pendidik. IPA*, vol. 3, no. 1, 2020, doi: 10.29303/jpmpi.v3i1.440.

[2] A. Elamin, M. Garemo, and A. Mulder, "Determinants of dental caries in children in the Middle East and North Africa region: a systematic review based on literature published from 2000 to 2019," *BMC Oral Health*, vol. 21, no. 1, 2021, doi: 10.1186/s12903-021-01482-7.

[3] D. Fatmasari, W. J. Dyah Utami, and S. Supriyana, "Edukasi dan Pendampingan Selama 21 Hari dengan Mogigu Meningkatkan Perilaku Menggosok Gigi dengan Benar pada Anak dan Orang Tua SD Bulusan Semarang," *J. Kesehat. Gigi*, vol. 7, no. 1, pp. 29–34, 2020, doi: 10.31983/jkg.v7i1.5661.

[4] G. Minervini et al., "Children oral health and parents education status: a cross-sectional study," *BMC Oral Health*, vol. 23, no. 1, pp. 1–7, 2023, doi: 10.1186/s12903-023-03424-x.

[5] N. M. A. Khattab and M. A. A. Abd-Elsabour, "Assessment of dental caries among a group of institutionalized orphan children compared to parented school children: case–control study," *BMC Oral Health*, vol. 23, no. 1, pp. 1–10, 2023, doi: 10.1186/s12903-023-02915-1.

[6] Sadimin, Prasko, Sariyem, and Sukini, "Dental health education to knowledge about PHBS how to maintain dental and mouth cleanliness at orphanage Tarbiyatul Hasanah Gedawang, Banyumanik, Semarang City," *J. Kesehat. Gigi*, vol. 8, no. 1, pp. 1–5, 2020.

[7] A. Q. Shqair et al., "Screen time, dietary patterns and intake of potentially cariogenic food in children: A systematic review," *J. Dent.*, vol. 86, pp. 17–26, 2019, doi: 10.1016/j.jdent.2019.06.004.

[8] A. Gamal-AbdelNaser, M. A. A. Mennat Allah, and N. M. A. Khattab, "Caries in orphan children: prevalence and determinants—a systematic review and meta-analysis," *BMC Oral Health*, vol. 24, no. 1, pp. 1–17, 2024, doi: 10.1186/s12903-024-04125-9.

[9] S. Mardelita, S. Sukendro, and I. Karmawati, *Pelayanan Asuhan Kesehatan Gigi dan Mulut Individu*, 2018.

[10] Kemenkes, "Laporan Nasional Riskesdas 2018," *Kementerian Kesehatan RI*, 2019. [Online]. Available: http://repository.bkpk.kemkes.go.id/3514/

[11] R. Meshki, L. Basir, S. Motaghi, and M. Kazempour, "Oral health status among orphan and non-orphan children in Mashhad: a case-control study," *J. Med. Life*, vol. 15, no. 9, pp. 1198–1201, 2022, doi: 10.25122/jml-2021-0127.

[12] B. Christian et al., "An epidemiological study of dental caries and associated factors among children residing in orphanages in Kerala, India: Health in Orphanages Project (HOPe)," *Int. Dent. J.*, vol. 69, no. 2, pp. 113–118, 2019, doi: 10.1111/idj.12419.

[13] O. E. Ayebameru, B. O. Popoola, and O. O. Denloye, "The prevalence of dental caries among children in orphanages in Ibadan," *Ann. Ibadan Postgrad. Med.*, vol. 22, no. 1, pp. 69–75, 2024.

[14] I. G. A. A. Agung, D. M. Wedagama, and R. Koesoemawati, "Gizi, Kesehatan Gigi-Mulut dan Dokter Gigi Kecil di SDN 1 Ketewel, Sukawati, Gianyar," *J. Bakti Sar.*, vol. 7, no. 1, pp. 1–64, 2018.

[15] S. Sontakke et al., "A comparison of caries experience among orphanage children with non-orphans attending government schools in Indore City," *Przegl. Epidemiol.*, vol. 77, no. 3, pp. 337–343, 2023, doi: 10.32394/pe.77.30.

e-ISSN:2808-6422; p-ISSN:2829-3037
Vol. 4 No.6, pp. 418-423, Desember 2024

[16] D. A. Putranto, H. S. Susanto, and M. S. Adi, "Hubungan Kebersihan Gigi dan Mulut, Indeks Plak dan pH Saliva Terhadap Kejadian Karies Gigi pada Anak di Beberapa Panti Asuhan Kota Semarang," *J. Kesehat. Masy.*, vol. 8, no. 1, pp. 66–75, 2020.

[17] E. S. Rahayu et al., "Upaya peningkatan kesehatan gigi melalui kegiatan Dental Health Education dan Scaling di Panti Asuhan Putri Al-Kaseem Kabupaten Aceh Besar," *J. PADE Pengabdi. Edukasi*, vol. 4, no. 2, p. 71, 2022, doi: 10.30867/pade.v4i2.1002.

[18] Y. Yuniarti, S. N. Irasanti, and F. Kurniasari, "Pemeriksaan kesehatan gigi dan mulut pada anak di Panti Asuhan Baitus Syukur & Tunas Melati, Bandung," *J. Pengabdi. Kpd. Masy. Bangun Cipta, Rasa, Karsa*, vol. 2, no. 4, pp. 115–118, 2023, doi: 10.30998/pkmbatasa.v2i4.2098.

[19] V. Suresan et al., "Dental caries experience and oral hygiene status among institutionalized orphans of Bhubaneswar City, Odisha: A comprehensive dental healthcare program outcome," *World J. Dent.*, vol. 12, no. 2, pp. 131–137, 2021, doi: 10.5005/jp-journals-10015-1810.

[20] M. Imran, "Teknologi Tepat Guna, Alternatif Material Konstruksi Hijau," *Radial - J. Perad. Sains, Rekayasa, dan Teknol.*, vol. 2, no. 2, pp. 85–94, 2013.

[21] W. Haryani, "Dental Health Promotion Using Traditional Media in Elementary School Children: Is it Effective?," *Int. J. Multidiscip. Res. Anal.*, vol. 4, no. 12, pp. 1901–1905, 2021, doi: 10.47191/ijmra/v4-i12-19.

[22] M. O. Nubatonis et al., "Pelatihan Kader Kesehatan Gigi dan Mulut Sekolah Dasar tentang Protokol Kesehatan di Era New Normal Se-Kecamatan Taebenu Tahun 2021," *GEMAKES J. Pengabdi. Kpd. Masy.*, vol. 1, no. 2, pp. 93–98, 2021, doi: 10.36082/gemakes.v1i2.368.

[23] I. K. Harapan, Y. Kaligis, and Y. Karamoy, "Tingkat Kecemasan Pasien Tindakan Pencabutan Gigi di Klinik Gigi Imanuel Kota Manado," *J. Ilm. Gigi dan Mulut*, vol. 5, no. 1, pp. 40–46, 2022.

[24] P., B. Santoso, and S., "Factors Affecting the Low Utilization of Dental Polyclinic in Karanganyar II Community Health Center on Demak," *J. Kesehat. Gigi*, vol. 5, no. 1, p. 8, 2018, doi: 10.31983/jkg.v5i1.3559.

[25] R. S. Naidu and J. H. Nunn, "Oral health knowledge, attitudes and behaviour of parents and caregivers of preschool children: Implications for oral health promotion," *Oral Health Prev. Dent.*, vol. 18, no. 1, pp. 245–252, 2020, doi: 10.3290/j.ohpd.a43357.

[26] D. P. Sari and D. Ratnawati, "Pendidikan kesehatan meningkatkan tingkat pengetahuan dan sikap ibu dalam merawat balita dengan ISPA," *J. Ilm. Ilmu Keperawatan Indones.*, vol. 10, no. 2, pp. 1–7, 2020, doi: 10.33221/jiiki.v10i02.578.

[27] Sadimin, Prasko, Sariyem, and Sukini, "Cadre training with learning methods on understanding UKGMD in Posyandu activities," *J. Kesehat. Gigi*, vol. 7, no. 2, pp. 127–132, 2020.

[28] B. Santoso, E. A. Eko Ningtyas, and D. Fatmasari, "Improving elderly's dental hygiene through nursing home staff's dental health education at the nursing home," *J. Kesehat. Masy.*, vol. 12, no. 2, pp. 189–198, 2017, doi: 10.15294/kemas.v12i2.8461.

[29] WHO, Oral Health Surveys: Basic Methods, 5th ed., Geneva: World Health Organization, 2013.

[30] R. S. Naidu and J. H. Nunn, "Oral health knowledge, attitudes and behaviour of parents and caregivers of preschool children: Implications for oral health promotion," Oral Health Prev. Dent., vol. 18, no. 1, pp. 245–252, 2020, doi: 10.3290/j.ohpd.a43357.

[31] Y. Yuniarti, S. N. Irasanti, and F. Kurniasari, "Pemeriksaan kesehatan gigi dan mulut pada anak di Panti Asuhan Baitus Syukur & Tunas Melati, Bandung," J. Pengabdi. Kpd. Masy., vol. 2, no. 4, pp. 115–118, 2023, doi: 10.30998/pkmbatasa.v2i4.2098.

[32] M. O. Nubatonis et al., "Pelatihan Kader Kesehatan Gigi dan Mulut Sekolah Dasar tentang Protokol Kesehatan di Era New Normal Se-Kecamatan Taebenu Tahun 2021," GEMAKES J. Pengabdi. Kpd. Masy., vol. 1, no. 2, pp. 93–98, 2021, doi: 10.36082/gemakes.v1i2.368.

[33] D. P. Sari and D. Ratnawati, "Pendidikan kesehatan meningkatkan tingkat pengetahuan dan sikap ibu dalam merawat balita dengan ISPA," J. Ilm. Ilmu Keperawatan Indones., vol. 10, no. 2, pp. 1–7, 2020, doi: 10.33221/jiiki.v10i02.578.

[34] V. Suresan et al., "Dental caries experience and oral hygiene status among institutionalized orphans of Bhubaneswar City, Odisha," World J. Dent., vol. 12, no. 2, pp. 131–137, 2021, doi: 10.5005/jp-journals-10015-1810.

[35] A. Q. Shqair et al., "Screen time, dietary patterns and intake of potentially cariogenic food in children: A systematic review," J. Dent., vol. 86, pp. 17–26, 2019, doi: 10.1016/j.jdent.2019.06.004.

[36] G. Minervini et al., "Children oral health and parents education status: A cross-sectional study," BMC Oral Health, vol. 23, no. 1, pp. 1–7, 2023, doi: 10.1186/s12903-023-03424-x.

[37] M. O. Nubatonis, K. Anjelina, and M. D. M. Lobo, "Pelatihan Kader Kesehatan Gigi dan Mulut Sekolah Dasar tentang Protokol Kesehatan di Era New Normal Se-Kecamatan Taebenu Tahun 2021," GEMAKES Jurnal Pengabdian Kepada Masyarakat, vol. 1, no. 2, pp. 93–98, 2021, doi: 10.36082/gemakes.v1i2.368.

[38] R. S. Naidu and J. H. Nunn, "Oral health knowledge, attitudes and behaviour of parents and caregivers of preschool children: Implications for oral health promotion," Oral Health & Preventive Dentistry, vol. 18, no. 1, pp. 245–252, 2020, doi: 10.3290/j.ohpd.a43357.

[39] G. Minervini et al., "Children oral health and parents education status: a cross-sectional study," BMC Oral Health, vol. 23, no. 1, pp. 1–7, 2023, doi: 10.1186/s12903-023-03424-x.

[40] M. O. Nubatonis, K. Anjelina, and M. D. M. Lobo, "Pelatihan Kader Kesehatan Gigi dan Mulut Sekolah Dasar tentang Protokol Kesehatan di Era New Normal Se-Kecamatan Taebenu Tahun 2021," GEMAKES Jurnal Pengabdian Kepada Masyarakat, vol. 1, no. 2, pp. 93–98, 2021, doi: 10.36082/gemakes.v1i2.368.

[41] V. Suresan et al., "Dental caries experience and oral hygiene status among institutionalized orphans of Bhubaneswar City, Odisha: A comprehensive dental healthcare program outcome," World Journal of Dentistry, vol. 12, no. 2, pp. 131–137, 2021, doi: 10.5005/jp-journals-10015-1810.

[42] A. Gamal-AbdelNaser, M. A. A. Mennat Allah, and N. M. A. Khattab, "Caries in orphan children: prevalence and determinants—a systematic review and meta-analysis," BMC Oral Health, vol. 24, no. 1, pp. 1–17, 2024, doi: 10.1186/s12903-024-04125-9.

[43] O. E. Ayebameru, B. O. Popoola, and O. O. Denloye, "The prevalence of dental caries among children in orphanages in Ibadan," Annals of Ibadan Postgraduate Medicine, vol. 22, no. 1, pp. 69–75, 2024.

[44] B. Santoso, P. Budiono, and S. Sudibyo, "Factors affecting the low utilization of dental polyclinic in Karanganyar II Community Health Center on Demak," Jurnal Kesehatan Gigi, vol. 5, no. 1, p. 8, 2018, doi: 10.31983/jkg.v5i1.3559.

[45] Y. Yuniarti, S. N. Irasanti, and F. Kurniasari, "Pemeriksaan kesehatan gigi dan mulut pada anak di Panti Asuhan Baitus Syukur & Tunas Melati, Bandung," Jurnal Pengabdian Kepada Masyarakat Bangun Cipta Rasa Karsa, vol. 2, no. 4, pp. 115–118, 2023, doi: 10.30998/pkmbatasa.v2i4.2098.

[46] D. P. Sari and D. Ratnawati, "Pendidikan kesehatan meningkatkan tingkat pengetahuan dan sikap ibu dalam merawat balita dengan ISPA," Jurnal Ilmiah Ilmu Keperawatan Indonesia, vol. 10, no. 2, pp. 1–7, 2020, doi: 10.33221/jiiki.v10i02.578.

[47] Sadimin, Prasko, Sariyem, and Sukini, "Cadre training with learning methods on understanding UKGMD in Posyandu activities," Jurnal Kesehatan Gigi, vol. 7, no. 2, pp. 127–132, 2020.