

Original Research Article

The Effectiveness of Online Dental Health Education to Changes Mother's Behavior on Preventing Dental Caries in Preschool Age Children

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Abstract: Background and purpose: Dental health education for mothers is very important in maintaining the dental health of preschool children. During the Covid-19 pandemic, there were limitations in the direct education process, so it is very important to conduct online dental health education. **Purpose:** This study purpose to compare the effectiveness of dental health education with audiovisual media, modules, and posters given online through Whatsapp media in improving the behavior (knowledge, attitudes and actions) of mothers in preventing dental caries in preschool children. **Methods:** Research subjects were determined by consecutive sampling according to those who met the inclusion and exclusion criteria. Total 73 subject of this study divided into three group intervention, 21 subjects in poster group, 23 subjects in modules group and 29 subjects in audiovisual group. The intervention was carried out by providing posters, modules, and videos of children's dental health education through online discussions in the Whatsapp group. Questionnaires were given before the intervention (pre-test), two weeks (post-test 1) and four weeks after the intervention (post-test 2). **Results:** Online dental health education with posters, modules and audiovisuals is effective in improving mother's behavior in preventing dental caries in preschool children. Audiovisual and module method are more effective than poster to improve mother's behavior in preventing dental caries in preschool children ($p < 0,001$). **Conclusion:** Dental health education online with audiovisual media has the best effectiveness in improving maternal behavior in preventing dental caries in preschool children.

Keywords: Online dental health education, mother's behavior, dental caries, preschool children.

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INTRODUCTION

Children's oral health is an integral component of health and determines the quality of life of children. Although preventive measures have been taken, dental caries and other oral diseases are still present in children, for this reason, basic dental and oral health management must start early because childhood is an important period [1]. Parents, especially mothers, have an important role in implementing dental and oral health maintenance behavior [2]. Mothers have a role in teaching oral hygiene, eating habits, and other health care practices to children from an early age [3].

The Covid-19 pandemic, which is still high, has forced the government to make a policy of implementing learning from a face-to-face system to e-learning (online)

[4]. Dental health education to the community apart from face-to-face can also be carried out online with various methods. Online media has the advantage of being easily accessible, can be viewed repeatedly, can be accessed anywhere using a laptop or mobile phone, can connect individuals from various regions and effectively increase knowledge [5]. Internet access makes it easier for people to find information and specific lessons, this trend is an opportunity for health practitioners to share health information with social media. WhatsApp is a popular application with the highest number of users in the world and is used most often and with the longest duration by smartphone users [6].

The population of Indonesia experiencing tooth decay is still relatively high, the most experiencing

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dental problems. The 2018 Indonesian National Basic Health Research data states that the age group is 5-9 years with a dental caries prevalence of 92.6% [7]. Therefore, it is necessary to carry out efforts to educate children's dental health to parents, especially mothers.

Research by Parwati *et al.*, and Makvandi Z *et al.*, in 2015 showed that there was an increase in knowledge after being given counseling using modules [8,9]. Syed E. Haque, *et al.*, research in Bangladesh was given dental health education training with audio-visual aids, models in the form of photos, phantom models, slides, posters which were carried out for 6 months, effectively increasing knowledge, attitudes and actions towards oral health [10].

This study aims to determine the effectiveness of online dental health education using posters, modules and audiovisuals on improving mother's behavior in preventing dental caries in preschool children. The researcher's hypothesis is that online dental health education with posters, modules and audiovisuals is effective in improving maternal behavior in preventing dental caries in preschool children, which the most effective is audiovisual media.

MATERIALS AND METHODS

This research is a quasi-experimental research with a pre-test and post-test group design. This research was conducted in three kindergartens, Melati Liliba Kindergarten, Tunas Harapan Liliba Kindergarten and Rosa Mystica Liliba Kindergarten Kupang after obtaining research ethics approval from the Health Research Ethics Commission, Faculty of Medicine, Nusa Cendana University, Kupang. The research subjects were determined by consecutive sampling according to the inclusion and exclusion criteria. Inclusion criteria included the subject being a biological mother or a surrogate mother of preschool children from Melati Liliba Kindergarten or Tunas Harapan Liliba Kindergarten or Rosa Mystica Liliba Kindergarten who live together in the same house, have a cell phone or gadget that can access the Whatsapp application, mothers who have a background minimum education is high school graduate. The exclusion criteria were that the subject was the biological mother or the surrogate mother of the preschool children from Melati Liliba Kindergarten or Tunas Harapan Liliba Kindergarten or Rosa Mystica Liliba Kindergarten but had not lived with these school children for at least the last three months. A total of 73 subjects who met the inclusion and exclusion criteria were divided into three intervention groups. A total of 21 subjects were included in the poster group who were given an intervention by providing education about children's dental health with poster media with an online discussion method through the Whatsapp group, meetings were held twice a week for four weeks. A total of 23 subjects were included in the module group which

was given an intervention by providing education about children's dental health with poster media with an online discussion method through the Whatsapp group, meetings were held twice a week for four weeks. A total of 29 subjects were included in the audiovisual group who were given an intervention by providing education about children's dental health with video media with an online discussion method through the Whatsapp group, meetings were held twice a week for four weeks. Questionnaires to assess the score level of maternal behavior (knowledge, attitude and action) were administered before the intervention (pre-test), 2 weeks after the intervention (post-test 1) and 4 weeks after the intervention (post-test 2). Analysis of research data using SPSS ver 16.0 for Windows. The analysis to compare changes in the subject's behavior (knowledge, attitudes and actions) before (pre-test) and after the intervention (post-test 1 and post-test 2) used the Repeated Anova test for data that were normally distributed and Friedman's test for data that were not normally distributed. To analyze the difference in effectiveness between the interventions using posters, modules and audiovisuals with the One Way Anova test. The degree of significance of this study was $p < 0.05$.

RESULTS

Comparison of the characteristics of the knowledge, attitudes and actions scores of mothers in the prevention of dental caries in children before intervention, it was found that there was no significant difference in the knowledge scores of mothers in the three intervention groups ($p = 0.987$). In the comparison of mother's attitude scores before intervention, it was also found that there was no significant difference in maternal attitude scores in the three intervention groups ($p = 0.185$). Likewise, the comparison of the mother's action scores before intervention between the three groups did not show a significant difference ($p = 0.383$). Thus it can be concluded that the three intervention groups deserve to be compared.

In this study, the results showed a significant increase in the score of mother's knowledge in the prevention of child dental caries in the three intervention groups, module group ($p < 0.001$), poster group ($p < 0.001$) and audiovisual group ($p < 0.001$) (Table 1). Mother's attitude score in preventing dental caries in children also showed a significant increase between pretest and post-test 1 and post-test 2 in the three intervention groups, module group ($p < 0.001$), poster group ($p < 0.001$) and audiovisual group ($p < 0.001$) (Table 2). Likewise, the score of mother's actions in preventing dental caries in children showed a significant increase between pretest and post-test 1 and post-test 2 in the three intervention groups, namely the module group ($p < 0.001$), poster group ($p < 0.001$) and audiovisual group ($p < 0.001$) (Table 3).

Table 1: Attitude’s score on intervention group

Attitude’s score Module Group	Mean ± SD	p value
Pretest	75,65 ± 5,9	<0,001*
Posttest 1	89,13 ± 5,1	
Posttest 2	94,78 ± 5,1	
Attitude’s score Poster Group		
Pretest	75,71 ± 5,1	<0,001*
Posttest 1	78,57 ± 5,7	
Posttest 2	89,05 ± 4,4	
Attitude’s score Audiovisual Group		
Pretest	75,86 ± 6,3	<0,001*
Posttest 1	93,45 ± 5,5	
Posttest 2	97,93 ± 4,1	

* Friedman test, significance with p value<0.05

Table 2: Attitude’s score on intervention group

Attitude’s score Module Group	Mean ± SD	p value
Pretest	36,09 ± 2,1	<0,001*
Posttest 1	41,96 ± 2,8	
Posttest 2	45,39 ± 2,3	
Attitude’s score Poster Group		
Pretest	36,33 ± 1,7	<0,001*
Posttest 1	40,29 ± 3,3	
Posttest 2	42,43 ± 2,4	
Attitude’s score Audiovisual Group		
Pretest	37,14 ± 0,5	<0,001**
Posttest 1	41,83 ± 0,4	
Posttest 2	47,41 ± 0,3	

* Friedman test, **Repeated Anova test, significance with p value<0.05

Table 3: Action’s score on intervention group

Action’s Score Module Group	Mean ± SD	p value
Pretest	36,17 ± 1,3	<0,001*
Posttest 1	40,91 ± 2,2	
Posttest 2	46,30 ± 2,1	
Action’s Score Poster Group		
Pretest	35,86 ± 0,6	<0,001**
Posttest 1	39,62 ± 0,6	
Posttest 2	42,09 ± 0,4	
Action’s Score Audiovisual Group		
Pretest	35,59 ± 1,7	<0,001*
Posttest 1	42,45 ± 2,9	
Posttest 2	47,66 ± 1,5	

* Friedman test, **Repeated Anova test, significance with p value<0.05

Comparison of the effectiveness between the three groups (modules, posters and audio visuals) on increasing knowledge scores was found that there was a significant difference in increasing knowledge scores

between the three groups (p<0.001) (Table 4). Therefore, the post Hoc Tukeys HSD test was conducted to compare the increase in scores between the intervention groups.

Table 4: Comparison of the increase in the score of knowledge, attitudes and actions between the intervention groups

Intervention group	Knowledge score improvement (Mean ± SD)	p value
Audiovisual	22,07 ± 6,7	
Module	19,13 ± 6,7	<0,001*
Poster	13,33 ± 4,8	
	Attitude score improvement (Mean ± SD)	
Audiovisual	10,28 ± 1,9	
Module	9,30 ± 2,6	<0,001*
Posters	6,10 ± 1,8	
	Action score improvement (Mean ± SD)	
Audiovisual	11,07 ± 1,4	
Module	10,13 ± 1,6	<0,001*
Poster	6,24 ± 2,5	

* One Way Anova test, significance with p value<0.05

In this study, it was found that the audiovisual group had the best average increase in knowledge scores compared to the module method and the poster method with an average increase in score of 22.07 ± 6.7. The audiovisual group compared with the module group statistically had no significant difference in effectiveness in increasing the mother's knowledge score in the prevention of child dental caries (p=0.217). Meanwhile, the audiovisual group had a significantly better effectiveness in increasing the knowledge score of mothers in preventing dental caries in children compared to the poster group (p<0.001). Likewise, the module group had a significantly better effectiveness in increasing the mother's knowledge score in preventing child dental caries compared to the poster group (p<0.001).

Comparison of the effectiveness between the three intervention groups (modules, posters and audio visuals) on increasing mother's attitude score was found that there was a significant difference in the increase in knowledge scores between the three groups (p<0.001) (Table 4). The post Hoc Tukeys HSD test was conducted to compare the increase in scores between the intervention groups. In this study, it was found that the audiovisual group had the best average attitude score increase compared to the module group and the poster group with an average attitude score increase of 10.28 ± 1.9. The audiovisual group compared to the module group had no significant difference in effectiveness in increasing the mother's attitude score in preventing dental caries in children (p=0.244). Meanwhile, the audiovisual group had a significantly better effectiveness in increasing the mother's attitude score in preventing dental caries in children compared to the poster group (p<0.001). Likewise, the module group had a significantly better effectiveness in increasing the mother's attitude score in preventing child dental caries compared to the poster group (p<0.001).

Comparison of the effectiveness between the three intervention groups (modules, posters and audio visuals) on increasing the score of the action, it was found that there was a significant difference in the increase in the knowledge score between the three groups (p<0.001) (Table 4). The post Hoc Tukeys HSD test was conducted to compare the increase in scores between the intervention groups. In this study, it was found that the audiovisual group had the best average increase in the action score compared to the module group and the poster group with an average increase in the score of 11.07 ± 1.4. The audiovisual group compared to the module group had no significant difference in effectiveness in increasing the score for maternal actions in preventing dental caries in children (p=0.165). Meanwhile, the audiovisual group had significantly better effectiveness in increasing the score of maternal actions in preventing dental caries in children compared to the poster group (p<0.001). Likewise, the module group had a significantly better effectiveness in increasing the score of maternal actions in preventing dental caries in children compared to the poster group (p<0.001).

DISCUSSION

In the module group, there was a significant increase in the score of mother's knowledge in preventing dental caries in preschool children (p<0.001). This is in accordance with the research conducted by Parwati, *et al.*, in Parit Masigi Village, Sungai Ambawang District, West Kalimantan, which stated that counseling using module was effective to increases mother's knowledge about how to take care of children's teeth [8]. It is the same with Fatmawati's on 2018 research at SDN 206/IV in Jambi City which provides dental health education with media modules and leaflets where the research results show a significant influence between respondents' knowledge before and after being given health education [11]. Research conducted by Niakurniawati *et al.*, in Banda Aceh showed that there was a significant

difference in the improvement of knowledge and attitudes towards dental and oral hygiene in the treatment group [12]. In education using the module method, there was a significant increase in the score of the mother's actions in preventing dental caries in children ($p < 0.001$). This is in accordance with research conducted by Zainab Makvandi, *et al.*, in Hamadan western Iran where the results were an increase in knowledge, attitudes and actions of mothers on oral health and dental hygiene of children [9].

In the poster group, there was a significant increase in the score of mother's knowledge in preventing dental caries in children ($p < 0.001$). This is in accordance with the study by Jumilah, *et al.*, on students of SD Negeri Saigon Pontianak, where there was an increase in students' knowledge after being exposed to posters for 7 and 14 days [13]. Linasari's research on 2017 show that there is an increase in knowledge about dental caries on poster media and leaflets with poster media being more influential in increasing students' knowledge about dental caries [14]. In poster group there was a significant increase of the mother's attitude score in preventing dental caries in children ($p < 0.001$). This is in line with Katarina Research. E. Panggabean on students in Medan. The results showed that health promotion with poster media was effective in increasing knowledge, attitudes, and actions. Media posters and flip charts are effective media and have the same effectiveness in improving the behavior of elementary school students in maintaining dental and oral health [15]. In poster group there was a significant increase in the score of the mother's actions in preventing dental caries in children ($p < 0.001$). This is in line with the research by Sukarsih and Aida Silfia on students of Madrasah Diniyah Takmiliyah Al-Banat, Muaro Jambi Regency, the result is an increase in skills on how to brush teeth after being given counseling on how to brush their teeth using poster media. Poster media is effective as an outreach media because it helps stimulate the sense of sight, visual aspects of illustration pictures, display of writing and poster themes are short and easy to understand, making it easier to receive information [16].

In audiovisual group there was a significant increase in the score of mother's knowledge in preventing dental caries in children ($p < 0.001$). This is in accordance with Yudiana research conducted counseling using animated video media which was carried out online for students of MTS Muhammadiyah Pengasawan Kampar by conducting a pretest and posttest, where the result was an increase in students' knowledge regarding dental and oral health by 11.43% after being carried out online counseling [17]. Zakarias, *et al.*, research at 2016 was carried out on Kolongan Elementary School students where dental health education interventions were given using video media and flip charts. The results showed that dental health education using video media and flip charts to increase the knowledge of children's oral health with $p < 0.001$ respectively. Dental health education using

video media is more effective in increasing children's dental and oral health knowledge than using flip chart media [18]. In audiovisual group there was a significant increase in the mother's attitude score in preventing dental caries in children ($p < 0.001$). This is in accordance with the research of Jusuf Kristianto, *et al.*, at the Yos Sudarso orphanage in Jakarta. In the group with the tooth brushing program and accompanied by the provision of counseling accompanied by videos via WhatsApp. The results showed that there was a difference in the improvement of dental and oral hygiene between the group that was given the WhatsApp intervention and the group that was not given the WhatsApp [19]. In audiovisual group there was a significant increase in the score of mother's actions in preventing dental caries in children ($p < 0.001$). This is in line with the research by Eko A. Papilaya, *et al.*, 2016 which states that giving oral health promotion using audio-visual media is better in improving children's dental and oral health maintenance behavior compared to using audio media [20]. Research by Andriany on elementary school children in Banda Aceh showed that animation, which is an audio-visual medium, was more effective in increasing students' dental health knowledge [21]. Siti H. Hasanudin's research on kindergarten children in Goa, South Sulawesi results showed health education video media was effective in improving teeth brushing skills, the same effectiveness was also found in media comic. Where the average value of the video media group is greater than the picture story media group, this indicates that video media is more effective [22]. Module group has a significantly better effectiveness in increasing mother's knowledge in the prevention of dental caries in preschool children compared to the poster group. This is in line with the research of Herwanda *et al.*, 2019 on elementary school students in Banda Aceh. This study uses pop-up books and posters in dental health education interventions. The results of this study showed that there was a significant increase in the score on both media, but the pop-up book media was more effective than the poster in increasing the dental and oral health knowledge of elementary school children aged 5 years [23]. Andriany's research. P, *et al.*, at Banda Aceh in 5th grade elementary school children, with dental health counseling interventions using animated posters and cartoons. The result of this research is that animated cartoon counseling media is more effective than poster media in increasing dental health knowledge [21].

Audiovisual group has a significantly better effectiveness in increasing mother's attitude in the prevention of dental caries in preschool children compared to the poster group. This is in line with the research of Al-Said OAM *et al.*, on elementary school students in Egypt. This study used two dental and oral health education materials in caries prevention (video and poster), which were used to evaluate knowledge, attitudes and actions. The results of this study are that both video and posters are considered effective

educational methods, but to improve attitudes and actions, video media is more effective than posters [24].

The audiovisual group and the module group had a significantly better effectiveness in increasing the score of mother's actions in preventing dental caries in preschool-aged children compared to the poster group. This is in line with Maftuhatin's research on 2017. The results showed that there was an increase in the value of knowledge, attitudes and actions of brushing teeth between pretest and posttest ($p < 0.001$), so that the health education package affected the level of knowledge, attitudes and actions of brushing teeth [25]. Syed E. Haque, *et al.*, on 2016 researched students in Araihasar Thana, Narayanganj district, Bangladesh using audio-visual aids, models in the form of photos, phantom models, slides, posters that were carried out for 6 months. The result is that oral health education interventions are effective in increasing knowledge, attitudes and practices (actions) on oral health and significantly reducing the prevalence of untreated dental caries among school-age adolescents from grades 6-8 in rural areas of Bangladesh [10].

CONCLUSION

Online dental health education through *Whatsapp* group discussions by providing media modules, posters and audiovisuals is effective in improving mother's behavior (knowledge, attitudes and actions) in preventing dental caries of preschool children. Dental health education using audiovisual media and modules is more effective than poster media in improving mother's behavior (knowledge, attitudes and actions) in preventing dental caries in preschool children.

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