



Effectiveness Of Using Comic Media In Children Aged 6-11 On The Level Of Knowledge And Attitude Of Following Covid-19 Vaccination

Harlinah¹, Iskandar Selly², Aziz Alamsyah Muhammad³, Vera Iriani Abdullah^{4✉}

^{1,4} Poltekkes Kemenkes Sorong, Indonesia

^{2,3} Universitas Padjadjaran Bandung, Indonesia

✉ verabdullah1977@gmail.com, Phone : +825254609366

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Abstract

Globally, children remain affected by COVID-19, although their proportion is lower compared to adults. While children generally experience milder symptoms, they remain susceptible to infection and can contribute to disease transmission. During the early phase of the pandemic, children accounted for a relatively small proportion of total cases; however, infection rates increased with the emergence of more transmissible variants such as Omicron, leading to higher seroprevalence among pediatric populations. This study aimed to analyze the effectiveness of comic-based educational media in improving knowledge and attitudes of children aged 6–11 years toward COVID-19 vaccination. A quantitative quasi-experimental design with a control group using a pre-test and post-test approach was employed. The sample consisted of children aged 6–11 years who were divided into intervention and control groups. The intervention involved the use of educational comic media about COVID-19 vaccination. The results showed that comic media was effective in improving knowledge, as indicated by a significant difference (p -value = 0.000) and an N-gain score of 0.34 (moderate category). However, no significant difference was found in the attitude variable in the intervention group (p -value = 0.095), although the control group showed a significant change (p -value = 0.014). Furthermore, comparison between groups revealed no significant difference (p -value = 0.565) with a low N-gain category. In conclusion, comic media is effective in improving knowledge but not effective in changing attitudes among children, which may be influenced by parental education as a confounding variable.

Keywords: Children; Covid-19 Vaccine; Comic Media; Knowledge; Attitude

INTRODUCTION

Globally, children remain a population affected by COVID-19, although their proportion is lower compared to adults. Evidence indicates that children generally experience milder symptoms; however, they remain susceptible to infection and can contribute to disease transmission. In the early stages of the pandemic, children accounted for a relatively small proportion of total cases, but infection rates increased over time with the emergence of more transmissible variants such as Omicron, leading to

higher seroprevalence among pediatric populations in various countries (Wurm et al., 2019).

Coronavirus Disease 2019 (COVID-19) is an infectious disease caused by the SARS-CoV-2 virus that primarily affects humans. The most common symptoms include fever above 38°C, dry cough, and shortness of breath, which may progress to respiratory tract infections and, in severe cases, pneumonia (Huang et al., 2020).

The Chairperson of the Indonesian Pediatricians Association (IDAI) in 2020 stated that the incidence of COVID-19 in children in Indonesia increased 11-12 percent. the highest child in the world at 12.5% (Setianingsih & Indrayati, 2021). The COVID-19 virus has had a very significant impact on all aspects of people's lives, from the economy, health, social to culture. The problem faced by several countries, especially Indonesia, is that there are differences of opinion and public interest regarding the obligation to vaccinate. Opinions and interests of the Indonesian people vary, there are positive and negative opinions, some are interested and some are not. This difference arises because the public still questions the effectiveness, side effects and halallness of the COVID-19 vaccine. (Farina, 2021).(PD et al., 2021) Aceh and West Sumatra are the two provinces with the highest number of vaccine refusers. In Aceh Province, only 46% of people are willing to receive the vaccine, while in West Sumatra only 47%.(Islam et al., 2021) Apart from these two provinces, there are still several regions that have refused, one of which is the Papua region. The diversity of customs, beliefs, languages or dialects, and the system of fulfilling the needs of the people of Papua are still very strong and well preserved. Likewise with the level of understanding and willingness to accept new things is very difficult. In fact, there are several tribes and customs that prohibit receiving the Covid-19 vaccine.(Carrity Virginia Woisiri & Hutapea, 2021)

The Covid 19 vaccine that has been recommended by the World Health Organization (WHO), has passed the BPOM and has a halal certificate from the MUI including; COVID-19 mRNA, BNT162b2 (Pfizer), mRNA-1273 vaccine (Moderna), ChAdOx1nCoV-19/AZD1222 vaccine (Astra

Zeneca), Ad26.COV2. S (Janssen), Sinopharm and Sinovac.(Islam et al., 2021) For the national COVID-19 vaccination target, it is targeted that 96% of Indonesia's population has met the requirements including health workers, the elderly group, the non-elderly group, adolescents 12-17 years and children aged 6-11 years, while the administration of the COVID vaccine -19 given in 3 doses, with a minimum range of 6 months between doses for doses 1 to 2 and 3 months for doses 2 to 3 (Kementerian Kesehatan, 2021) The target group for vaccines in children is 26.5 million per live birth rate. Statistical data from the Ministry of Health of the Republic of Indonesia until the 2nd quarter of 2022, in the age group 6-11 years and 12-17 years, still do not meet the coverage target.(KPC PEN dan Dikes Papua Barat, 2022) This data is synergistic with West Papua Province vaccination coverage data for the 6-11 year age group, namely, the status of dose 1 is 23.9%, and dose 2 is 9%.(KPC PEN dan Dikes Papua Barat, 2022)

The World Health Organization (WHO) states that the low coverage of vaccines in the age group 6-11 years and 12-17 needs to be addressed immediately considering that this group has a range of exposures to COVID-19 infection (Setianingsih & Indrayati, 2021). The findings indicate that children are vulnerable to COVID-19 infection due to the characteristics of their developing immune system, resulting in immune responses that are not yet fully mature and may affect multiple organ systems. Furthermore, the development of the immune system and the inflammatory response play important roles in determining the level of susceptibility and clinical manifestations in children (Rotulo & Palma, 2023).

Age 6-11 years is a period when the brain is very open and sensitive in receiving various

kinds of learning and enrichment, both positive and negative, so that the child's growth and development will be optimal if the environment provides positive support. Providing education through age-appropriate reading, writing and drawing media is useful for stimulating children's knowledge and attitudes. One of the educational media that can be used to convey information to children optimally is by using comic media (Entoh et al., 2020).

Comics can be an entertainment medium, a communication tool as well as a learning medium for children.(Moza et al., 2019) his is in line with research conducted by Moza et al proving that comic media can increase the knowledge of children aged 6-11 years, in which the average score of knowledge before using comic media is around 62% and after using comics it increases to 78.5% (increased 16.9% (Moza et al., 2019)

However, studies examining the effectiveness of comic-based educational media on both knowledge and attitudes of children toward COVID-19 vaccination are still limited. Previous research has shown that comics can be an effective multimodal educational tool that enhances understanding, recall, and engagement by combining visual and textual elements. However, their application in health education, particularly in influencing knowledge and attitudes simultaneously, remains underexplored . Therefore, this study is important to provide evidence on the role of age-appropriate educational media in improving children's understanding and attitudes toward vaccination (Rosas-Blum et al., 2018).

Based on this phenomenon, this study was conducted using comic media as an educational tool containing information about COVID-19 vaccination. This media was designed according to the characteristics of children aged 6–11 years

to enhance their understanding effectively. This study aims to analyze the level of knowledge and attitudes of children aged 6–11 years toward participation in COVID-19 vaccination after being exposed to comic-based educational intervention.

METHOD

This research is a quantitative research using Quasi Experiment, with approach, with control group Design, pre test and post test. (Kusumarani et al., 2018). The study population consisted of children aged 6–11 years who had not yet received the COVID-19 vaccine, with a sample of 70 participants divided into intervention (comic media) and control groups. The sample was selected based on inclusion and exclusion criteria, and the comic media used had been tested for theoretical and empirical validity.(Angita.T, 2018)

RESULT

Table 1 Characteristic of Children Accompanied by Parents

Characteristic	Intervention		Control		p-value
	n	%	n	%	
Age					
6 years	12	34,3	6	17,1	0,699
7 years	5	14,3	5	14,3	
8 years	6	17,1	7	20	
9 years	3	8,6	5	14,3	
10 years	6	17,1	8	22,9	
11 years	3	8,6	4	11,4	
Gender					
boy	16	45,7	13	37,1	0,467
girl	19	54,3	22	62,9	
Mom's Education					
Elementary school	3	8,6	10	28,6	0,000

Secondary school	11	31,4	20	57,1	
Higher Education	21	60	5	14,3	
Mom's Occupation					
Working	16	45,7	15	42,9	0,81
Not working	19	54,3	20	57,1	

Conclusion : The table above shows the characteristics of the respondents based on the age of the child, gender, mother's occupation in the three groups tended not to show a significant difference with a p-value > 0.05, while there were significant differences in educational characteristics with a p-value <0.05 so that further tests will be carried out to see whether mother's education can affect the results of the study (confounding variable).

Table 2 Differences and Increased Knowledge of Children Aged 6-11 years about the COVID-19 vaccine in both groups

	Intervention		Control	
	Pre-test	Post-test	Pre-test	Post-test
Knowledge before and after				
Median	83 (7,57)	89 (6,75)	76,0 (7,4)	76,0 (7,37)
(SD)				
p-value	<0,001*		<0,001*	
Increased value of knowledge				
Median	6 (7,65)		0,00 (0,48)	
(SD)				
p-value	<0,001**			

Description: * Uji Wilcoxon, ** Uji Mann Whitney

The results of the pre-test and post-test knowledge statistics in the intervention group and the control group showed a significant difference (p-value 0.000). Analysis was also carried out to see the difference in score increase between the control and intervention groups. The mean

increase in the value of the intervention group was 6 (7.65) while the mean increase in the value of the control group was 0.00 (0.48). Analysis of the difference in the mean of the two groups obtained a p-value of 0.000. So it can be interpreted statistically significant.

Table 3 Differences and Improved Attitudes of Children Aged 6-11 Years About the COVID-19 Vaccine in the Two

	Intervention		Control	
	Pre-test	Post-test	Pre-test	Post-test
The attitude before and after				
Median	89	89	66	68,00
(SD)	(6,02)	(5,68)	(8,11)	(7,99)
p-value	0,095*		0,014*	
Increased value attitude				
Median	0,00 (8,33)		0,00 (4,59)	
(SD)				
p-value	0,565**			

Description: * Uji Wilcoxon, ** Uji Mann Whitney

The results of the pre-test and post-test attitude statistics in the intervention group showed no significant difference (p-value 0.095), while in the control group there was a significant difference with the value (p-value 0.014). Analysis was also carried out to see the difference in score increase between the control and intervention groups. The mean increase in the value of the intervention group was 0.00 (8.33) while the mean increase in the value of the control group was 0.00 (4.59). So it can be interpreted that the mean increase in attitude scores in the intervention group was greater than that of the control group, although it was not statistically significant. Analysis of the difference in the mean of the two groups found a p-value of 0.565 > 0.05,

which means that there is no statistically significant difference between the two groups.

Table 4. The Effect of Mother's Education on Knowledge Increase and child's attitude

Variable	Regression Coefficient	t	Sig.
Knowledge			
Constant	11,628		
Education	0,406	0,4	0,690
Attitude			
Constant	-4,167		
Education	2,503	2,050	0,044

Source: Primary data

In the knowledge variable there is a significant correlation between comic media and increased knowledge (p-value = 0.000) while education is not significant (p-value = 0.690). While the attitude variable shows the opposite result, namely education is correlated with an increase in attitude (p-value = 0.044).

Table 5 The Effectiveness of Comics in Increasing Knowledge and Attitudes Using the N_Gain Score Test (Intervention)

Intervention	Score	Effectiveness
Knowledge	0,345	Medium
Attitude	0,001	Low

Source: Primary data

The mean N-Gain score for knowledge is 0.345 (medium effectiveness) and the mean N-Gain score for attitude is 0.001 (low effectiveness). So that comics are quite effective in increasing knowledge compared to changing the attitude of children aged 6-11 years.

Table 6. The effectiveness of comic media on knowledge and attitudes based on respondents (intervention)

Effectiveness	Knowledge		Attitude	
	N	%	N	%
Low	13	37,14	22	62,86
Medium	18	51,43	9	25,71
High	4	11,43	4	11,43
Total	35	100	35	100

The table above shows that based on the results of the N-Gain test for each variable that was given the intervention, there were 4 respondents (11.43%), the effectiveness value was high, and there were 18 respondents (51.43%) who received a moderate effective value on variable of knowledge while 4 respondents (11.43%) who got a high value of effectiveness, 9 respondents (25.97%) who got a moderate effective value on the attitude variable. Whereas in the control group both knowledge and attitude showed low effectiveness.

Table 12. Description of the knowledge of the intervention group based on the questionnaire indicators

The assessment indicator for the questionnaire given by						
Knowledge	comic					
	Cinovac vaccine	Benefits of the vaccine	Method of vaccination	Vaccination requirements	KIPI	Handling KIPI
	99,05	97,14	76,19	93,33	60,00	99,05

Source: Primary data

Shows that based on the results of the questionnaire indicators the average score is very good (93.33-99.05) on the Sinovac vaccine indicator, the benefits, conditions and handling of KIPI, for the method of administration indicator the average value is good (76.19) while the KIPI indicator has an average value less (60.00).

DISCUSSION

Knowledge about the COVID-19 vaccine is important to do in order to minimize exposure to COVID-19. The knowledge conveyed includes the definition of vaccines, types of vaccines for children aged 6-11 years, vaccine mechanisms, the benefits of the COVID-19 vaccine and things that need to be done if side effects occur. (Pradiningsih et al., 2021) Providing vaccination as an effort to break the chain of

transmission of diseases with known causes such as infection with the COVID virus. Giving COVID-19 vaccination is given to targets who are vulnerable to contracting the corona virus with priority targets that have been determined from daily activities, frequency of close contact with sufferers up to the age limit of those who are vulnerable from 6 years old to the elderly.(Kesehatan et al., 2019)

The results of this study indicate that comic media can affect the increase in children's knowledge which is proven by the results of statistical tests with a p-value of $0.00 < 0.05$. The increase in the value of the intervention group was 6 (7.65) while the mean increase in the value of the control group was 0.00 (0.48). Analysis of the difference in the mean of the two groups obtained a p-

This is in line with previous research, which explains that knowledge can be obtained through teaching and training, including media input designed to provide information to the public.(Yanti et al., 2020)An effective educational medium to generate interest in learning and improve student learning outcomes is comic media, because comic media will create fun and not boring atmosphere for students. Comic media is proven to increase student learning outcomes by 75%. Increasing learning outcomes is preceded by student interest which can increase student interest and activity in studying the material provided value of 0.000.) So it can be said that comic media affects knowledge. The value of the effectiveness of comic media can increase knowledge with a value of 0.34 (medium effectiveness). Each of the variables given the intervention had 4 respondents (11.43%), the effectiveness score was high, and there were 18 respondents (51.43%) who got a moderate effective score. Whereas in the control group it

showed a low effectiveness value, which means that comic media can increase children's knowledge.(Hidayah et al., 2021)

This research is also in line with Nugroho Arie's research, which is an experimental research with a quasi-experimental research design, which was conducted at SD Bandar Lampung City. The subjects used as cases were elementary school children who were obese who received nutrition media interventions (comics). The total number of subjects consisted of 31 cases and 31 controls. The observed variables include changes in body weight, and changes in data knowledge. Data analysis with independent t-test and paired t-test. There is an influence of nutrition media intervention (comics) on the knowledge score as indicated by the value of $p=0.001$. There was an increase in the knowledge score only in the treatment group, from 10.96 ± 1.99 to 13.38 ± 1.68 . Meanwhile, the nutrition media intervention (comic) did not affect changes in the weight of obese children, as indicated by the p-value of 0.491 for the treatment group and 0.725 for the control group. Intervention of nutritional media (comics) can increase the knowledge score of obese elementary school children, but has no effect on children's weight changes.(Nugroho, 2018)

Comics is a unique multimodal educational tool that promotes attention, can be related and remembered because of the simplicity of the model presented in the medium. In addition, comics enhance memory and comprehension by offering abundant mental images and concise written descriptions. This may be especially helpful in the medical field, where there is often a need to simplify complex information, such as for patients with limited health literacy and/or patients with communication barriers.(Rosas-Blum et al., 2018)

Della's research is inversely proportional to the research that has been done. Based on this research, the results of data analysis prove that there is a difference in influence between the video media group and the digital comic media group. The difference in the average score between the pretest and posttest in the digital video media group was 1.61 while in the digital comics group it was 0.5 and the p-value obtained was 0.022 ($p < 0.05$) so that H_a there is a difference which means there is a difference health education using video media and digital comic media via WA. Then by looking at the difference in the average difference value of the video group and the digital comic group, the average difference value of video media is higher than that of digital comic media. Therefore, health education using video media through WA is more effectively used for health education than digital comic media. (D'azzuri et al., 2020)

The results of this research indicate that comic media does not affect children's attitudes in the intervention group as evidenced by the results of a statistical test with a p-value < 0.05 , namely a p-value of 0.095. Whereas in the control group it shows influence as evidenced by a p-value of 0.014 < 0.05 . Even though the intervention group was not statistically significant, there was an increase in the value of the intervention group by 0.00 (8.33) while the mean increase in the value of the control group was 0.00 (4.59). So the results of the analysis of differences in the increase in the two groups showed no effect as evidenced by the results of the p-value $0.565 > 0.05$ and the analysis of the effectiveness of comic media showed that the average score was 0.010 (low effectiveness) for each variable given the intervention there were 4 respondents (11.43 %) who got a high value of effectiveness, 9 respondents (25.97%) who got a medium

effective value. This research also has a confounding variable, namely Education. So that the research that has been done can be interpreted that children's attitudes are not easily changed just because of comic media.

This is in line with research conducted by Anjas et al, where the results of the study showed no significant difference in increasing the attitude score between the treatment group and the control group. Thus, changing attitudes is not easy and requires quite a long time, because attitudes can be formed from 3 components, namely cognitive, affective and action tendencies (conative) which are a system, so they cannot be separated from one another. The comic media used in this study is not integrated with the characters through figures that can be used as examples and good role models that are exemplary so that students cannot be emotionally involved when reading comics and indirectly the comics in this study cannot instill values and attitudes. (Kusumarani et al., 2018)

The three main components of education consist of the cognitive, affective, and psychomotor domains. The cognitive domain includes knowledge, comprehension, application, analysis, evaluation, and creation. The affective domain encompasses aspects such as receiving, responding, attitude formation, value organization, and the internalization of values in daily life. Meanwhile, the psychomotor domain involves perceptual abilities, readiness, and skills in performing actions or activities. These three domains are interrelated and collectively contribute to shaping comprehensive behavioral changes in individuals, in accordance with Bloom's Taxonomy (Defi Efendi, 2023).

This is in line with research conducted by Nikmatul et al that there was a change in the attitude of WUS from initially being negative to being positive in an effort to detect early cervical

cancer. This attitude itself consists of three forms of components, namely cognitive (views, knowledge, beliefs and perceptions), affective (a feeling of pleasure or positive and displeasure or negative towards an object), conative (the tendency to act towards the object of attitude) (Nikmatul Husna, Asfeni, 2020).

This is consistent with studies showing that attitude is a multidimensional construct consisting of three main components: cognitive (knowledge and beliefs), affective (feelings or emotions toward an object), and conative (the tendency to act). These components collectively influence how individuals think, feel, and behave toward a particular object or behavior (Zeng et al., 2023).

Therefore, comic media that is effective in improving knowledge also has the potential to develop students' ideas and imagination in accordance with their cultural and environmental characteristics. When comic media is integrated with relevant characters and storylines, students can obtain positive examples and behavioral models, thereby indirectly instilling values, attitudes, and character. This is consistent with studies showing that comics as a multimodal learning medium can enhance understanding, engagement, and value formation through visual and narrative-based learning processes (Rosas blum et al., 2018).

In addition to comic characters that are adapted to regional characteristics such as dialect, ethnicity, and language, children's attitudes are also influenced by parental education, as education is a key factor in shaping children's behavior. Parental education plays an important role in creating a conducive learning environment and influences children's cognitive, emotional, and social development. Parents with higher levels of education tend to have better knowledge and skills in guiding, directing, and positively

shaping their children's attitudes. This is supported by studies indicating that parental behavior and involvement have a significant influence on children's behavioral development and health outcomes (Maia et al., 2025).

This other study is in line with research conducted by G. Fitriyani. Based on the results of the study, the average pretest and posttest attitudes of the respondents increased. Where the average value of the respondent's pretest was 51.59 and experienced an increase during the posttest, which was 59.43. Then a hypothesis test was carried out using the paired sample t-test to obtain a tcount of 8.486 with a significance value (p-value) of 0.000. The test decision was that H_0 was rejected because the p-value was less than 0.005 ($0.000 < 0.005$). Based on the test decision, it was concluded that there was an influence of health education on the attitude of early detection of cervical cancer.(Fitriyani, 2021)

Another thing was revealed by Carl Hovland's (Attitude Change Theory) that the theory of attitude change provides an explanation of how a person's attitude is formed and how that attitude changes through the communication process and how that attitude can affect the attitude or behavior. This is stated by someone who will experience mental discomfort if he is faced with new information or information that is contrary to his beliefs. People will try consciously or unconsciously to limit or reduce their discomfort through three selective processes, selective memory, selective perception. So that in increasing changes in attitudes in children, parents need to be given effective communication to form confidence in themselves and their families.(Hartawan, 2020)

The findings indicate that comic media was effective in improving knowledge but not in changing attitudes, which may be due to the lack

of a strong theoretical foundation. Behavioral studies on vaccination should be based on frameworks such as the *Health Belief Model (HBM)* and the *Theory of Planned Behavior (TPB)*, which emphasize that attitudes and behaviors are influenced not only by knowledge but also by perceptions, beliefs, and social factors. Therefore, the absence of a theoretical basis may explain the weak findings in the attitude variable (Muhammad Mainuddin Patwary et al., 2023).

The significant change in attitudes observed in the control group represents an important finding that warrants further analysis. Although this group did not receive any direct intervention, several methodological and contextual factors may explain this result. First, a contamination effect may have occurred, whereby participants in the control group were indirectly exposed to information from the intervention group or their surrounding environment. Second, external information exposure may have influenced attitudes, as children could obtain information about COVID-19 vaccination from various sources such as media, parents, schools, or social interactions. Third, the maturation effect may have contributed, given that children aged 6–11 years are in a dynamic stage of cognitive and emotional development, allowing attitudes to change naturally over time. Fourth, a testing effect may have occurred, in which the pre-test increased participants' awareness and influenced their responses in the post-test. Furthermore, attitude change is not solely determined by a single intervention but is also shaped by psychosocial factors such as perceived risk, perceived benefits, and self-efficacy, as explained in the *Health Belief Model*. Therefore, the observed changes in the control group are likely the result of the interaction of these factors. Future studies should control for external variables and

adopt more rigorous designs to enhance internal validity (Bahrami et al., 2025).

LIMITATIONS

The material for this comic is based on the Ministry of Health and the COVID-19 Task Force. This comic does not yet include problems according to the characters in the area. The number of children who have not had vaccines in the East Sorong Health Center work area is still large. even so, the child's parents refused to become respondents for various reasons so that the research process which was planned for 2 weeks was completed in approximately 1 month because they picked up the ball in search of respondents who wanted to be studied. This research does not assess cultural aspects, parents' beliefs considering that the range of access areas is very wide, there are many cultures within one tribe besides that there are many rules that must be fulfilled, one of which is that researchers are required to pay customary fees. This research does not assess the psychological aspects of the child's parents due to time constraints and is not a qualitative research.

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