



Effect of Booklet Education on Mothers' Knowledge and Attitudes Regarding Toddler Acute Respiratory Infections

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ABSTRACT

Acute Respiratory Infections (ARI) are one of the leading causes of morbidity and mortality in toddlers in Indonesia and consistently represent the highest reported number of cases annually in Malang City. Mothers' knowledge and attitudes play an important role in the prevention of ARI, so education through booklet media is chosen because it is practical, attractive, and easy to understand. This study aims to determine the effect of education using booklet media on mothers' knowledge and attitudes about ARI in toddlers at the Delima Integrated Service Post RW 03 Madyopuro, Malang City. This quantitative study employed a pre-experimental one-group pretest-posttest design and was conducted from November 6 to November 13, 2025. The population consisted of all mothers with toddlers, totaling 83 people, with a sample of 69 respondents selected using simple random sampling, and data collection was carried out using knowledge questionnaires and attitude checklists. Data analysis was performed using the Wilcoxon Signed Rank test and Spearman test with a significance level of $\alpha = 0.05$. The results of the study showed an increase in mothers' knowledge and attitudes, indicated by a rise in the mean knowledge score from 67 to 87 and attitudes from 58 to 77 after the intervention. The Wilcoxon test showed a p -value < 0.001 and the Spearman test a p -value $= 0.001$ (< 0.05), indicating a significant effect of booklet education and a significant correlation between knowledge and attitudes. Booklet education effectively improves mothers' knowledge and attitudes and supports promotive and preventive health efforts.

Keywords : Education; Booklet; Knowledge; Attitude; ARI

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INTRODUCTION

Acute Respiratory Tract Infection (ARI) remains a major health problem for toddlers in Indonesia. ARI can affect both the upper and lower respiratory tracts and is the leading cause of morbidity and mortality in toddlers. The 2023 Indonesian Health Survey showed that the prevalence of toddlers diagnosed with ARI by health workers reached 4.8%, with the highest rate in Central Papua at 11.8%. Data from the Central Statistics Agency also confirms that infectious diseases, including ARI, remain the leading cause of visits to health care facilities by toddlers.(1) Meanwhile, the 2018 Basic Health Research recorded a national prevalence of ARI among toddlers of 12.8%, indicating that ARI remains a public health problem that requires serious attention, particularly in prevention and early treatment.(2)

According to the World Health Organization (WHO), approximately 68% of visits to health care facilities by toddlers are due to ARI, particularly pneumonia. The incidence of ARI in developing countries is higher than in developed countries, at 25%–30% and 10%–15%, respectively.(3) Data from the Indonesian Ministry of Health shows that the incidence ARI in Indonesia is 25.5%, with pneumonia morbidity in infants at 2.2% and in toddlers at 3.0%, while mortality in infants was 23.8% and in toddlers at 15.5%.(4)

Data from the East Java Provincial Health Office indicates that the incidence of ARI in 2020 reached 4.45% of all illnesses, with an estimated 173,463 cases.(5) The Malang City Health Office's annual report also noted that ARI ranked first among the ten most common diseases each year, with 56,000 cases in 2022 and 43,000 cases in 2023.(6) According to the 2025 profile of the Gribig Community Health Center, ARI still ranked first among the ten most common diseases, with 363 cases, consisting of 167 cases in males and 196 cases in females. At the Delima Integrated Health Post (Posyandu) in RW 03 Madyopuro, Malang City, risk factors were also identified, including overcrowding, inadequate ventilation and lighting, and a lack of specific education regarding ARI.(6)

Toddlers are an age group vulnerable to ARI due to their immature immune systems. Factors influencing the incidence of ARI in toddlers include birth weight, exclusive

breastfeeding, immunization status, home ventilation, and air pollution.(7) Furthermore, parental knowledge influences attitudes regarding the management of acute respiratory infections (ARI). Increased knowledge is expected to foster better attitudes toward disease prevention and management.(8)

One way to improve maternal knowledge and attitudes is through health education. Printed media, such as booklets, are often used in health promotion because they contain easy-to-understand text and images. Booklets offer advantages, including the ability to be studied repeatedly, providing accountability for the information received, and presenting material more comprehensively.(9) Based on this background, researchers conducted a study entitled "Effect of Booklet Education on Mothers' Knowledge and Attitudes Regarding Toddler Acute Respiratory Infections"

METHODS

This study was a quantitative research using a pre-experimental one group pretest-posttest design aimed at determining the effect of education using booklet media on mothers' knowledge and attitudes about Acute Respiratory Infections (ARI) in toddlers. The study was conducted from 6 November 2025 to 13 November 2025 at the Delima Integrated Health Post (Posyandu) RW 03 Madyopuro, Malang City. The population consisted of all mothers with toddlers registered at the posyandu, totaling 83 individuals. The sample included 69 mothers selected using simple random sampling. The research involved a single experimental group without a control group. The educational intervention consisted of a 30-minute booklet-based health education session delivered in seven small-group sessions. The booklet was developed and validated by the researchers and contained educational materials on the definition of ARI, signs and symptoms, risk factors, causes and transmission of ARI, the concept of droplet transmission, the benefits of breastfeeding, the impact of ARI, and strategies for preventing ARI in toddlers.

In this study, the independent variable was education using booklet media, while the dependent variables were mothers' knowledge and attitudes about ARI. Data were collected

using a knowledge questionnaire and an attitude checklist administered before (pretest) and after (posttest) the educational intervention using booklet media. The posttest was administered seven days after the educational intervention to evaluate changes in mothers' knowledge and attitudes. Data processing included editing, coding, scoring, entry, cleaning, and tabulating. Univariate analysis was used to describe the distribution of variables, while bivariate analysis was conducted using the Wilcoxon Signed Rank Test with a significance level of $\alpha = 0.05$ to examine differences before and after the intervention. The Spearman test was also applied to analyze the relationship between knowledge and attitudes.

RESULTS

Respondent Characteristics

Subject descriptions were categorized based on education, age, and information about ARI. The following analysis of 69 mothers of toddlers yields the following characteristics:

Table 1
Respondent Characteristics

No	Respondent Characteristics	Frequency (F)	Percentage (%)
1.	Education		
	Elementary School	2	3
	Junior High School	14	20
	Senior High School	35	51
	Diploma	5	7
	Bachelor's Degree	13	19
	Total	69	100
2.	Age		
	15-20	1	1
	21-30	45	65
	31-40	22	32
	41-50	1	1
	Total	69	100
3.	Ever Received Information about ARI		

Yes	7	10
No	62	90
Total	69	100

Source : Primary Data, 2025

Based on the data obtained in Table 1, the majority (51%) of the 69 mothers had a high school education. Most (65%) of the mothers were aged 21-30, and almost all (90%) of the mothers had never received information about ARI.

Mothers' Knowledge of ARI Before and After Education Using Booklets

The frequency distribution table of mothers' knowledge of ARI before and after education provides clear percentages of changes in the knowledge level of mothers of toddlers. Knowledge levels are categorized as good, fair, and poor.

Table 2

Results of the Pretest and Posttest Frequency Distribution of the Questionnaire on Mothers' Knowledge of ARI in Toddlers

No.	Pretest Knowledge about ARI			Posttest Knowledge about ARI	
	Category	F	%	F	%
1.	Good	25	36	60	87
2.	Fair	21	30	9	13
3.	Poor	23	33	0	0
	Total	69	100	69	100
	Mean	67		87	

Source : Primary Data, 2025

Based on table 2, information was obtained that the pretest results of mothers' knowledge about ARI before being given education by the researcher were that almost half (33%) had poor knowledge about ARI with a mean value of 67, and after being given education about ARI, the posttest results of mothers' knowledge of toddlers increased to (87%) almost all had good knowledge with a mean value of 87. This shows that there was an increase in knowledge before and after education of (51%) and this education was quite effective in forming respondents' basic knowledge about ARI.

Mothers' Attitudes About ARI Before and After Education Using Booklets

Table 3
Frequency Distribution Results of the Pretest and Posttest: Checklist of Mothers' Attitudes About ARI in Toddlers

No	Category	Pretest Attitudes About ARI		Posttest Attitudes About ARI	
		F	%	F	%
1.	Positive	35	51	51	74
2.	Negative	34	49	18	26
Total		69	100	69	100
Mean		56		77	
Std Dev		13		3	

Source : Primary Data, 2025

Table 3 shows that the pretest results show that almost half of the respondents (49%) still held negative attitudes about ARI, with a mean score of 58. After the education was provided, the posttest results showed that 74% of the respondents held positive attitudes about ARI, with a mean score of 77. This indicates a 23% increase in attitudes before and after the education, and that this education was quite effective in shaping respondents' positive attitudes about ARI.

Relationship between Mothers' Knowledge and Attitudes Regarding ARI in Toddlers

To determine whether this research has a relationship, a preliminary test was conducted. This study used the Spearman test, which include ed data entry on the frequency distribution after education on the level of knowledge and attitudes. The following are the results of the analysis of the relationship between knowledge and attitudes using the Spearman test:

Table 4
Crosstable: Relationship between Mothers' Knowledge and Attitudes
Regarding ARI in Toddlers

	Attitude					
	Positive		Negative		Total	%
	F	%	F	%		
Knowledge						
Good	51	74	9	13	60	87
Fair	5	7	4	6	9	13
Poor	0	0	0	0	0	0
Total	56	81	13	19	69	100

Source : Primary Data, 2025

Table 4 shows the relationship between mothers' knowledge and attitudes regarding ARI. The majority of respondents (74%) had good knowledge and positive attitudes about ARI. A small percentage (6%) had adequate knowledge and negative attitudes about ARI. This indicates that knowledge plays a significant role as a predisposing factor in attitude formation, making health education effective in increasing mothers' knowledge and developing positive attitudes regarding ARI in toddlers.

Table 5
Spearman Test Results: Analysis of the Relationship Between Mothers'
Knowledge and Attitudes Regarding ARI in Toddlers

		Correlations		
Spearman's rho	Knowledge		Knowledge	Attitude
		Correlation Coefficient	1.000	.680**
		Sig. (2-tailed)		<.001
		N	69	69
	Attitude	Correlation Coefficient	.680**	1.000
		Sig. (2-tailed)	<.001	.
		N	69	69

** . Correlation is significant at the 0.01 level (2-tailed).

From the data analysis above, the Spearman test revealed a significance p-value of 0.001. Since p-value <0.05, it can be concluded that there is a significant relationship between mothers' knowledge and attitudes after providing ARI education to toddlers at the

Delima Integrated Health Post (Posyandu) in RW 03 Madyopuro, Malang City, with a coefficient of $r = 0.680$, indicating a strong relationship.

Hypothesis Test Results: The Effect of Booklet Education on Mothers' Knowledge of ARI in Toddlers

To determine whether this research has an effect or not, a preliminary test was conducted. This study used the Wilcoxon signed-ranks test, with data entry of frequency distributions before and after education on knowledge levels. The following are the results of the analysis of the effect of knowledge levels using the Wilcoxon test:

Table 6
Results of the Wilcoxon Test: The Effect of Booklet Education on Mothers' Knowledge of ARI in Toddlers

Variable	N	Mean	Wilcoxon p-value
Knowledge			
Pretest	69	67,23	<0,001
Posttest	69	87,33	

Based on the results of the Wilcoxon Signed Rank Test, there was a significant difference between mothers' knowledge scores about ARI in toddlers before and after education using booklets. The mean knowledge score for mothers in the pretest was 67.23, while in the posttest it increased to 87.33, with a total of 69 mothers of toddlers. The statistical test results showed a p-value <0.001, which is less than the significance level of $\alpha = 0.05$, therefore, H_0 is rejected and H_1 is accepted. This shows that education using booklet media has a significant effect on increasing mothers' knowledge about ARI in toddlers at the Delima Integrated Service Post (Posyandu) RW 03 Madyopuro, Malang City.

Hypothesis Test Results: The Effect of Education Using Booklets on Mothers' Attitudes About ARI in Toddlers

To assess whether this research has an effect or not, a preliminary test was conducted. This study used the Wilcoxon signed-ranks test, with data entry of frequency distributions before and after education on attitude levels. The following are the results of the analysis of the effect of attitude levels:

Table 7
Results of the Wilcoxon Test: The Effect of Education Using Booklets on Mothers' Attitudes About ARI in Toddlers

Variable	N	Mean	Wilcoxon p-value
Knowledge			
Pretest	69	58	<0,001
Posttest	69	77	

Based on the results of the Wilcoxon Signed Rank Test, there was a significant difference in mothers' attitudes about ARI in toddlers before and after education using booklets. The mean maternal attitude score in the pretest was 58, while in the posttest it increased to 77, with a total of 69 mothers of toddlers. The statistical test results showed a p-value <0.001, which is less than the significance level of $\alpha = 0.05$, therefore, H_0 was rejected and H_1 was accepted. This shows that education using booklet media has a significant effect on improving mothers' attitudes about ARI in toddlers at Delima Integrated Service Post (Posyandu) RW 03 Madyopuro, Malang City.

DISCUSSION

Mothers' Knowledge of ARI Before and After the Booklet Education

Based on pretest results, mothers of toddlers' knowledge of ARI before the intervention was still relatively low, as indicated by the presence of respondents in the poor knowledge category. According to (19), knowledge is the result of "knowing" after a person experiences sensation through the five senses, especially the eyes and ears, and through

learning with the help of media such as books.(10) Knowledge can be influenced by education, age, experience, and exposure to health information. Most mothers had a high school education and were aged 20–30, characteristics that may have supported their ability to receive and process new information. A high school educational background may provide sufficient basic literacy skills to understand written explanations and interpret simple health messages, while being in a productive age range may facilitate active engagement with new information. However, the limited previous exposure to ARI information may have resulted in gaps in their prior knowledge. Therefore, the booklet had the potential to introduce unfamiliar information in a structured form and facilitate the initial acquisition of knowledge about ARI.

After receiving education using the booklet, the proportion of mothers with good knowledge increased substantially. This finding suggests that the booklet was able to facilitate the acquisition and understanding of information about ARI. These results align with those of (11) and (12), who reported that booklets with attractive visual elements can increase mothers' interest in reading and facilitate their understanding of health information. The effectiveness of the booklet in the present study may also be related to the respondents' characteristics. Their predominantly senior high school educational background may have enabled them to comprehend the written and visual messages presented in the booklet, while their limited prior exposure to ARI information meant that the material addressed an existing information gap. Consequently, the booklet may have provided a relatively accessible source of new information that could be read and reviewed independently, thereby facilitating comprehension and knowledge acquisition.

Mothers' Attitudes about ARI Before and After the Education Booklet

Pretest results showed that a considerable proportion of mothers had negative attitudes toward ARI prevention. According to (13), knowledge constitutes an important cognitive component in attitude formation, therefore, limited understanding of ARI may make mothers less likely to recognize the importance of preventive measures. Personal experiences and previous exposure to ARI cases may also shape mothers' perceptions and

responses to prevention. The education booklet provided factual and visual information to address potential misconceptions and support the development of more proactive attitudes toward ARI prevention.(13)

After the intervention, the improvement in attitudes suggests that the booklet may have contributed not only to increasing understanding but also to shaping mothers' perceptions of ARI prevention. These results align with (14) and (15), which indicated that better health knowledge can support the development of more positive attitudes toward child healthcare. The respondents' educational background may have facilitated this process because mothers with adequate literacy skills could more readily understand and evaluate the messages presented in the booklet. In addition, limited prior exposure to ARI information may have made the booklet an important source of new information, allowing mothers to reconsider their perceptions and recognize the importance of preventive actions. The use of simple language and supporting illustrations may have further enhanced comprehension and made the health messages easier to accept and remember.

The Relationship Between Mothers' Knowledge and Attitudes Regarding ARI

The Spearman test showed a statistically significant and strong positive relationship between mothers' knowledge and attitudes regarding ARI. This finding indicates that mothers who have better knowledge tend to demonstrate more positive attitudes toward ARI prevention. The direction of the relationship suggests that improvements in knowledge may be accompanied by more favorable perceptions and greater readiness to engage in preventive practices.

This finding aligns with (16) and (17), who stated that knowledge is the foundation for forming attitudes and behavior. According to (18), knowledge is the foundation for developing attitudes. Adequate knowledge may help mothers recognize the risks associated with ARI and understand the importance of preventive actions. In the context of toddler care, this understanding can support mothers' willingness to adopt appropriate preventive practices, such as completing immunizations, maintaining adequate home ventilation, and avoiding exposure to cigarette smoke. Thus, the relationship identified in this study

supports the importance of strengthening mothers' knowledge as part of efforts to promote positive attitudes toward ARI prevention.

The Effect of Booklet Education on Mothers' Knowledge

The Wilcoxon test showed a statistically significant effect of booklet-based education on mothers' knowledge. This finding indicates that the intervention was effective in facilitating the acquisition of ARI-related information. This aligns with (19) theory that knowledge is formed through the process of sensing and understanding. (20) stated that booklets are effective because they contain concise, systematic explanations and illustrations that facilitate understanding.

Booklets can be studied repeatedly, strengthening domain knowledge and comprehension, leading to application (19). Research by (21) also supports the effectiveness of print media in increasing knowledge. The effectiveness of the booklet in this study was likely enhanced by the respondents' educational characteristics, as most had completed senior high school and were therefore able to understand the written material independently. In addition, because most mothers had not previously received ARI education, the booklet provided new and relevant information that could be reviewed repeatedly, reinforcing knowledge retention and comprehension.

The Effect of Educational Booklets on Mothers' Attitudes

The Wilcoxon test showed a statistically significant effect of booklet-based education on mothers' attitudes toward ARI prevention. This finding suggests that the intervention was able to support not only cognitive changes but also changes in mothers' perceptions toward preventive health behaviors. According to (13), this change occurred because education influences cognitive, affective, and conative components.

Booklets not only convey information but also build mothers' emotional awareness. An attractive and communicative design facilitates understanding. This is supported by (22) who found that educational media enhances cognitive, affective, and psychomotor domains. Moreover, the respondents' educational background and limited prior exposure to ARI information likely contributed to the effectiveness of the intervention. The booklet

presented information in a structured and easily understandable format, enabling mothers to acquire new knowledge and translate it into more positive attitudes toward ARI prevention. Thus, booklets are effective as a health promotion medium in increasing knowledge and fostering mothers' proactive attitudes towards preventing ARI in toddlers.

CONCLUSIONS AND RECOMMENDATIONS

This study found that health education using booklet media improved mothers' knowledge and attitudes regarding Acute Respiratory Infections (ARI) in toddlers at Delima Integrated Health Post RW 03 Madyopuro, Malang City. Prior to the intervention, many mothers had limited understanding of ARI and demonstrated less supportive attitudes toward prevention efforts. After receiving the booklet-based education, most mothers showed better comprehension of the causes, risk factors, symptoms, and preventive measures of ARI, accompanied by more positive and proactive attitudes in protecting their children's respiratory health. These findings indicate that improved knowledge contributes to the development of constructive attitudes and strengthens mothers' readiness to implement preventive practices at the household level.

Based on these results, it is recommended that health promotion programs at community health centers integrate booklet-based education as a regular strategy to enhance maternal awareness and preventive behavior related to ARI. Mothers are encouraged to use the booklet as a practical and accessible learning resource to reinforce their understanding and apply preventive measures consistently. Future research should explore the long-term impact of booklet-based education on actual caregiving practices and ARI incidence in toddlers, as well as examine additional factors such as family support, environmental conditions, and the role of healthcare providers in sustaining positive behavioral changes.

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