Dental and Oral Health Education Model as an Educational Media in Improving Parental Behavior towards Persistence in the Pendang Community Health Center Work Area

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Abstract:- Dental health is an integral part of overall health. Parental knowledge is essential in underlying the formation of attitudes and behaviors that support or do not support children's dental and oral health. Children's milk teeth are essential in the child's growth and development process. Technological developments impact society in Indonesia, particularly in the field of information and communication technology. Today's relevant media is technologically based. This research aims to produce a Dental and Oral Health Education Model as an educational model for improving parental behavior toward persistence. The study design employed is a quasi-experimental Pretest-Posttest group design, and the methodology is research and development. This study includes knowledge, attitudes, and behaviors as variables. Two groups comprised the research subjects: 22 participants received the Dental and Oral Education Model as an intervention, while 22 participants received animated video media as a control. Wilcoxon and Mann-Whitney tests were performed on the data. The validation test results were 92%, which means that the dental and oral health education model is suitable as a medium for dental health education, and the unpaired test results stated that its implementation was effective in increasing knowledge ($\Delta 3.82$), attitudes ($\Delta 5.91$), actions ($\Delta 1.77$). The Dental and Oral Health Education Model was proven to be feasible and its implementation effective as an effort to increase parental behavior toward persistence compared to the control group.

Keywords:- *Knowledge, Attitude, Action, Persistence, Augmented Reality.*

I. INTRODUCTION

A vital component of overall health is dental health. We know that the causes and risk factors for oral diseases are often the same as common diseases and can affect the health, well-being, education, and development of children, families, and society as a whole [1]. The results of the 2018 Basic Health Research in South Kalimantan province showed that the prevalence of dental and oral problems was 60%. Cases of crowded teeth in this province show a percentage of 15.6%, which is the highest percentage in its category. In research

conducted by Rima Tria Kusuma in 2019, 23 people (46%) obtained results from 50 parents of patients with persistent teeth at the Cempaka Community Health Center, Banjarmasin, with the good knowledge category and 27 people (54%) with the poor knowledge category. In research conducted by Norma Bakti in 2018 at SDN Alur 2 Jorong, Tanah Laut Regency, there were 24 respondents with a good knowledge category of 42.8% and 29 respondents with a poor knowledge category of 54.72% [2],[3].

Tooth persistence is a condition where the primary teeth have not completely fallen out, but the permanent teeth have grown. The causes are ankylosis, late root resorption, hypothyroidism, malnutrition, genetics, or abnormal position of the permanent tooth buds. Persistence of primary teeth over-retained primary teeth or prolonged primary teeth is not something that is rarely found. Based on a survey from the Ministry of National Education in the Health Professional Education Quality (HPEQ) Project in 2010, it was stated that the persistence of primary teeth was included in the top 10 dental and oral diseases in Community Health Centers. In addition, according to the 2012 West Java Provincial Health Service Standard Disease Management Guidelines, dental problems in elementary school children include poor oral hygiene, caries, gingivitis, persistence of primary teeth, ulcer decubitus, pulp hyperemia, and acute/chronic pulpitis [4],[5].

Milk teeth play an important role in physical and mental development. This can be seen from the various functions of milk teeth: chewing, jaw bone growth, acting as a guide for the growth of permanent teeth, aesthetic function, and speech function. Primary teeth will fall out at a certain age and be replaced by permanent teeth which are below the primary teeth. If milk teeth fall out early or late before the permanent teeth grow, the permanent teeth can grow irregularly, become crowded, or even fall out [5].

Parents need to know about dental and oral health education because the age that is most vulnerable to dental and oral health is elementary school age, namely 6-12 years. One of the factors that causes children's dental health to be poor is low economic level. People with low economic status tend to be more afraid and anxious about having dental examinations compared to people with middle to upper

economic status. This is because dental examinations are not something commonly done by low-income people. In addition, they felt that dental examinations were very expensive and parents lacked knowledge about dental health. Parental knowledge is essential in forming attitudes and behaviors that support or do not support children's dental and oral health. Teeth are very important for children during their growth and development. The function of teeth is very necessary as a tool for chewing, aiding speech, facial balance, and supporting facial aesthetics, and primary teeth are very useful as guides for the growth of permanent teeth, especially during elementary school [6], [7].

Efforts to increase parents' knowledge of the incidence of dental persistence are through health promotion. Delivery of counseling materials to the target is determined not only by the manner chosen but also by the availability or lack of media and supporting technologies [8].

Health promotion is a program that aims to influence and improve both society itself and organizations and their environment, including the physical, socio-cultural, and political environment. In other words, health promotion is not only about improving knowledge, attitudes, and practices but also about improving and improving the environment [9].

Educational media is built on the principle that the knowledge that exists within each person is received or captured through the five senses. The more senses are used, the more and clearer the understanding and knowledge that can be obtained. This is because the media is used by educators to provide educational and teaching materials that enable the target audience to more easily understand what is being communicated [10].

Current technological developments indirectly influence Indonesian society, especially the advancement of communication and information technologies. In the digital age, information and communication technology is evolving quickly and affecting many forms of media that are already in use. In order to transform human thought processes and stay up to date with advancements in the field of information and communication technology in the 4.0 (digital) era, this pushes people to be more inventive in how they manage their knowledge. Many multimedia domains that are useful for information transmission are now being developed as part of information and communication technology [11].

By utilizing a range of media, such as text, images, music, animation, and augmented reality (AR), multimedia technology contributes to the creation of high-quality learning environments. Augmented Reality (AR) is the technology being developed for application in the multimedia area, which uses computer processing to combine virtual and real objects naturally so that they appear real as if they were in front of the user's eyes. AR is a technology that combines three-dimensional (3D) virtual objects with three-dimensional real-world environments and displays them in real-time [11].

Based on the background above, researchers need to develop health promotion specifically using contemporary application media towards the era of the industrial revolution 4.0 through a "dental and oral health education model" to encourage changes in parents' attitudes and behaviors in the field of dental and oral health-related actions. disease prevention, hygiene, choosing food, and so on, when elementary school-aged children change their teeth.

II. RESEARCH METHODS AND SAMPLE

This research uses the Research and Development (R&D) method. This method is used to produce a product and test the effectiveness of the product. The R&D procedure includes five main steps, namely: information collection, product/model design, expert validation and revision, product/model testing, and product/model results. The design used is the Quasy Experiment Pretest-Posttest Control Group Design. The sample in this study was 22 people in each group with inclusion and exclusion criteria.

III. RESEARCH RESULT

A. Expert Validation

Table 1 Expert Validation

Expert Validation					
Validator	N	Mark	F (%)	Average	P-Value
Validator I	1	90	90	92	0.0001
Validator II	2	94	94		
Validator III	3	92	92		

Interclass Correlation Coefficient (ICC)

The assessment results of three expert validators have an average score of 92 with a p-value of 0.001, as shown in the above table. This indicates that the Dental and Oral Health Education Model is relevant and appropriate as an educational tool for enhancing parental persistence behavior.

B. Normality Test

The normality test is a test carried out to determine whether the data collected on each variable is normally distributed or not. This test uses the Shapiro-Wilk method because the number of samples in this study is less than 50 samples.

Table 2 Normality Test

Variable	P-value	
	Intervention	Control
Pretest Knowledge	0.175	0.411
Posttest Knowledge	0.011	0.444
Pretest Attitude	0.032	0.317
*Posttes t*Attitude	0.026	0.022
Pretest Action	0.044	0.320
Posttest Action	0.002	0.024

*Shapiro-Wilk

The results of Table 2, show that the data is normally distributed on the variables Pretest Knowledge (intervention-control), Pretest Attitude (control), and Pretest Action (control) with a p-value>0.05. If data is not normally distributed, the test that will be carried out is a non-parametric test, namely using the Wilcoxon test for paired tests and the Mann-Whitney test for unpaired tests.

C. Effectiveness Test

Bivariate analysis is used to test the differences between two variables. In the initial stage, model testing is carried out by carrying out a normality test first and then testing the effectiveness of paired and unpaired variables.

➢ *Test the Effectiveness of Parental Knowledge*

Table 3 Test of the Effectiveness of Parental Knowledge in the Intervention and Control Groups

Variable	Group	Mean±SD Pretest	Mean±SD Posttest	Delta±SD (Δ)	*p-value*
Knowledge	Intervention	8.00±2.138	11.82±1,500	3.82 ± 2.657	0.0001*
	Control	8.86 ± 2.054	9.55±2.176	0.69 ± 2.119	0.060*
		0.145**	0.001**	0.0001**	

*Wilcoxon
**Mann-Whitney

The Dental and Oral Health Education Model is effective in raising parental awareness of persistence, as evidenced by the p-value for the intervention group being 0.0001 (p<0.05) in the efficacy test of paired data on the parental knowledge variable. In contrast, the control group's p-value was 0.060 (p>0.05), indicating that the instructional video's ability to raise parents' awareness was ineffective.

The results of the effectiveness test of unpaired data in the pretest group for the knowledge variable were with a p-value of 0.145 (p>0.05) which showed that there was no difference in parents' knowledge before being given treatment in either the intervention group that received the educational model or the control group that received the educational video. Meanwhile, the results of the p-value for the posttest group on the knowledge variable were 0.001, which means that there was a difference in the level of knowledge of parents after being given treatment, with a change in the mean value in the intervention group being 11.82 while in the control group being 9.55.

The value of change in knowledge (Δ) pre-post-test with a p-value of 0.001 indicated the effectiveness of the unpaired data effectiveness test. This indicates that there was a significant change in increasing knowledge in both the intervention and control groups, with a difference value (Δ) of 3.82 in the intervention group and the control group. 0.69 was the control.

➢ *Test the Effectiveness of Parental Attitudes*

Table 4 Test of the Effectiveness of Parental Attitudes in the Intervention and Control Groups

Variable	Group	Mean±SD Pretest	Mean±SD Posttest	Delta±SD (Δ)	*p-value*
Knowledge	Intervention	39.41±5.333	45.32 ± 4.571	5.91±5.747	0.0001*
	Control	40.50±5.763	41.50±6.781	1.00±6.239	0.330*
		0.517**	0.050***	0.0001****	

*Wilcoxon
**Mann-Whitney

The Dental and Oral Health Education Model is effective in increasing parents' attitudes about perseverance, as evidenced by the p-value for the intervention group being 0.0001 (p<0.05) in the effectiveness test of matched data on attitude variables. In contrast, the control group's p-value was 0.330 (p>0.05), indicating that the instructional video's ability to change parents' opinions was ineffective.

The results of the effectiveness test of unpaired data in the pretest group of attitude variables with a p-value of 0.517 (p>0.05) show that there was no difference in parents'

attitudes before being given treatment in both the intervention group which received the educational model and the control group which received the educational video. Meanwhile, the posttest group's p-value for the attitude variable was 0.05, which means there were differences in parents' attitudes after being given treatment, with a change in the mean value in the intervention group being 45.32 while in the control group, it was 41.50.

> *Test the Effectiveness of Parental Actions*

Table 5 Test the Effectiveness of Parental Actions in the Intervention and Control Groups

Variable	Group	Mean±SD Pretest	Mean±SD Posttest	Delta±SD (Δ)	*p-value*
Knowledge	Intervention	39.41±5.333	45.32 ± 4.571	5.91±5.747	0.0001*
	Control	40.50±5.763	41.50±6.781	1.00±6.239	0.330*
		0.517**	0.050***	0.0001****	

*Wilcoxon
**Mann-Whitney

The Dental and Oral Health Education Model is effective in encouraging parental behaviors toward persistence, as evidenced by the p-value for the intervention group of 0.0001 (p<0.05) in the efficacy test of paired action variable data. In contrast, the control group's p-value was 0.066 (p>0.05), indicating that the instructional video's ability to encourage parental involvement was ineffective.

The results of the effectiveness test of unpaired data in the action variable pretest group with a p-value of 0.886 (p>0.05) shows that there was no difference in parents' actions before being given treatment in both the intervention group which received the educational model and the control group which received the educational video. Meanwhile, the posttest group's p-value for the action variable was 0.019, which means there were differences in parents' actions after being given treatment, with a change in the mean value in the intervention group being 8.41 while in the control group being 7.18.

The effectiveness test of unpaired data yielded the following results: a p-value of 0.0001 for the change in action (Δ) pre-post- test. This indicates that there was a significant difference in increasing action between the intervention and control groups, with the intervention group's difference value (Δ) being 1.77 and the control group's being 0.68.

IV. DISCUSSION

A. Model Augmented Reality Dental and Oral Health Education

The most common health problems in children are persistence, dental caries, and periodontal disease. One of the high prevalence of dental and oral diseases is teeth that are difficult to move. In order to address this issue, it is necessary to teach children how to avoid dental caries, mostly by teaching their parents and use suitable media to meet health education objectives. The target audience must be taken into consideration when selecting techniques and media for health promotion activities. This will ensure that the audience can readily comprehend the information delivered by the speaker and that the medium utilized can pique their attention,

overcome physical constraints, interact, and activate their senses [12].

With its appealing look and easily comprehensible content, the dental and oral health education model can be applied in this intervention group as a promotive and preventive medium during health promotion activities, making it simpler for parents to take action to stop children from becoming persistent.

B. Implementation Model Augmented Reality Dental and Oral Health Education on Parents' Knowledge

In this study, 44 parents with children ages 6 to 9 participated in the model test. The paired analysis's findings indicate that there were notable variations in the intervention group's and the control group's knowledge scores prior to and following treatment. The Dental and Oral Health Education Model applied to the intervention group was effective in increasing the parent's knowledge of persistence, as demonstrated by the results of the Wilcoxon test used to assess the effectiveness of data on paired variables, which revealed an increase in knowledge with a p-value of (p<0.05). The control group that was given animation video treatment did not experience an increase in known knowledge from the value (P>0.05).

The efficacy of the Dental and Oral Health Education Model is further demonstrated by the results of the unpaired effectiveness test, which employed the Mann-Whitney test of pre-posttest knowledge in the intervention group (p<0.05) and in the control group (p>0, 05). This indicates that the Dental and Oral Health Education Model is superior to the application of persistence animation videos in the control group in terms of raising parents' persistence knowledge.

The dental and oral health education model, which was created based on the needs of the target audience and the information was presented in an engaging, interactive, and easily understood application, is responsible for the gain in knowledge that took place in the intervention group. The educational material included in this 'Dental and Oral Health Education Model', such as understanding, causes,

consequences, the timing of tooth growth, prevention and treatment of cavities, is not only in the form of writing but also accompanied by very interactive Augmented Reality animations, and model displays. that has been developed is very interesting both in terms of appearance and usability. This has also been proven in research by Zulfikar et al. in 2023, where the use of nail models as Augmented Reality-based education has been proven to be a learning tool [13].

The acceptance of information and knowledge is one of the variables that impacts knowledge, which is the foundation for parents to overcome and address specific challenges. Naturally, the means and medium by which the information is presented have an impact on the amount of knowledge that may be gained. A study conducted by Nataliani in 2023 found that the use of educational media was more effective in changing people's behavior compared to two-way communication alone. The results of this research are as follows. The research is the result of the use of interactive 3D animated video material and the delivery of educational material regarding dental and oral health and prevention which is packaged attractively way [14].

C. Implementation Augmented Reality Model for Dental and Oral Health Education on Parental Attitudes

The Dental and Oral Health Education Model was effective in increasing parents' attitudes about perseverance, as evidenced by the p-value in the intervention group of data effectiveness tests on paired variables using the Wilcoxon test being less than 0.05. On the other hand, the control group's p-value was ($p>0.05$), indicating that the use of animated movies in the control group did not improve parents' attitudes about perseverance.

The results of the unpaired Mann-Whitney test in the post-test group show that the augmented reality model for Dental and Oral Health Education was successfully implemented; the test had a value of ($p<0.05$), indicating that the model is more effective when applied to improve attitudes. parents on perseverance as opposed to giving the control group animated videos.

Because the dental and oral health education model, which included interactive 3D animated video material and sustainability material, was packaged as attractively as possible to ensure that users, especially parents, did not get bored reading the material in the model developed, an improvement in attitudes was observed in the intervention group. This investigation discovered. This study used a dental and oral health education paradigm as a 21-day intervention.

A parallel study conducted by Siti Adlina Fatma et al. found that respondents with good knowledge were followed by good attitudes as well. In this case, as respondents' knowledge declines, so do their attitudes.

D. Model Implementation Augmented Reality Dental and Oral Health Education on Parental Actions

Using animated videos and the dental and oral health education model, parents' behavior in cavity prevention improved, as demonstrated by the p-value of ($p<0.05$) in the control group and intervention groups of the validity test of paired variable behavioral data using the Wilcoxon test. These findings also support the findings of the unpaired test using the Mann-Whitney test ($p<0.05$), indicating that the use of animated movies and the dental and oral health education model are successful in modifying parental behavior toward the prevention of betel quilling. The results of the differences between the two show that the application of the dental and oral health education model is more effective than animated videos. Actions are what the target person does in terms of health, including preventive, therapeutic, and rehabilitative behavior. Actions are also responses to target behavior.

V. CONCLUSION

With a p-value of 0.001 ($p<0.05$), it is possible to enhance parental behavior toward tooth persistence using the Dental and Oral Health Education Model. With a p-value of 0.001 ($p<0.05$), the Dental and Oral Health Education Model is also appropriate for raising parents' awareness of dental persistence and for improving their attitudes and behaviors in this area.

REFERENCES

[1]. Salfiyadi T, Nuraskin CA, Khaira U, et al. Jurnal Kesehatan Gigi. 2022;2:115-121.

[2]. Aufar Rafif Adha M, Wibowo D, Indah Rasyid N. Gambaran Tingkat Keparahan Maloklusi Menggunakan Handicapping Malocclusion Assessment Record (Hmar) Pada Siswa Sdn Gambut 10. *Dentin (Jur Ked Gigi)*. 2019;3(1):1-9. https://ppjp.ulm.ac.id/journals/index.php/dnt/article/view/884

[3]. Kemenkes P, Jurusan B, Gigi K. PPertumbuhan Gigi Dengan Persistensi Gigi Pada Anak Di Sekolah Luar Biasa Negeri Kotabaru Poltekkes Kemenkes Banjarmasin Jurusan Keperawatan Gigi Perkembangan Sang Anak . Fungsi Gigi Sangat Diperlukan Yaitu Sebagai Alat Diperlukan Tubuh Karena Sakit Gigin. :64-72.

[4]. Kurniasih PW, Purwaningsih E, Hidayati S. Persistensi Gigi Di Wilayah Kerja Puskesmas Parengan Kabupaten Tuban 2022. 2022;2(3):333-341.

[5]. Persistensi K, Pada G, Usia A, Di T, Nagarakasih MI. Hubungan Tingkat Pengetahuan Ibu Dengan Dengan Kejadian Persistensi Gigi Pada Anak Usia 6-12 Tahun Di Mi Nagarakasih 2. 2020;1(1).

[6]. Sari YA, Hanum NA. Gambaran pengetahuan orang tua terhadap kasus persistensi gigi pada anak usia 6-10 tahun. *J Kesehat Gigi dan Mulut*. 2019;1(2):45-48.

[7]. Dwi Nurfadila R, Insanuddin I, Mulyanti S, Supriyanto I. Pengetahuan Orang Tua Terhadap Kasus Persistensi Gigi Anak Sd Kabupaten Deli Serdang, Kota Bandung, Dan Palembang. *J Kesehat Siliwangi*. 2020;1(2):222-227.

[8]. Ramadhani A, Sosiawan A. Gigi Sehat: Channel Video Edukasi Kesehatan Gigi dan Mulut untuk Orangtua Murid di Surabaya. *JPPM (Jurnal Pengabdi dan Pemberdaya Masyarakat)*. 2022;5(2):317. doi:10.30595/jppm.v5i2.6077

[9]. Arista BE, Hadi S, Soesilaningtyas. Systematic Literature Review : Penggunaan Media yang Efektif dalam Promosi Kesehatan Gigi dan Mulut pada Anak Sekolah Dasar. *J Ilm Keperawatan Gigi*. 2021;2(2):208-215. http://ejurnal.poltekkestasikmalaya.ac.id/index.php/jikg/article/view/704

[10]. Prasko, Sutomo B, Santoso B. Penyuluhan Metode Audio Visual dan Demonstrasi terhadap Pengetahuan Menyikat Gigi pada Anak Sekolah Dasar. *J Kesehat Gigi*. 2016;3(2):53-57.

[11]. Suciliyana Y, Ode L, Rahman A, et al. Augmented Reality Sebagai Media Pendidikan School-Age. *Surya Muda*. 2020;2(1):39-53.

[12]. Putri VS, Suri M. Pentingnya Kesehatan Gigi dan Mulut pada Anak Usia Sekolah di RT 10 Kelurahan Murni Kota Jambi. *J Abdimas Kesehat*. 2022;4(1):39. doi:10.36565/jak.v4i1.207

[13]. Ali Z, Wahyuningsih D, Supurwoko S. Pengembangan Media Pembelajaran Fisika SMA Augmented Reality Video Berbasis Android pada Materi Pemanasan Global di Kelas XI SMA N 1 Gemolong. *J Mater dan Pembelajaran Fis*. 2021;11(1):33. doi:10.20961/jmpf.v11i1.47826

[14]. Natalia N, Sunarjo LS, Djamil M. Utilization of Augmented Reality E-Pregnant As Educational Media For Improving Prevention Behavior Caries in Pregnant Mothers. *J Heal Sains*. 2023;4(5):31-41. doi:10.46799/jhs.v4i5.898