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# Animated Heimlich maneuver education and mothers' preparedness for toddler choking first aid

**Amelia Nurul Hakim [a*], Al Amin [b]**

[a] Nursing Professional Program, STIKes Widya Dharma Husada, Tangerang, Indonesia
[b] Nursing Professional Program, Faculty of Nursing, Sultan Agung Islamic University, Semarang, Indonesia
* Corresponding author: amelianurulhakim28@gmail.com

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ABSTRACT

Choking is a life-threatening emergency in toddlers that can lead to hypoxia and death if not promptly managed. Mothers often serve as first responders at home, yet many lack adequate knowledge and appropriate attitudes toward choking first aid. This study evaluated the effect of animated Heimlich maneuver education on mothers' preparedness to manage choking in toddlers. A pre-experimental one-group pretest–posttest design was conducted among 86 mothers of children aged 1–3 years at Pamulang Community Health Center, recruited through consecutive sampling. Knowledge and attitudes were assessed using structured questionnaires before and after a 6-minute animated video intervention demonstrating choking risks, signs, and the Heimlich maneuver. Data were analyzed using the Wilcoxon signed-rank test. Results showed significant improvements in both knowledge and attitudes. The proportion of mothers with good knowledge increased from 18.6% to 72.1%, and positive attitudes increased from 30.2% to 90.7%. These changes were statistically significant (knowledge: $Z = -8.214$, $p < 0.001$; attitudes: $Z = -8.342$, $p < 0.001$). Animated education on the Heimlich maneuver effectively improves mothers' knowledge and attitudes toward choking first aid and offers a practical strategy to enhance caregiver preparedness.



## 1. Introduction

Choking is a common emergency that frequently occurs among children and can lead to serious health consequences. Choking occurs when the airway is partially or completely obstructed by a foreign object, preventing normal airflow into the lungs [1]. This condition constitutes a medical emergency that requires immediate and appropriate management because delayed intervention may result in oxygen deprivation (hypoxia), potentially leading to severe complications, brain damage, or death [2,3]. Young children are particularly vulnerable to choking due to developmental and behavioral factors [3].

According to the World Health Organization (WHO), choking incidents frequently occur in children aged 1–3 years [4]. The causes of choking include food (59.5%), foreign objects (31.4%), and unknown causes (9.1%). In developing countries, an estimated 300–600 children under the age of 15 die annually due to foreign body aspiration. Such incidents are reported to occur more frequently in boys than in girls, with a ratio of approximately 2:1 [5,6]. In the United States, data from the American Academy of Pediatrics reported 710 choking cases in children under four years old in 2018, with the highest incidence occurring among children aged 1–3 years [6].

Toddlers are especially at risk because their chewing and swallowing abilities are not fully developed. At this developmental stage, children also tend to explore objects by placing them in their mouths, increasing the likelihood of airway obstruction [7]. Additionally, behaviors such as eating while playing, laughing, talking, or running may further increase the risk of choking incidents. The relatively narrow airway in young children also makes them more susceptible to obstruction by small food particles or foreign objects [8]. Most choking incidents among toddlers occur at home during routine daily activities. In the family setting, mothers often serve as the primary caregivers responsible for supervising children during feeding and playtime [9]. Consequently, mothers are typically the first individuals present when choking incidents occur. Their ability to recognize choking symptoms and provide immediate first aid is therefore essential to prevent life-threatening complications [10].

Appropriate first aid management can significantly increase survival rates in choking emergencies. The Heimlich maneuver is widely recommended for children older than one year and involves abdominal thrusts that generate pressure to expel foreign objects from the airway. When performed correctly, this technique can be a life-saving intervention [7,11]. Despite its importance, many parents and caregivers still lack adequate knowledge and skills in managing choking emergencies. Insufficient knowledge may lead to delayed responses or inappropriate first aid actions, such as forcing the child to drink water or inserting fingers into the mouth without proper visualization. These incorrect practices may worsen airway obstruction and increase the risk of complications [12].

Health education plays an important role in improving community awareness and preparedness in managing emergency situations [13]. Conventional educational methods, such as lectures or printed materials, may not always be effective in delivering practical emergency procedures. Recently, multimedia-based educational tools, including animated videos, have been increasingly used in health promotion because they provide visual demonstrations that are easier to understand and remember [14]. Animated educational media can clearly illustrate step-by-step emergency procedures, helping caregivers better understand and retain key information. However, research examining the effectiveness of animated Heimlich maneuver education in improving mothers' knowledge and attitudes regarding choking first aid remains limited, particularly in community health settings. Therefore, this study aimed to evaluate the effect of animated Heimlich maneuver video education on mothers' knowledge and attitudes regarding choking first aid in toddlers aged 1–3 years at Pamulang Community Health Center.

## 2. Method

This research utilized a pre-experimental one-group pretest–posttest design at the Pamulang Community Health Center to evaluate alterations in mothers' knowledge and attitudes after an educational intervention. The sample consisted of 340 mothers with children aged 1 to 3 years. The application of the Slovin formula, with a margin of error set at 10%, determined a minimum sample size of 78. This figure was subsequently adjusted to 86 to accommodate potential participant dropouts. Participants were recruited using consecutive sampling according to established inclusion criteria: mothers of toddlers aged 1–3 years who were able to read and comprehend Indonesian and provided consent to participate. Participants who were absent during the intervention or had incomplete questionnaires were excluded from the study.

Data were gathered through structured questionnaires that included 15 knowledge items and 10 attitude statements regarding choking first aid utilizing the Heimlich maneuver. Three experts in pediatric nursing and emergency care confirmed the content validity. Reliability testing conducted in a pilot study (n = 30) produced Cronbach's alpha values of 0.82 for knowledge and 0.85 for

attitude, demonstrating satisfactory internal consistency. The intervention consisted of a 6-minute animated video addressing choking risk factors, signs, and the correct technique for the Heimlich maneuver, presented twice, followed by a 10-minute explanation and discussion session. Questionnaires for pretesting and posttesting were conducted prior to and following the intervention.

The analysis involved univariate statistics to assess respondent characteristics and employed the Wilcoxon signed-rank test for paired comparisons due to the non-normal distribution of the data. Statistical significance was established at $p < 0.05$. All participants gave written informed consent, and confidentiality was upheld. Identified limitations encompassed the absence of a control group, potential self-report bias, and the use of non-probability sampling methods. Standardized instruments and uniform procedures were utilized to reduce bias.

## 3. Results and Discussion

### 3.1. Results

This study investigated the effect of animated video education on mothers' knowledge and attitudes regarding first aid management of choking using the Heimlich maneuver among toddlers aged 1–3 years at Pamulang Community Health Center. A total of 86 mothers participated in this study. The characteristics of the respondents are presented in Table 1.

**Table 1.** Respondent Characteristics (n = 86)

| Characteristics | | N | % |
|---|---|---|---|
| **Age** | Late Adolescence (17–25 years) | 6 | 7 |
| | Early Adulthood (26–35 years) | 48 | 55.8 |
| | Late Adulthood (36–45 years) | 28 | 32.6 |
| | Early Elderly (46–55 years) | 4 | 4.7 |
| **Educational background** | Elementary School | 2 | 2.3 |
| | Junior High School | 8 | 9.3 |
| | Senior High School | 63 | 73.3 |
| | Higher Education | 13 | 15.1 |
| **Occupation** | Housewife | 66 | 76.7 |
| | Private Employee | 10 | 11.6 |
| | Self-Employed | 6 | 7 |
| | Civil Servant | 4 | 4.7 |

Table 1 presents the demographic characteristics of the respondents. Most mothers were aged 26–35 years (55.8%), had a senior high school education (73.3%), and were housewives (76.7%).

**Table 2.** Mothers' Knowledge Pretest and Posttest on Animated Heimlich Maneuver Education

| Variable | | Pre-test n (%) | Post-test n (%) |
|---|---|---|---|
| **Knowlegde** | Poor | 45 (52.3) | 6 (7) |
| | Moderate | 25 (29.1) | 18 (20.9) |
| | Good | 16 (18.6) | 62 (72.1) |
| **Attitudes** | Poor | 12 (14.0) | 2 (2.3) |
| | Moderate | 48 (55.8) | 6 (7.0) |
| | Good | 26 (30.2) | 78 (90.7) |

Table 2 shows an improvement in mothers' knowledge after the intervention. Before the intervention, most mothers had poor knowledge (45; 52.3%), followed by moderate (25; 29.1%) and good knowledge (16; 18.6%). After receiving the animated Heimlich maneuver education, most mothers had good knowledge (62; 72.1%), while 18 (20.9%) had moderate knowledge, and 6 (7.0%) remained in the poor category. These results indicate that the intervention improved mothers' knowledge of choking first aid in toddlers.

The distribution of mothers' attitudes toward choking first aid in toddlers aged 1–3 years based on pretest and posttest results. In the pretest, most mothers had moderate attitudes (48 mothers; 55.8%), followed by good attitudes (26 mothers; 30.2%) and poor attitudes (12 mothers; 14.0%).

After the educational intervention using the animated Heimlich maneuver video, the posttest results show a clear improvement. Most mothers (78; 90.7%) had good attitudes, 6 (7.0%) had moderate attitudes, and only 2 (2.3%) remained in the poor category. These findings indicate that animated video education improved mothers' attitudes toward providing first aid for choking in toddlers.

**Table 3.** Wilcoxon Signed-Rank Test of Mothers' Knowledge Before and After Intervention

| Variable | Pre-test Mean | Post-test Mean | Z value | p-value |
|---|---|---|---|---|
| **Mothers' Knowledge** | 72.70 | 88.13 | −8.214 | <0.001 |
| **Mothers' Attitudes** | 72.50 | 87.5 | −8.342 | <0.001 |

Table 3 shows that the mean knowledge score of mothers increased after the intervention. The mean pretest score was 72.70, while the mean posttest score rose to 88.13. The Wilcoxon signed-rank test showed a statistically significant difference between pretest and posttest scores ($Z = -8.214$; $p < 0.001$). These results indicate that animated Heimlich maneuver education significantly improved mothers' knowledge of first aid for toddler choking.

The mean score of mothers' attitudes toward choking first aid increased after the intervention. The mean pretest score was 72.50, while the mean posttest score rose to 87.50. The Wilcoxon signed-rank test showed a statistically significant difference between pretest and posttest scores ($Z = -8.342$; $p < 0.001$). These results indicate that animated Heimlich maneuver education significantly improved mothers' attitudes toward providing first aid for choking in toddlers.

### 3.2. Discussion

The findings of this study indicate that animated video–based health education can enhance mothers' understanding and attitudes toward appropriate first aid management of choking in toddlers [15]. The findings indicate that educational interventions using visual media may significantly enhance caregivers' readiness to respond to choking emergencies in young children. Animated videos serve as an effective educational medium by integrating visual demonstration with auditory explanation, thereby facilitating the presentation of complex procedures, such as choking management, in a straightforward and comprehensible manner [16,17].

Visual learning methods improve information processing and memory retention, particularly for elucidating practical emergency procedures that require clear, sequential actions. Research indicates that video-based education enhances caregivers' ability to identify choking incidents and increases their confidence in administering appropriate first aid measures. From a behavioral standpoint, knowledge and attitudes are fundamental in influencing health behavior. The Health Belief Model posits that individuals are more inclined to engage in preventive or emergency actions when they recognize a health threat and possess the requisite knowledge and skills to address it. Mothers who comprehend the risks associated with choking in toddlers and the corresponding response strategies are more likely to react swiftly and effectively in emergency situations [17].

Enhancing caregivers' preparedness is crucial, as choking continues to be a major cause of accidental injury and mortality in young children globally. Toddlers exhibit heightened vulnerability owing to developmental characteristics, including underdeveloped chewing skills, curiosity about small objects, and a propensity for oral exploration of items [10,18]. Failure to promptly manage airway obstruction can result in swift oxygen deprivation, potential brain injury, or fatality. The Heimlich maneuver is often endorsed as an effective first-aid method for relieving airway obstruction; however, many caregivers are inadequately informed or trained to perform it. Educational interventions that explicitly illustrate the technique are crucial for enabling caregivers to respond safely and effectively in choking situations [19,20].

This study uses animated video to overcome prevalent obstacles in community health education, including limited training time and challenges in conveying practical techniques solely through

verbal instruction. Animated media effectively conveys realistic scenarios and procedural demonstrations in a consistent and engaging manner, potentially enhancing participants' attention and comprehension. Educational tools can serve as valuable resources for community health centers to enhance caregiver education programs focused on child safety and emergency preparedness [19,21]. Notwithstanding these favorable implications, it is essential to recognize several limitations. The study employed a pre-experimental design lacking a control group, which may introduce bias and restrict the capacity to attribute the observed changes exclusively to the intervention. External factors, including previous exposure to health information and discussions among participants, may have influenced the outcomes. The study included mothers from a single community health center, potentially limiting the generalizability of the findings to other contexts or populations [20].

Future studies should consider employing quasi-experimental or randomized controlled designs to provide stronger evidence of intervention effectiveness. Long-term follow-up assessments would also be valuable for evaluating retention of knowledge and attitudes over time, as well as for examining whether improvements in knowledge translate into appropriate first aid behavior during actual choking incidents.

## 4. Conclusion

This study demonstrates that an animated video–based educational intervention significantly improves mothers' knowledge and attitudes regarding choking first aid for toddlers aged 1–3 years. Following the intervention, most mothers showed good knowledge and positive attitudes, reflecting increased readiness and confidence to perform appropriate first aid. These findings indicate that animated video education is an effective approach for enhancing caregiver preparedness to manage choking emergencies.

In practice, community health centers can integrate this approach into routine maternal and child health programs, including health promotion sessions and parenting education. Health workers may also use animated videos during counseling to strengthen caregivers' understanding of choking prevention and first aid management. Future studies should assess long-term retention and include controlled designs to strengthen the evidence base.

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### Conflict of Interest

The authors declare that there are no conflicts of interest related to this study. The research was conducted independently, and no financial or personal relationships influenced the results or interpretation of the data.

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