



The Effectiveness of Health Education using Mobile Phone-based Audiovisual on Knowledge and Attitude among Mother in Treating Toddler with Pneumonia

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Abstract. Mothers who have good knowledge will support the acceleration of pneumonia recovery of toddlers. The study aimed to examine the effectiveness of mobile phone-based audiovisual education on increasing knowledge and attitudes among mothers in treating toddlers with pneumonia. The quasi-experimental study, pre-test, and post-test design with the non-equivalent control group were applied in this study. Forty-six samples collected using consecutive sampling with questionnaires analyzed by the Fisher Exact Test. There are differences in the knowledge and attitudes of mothers in the intervention group before and after health education (knowledge: $p = 0.017$; attitude: $p = 0.003$). But in the control group, it is only knowledge that is significantly different ($p = 0.030$). Knowledge and attitudes in the intervention and control groups have different statistical values after health education (knowledge: $p = 0.018$; attitude: $p = 0.384$). Conclusion: There is a correlation between education and experience with knowledge of mothers in treating toddlers with pneumonia, but there is no difference in mothers' attitudes. Concerning age, family income, and information, there is no difference in mothers' knowledge and attitudes. Using audiovisuals in health education activities to improve mothers' knowledge and attitudes.

Keywords: Audiovisual, the toddler with pneumonia, knowledge, attitude



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INTRODUCTION

Pneumonia is a lung inflammation caused by bacteria, viruses, and fungi (1). International Vaccine Access Center reports that globally pneumonia and diarrhea account for 25% of deaths of children under five years of age, 1,5 million children (2). Fifteen countries have the highest mortality in the world, one of which is Indonesia. The results of Riskesdas (Fundamental Health Research) in 2013 showed that the provinces that had the highest incidence of pneumonia for all ages were East Nusa Tenggara (4.6%), West Sulawesi (3.1%), Papua (2.6%), South Sulawesi (2.4%) and Central Sulawesi (2.3%). The highest discovery of pneumonia sufferers in toddlers in Central Sulawesi Province was Palu City, which amounted to 11.29 per 1000 live births (3).

Several risk factors trigger pneumonia in toddlers, namely LBW (Low Birth Weight), malnutrition, lack of breastfeeding, vitamin D and A deficiency, exposure to cigarette smoke, and education (4). Lack of parental knowledge about the danger signs and symptoms of pneumonia and delays in bringing their children to health services is a factor for the increase of incidence and mortality in toddlers with pneumonia (5). Nurses are one of the health workers who act as caregivers, who aim to provide health education to increase knowledge and change the attitudes of parents, families, and communities. The health education program is beneficial for nurses or health workers to provide knowledge about pneumonia and parents' behavior in treating their children (6).

A previous study explores perceptions about family empowerment in toddlers with pneumonia in hospitals. In this study, there were three main themes, one of which was family empowerment. The study was found that through Family empowerment, there was an increase in knowledge and skills, knowledge sharing, pride and self-confidence, short days of care, early detection of pneumonia, and a decrease in morbidity rates (7). Audiovisual media is a tool used to provide subject matter by combining audio and visual involving hearing and vision simultaneously, such as video, television, and CCTV (8). Junior et al. have carried out a study on the development of educational videos for eye health promotion for school children. The results of the study found that educational videos affected people's understanding of the subject matter, so they can diagnose and deal with earlier eye disorders (9).

In 2013, Ball State University conducted an annual survey of 73% of students using smartphones in their daily activities (10). Nam-Ju et al. his research on the results of learning based on mobile video found that using clips Mobile-based video will increase students' motivation and self-confidence (11). The results of a preliminary study through informal interviews with four nurses at a hospital in Central Sulawesi showed that the lack of understanding of mothers about pneumonia, especially about early symptoms of children, might expose to pneumonia. Most pneumonia patients are referrals from regions or rural areas. Efforts have been made to deal with the problem of pneumonia, one of which is health education. The types of media used in education are still minimal, namely leaflets and flipcharts. From the results of the interview, it was also found that there are no educational media in the form of audiovisual media containing pneumonia information. Therefore, the researchers are curious to find out the effectiveness of health education using mobile phone-based audiovisuals as a media for health education in increasing knowledge of pneumonia and the attitude of parents in caring for toddlers with pneumonia.

OBJECTIVE

The study aimed to examine the effectiveness of mobile phone-based audiovisual education on increasing knowledge and attitudes among mothers in treating toddlers with pneumonia.

METHOD

This study was conducted by using a Quasi-experimental with Non-equivalent Control Group pre-test and Post-test design. This research was conducted at 46 mothers who have toddlers with pneumonia who were treated at Anutapura General Hospital, Undata Hospital, and Madani Hospital in Palu City, Central Sulawesi, Indonesia. Technique data collection used consecutive sampling. At first, the research sample was taken in the intervention group until the number of samples was fulfilled then the control group. Inclusion criteria: Mothers who have toddlers with pneumonia and bronchopneumonia are willing to become respondents and sign a statement of willingness to become respondents, mothers who can write, read, and speak Indonesian clearly, and mothers who have an android cellphone. Exclusion criteria: Mothers who suffer from illness and toddlers with pneumonia with complications. The study consisted of two groups, namely the intervention group and the control group, with a sample of each group of 23 respondents. The intervention group was educated using videos, while the control group was educated using leaflets.

In the intervention group, the pretest was conducted on the first day using a knowledge questionnaire and an attitude questionnaire. Health education interventions were given on the second day using audiovisual media. Health education material is sent to WhatsApp. Then respondents download it with the help of researchers or research assistants. Researchers conducted health education by watching respondents watch videos for 15 minutes. Then respondents were asked to view the video again at another time 2-5 times.

Furthermore, on day seven, respondents were given a post-test using a questionnaire of knowledge and attitudes of mothers caring for children with pneumonia. Respondents who returned home on the third day were followed up at the respondent's home. The number of respondents who were followed up at home was seven people for the intervention group, while the control group was five people. In the control group, a pre-test was done on the first day using a questionnaire of knowledge and attitudes of mothers caring for children with pneumonia. On the second day, researchers provided health education with leaflet media. Posttest was carried out on the seventh day using a questionnaire of knowledge and attitudes of mothers caring for children with pneumonia.

Furthermore, researchers conducted health education in the control group using audiovisual, after the posttest was completed to apply the ethical principle of justice. Health education material is sent to WhatsApp. Then respondents download it with the help of researchers or research assistants. The pre-test is conducted to assess whether the intervention group and the control group have the same measurement results after the intervention. Besides, the design of this study will compare the differences between the intervention group and the control group after being given intervention.

The instrument of data collection used questionnaires of respondent characteristics, knowledge, and attitudes of mothers. Knowledge and attitudes questionnaire has been tested for validity and reliability for 20 respondents using product moments, each with Cronbach Alpha 0.816 and 0.792. This questionnaire was used to determine the characteristics of the respondents, including the age of the mother, the age of the toddler, the age of the toddler, the

mother's education, family income, experience caring for children with pneumonia, and previous information about pneumonia.

The knowledge questionnaire is used to measure the mother's knowledge about pneumonia. This instrument consists of 13 question items with multiple choice answer choices. The correct answer is 1, while for an incorrect answer, the value is 0. The number of answers divided by the number of questions is then multiplied by 100.

The attitude questionnaire is used to measure the attitude of caring mothers for children under five with pneumonia. This instrument consists of 14 question items, consisting of 12 positive questions and 2 negative questions. Choices of answers to positive questions: strongly agree with a score of 4, agree with a score of 3, disagree with a score of 2, strongly disagree with a score of 1. In contrast, a negative question: strongly disagree with a score of 4, disagree score 3, agree score 2, strongly agree with a score of 1. The total number of answers divided by the maximum value multiplied by 100.

Audiovisuals and leaflets as a medium to provide health education to mothers of children under five with pneumonia. Researchers compile audiovisual material, which is then consulted with child care lecturers regarding audiovisual content and leaflets covering the contents of the material, language, writing, sound, images, and videos. After the consultation, researchers make revisions following the input and suggestions from the results of the consultation

Data analysis in this study used the Chi-square test. After the data was analyzed, it did not meet the Chi-square test criteria because more than 20% of cells had expected less than 5, so the alternative test used the Fisher exact test. The research ethics committee, faculty of nursing in Indonesian universities, has approved this study (No.152/UN2.F12.D/HKP.02.04/2018). Informed consent was obtained from each respondent who was willing to participate in this study

RESULTS

Characteristics of Respondents

Table 1 showed the characteristic of respondents. Most mothers who have children under five with pneumonia are early adults (19-30) at 69.6% in the intervention group and the control group at 56.5%, higher education 39.1 in the intervention group while, 56.5% in the control group. Meanwhile, income mothers in both the intervention and control groups have a high income (65.2% and 78.3%). The majority of mothers who have children under five with pneumonia don not have prior experience amounting to 73.9% in the intervention group. While in the control group is 78.3%, and most mothers have never received information previously about pneumonia by 73.9% in the intervention group while in the group, control is 73.9% (see table 1).

Table 1 Characteristics of respondents

Variable	Intervention (n=23)		Control (n=23)	
	F	%	F	%
Age				
Early Adult (19-30)	16	69.6	13	56.5
Middle Adult (31-44)	7	30.4	10	43.5
Education				
High	9	39.1	7	30.4
Middle	8	34.8	13	56.5

Elementary	6	26.1	3	13.0
Income				
High	15	65.2	18	78.3
Low	8	34.8	5	21.7
Experience				
Experienced	7	30.4	5	21.7
Inexperienced	16	69.6	18	78.3
Information				
Ever	6	26.1	6	26.1
Never	17	73.9	17	73.9

The difference scores of knowledge before and after receiving intervention among the experimental group

Table 2 explained the difference of knowledge before and after receiving intervention among the experimental group and the control group. The findings found that the intervention after receiving health education, most of the mothers' knowledge improves to be well informed with 56.5% (less) pretest results being increased with the results of posttest 73.9% (good) and control group of pretest 73.9 (less) increase with the results of Posttest 60.9% (good). Similarly, the attitude of the mothers after being given health education has a significant rise in attitude with a percentage rate in the intervention group is 52.2% (less) increasing with Posttest results of 69.6% (deficient). In the control group after health education, there are no significant changes, most of them already had a good knowledge with the results of the pretest 78.8% (good) which increase the posttest result of 87.0% (good).

Table 2. The difference of knowledge among the experimental group and the control group after receiving the intervention

Intervention Group					Control Group				p-value
Variable	Pre-test		Post-test		Pre-test		Post-test		
	F	%	F	%	F	%	F	%	
Knowledge									0.017
Good	10	43.5	17	73.9	6	26.1	14	60.9	
Deficient	13	56.5	6	26.1	17	73.9	9	39.1	
Attitude									0.003
Good	11	47.8	16	69.6	18	78.3	20	87.0	
Deficient	12	52.2	7	30.4	5	21.7	3	13.0	

Correlation between age, education, income, experience, and information with mothers' knowledge after receiving health education

The results of the analysis in Table 3 show that there is a correlation between mothers' education and the experience of treatment for pneumonia toddlers with knowledge of mothers with their respective p-value = 0.007 and p = 0.036

Table 3. Correlation between age, education, income, experience, and information with mothers' knowledge after receiving health education

	Post-test of knowledge				p-Value
	Good		Deficient		
	N	%	N	%	
Age of mother					0.507
19-30 (Early Adult)	20	69.0	9	31.0	
31-44 (Middle Adult)	11	64.7	6	35.3	
Total	31	67.4	15	32.6	
Income of family					0.421
High Income	23	68.7	10	30.3	
Low Income	8	61.5	5	38.6	
Total	31	67.4	15	32.6	
Education of mother					0.007
High Education	3	33.3	6	66.7	
Middle Education	14	66.7	7	33.3	
Elementary	14	87.5	2	12.5	
Total	31	67.4	15	32.6	
Prior experience					0.036
Experienced in Treatment	11	91.7	1	8.3	
Inexperienced in Treatment	20	58.8	14	41.2	
Total	31	67.4	15	32.6	
Prior information					0.608
With Prior Information	8	66.7	4	33.3	
Without Prior Information	23	67.6	11	32.4	
Total	31	67.4	15	32.6	

Correlation between age, education, income, experience, and information with mothers' attitude after receiving health education

Table 7 shows that there is no significant correlation among maternal age, maternal education, family income, the experience of treatment for toddlers with pneumonia, and prior information about pneumonia with mothers' attitudes after health education is conducted.

Table 4. Correlation between age, education, income, experience, and information with mothers' attitude after receiving health education

	Post-test of attitude				p-Value
	Good		Deficient		
	N	%	N	%	
Age of mother					0.272
19-30 (Early Adult)	24	82.8	5	17.2	
31-44 (Middle Adult)	12	70.6	5	29.4	
Total	36	78.3	10	21.7	
Income of family					0.095
High Income	28	84.8	5	15.2	
Low Income	8	61.5	5	38.6	
Total	36	78.3	10	21.7	

Education of mother					0.216
High Education	6	66.7	3	33.3	
Middle Education	16	78.2	5	23.8	
Elementary	14	87.5	2	12.5	
Total	36	78.3	10	21.7	
Prior experience					0.187
Experienced in Treatment	11	83.3	1	8.3	
Inexperienced in Treatment	25	73.5	9	26.5	
Total	36	78.3	10	21.7	
Prior information					0.481
With Prior Information	10	83.3	2	16.7	
Without Prior Information	26	76.5	8	23.5	
Total	36	78.3	10	21.7	

DISCUSSION

Characteristic of respondents

The mothers' age who have children afflicted by pneumonia was 69.6% with an age range of 19-30 years (early adulthood). The results of this study found there is a correlation between age and maternal attitudes, but there is no age correlation found with knowledge. This indicates that one's age does not reflect the high level of one's knowledge. Previous studies found a relationship between age and knowledge (12,13). The intervention group has a majority of highly educated mothers, namely 39.1%, while those in the middle-level educated control group is 56.5%. Mothers who have low education tend to have toddlers exposed to pneumonia compared to mothers who are highly educated (14,15). Other studies showed that no correlation between education and knowledge of mothers in treating children afflicted by the disease of pneumonia with a value of $p = 1.00$ (16).

Most of the family income of respondents with high income is above Rp2,235,900. Family income can guarantee the availability of daily necessities. The economic status may influence the occurrence of pneumonia in children. The higher a person's financial status, the more likely the person is not to suffer from pneumonia (14). Statistically, the results of the study show no correlation between income and knowledge and attitudes of mothers. This research is similar to the research conducted by Parvez, Wiroonpanich, and Naphapunsakul, who found that there is no correlation between income and knowledge of mothers in treating children suffering from pneumonia with a value of $p = 0.6$ (16). This finding is different from the results of the study claimed that income could affect knowledge and attitudes with an amount of $p = 0,000$ (17).

The intervention group and the control group are mostly mothers with no experience of 69.6% and 78.3%. Statistically, there is no significant correlation between the experience, knowledge, and attitudes of mothers. This is consistent with previous research that is no correlation between experience and knowledge of mothers in treating toddlers suffering from pneumonia with $p = 0.19$ (16). Almost all mothers who have children afflicted by pneumonia did not have information about pneumonia before. Mothers who have received information about the management of pneumonia are 26.1%, while mothers who never received information are 73.9%. Statistically, it shows that there is no correlation among prior information in treating toddlers afflicted by pneumonia, the mother's knowledge, and attitudes.

The difference scores of knowledge before and after receiving intervention among the experimental group

The percentage of mothers' knowledge in the intervention group before health education was conducted in which most of the mothers had less knowledge with the percentage of pretest results of 56.5%. After health education was carried out, mothers' knowledge increased with the percentage of Posttest results in 73.9% (good). In the control group, the percentage of mothers' knowledge of the majority of mothers have less knowledge with the results of pretest 73.9% (less), after health education had increased with the percentage of Posttest results from 60.9% (good). This indicates that the majority of mothers' knowledge before being given health education is less. After health education, it has increased. It was similar to the results of a study by Mohamed about the impact of educational programs on the level of knowledge about the polycystic ovarian syndrome in teenage girls. After providing health education, it was found out of 96 respondents. There is 92.7% of good knowledge, 6.25% of sufficient knowledge, and only 1.04% have low knowledge. It can be concluded that providing health education is a very effective way of changing one's knowledge (20).

The percentage of the results of pretest attitudes in the intervention group before health education is 52.5% (not good). After being given health education, the mothers' attitude improved with the percentage of posttest results of 69.6% (good). The percentage of mothers' attitudes in the control group before health education mostly has a good attitude with a percentage of 78.3% pretest results (good), after health education being given, there is an increase in attitude with the percentage of posttest results of 87.0% (good). This indicates that the difference in percentage before and after the mothers being given health education did not experience a significant attitude change. Based on the results of the study of Haqhihi and Varzande about the knowledge of mothers on exclusive breastfeeding, found that from 201 respondents, 73.2% of mothers have good attitudes, while the rest have moderate attitudes. This shows that mothers have a positive attitude towards exclusive breastfeeding (15).

Correlation between age, education, income, experience, and information with knowledge and attitude among mothers

Age

There are no correlation between mothers' age, knowledge, and attitudes. This indicates that one's age does not reflect the high level of one's knowledge. This research is supported by the results of research conducted by Haqhihi and Varzande, who found no significant correlation between mothers' age and knowledge (15). The results of this study are different from the effects of research that claimed age could affect a mother's knowledge, and also, there is a correlation between age and mother's attitude (13). The same is the case with the results of Hoseini, Walki, Khakshour, and Saeidi and Mardany, Mohsenzadeh, and Yariipoor, who claimed that there is a correlation between age and knowledge (23,24).

Education

The majority of mothers who have toddlers afflicted by pneumonia are highly educated in the intervention group, while those in the control group have secondary education. The results of this study indicate there is a correlation between education and the mother's knowledge. This finding is supported by research conducted by Haqhihi and Varzande, which shows that education can affect one's knowledge (15). Another researcher also found that there was a correlation between education and the level of knowledge of mothers (13,23,24).

Family income

The percentage of family income is high income. This is different from the results of the study of Esfandiyari et al. in his study, the income of respondents are mostly middle income. The results of the study statistically, there is no correlation between income, knowledge, and attitudes of mothers (13). The other result researchers showed that no relationship between income and knowledge of mothers in treating children afflicted by pneumonia with a value of $p = 0.6$ (6). This finding is different from the results of the study claimed that income could affect knowledge and attitudes with a value of $p = 0,000$ (17).

Experience of mothers in treating toddlers afflicted by pneumonia

Statistically, there is a significant correlation between experience and the mother's knowledge and attitudes. This research on parental knowledge and attitudes in the use of antibiotics found that parents who have experience in treating sick children will apply this experience to other children. For example, in the case of antibiotics, mothers who have given antibiotics to one of their children, the mother will treat the same way to other children if they have the same disease (18). This study is different from the research conducted by Parvez, Wiroonpanich, and Naphapunsakul, who found that there was no correlation between experiences and knowledge mothers care for toddlers afflicted by pneumonia with a p-value of 0.19 (16).

Previous information about pneumonia

The intervention group and the control group are mostly mothers who have never received prior information about pneumonia. Statistically, it shows that there is no correlation between previous information about pneumonia and the mother's knowledge and attitude. Other researchers found that information can influence one's knowledge (19). The majority of parents received information about the treatment obtained from doctors (65.2%), television (18.5%), family (17.6%), friends (14.4%), newspapers (12.8%), radio (8.7%), others (13.3%) (17).

CONCLUSION

Providing health education using mobile phone-based audiovisual media to the knowledge and attitudes of mothers in treating toddlers afflicted by pneumonia effectively increases knowledge. It was not effective in changing mothers' attitudes. So, this may be applied to provide health education to patients. Further research needs to use randomized control trial designs in different places to ensure the effectiveness of health education using the video-based mobile phone.

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