

## Measles-Rubella immunization health education using animated videos and text messages via WhatsApp

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### Abstract

**Purpose:** This study aimed to compare the effect of health education using animated video and text messages through WhatsApp on parental knowledge and attitude. **Method:** This study used a quasi-experimental design on two groups that consisted of 36 respondents in each group. The first group received animation videos about MR immunization, and the second group received text messages through WhatsApp. The instruments of this study consisted of a knowledge questionnaire and an attitude questionnaire. The study was conducted on parents who had an infant less than nine months old, had a smartphone and WhatsApp account. **Results:** The pretest-posttest scores show increased knowledge and attitude about MR immunization after educational animation video and text message intervention. Video animation had a higher mean of knowledge and attitude than text messages. **Conclusion:** Health education using animation videos through WhatsApp can improve parental knowledge and attitude higher than a text message.

**Keywords:** measles-rubella; health education; animation video; text message; WhatsApp

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## INTRODUCTION

In 2012, WHO launched the Global Measles-Rubella Strategic Plan 2012-2022, targeting the elimination of measles and rubella in all WHO regions. So WHO urges member countries to achieve the elimination of measles in 2015 and control of Rubella disease in 2020 [1]. Measles and Rubella are dangerous diseases that can cause morbidity, disability, and even death [2]. Measles can become an epidemic if immunization coverage is low, and herd immunity is not formed. When a person is exposed to measles, 90% of people who interact closely with sufferers can get it if they are not yet immune to measles. A person can be immune if they have been immunized or infected with the measles virus. In 2000, around more than 562,000

children per year died worldwide due to complications of measles. In 2014, that number decreased to 115,000 per year as a result of measles immunization and various efforts that have been made [3]. Indonesia ranks fifth out of 10 countries with the most cases of measles in the world. The total number of measles cases in Indonesia in 2018 in 2374 cases [4].

In children and adults, the Rubella virus causes mild fever and a rash that can resolve on its own [5]. However, Rubella can cause teratogenic effects if it occurs in pregnant women especially in the first trimester. Rubella can cause miscarriage or disability in infants which is often called Congenital Rubella Syndrome (CRS). CRS is a collection of symptoms in the form of Congenital Heart Disease, hearing loss, conge-

nital cataracts, microcephaly, and developmental delay [6].

Until now, no specific treatment has been found for measles and rubella. However, measles and rubella can be prevented by immunization. Measles-Rubella (MR) immunization is an immunization aimed at forming immunity against measles and rubella as well. MR immunization is given to children aged > 9 months to <15 years which is the age most vulnerable to contracting measles and rubella. MR immunization has been carried out in the United States since 1974 and Rubella's disease was eliminated from the United States in 2010 [5]. However, in developing countries, MR immunization has not yet been introduced in routine immunization until 2017. Indonesia and India are 2 countries in the Southeast Asia region that have only recently introduced the Measles-Rubella Immunization into routine immunization programs in 2017 [4].

Indonesia targets to eliminate measles and rubella, or CRS control, in 2020. The Indonesian government has set these targets according to global targets.

The use of the internet and smartphones has been widely researched and proven to be effective as a medium to improve public health status. Internet access makes it easy for people to find specific information and learning. Information search is dominated by internet utilization through smartphone media. This trend is an opportunity for health practitioners to deliver health information with social media [7].

Several studies that have investigated video animation and text messages through smartphones and other digital media have been carried out including the use of video and text for subjects who want to quit smoking[8], video education and written education to increase knowledge about HPV (Human Papilloma Virus) in among young adults [9], about BSE education through Whatsapp and LINE messenger media [10], as well as research on video animation education compared with written text messages on subjects with low levels of health literacy [11].

WhatsApp is a messaging application that is popular in various circles with the highest number of users in the world. The facilities available in the application are facilities to send messages, pictures, videos, and video calls to create discussion groups. is the application most frequently used and with the longest duration by smartphone users [7]. The use of smartphones can reduce costs and improve health quality to strengthen disease prevention and improve health in the long run. High flexibility and accessibility

support the importance of using smartphones as a medium to improve health status. The use of WhatsApp as a medium for sending health education has promising opportunities because education can be delivered in video or text format.

## METHOD

This research was a quasi-experimental research design. The research took place in September to October 2019. The subjects of this study consisted of 72 parents with babies in the work area of Unaaha Primary Health Care, Konawe Regency, divided into 2 treatment groups: 36 people in the animated video group and 36 people in the text message group. Sample criteria in this study were parents who had babies <9 months, had a minimum smartphone OS Android Jelly Bean or IOS 7, had a WhatsApp account, and were able to operate it.

Each respondent was given a pre-test of knowledge and attitude using a questionnaire and then given an intervention through the Whatsapp application for 7 days. Furthermore, respondents were given a post-test on knowledge and attitude at home visits.

The instrument used in this study was a questionnaire which consisted of written questions to obtain information from respondents regarding knowledge and attitudes about MR immunization. The questionnaire used in this study was a questionnaire that had been used in previous studies and had been developed by researchers. Before using the questionnaire, a validity and reliability test had been conducted on 30 respondents who were not selected as research subjects.

Other instruments used in this research were the design of research video media based on the stages of study of literature, the design of counseling material in the form of videos for intervention, and assessment by experts. They were mostly crafted by studying theories related to Measles and Rubella disease and MR Immunization through journals and the latest scientific references and other relevant sources. The video was designed in the form of animation with a duration of 5 minutes. The animation was a sophisticated technique to make images more interesting/lively. A duration of 5 minutes was chosen to avoid boredom.

Besides video, another instrument used in this study was the text messaging media. The design of the text message media used in this study was based on the stages of literature study, the design of counseling material in the text message media, and expert

judgment. Generally done by studying theories related to Measles and Rubella disease and MR Immunization through journals and the latest scientific references and other relevant sources.

Univariate analysis and bivariate analysis were carried out to determine the effect of animated videos and text messages on knowledge and attitudes on the pretest and posttest of the animated video group and the text message group. The test used to determine differences in knowledge and attitudes in the video group and text message pretest-posttest was the Wilcoxon test. The test conducted to determine the increase in knowledge and attitude scores in the video group and text message group was the Mann-Whitney test. All tests were carried out using the SPSS version 20 software.

## RESULTS

Table 1 shows that both video groups and text message groups were similar. This could be seen through the characteristics of age, the number of children, education, and employment that had the p-value > 0.05. So that the two groups of research subjects did not have significant differences and deserved to be compared.

Table 2 shows that statistically, providing education with animated video media through the WhatsApp application could improve parents' knowledge and attitudes about MR immunization. Table 2 also shows that education with text messaging media through the WhatsApp application could also improve parents' knowledge and attitudes about MR immunization.

**Tabel 1. Subjects Characteristics**

Characteristics	Groups		P Value
	Animated Video (n=36)	Text Message (n=36)	
<b>Education</b>			0.440*
Primary	4	8	
Secondary	18	15	
Tertiary	14	13	
<b>Employment</b>			0.527*
Employed	7	5	
Unemployed	29	31	
<b>Age (y.o.)</b>			0.374**
Mean (SD)	27.1 (5.0)	28.3(6.5)	
Range	19-42	18-40	
<b>Number of children</b>			0.891***
Median	2	2	
Range	1-6	1-5	

\*)Chi-Square Test, \*\*) T-Test, \*\*\*)Mann-Whitney Test

Statistically, there was a significant difference between attitude and knowledge scores between the

animated video groups compared with the text message group. The percentage increase in knowledge scores in the animation video group was higher than in the text messaging group. Likewise, the percentage increase in attitude scores was higher in the animated video group compared with the text message group.

**Table 2. Comparison of Knowledge and Attitude Scores in Animated Video and Text Message Groups**

Variable	Groups		P-Value
	Animated Video (n=36)	Text Message (n=36)	
<b>Knowledge</b>			
Pretest			0.580*
Mean (SD)	68.4 (10.8)	65.3 (17.9)	
Median	70.5	64.7	
Range	41.1-82.35	23.5-94.1	
Posttest			0.004*
Mean (SD)	92.1 (7.1)	80.3 (17.6)	
Median	94.1	85.2	
Range	76.4-100	41.1-100	
Pretest-posttest comparison	p < 0.001**	p < 0.001**	
% median increase	30.7%	15.3%	0.003*
<b>Attitude</b>			
Pretest			0.701*
Mean (SD)	74.9 (9.0)	74.4 (11.2)	
Median	73.6	73.6	
Range	57.8-100	56.1-98.2	
Posttest			0.000*
Mean (SD)	90.5 (7.9)	78.8 (11.8)	
Median	92.9	80.7	
Range	66.6-100	56.1-100	
Pretest-posttest comparison	p < 0.001**	p < 0.001**	
% median increase	24.1%	4.2%	0.000*

\*) Mann-Whitney Test, \*\*) WilCoxon Test

## DISCUSSIONS

The characteristics of the subjects in this study were reviewed in terms of age, occupation, education, and the number of children. The age of the mothers was in the range of 18-42 years. It was possible for the two groups in this study to have similarities in emotional maturity, experience, and information because the age of the study subjects in the two groups had insignificant differences. The results of this study indicate that health education with video media through the Whatsapp application is proven to be able to improve parents' knowledge and attitudes about MR immunization. Knowledge is the result of observations and experiences of individuals about something new

that can be useful for the individual. According to Bloom and Skinner, knowledge is the ability of a person to re-express what he knows in the form of proof answers both oral and written as evidence of the stimulus reaction of questions [12].

Health education provided through the Whatsapp app is in accordance with today's lifestyles that cannot be separated from smartphones. Education through smartphones broadens the reach of recipients of information and shortens the distance and time. Whatsapp is the most often used application by young adults even among housewives. Health education through smartphones can be provided in various formats. One way is to use an animated video format.

The results of this study indicate that the use of video as a medium in health education is considered to be more interactive so that it is more inviting respondents' interest to receive the information provided [13]. Several previous studies have revealed that the use of videos in health education can increase knowledge and attitudes because it can attract and stimulate even groups of people who have low levels of health literacy [8,14].

Research conducted by Nicola Stanzyk et al on video interventions on subjects who want to stop smoking reveals that the information provided in video format is easier to digest (less effort) and is able to make someone more focused on the common thread of the education provided. The process of changing attitudes can not be separated from changes in persuasion from video media that change attitudes by including ideas, thoughts, and opinions as well as new thoughts through an interactive format aimed at shaping the internalization of individual attitude components [8,15].

The results of this study are in line with the results obtained in a study conducted by Dwi Hesti Ermawati regarding the influence of counseling on maternal knowledge about pentavalent immunization in Keprabon Surakarta village [16].

The results of this study indicate that health education with text messaging media through the Whatsapp application is proven to be able to improve parents' knowledge and attitudes about MR immunization. This is illustrated in table 4.4 which shows an increase in parents' knowledge and attitudes about MR immunization after being given an educational intervention on MR immunization.

According to Notoadmojo, knowledge is the result of tofu and occurs after individuals have sensed a certain object. While attitude is an action or activity which is a

factor that supports behavior that shows acceptance or rejection. The role of the media in health education is to help channel messages to the senses owned by respondents [12,17].

According to Azwar, one of the exposures that influence one's knowledge and attitudes is the mass media[15]. Nowadays smartphones are a means of communication that can shape opinions and individual beliefs. Research that has been conducted to date reveals that mHealth-based health education is a health promotion media that promises to change knowledge, attitudes, and health behaviors widely [18]. One of the most widely used smartphone applications is the text messaging service of the WhatsApp application.

The results of this study are in accordance with the results of research conducted by Dinda Anindita about BSE education through Whatsapp and LINE messenger media which can significantly improve adolescent knowledge and attitudes about BSE. This is evidenced by the average value of knowledge ( $p < 0.001$ ) and attitude ( $p < 0.001$ ) which shows differences before and after the intervention [10].

In line with the results of previous studies conducted by Usi Lanita who conducted research on health education based on text messages in overweight and obese adolescents. In this study health education with text messages was able to increase adolescent knowledge about obesity ( $p < 0.05$ ) [19].

The results showed the median knowledge score before education with video media was 70.5 and after education with video media through the Whatsapp application was 94.1, whereas in the text message group before the intervention was 64.7 and after the intervention 85.2. So that there was a statistically significant increase in knowledge scores in both groups ( $p < 0.001$ ). These results are in line with previous studies conducted by Andrea Krawczyk who compared the effectiveness of video and written education to increase knowledge about HPV (Human Papilloma Virus) among young adults. Based on this research both video and written media are equally effective at increasing knowledge about HPV and increasing vaccination participation [9].

Table 2 shows an increase in the percentage of median knowledge score in the video group by 30.7%, higher than that in the text message group by 15.3% with a  $p$ -value  $< 0.001$ . This is in line with previous studies conducted by Nicola Stanzyk who conducted research on people who want to stop smoking by providing interventions in the form of computer text and video that is specifically designed. The results

showed that computer video can increase knowledge and motivation to stop smoking compared to those given only text (OR 1.45, 95% CI 1.09-1.94, P = 0.01). Video is considered more successful given to smokers with low educational levels [8]. Based on Multimedia Learning Theory illustrates how a person can learn through pictures and words. This theory is based on the dual-channel assumption which estimates that individuals have separate channels for processing auditory and visual information. Both of these channels have limited capacity in information processing. So according to this theory, the information presented in two modes (audiovisual) will be better stored than information presented in one mode only. The use of dual-mode in the form of the animated video also reduces the likelihood of overfilling of information storage channels [11]. Based on table 4.4 in the pre-test results of the research group, most parents had an average attitude score of the video media group 90.5 and in the text message group 78.8. Attitude is a predisposition to behavior or a tendency for actual behavior. Attitude is also a manifestation of an individual's view of an object in this case the attitude about MR immunization and ready is a settled system of components of cognition, affection, and convention [20].

In table 2, the percentage increase in attitude score in the video group was 24.1% higher than the text message group 4.2% with a p-value <0.001. So it can be concluded that the increase in attitude in the video group is higher than in the text message group. The results of this study are in line with research conducted by Corine S Meppelink who revealed that animated videos can improve attitudes when compared to written text messages (p = 0.03)[11].

Other research that is in line with the results of this study is a study conducted by Yuli Lestari about the use of mobile video to increase the knowledge and attitudes of mothers in reducing the duration of diarrhea in infants. The results of the study showed a significant difference between maternal attitudes before and after the intervention (p = 0.008) [21].

Health education is used as a tool to increase knowledge and awareness that can improve individual attitudes about MR immunization. Based on Cognitive Theory, health education is a learning process that can improve the interpretation of the good sensations received. This sensation will affect aspects of perception and will help individuals in making decisions. In this study, this is indicated by the attitude of parents about MR immunization. Parents can make

the decision to change their attitudes about MR immunization for the better if they can concentrate, understand, and interpret the information they get [22].

In today's digitalization era, the number of smartphone users in Indonesia reaches around 25% of the total population of around 65 million people. The number of smartphone users provides an opportunity for health workers to provide education in digital form[21]. Health information can affect a person's attitude if the information is easy to process. Information that has an audiovisual (video) format that uses the sense of sight and hearing will be easier to process than information that uses only one sense (text). The ease with which people process information will affect a person's preferences about that information. Therefore, a person can have a positive attitude through the information that is easier to process compared to information that is difficult to process. The theory is in line with the results of this study where the group that gets the video is easier to process information about MR immunization so that the increase in attitude is higher compared to group text messages [23].

## CONCLUSIONS

Health education using animation videos through WhatsApp can improve parental knowledge and attitude higher than a text message. The method can be implemented by midwives or the health promotion workers of primary health centers, particularly in urban areas, to reach out and educate parents about MR immunization. This method makes the process of health promotion more organized so that the beneficiaries can access the information through the WhatsApp groups that they follow. Therefore, they can also keep their knowledge updated in more interactive ways. Future studies can explore more about how the method can improve parents' literacy and compliance towards MR vaccination.

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