

ARTICLE INFORMATION

Received: February, 23, 2025

Revised: March, 03, 2025

Available online: March, 04, 2025

at : <https://e-jurnal.iphorr.com/index.php/minh>

Improving school-age children's knowledge about the ethics of coughing and sneezing

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Abstract

Background: Coughing is a natural defense mechanism that helps clear the respiratory tract of irritants and pathogens. In addition to being a necessary physiological reflex, coughing can also be caused by diseases that attack the respiratory tract, such as tuberculosis, asthma, pneumonia, acute respiratory infections, and other respiratory diseases. Transmission of the disease occurs when an infected person releases these droplets, which can be inhaled by others.

Purpose: To determine the effectiveness of flip chart-based health education in improving children's knowledge about coughing and sneezing etiquette.

Method: Pre-experimental quantitative research design with a one-group pretest-posttest design approach. The sample was selected through total sampling involving Al-Huda Elementary School, Jember. This research was conducted in October-December 2024. The independent variable in this study is the use of flip charts, while the dependent variable is knowledge of cough etiquette. The instrument used was a questionnaire on knowledge of coughing and sneezing etiquette consisting of 10 multiple-choice questions.

Results: The average age of the participants was 8.4 years with a standard deviation of 1.0 in the age range of 7-10 years. The number of male and female participants had the same percentage of 12 participants (50%). The average pre-test score was 55.8 with a standard deviation of 25.7, while the post-test score increased to 75.0. Statistical calculations revealed a z value of -3.7 and a significance level (2-tailed) of less than 0.001. This indicates a significant increase in knowledge of cough etiquette pre-post test.

Conclusion: Flip chart media is an effective educational tool to improve children's knowledge about coughing and sneezing etiquette. By providing structured, interesting, and visually appealing content, flip charts improve learning outcomes and contribute to the implementation of better health behaviors.

Keywords: Child; Cough; Flip Chart; Health Education; Knowledge; Sneeze.

INTRODUCTION

Coughing is a natural defense mechanism that helps clear the respiratory tract of irritants and pathogens (Zheng, Tang, Wang, Chen, Zhao, & Chen, 2024). In addition to being a necessary physiological reflex, coughing can also be caused by diseases that attack the respiratory tract, such as tuberculosis, asthma, pneumonia, acute respiratory infections, and other respiratory diseases (Jadhav,

Singh, Hussain, Gilhotra, Mishra, Prasher, & Gupta, 2021). When someone coughs, the sufferer can also expel droplets and cause the spread of infection (Lestari, Syaifurrahman, Pisacha, Safutri, Putri, Pratiwi, & Zahra, 2023). The phrase "Coughing and Sneezing Spread Disease" was first introduced during the 1918–1920 influenza pandemic to emphasize the role of respiratory droplets in disease transmission. A

single cough produces about 3,000 droplets, while a sneeze can release up to 40,000 droplets, contributing to the spread of infectious agents (Dhand & Li, 2020). Disease transmission occurs when an infected person expels these droplets, which can be inhaled by others or land on surfaces (Calcagni, Venier, Nasso, Boudin, Jarrige, Parneix, & Quintard, 2023).

Acute respiratory tract infection is an acute infection of the respiratory tract caused by fungal or viral infections, which can cause shortness of breath and itching in the respiratory tract and can be transmitted through droplets (Azoulay, Russell, Van de Louw, Metaxa, Bauer, & Pova, 2020). If a child experiences an acute respiratory tract infection, it must be treated immediately, otherwise it can cause more serious problems. Acute respiratory tract infection is one of the causes of death in children in developing countries (Purnamasari, 2023).

The World Health Organization (WHO) reports that almost 20% of under-five deaths in the world are caused by acute respiratory infections that can escalate into epidemics or even pandemics (Fadila & Siyam, 2022). In Indonesia, data from the 2018 Basic Health Research shows that the incidence of acute respiratory infections in toddlers continues to increase, contributing 20–30% of all child deaths (Ministry of Health of the Republic of Indonesia, 2018). Furthermore, in 2019, the prevalence of acute respiratory infections in Indonesian toddlers was recorded at 3.55% of the total 7,639,507 reported cases.

Coughing and sneezing etiquette applies to everyone, especially in cases of airborne infections in the form of droplets that can cause the spread of germs (Brown, Nettleton, Buse, Lewis, & Martin, 2021). This is necessary to prevent the spread of infectious bacteria and viruses. According to the Centers for Disease Control and Prevention (CDC), the correct coughing and sneezing etiquette is to wear a mask when you have a cold or cough, use a tissue to cover your nose and mouth and throw the tissue in a closed trash can. If you do not have a mask or tissue, cover your mouth when coughing or sneezing with the inner upper arm or inner elbow, and keep washing your hands with running water and soap or alcohol-based hand sanitizer (Centers for Disease Control and Prevention, 2024).

Knowledge is acquired through sensory perception, especially through sight and hearing (Rosida, Amaliah, Mahardika, & Suratno, 2023). Education plays an important role in increasing knowledge in various fields including health (Puspita, Khayan, Suaebah, Ihsan, & Hanif, 2024). Health education is very important to foster good healthy living behaviors, especially in school-age children because habits formed at this stage often continue into adulthood (Haryani & Sulastr, 2022).

Health education in the form of socialization needs to be carried out, in order to prevent the spread of infectious diseases and to enable the community, especially children, to adopt healthy living behaviors so that they can play an active role in efforts to achieve optimal health. Effective delivery of health education requires appropriate learning media. One such media is a flip chart, which is a simple but effective visual aid that presents information through sequential images and text (Haryani & Sulastr, 2022). Children generally respond more to visually appealing material than text-heavy content, making flip charts the right tool for teaching health-related topics. The advantage of flip charts lies in their structured and interactive format, which facilitates understanding and engagement.

Based on preliminary research, it shows that children's knowledge of proper coughing and sneezing etiquette is still lacking. Given its effectiveness as a teaching tool, flip charts can be an optimal medium for educating elementary school children about this topic. This study aims to analyze the effectiveness of flip charts as an educational tool in improving children's understanding of coughing and sneezing etiquette.

RESEARCH METHOD

Pre-experimental quantitative research design with a one-group pretest-posttest design approach. The sample was selected through total sampling involving Al-Huda Elementary School, Jember. This research was conducted in October-December 2024.

The independent variable in this study is the use of flip charts, while the dependent variable is knowledge of cough etiquette. The instrument used was a questionnaire on coughing and sneezing etiquette knowledge consisting of 10 multiple-choice questions.

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The research procedure includes three stages: 1) Pre-test to obtain data on participant knowledge about coughing and sneezing etiquette which is assessed using a validated questionnaire; 2) The intervention provided is in the form of health education delivered using flip chart media; and 3) Post-test to obtain participant knowledge scores after the intervention, so that the impact of flip chart-based education can be evaluated. Knowledge is categorized into 3, good if

the score obtained is in the range of 76-100%, sufficient if the score is 56-75%, and poor if the percentage result is <56%.

The collected data were analyzed descriptively and statistically. The Wilcoxon signed-rank test was performed using SPSS to compare pre-test and post-test scores and determine the statistical significance of the intervention effects.

RESEARCH RESULTS

Table Distribution of Participant Characteristics (N=24)

Variables	Results	Asymp.Sig.(2-tailed)	z
Age (Mean±SD)(Range)(Years)	(8.4±1.0)(7-10)		
Age (n/%)			
7	4/16.7		
8	11/45.8		
9	5/20.8		
10	4/16.7		
Gender (n/%)			
Male	12/50.0		
Female	12/50.0		
Coughing and Sneezing Etiquette Knowledge (Mean±SD)(Range)			
Pre-test	(55.8±25.7)(10-90)	<.001	-3.723^b
Post-test	(75.0±20)(40-100)		

Based on the table above, the average age of the participants was 8.4 years with a standard deviation of 1.0 in the age range of 7-10 years. The number of male and female participants had the same percentage of 12 participants (50%). The average pre-test score was 55.8 with a standard deviation of 25.7, while the post-test score increased to 75.0. Statistical calculations revealed a z value of -3.7 and a significance level (2-tailed) of less than 0.001. This indicates a significant increase in knowledge of cough etiquette pre-post test.

DISCUSSION

The findings of this study indicate that flip chart media is effective in improving children's knowledge of coughing and sneezing etiquette. Statistical

analysis showed a significant difference in the level of knowledge before and after the intervention, with Asymp. Sig. (2-tailed) <0.001, which confirms the impact of flip chart-based health education. The results of this study are in line with previous studies showing that ethical coughing interventions in elementary schools are acceptable and feasible to reduce coughing and sneezing in open environments (Sultana, Nizame, Southern, Unicomb, Winch, & Luby, 2017). Similar studies also show that elementary school children can identify safe coughing etiquette (Shin, Ali, & Dawy, 2022; Utami, Claramita, & Istiono, 2020).

Educational media plays an important role in improving knowledge retention and understanding in children. The effectiveness of knowledge transfer

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depends on the ability of human senses to receive, process, and store information. This study shows that multisensory learning involving visual and auditory elements can improve memory retention. The more senses involved in the learning process, the more effective the absorption of knowledge (Puspita et al., 2024). Visual aids, such as flip charts with colorful illustrations make abstract concepts easier for young learners to understand and increase engagement.

At the elementary school level, developing health behavior is very important because habits formed since childhood tend to persist into adulthood (Haryani & Sulastri, 2022; Kim & Oh, 2021). Health education aims to encourage behavioral change, ensuring that individuals adopt and maintain healthy practices. Flip chart media enhances this process by providing structured, visually appealing, and easy-to-understand educational content. This is in accordance with the results of previous studies showing that illustration media can improve elementary school children's knowledge, attitudes, and skills about cough etiquette (Linda & Marsofely, 2022).

Flip charts function as effective two-dimensional learning tools, allowing students to understand abstract concepts concretely and contextually. According to Piaget's theory of cognitive development, children at the elementary school level are at the concrete operational stage, meaning they can understand symbols and concepts but benefit from concrete visual aids to strengthen their understanding (Aprilia, Arif, Hidayah, & Nataliswati, 2023). Flip charts provide this visual reinforcement, making health messages more digestible and actionable.

In addition, flip charts offer several practical advantages including; 1) Simplicity, namely easy to use and does not require electronic devices; 2) Engagement, namely colorful visuals attract students' attention and maintain their interest; 3) Effectiveness, namely presenting information concisely and systematically, thus facilitating knowledge retention.

These advantages are in line with previous studies that found that flip charts were more effective than PowerPoint presentations in improving children's knowledge of oral hygiene with a higher average rating score (58.03 vs. 20.98) (Haryani & Sulastri, 2022). Likewise, other studies have shown that learning with the help of flip charts significantly

improves students' academic achievement and cooperative attitudes with statistically significant differences (Sig = 0.00, $p < 0.05$) before and after the intervention (Nofita & Rusnilawati, 2022). A similar study reported that flip charts are an effective health education medium (Dewi & Caesar, 2022). These findings further support the use of flip charts as an effective educational tool in health promotion efforts. However, a study reported that film media is more effective than flip charts.

Cough etiquette is a non-pharmacological preventive measure that helps reduce the transmission of respiratory infections caused by viruses and bacteria. Several studies have confirmed that proper cough etiquette significantly reduces the spread of infectious airborne droplets (Bakhtiar, Duma, Hilda, Hendra, & Mallongi, 2024; Tang, Nicolle, Pantelic, Jiang, Sekhr, Cheong, & Tham, 2011). Key preventive measures include covering the nose and mouth with a tissue, cloth, or mask when coughing or sneezing, and using the inside of the elbow or hand (followed by immediate hand washing) if other barriers are not available.

Educating children about proper cough etiquette is essential to fostering responsible health behaviors. Knowledge and behavior are interrelated, as increased awareness leads to better adherence to proper etiquette (Bakhtiar et al., 2024). Educational interventions, including flip chart-based learning, posters, and flyers, have been shown to improve awareness and behavioral adherence to cough etiquette.

CONCLUSION

Flip chart media is an effective educational tool to improve children's knowledge of coughing and sneezing etiquette. Providing structured, interesting and visually appealing content, flip charts improve learning outcomes and contribute to the adoption of better health behaviors. It is hoped that by implementing flip chart-based education in schools, students will develop a stronger understanding of proper coughing and sneezing etiquette, which ultimately helps reduce the spread of airborne diseases.

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DOI: <https://doi.org/10.33024/minh.v7i12.745>

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