



THE EFFECTIVENESS OF HEALTH EDUCATION ON COUGHING AND SNEEZING ETIQUETTE ON STUDENT'S KNOWLEDGE AND BEHAVIOR AT SDIT MUTIARA HATI IN 2025

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Abstract

Acute Respiratory Infections (ARI) remain one of the major health problems among schoolage children. Respiratory diseases can be transmitted through droplets emitted when coughing and sneezing, especially if proper etiquette is not followed. The busy school environment has the potential to accelerate the spread of disease if students have poor knowledge and behavior regarding coughing and sneezing etiquette. Therefore, health education is needed as a promotive and preventive measure to improve students knowledge and behavior from an early age. To determine the effectiveness of health education on coughing and sneezing etiquette on the knowledge and behavior of students at SDIT Mutiara Hati in 2025. Methods this study used a quatitative method with a quasi-experimental design using a pretest and posttest approach. The research population consisted of all 61 third grade students at SDIT Mutiara Hati. The sampling technique used purposive sampling. Data collection was conducted using knowledge and behavior questionnaires. Data analysis was performed using univariate and bivariate analysis using the Wilcoxon test. Results the results of the study show an increases in the average knowledge score of students from 77,70 before the intervention to 90,49 after receiving health education. The Wilcoxon test result showed a p-value of 0.000 ($p < 0.05$), indicating a significant difference in knowledge before and after the intervention. For the behavior variable, a p-value of 0.000 ($p < 0.05$) was also obtained, indicating an increase in student behavior in applying coughing and sneezing etiquette. Discussion health education on coughing and sneezing etiquette proved effective in improving the knowledge and behavior of students at SDIT Mutiara Hati in 2025. The findings of this study demonstrate that structured health education utilizing video media and interactive explanation is effective in significantly improving both knowledge and behavior regarding coughing and sneezing etiquette among third-grade students at SDIT Mutiara Hati. The statistically significant increase in knowledge scores and the positive shift in behavioral patterns toward more frequent and consistent application of proper etiquette highlight the intervention's impact. This suggests that targeted, age-appropriate educational programs in school settings can successfully enhance students' understanding and adoption of preventive respiratory hygiene practices. The results align with prior research emphasizing the role of early health education in fostering sustainable healthy habits, thereby contributing to infection control efforts within densely populated environments like schools. Consequently, integrating such interventions into routine school health promotion is recommended to mitigate the transmission of Acute Respiratory Infections (ARI) among children.

Keywords: *Health Education, Coughing and Sneezing Etiquette, Student Behavior*

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INTRODUCTION

Acute Respiratory Infections (ARI) are a global health problem causing approximately 4 million deaths annually, with 98% of these attributed to lower respiratory tract infections such as pneumonia [1]. The disease is easily transmitted through droplets during coughing or sneezing, facilitating rapid spread in crowded environments like schools and orphanages [2]. Preschool to elementary school-aged children are particularly vulnerable due to their immature immune systems and lack of awareness regarding respiratory hygiene.

Data from the Indonesian Health Survey (SKI, 2023) shows the prevalence of ARI across the country was 2.2%, with the highest rate found among children aged 1 to 4 years at 4.9% [1]. Major risk factors include air pollution, exposure to cigarette smoke, improper handwashing practices, and poor coughing habits. Therefore, education on correct coughing etiquette is necessary as a preventive measure against droplet transmission and to enhance individual awareness of their health responsibility towards others from an early age [3, 4].

Health education in the short term aims to increase individual or community understanding of health, and in the medium term, it influences behavior [5]. One such approach is teaching cough etiquette from an early age. Cough etiquette, such as covering the mouth/nose with a tissue or the inner elbow and washing hands afterward, is a crucial method for preventing transmission. The guidelines from the U.S. Centers for Disease Control and Prevention (CDC) recommend these steps to reduce virus spread [6].

Research indicates that improving handwashing habits in schools can reduce respiratory infections by up to 23% and laboratory-confirmed influenza cases by up to 50% among school children [6]. However, many children still do not understand or correctly practice cough etiquette. Many cover their mouth and nose with their hands or do not cover them at all when coughing or sneezing [7]. A study among elementary school students found that more than 50% did not practice proper coughing/sneezing etiquette, such as using their elbow or a tissue [8].

Droplets from coughing and sneezing can spread pathogens like influenza, tuberculosis, and COVID-19 over a distance of more than one meter [9]. Educational interventions have proven significantly effective in increasing knowledge.

For example, a study at SDN 03 Kemiri showed the average knowledge score increased from 55 (pre-test) to 88.33 (post-test) with a p-value of 0.000 (<0.005) [8]. Another study also reported an increase in understanding from 30% to nearly 90% following an educational intervention [10].

Based on this background, this study aims to analyze the effectiveness of health education on coughing and sneezing etiquette in improving the knowledge and changing the behavior of students at SDIT Mutiara Hati in 2025. Specific objectives include identifying differences in knowledge before and after the intervention, observing behavioral changes, and analyzing the overall effectiveness of health education. The findings of this study are expected to contribute to the body of knowledge, particularly in health education as a measure for disease transmission prevention.

METHODS

Study design and setting

This study utilized a quantitative research method, as it allows for efficient data collection without requiring an extended timeframe. A quasi-experimental design with a one-group pretest-posttest approach was employed. In this design, a single class of students received health education, and tests were conducted both before and after the intervention to assess the differences that occurred. The research approach was cross-sectional, meaning data was collected at a single point in time following the intervention to observe the changes that had taken place. The study was conducted at SDIT Mutiara Hati in October 2025.

Population and Sample

The population in this study consisted of all 61 third-grade students at SDIT Mutiara Hati during October 2025. The sample size was determined using Slovin's formula, resulting in a sample of 53 students, selected through purposive sampling. The study applied the following inclusion and exclusion criteria:

1. Inclusion Criteria:
 - a. Actively enrolled third-grade students at SDIT Mutiara Hati in 2025.
 - b. Students present during the research activities.
 - c. Students willing to participate in the entire research process.
 - d. Students able to communicate effectively
2. Exclusion Criteria:

- a. Students are absent during the research implementation.
- b. Students who are not enrolled at SDIT Mutiara Hati.
- c. Students who were sick or excused during the activity period.

Instrument

Data were collected using two primary instruments: a knowledge questionnaire and a behavior questionnaire.

1. Knowledge Questionnaire

A structured questionnaire consisting of 10 multiple-choice questions designed to assess students' understanding of proper coughing and sneezing etiquette. The content covered topics such as definition, purpose, correct steps (covering mouth/nose with tissue or inner elbow, using a mask, handwashing), and common mistakes related to cough etiquette. The same questionnaire was administered twice: as a pretest before the health education intervention and as a posttest immediately after the intervention. Each correct answer was awarded 1 point, while incorrect answers received 0 points. The total score was then calculated as a percentage.

2. Behavior Questionnaire

A self-reported behavior checklist containing 10 items related to the practical application of cough and sneezing etiquette in daily situations. Behaviors assessed included covering the mouth/nose when coughing/sneezing, using a tissue or elbow, handwashing after coughing/sneezing, proper disposal of used tissues, wearing a mask when sick, maintaining distance, and reminding peers. Respondents indicated the frequency of each behavior using a 4-point Likert scale: Always (SL), Often (SR), Rarely (J), and Never (TP). Responses were assigned scores to calculate a total behavior score, which was then converted into a percentage.

Procedure

The research procedure was conducted through the following steps:

1. The researcher submitted a research permission letter from STIKES Abdi Nusantara Jakarta to conduct the study at SDIT Mutiara Hati.
2. The researcher formally requested permission for the study from the principal of SDIT Mutiara Hati.

3. Respondents were selected based on the predetermined inclusion and exclusion criteria.
4. The researcher developed questionnaires on knowledge and behavior regarding cough and sneeze etiquette.
5. The researcher determined the final sample and established rapport with the participants to facilitate smooth data collection.
6. All 61 respondents were administered a pretest using the knowledge and behavior questionnaires prior to the health education intervention.
7. Following the pretest, the researcher delivered a health education session featuring a two-minute instructional video on proper cough and sneeze etiquette, followed by an interactive explanation.
8. Respondents then practiced the demonstrated cough and sneeze etiquette techniques to assess their understanding of the material.
9. Subsequently, the researcher administered a posttest using the knowledge questionnaire to measure changes after intervention.

Data analysis

Data analysis in this study consisted of univariate and bivariate analysis.

a. Univariate Analysis

This analysis was used for descriptive statistics to characterize the variables under study, such as age, gender, and initial knowledge and behavior scores. Univariate analysis was performed on each variable to describe the central tendency and distribution of the data.

b. Bivariate Analysis

Bivariate analysis aimed to examine the relationship between the independent variable (health education intervention) and the dependent variables (knowledge and behavior). This analysis was conducted to determine the effectiveness of health education on coughing and sneezing etiquette on students' knowledge and attitudes. After data collection, the data were processed using SPSS statistical software. Each variable was coded, and the statistical test employed was the paired T-Test to compare the mean scores of knowledges and behavior before (pretest) and after (post test) the intervention.

RESULTS AND DISCUSSION

Univariate Results

Table 1. Frequency Distribution of Respondent Characteristics by Gender

Gender	Frequency	Percentage (%)
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Male	25	41,0 %
Female	36	59,0%
Total	61	100%

From Table 1, out of 61 respondents, 25 students (41.0%) were male and 36 students (59.0%) were female. This shows a higher number of female students in the research class.

Table 2. Distribusi Frekuensi Karakteristik Responden Berdasarkan Usia

Age	Frequency	Percentage (%)
8 Years	23	37,7%
9 Years	35	57,4%
10 Years	3	4,9%
Total	61	100%

This age distribution shows that the respondents were dominated by students aged 8 to 9 years, which is typical for 3rd-grade students. Ages 8-9 represent the concrete operational stage of cognitive development, where children can receive and understand information provided through health education.

Table 3. Descriptive Statistics of Student Knowledge Before and After Health Education

	N	Min	Mean	Max	SD	Median	95% CI	Total Questionnaire Score
BEFORE	61	60	77.70	90	7.83	80	79.67	10
AFTER	61	70	90.49	100	9.02	90	92.76	10

Descriptive analysis shows that students experienced an increase in their knowledge after receiving health education. Before the intervention, the average pre-test score was 77.70, with the lowest score of 60, the highest of 90, and a median of 80, indicating fairly good initial knowledge. After the intervention, the post-test score rose to an average of 90.49, with the lowest score of 70, the highest of 100, and a median of 90. The increase in both the mean and median scores indicates that the health education successfully improved students' knowledge regarding cough and sneeze etiquette.

Table 4. Frequency Distribution of Student Behavior Levels

Behavior Category	Frequency	Percentage %
Never	51	8,36%
Rarely	145	23,77%
Often	205	33,60%
Always	209	34,26%
Total	610	100%

The distribution of student behavior levels falls into the categories 'Often' and 'Always', with percentages of 33.60% and 34.26% respectively. This indicates that many students have applied cough and sneeze etiquette well and quite consistently. The 'Rarely' category (23.77%) and the 'Never' category (8.36%) appear with smaller

numbers, suggesting that only a few students have not optimally applied the behavior.

Bivariate Results

The results of the normality test for the knowledge scores of third-grade students at SDIT Mutiara Hati in 2025 regarding health education on coughing and sneezing etiquette can be seen in the following table 5.

Table 5. Tests of Normality for Knowledge Scores

Tests of Normality						
Kolmogorov-Smirnov				Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
PRETES Score	0.304	61	0.000	0.841	61	0.000
POSTTEST Score	0.231	61	0.000	0.836	61	0.000

Normality tests were conducted using the Kolmogorov-Smirnov and Shapiro-Wilk methods. The results showed significance values for the Kolmogorov-Smirnov test of 0.304 ($p=0.000$) for pre-test data and 0.231 ($p=0.000$) for post-test data. The Shapiro-Wilk test results were 0.841 ($p=0.000$) for pre-test data and 0.836 ($p=0.000$)

for post-test data. All p-values from both tests were below the significance level of 0.05, concluding that the pre-test and post-test data were not normally distributed. Therefore, further analysis used the non-parametric Wilcoxon signed-rank test instead of the Paired T-Test.

Table 6. Distribution of Knowledge Pre-test and Post-test Comparison

Knowledge Pre test and Post test	n	Mean Rank	Sum of Ranks	P Value
Negative Ranks	0	0.00	0.00	0,000
Positive Ranks	57	29.00	1653.00	
Ties	4	-	-	
Total	61	-	-	

From the Wilcoxon test results, 57 respondents showed an increase in knowledge after participating in health education, while no respondents showed a decrease in scores (negative ranks = 0). Additionally, 4 respondents showed the same scores in the pre-test and post-test. The obtained mean rank was 29.00 with a sum of ranks of 1653.00, indicating a strong score

increase for most respondents. Further analysis showed a p-value of 0.000 ($p < 0.05$), signifying a statistically significant difference between pre-test and post-test scores. Thus, it can be concluded that health education on cough and sneeze etiquette had a significant and effective impact on improving student knowledge at SD Mutiara Hati in 2025.

Table 7. Distribution of Behavior Pre-test and Post-test Comparison

Behavior Pre test and Post test	n	Mean Rank	Sum of Ranks	P Value
Negative Ranks	0	0,00	0,00	0,000
Positive Ranks	59	30,00	1770,00	
Ties	2			
Total	61			

Based on the Wilcoxon test analysis comparing pre-test and post-test scores, out of 61 total respondents, 59 showed an increase in scores. This is seen from the positive ranks with a mean sum of 30.00 and a total sum of 1770.00. No respondents recorded a decrease in scores (negative ranks = 0), and 2 other respondents had the same scores in the pre-test and post-test. The results of the Wilcoxon statistical test show a p-value of 0.000 ($p < 0.05$), meaning there is a

statistically significant difference between pre-test and post-test scores. Therefore, the applied intervention proved to have a significant impact on improving respondent behavior.

Discussion

Univariate Result

The results of this study indicate that among the 61 respondents, the majority were female students (59.0%), while male students accounted for 41.0%. This gender distribution

provides a profile of the respondents and suggests potential variation in responses to health education, as previous research indicates demographic factors like gender can influence how health information is received. Prior studies have documented gender differences in behavior and response to health education, with female students tending to exhibit better health-promoting behaviors and reporting greater perceived usefulness of educational materials.

Most respondents were aged 9 years (57.4%) and 8 years (37.7%), with a small proportion aged 10 years (4.9%). This age range corresponds to the concrete operational stage of cognitive development, where children can comprehend concrete information and begin adopting new rules and habits, such as cough etiquette. This finding highlights the school-age period as a crucial developmental phase for the success of health education interventions, as children at this stage possess adequate cognitive and psychosocial abilities to understand health-related content. This aligns with research by Wibisono et al. (2025), which demonstrates that providing health education to elementary school children can significantly improve knowledge post-intervention, underscoring that the school years are an optimal time for such interventions [11].

Descriptive analysis revealed an increase in students' knowledge scores after receiving health education. The average pre-test score was 77.70, which increased to 90.49 in the post-test. This change indicates that health education on cough and sneeze etiquette was effective in enhancing students' understanding of the material. This finding is consistent with prior research, such as the study by Camila Irianti, which reported that a similar educational intervention at SDN 03 Kemiri significantly increased elementary students' knowledge, with average scores rising from 55 in the pre-test to 88.33 in the post-test, supported by a Wilcoxon test result of $p\text{-value} = 0.000$ [7].

The distribution of behavior showed a significant proportion of students frequently (33.60%) and always (34.26%) practiced proper etiquette. This suggests that health education not only improved knowledge but also positively impacted student behavior. The adoption of correct coughing and sneezing practices is a crucial component of a clean and healthy lifestyle to prevent the transmission of infectious diseases, particularly acute respiratory infections. This aligns with findings from a study in Sumber Jeruk village, where education on clean and healthy

living behaviors, including cough etiquette, successfully helped children and their families implement correct practices after receiving information.

Bivariate Result

Normality tests (Kolmogorov-Smirnov and Shapiro-Wilk) indicated that the knowledge data (pre-test and post-test) were not normally distributed ($p < 0.05$). This finding is common in health intervention studies with pre-post measurements in student populations, where data often show skewness due to significant behavioral changes following the intervention. Therefore, the application of the non-parametric Wilcoxon signed-rank test was appropriate to assess the difference between the two related measurements.

The Wilcoxon test results showed a statistically significant improvement in students' knowledge after receiving education on cough and sneeze etiquette ($p = 0.000$, $p < 0.05$). This indicates that the health education intervention successfully enhanced the respondents' comprehension of the information presented. The clear difference between pre-test and post-test scores suggests that students were not only able to recall the material but also understood and integrated the new health etiquette knowledge into their daily lives. This finding is supported by other studies in different contexts involving elementary school populations. An experimental study at SD Negeri Rancamedalwangi in Sumedang, West Java, which implemented a health education program on Clean and Healthy Living Behaviors (PHBS) using various interactive methods such as lectures, demonstrations, and visualizations, also reported a significant increase in knowledge scores and a significant $p\text{-value} (<0.05)$ in the Wilcoxon test, demonstrating the effectiveness of health education in improving student understanding [6].

Furthermore, the Wilcoxon test revealed that health education on cough and sneeze etiquette also significantly improved the health behavior of the third-grade students at SDIT Mutiara Hati ($p = 0.000$). This finding demonstrates that after participating in the education, many students exhibited more positive changes in applying proper cough and sneeze etiquette in their daily routines. These changes extend beyond knowledge to the adoption of healthier habits in social interactions at school, such as covering the mouth when coughing, using tissues, washing hands afterward, and reducing disease spread via droplets. This behavioral shift is consistent with research by Sidabutar et al.

(2022), which found that organized health education programs can promote tangible behavioral changes in school-aged children [12]. Their quasi-experimental study in an elementary school showed that a structured health education program significantly increased the frequency of target behaviors compared to a control group that did not receive the intervention ($p < 0.001$). This signifies that health education interventions employing interactive methods, practical demonstrations, and positive reinforcement can encourage students not only to understand but also to consistently practice healthy behaviors.

In conclusion, the results of this study demonstrate that health education on cough and sneeze etiquette consistently improved both the knowledge and behavior of students. This is evidenced by the Wilcoxon test results showing a significant difference ($p < 0.05$) between scores before and after the intervention. The increase in knowledge indicates that students gained an understanding of the importance of applying proper etiquette. This understanding subsequently motivated students to change their habits, integrating correct coughing and sneezing practices into their daily lives. Thus, health education proved effective not only in enhancing knowledge but also in fostering healthier behavior. Therefore, such education is vital in helping students build healthy living habits from an early age.

Conflict of interest

All authors declare no conflict of interest.

Availability of data and materials

A confidentiality agreement with participants prevents us from sharing the data, therefore, dataset cannot be shared.

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