

Original Research

Enhance Mothers' Knowledge and Skills in Choking First Aid through Self-Directed Learning with Video Resources

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ABSTRACT

Choking represents a life-threatening emergency that necessitates immediate intervention, making bystanders' knowledge and skills essential for practical first aid. Traditional training methods, such as PowerPoint presentations and printed materials, are widely employed; however, technological advancements have prompted the exploration of self-directed learning through video (SDL-V) as a potentially more effective approach. This study aims to evaluate the impact of SDL-V-based choking first aid training on mothers' knowledge and skills concerning toddler choking in Kalisongo village. Employing a quasi-experimental pretest-posttest design with a control group, 30 participants from the intervention and control groups were selected through simple random sampling. Knowledge and skills were assessed before and after training, and differences were analyzed using independent and paired sample T-tests. The N-Gain Score test was employed to determine the effect size. The results revealed no significant differences in knowledge and skills between the groups before training ($P > 0.05$). Nonetheless, significant improvements were noted within each group following the training ($P < 0.05$). The intervention group exhibited significantly higher levels of knowledge and skills compared to the control group after training ($P < 0.05$), demonstrating a high N-Gain Score (>0.70). In conclusion, SDL-V-based choking first aid training significantly enhances mothers' knowledge and skills in Kalisongo village. Healthcare professionals should consider the integration of SDL-V into public education and training programs.

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Introduction

An emergency is an unpredictable condition (AHA, 2020). Choking is an airway emergency that requires immediate recognition and intervention. Acute upper airway obstruction can lead to ventilation and oxygenation failure, which may result in fatal consequences within minutes (Haryaty *et al.*, 2022). The prevalence of choking in developed countries can result in as many as 300 to 600 deaths among children under the age of five each day (Fano *et al.*, 2019). According to data from the Indonesian Ministry of Health, between 2016 and 2017, there were 269 cases of choking treated in Emergency Departments (ER) across Indonesia, predominantly involving children under 14 years old (Kamiwarno *et al.*, 2022). In 2016, 116 cases of choking in toddlers were also reported in East Java (Putri *et al.*, 2021; Suryani & Rahmawati, 2019).

Choking incidents in children aged 1-5 years account for 80% of all cases (Pondete *et al.*, 2022; Suryani & Rahmawati, 2019). Children under five years of age are particularly vulnerable to choking due to their developmental stage, known as the oral phase, during which they explore the world by putting objects in their mouths (Chang *et al.*, 2021; Khadijah *et al.*, 2021). The World Health Organization (WHO) reports that toddlers represent the highest proportion of choking cases worldwide (Suartini & Kusniawati, 2020). Furthermore, Purnomo *et al.* (2021) emphasize that choking is a major cause of death among young children, particularly those around the age of three.

The high mortality rate from choking is predominantly attributed to the insufficient knowledge and skills of bystanders in providing first aid (Alamsyah, 2022). This aligns with the findings of Purnomo *et al.* (2021), who emphasize that a person's knowledge level significantly impacts their ability to respond effectively to choking incidents. For children under five, mothers are typically the closest individuals to the child, making them the most frequent bystanders during choking incidents (Behboudi *et al.*, 2022).

A mother's adequate knowledge and skills in providing first aid for choking are crucial in helping her respond effectively

when a child is choking (Behboudi *et al.*, 2022). A mother's knowledge significantly influences her decision-making, where better knowledge leads to better handling of situations (Sirait *et al.*, 2021). This aligns with the study by Meilani and Fitriana (2023), which suggests that a mother's strong knowledge and skills can reduce her anxiety, enabling her to manage choking incidents more accurately and swiftly. Knowledge results from awareness gained through the sensory perception of an object via the senses (Dewiyanti *et al.*, 2022), while skills refer to the ability and confidence to take action in solving a problem (Behboudi *et al.*, 2022). Mother's knowledge and skills regarding first aid for choking can be improved by continuous training on the risks, symptoms, and treatment of choking (Behboudi *et al.*, 2022). Various professionals can conduct the training, and in the healthcare field, nurses can serve as facilitators in their role as health educators (Eka *et al.*, 2023).

Training can significantly affect knowledge and skills, supported by factors such as the methods and media used (Rahayu & Anggeriyane, 2022). Most learning is delivered through lectures with PowerPoint presentations and leaflets (Sulaikho *et al.*, 2022). However, these methods and media have limitations, such as inflexibility in time and location, the inability to be repeated, which leads to knowledge and skills not being retained for long, and a lack of facilitators resulting in infrequent training (Robinson & Persky, 2020). These issues indicate that the methods and media currently used in training still need to be more effective, and there is still a need for innovation in training methods and media that are more engaging and flexible.

The recommended approach is to implement training utilizing self-directed learning with video (SDL-V) (Szyld *et al.*, 2021). According to Malcolm Knowles' andragogy theory, SDL-V is characterized as a learning process that enables individuals to learn autonomously by adhering to instructions delivered via video, aiming to create a realistic and easily comprehensible experience (Charokar & Dulloo, 2022; Szyld *et al.*, 2021; van der Walt, 2019). The training based on SDL-V is more flexible, cost-effective, can be repeated until proficiency is achieved,

does not require a direct facilitator, and can increase motivation and awareness to learn (Charokar & Dulloo, 2022; Rong *et al.*, 2019; Szyld *et al.*, 2021).

This is consistent with Sustiyono (2021), which indicates that SDL-V is more effective in enhancing knowledge and skills than traditional lecture methods. Similarly, research by Qi *et al.* (2023) demonstrated increased caregiver knowledge following training using SDL-V. The training based on SDL-V is still rarely used in communities (Pondete *et al.*, 2022). This is consistent with preliminary studies conducted in the working area of the Dau Health Center, where it was found that education for the community is still delivered through lectures using PowerPoint and leaflets, which require a direct facilitator. This creates a problem, as training and education are rarely conducted.

Moreover, interviews with village office employees, Posyandu cadres, and five mothers from the Posyandu who have toddlers revealed that choking first aid training has never been conducted in Kalisongo village. Five mothers stated that they do not know how to provide first aid for choking in toddler cases. Based on these issues, the researcher is interested in conducting this study to determine the effect of choking first aid training for toddler cases based on SDL-V on mothers' knowledge and skills in Kalisongo village.

Method

This study is a quasi-experimental design using a pretest-posttest with a control group. This study was conducted at the Posyandu in Kalisongo village in July 2024, with 118 people in the population. Respondents were selected using Simple Random Sampling, which required the researcher to use a formula to determine the minimum sample size. The minimum sample size obtained was 16 participants. However, to minimize potential bias, the researcher included 30 participants in the intervention group and 30 in the control group. According to Supranto (2007), the sample calculation formula is presented in Figure 1.

$$(t-1) (r-1) \geq 15$$

Figure 1: Minimum Sample Size Formula

Explanation:

t: number of interventions

r: number of samples/group

The intervention group received choking first aid training for toddler cases based on self-directed learning with video (SDL-V). The video, which lasts 5 minutes, was reviewed and validated by experts. SDL-V was provided to the respondents for 7 days, during which they were encouraged to watch the video at least once per day. In the control group, choking first aid training for toddler cases was delivered through a lecture method using PowerPoint and leaflets. The lecture lasted 20 minutes and was conducted only once, while respondents were encouraged to read the leaflets at home over 7 days. Respondents' knowledge and skills were assessed before the training (pretest) and after the training (posttest). The posttest was conducted on the eighth day after the pretest in each group.

Knowledge was evaluated through a questionnaire administered to respondents. In contrast, skills were assessed using an observation sheet that examined their performance during a role play on choking first aid for toddler cases. The questionnaire used in this study assessed knowledge of choking first aid for toddler cases. It consisted of 21 questions that were proven valid (r-value 0.666–0.743) and reliable (Cronbach's Alpha 0.950). The observation sheet was based on the Standard Operating Procedure (SOP) for choking first aid in toddler cases from the American Red Cross. It comprised ten statements that were proven valid (r-value 0.672–0.946) and reliable (Cronbach's Alpha 0.942).

This study used parametric tests because the data was normally distributed. The difference was assessed using an Independent Sample T-test and a Paired Sample T-test, while the effect was analyzed using the N-Gain Score test. The data are presented as means and standard deviations. This study was carried out after obtaining ethical approval from the University of Brawijaya, with number 10453/UN10.F17.10.4/TU/2024.

Results and Discussion

The results of this study indicate that all knowledge and skill data in both the intervention and control groups were normally distributed, as evidenced by a Shapiro-Wilk P-Value > 0.05. Furthermore, the two groups' pre-training knowledge and skill data were equivalent, with a p-value > 0.05, indicating homogeneity of the data. Based on

these findings, this study qualified for analysis using Parametric Tests.

This section discusses each group's characteristics, the differences in knowledge and skills before and after the choking first aid training for toddler cases within each group, the differences in knowledge and skills between the two groups following the choking first aid training for toddler cases, and the effect of choking first aid training for toddler cases based on SDL-V on knowledge and skills.

Table 1. Respondent Characteristics (N=60)

Variable	Intervention Grup		Control Grup	
	n	%	n	%
Age				
Early Adulthood (21-35)	26	86.7	27	90.0
Middle Age (36-50)	4	13.3	3	10.0
Educational Background				
Elementary School	3	10.0	4	13.3
Junior High School	13	43.3	11	36.7
Senior High School	9	30.0	10	33.3
Vocational High School	4	13.3	5	16.7
Undergraduate	1	3.3	0	0
Occupation				
Housewife	24	80.0	22	73.3
Private Sector	6	20.0	7	23.3
Entrepreneur	0	0	1	3.3
Total	30	100	30	100

Table 1 shows that in the intervention group, most respondents are in early adulthood (21-35 years old), totalling 26 respondents (86.7%). The most common educational background is junior high school, with 13 respondents (43.3%), and the most common occupation is housewife, with 24 respondents (80%). In the control group, most

respondents are also in early adulthood (21-35 years old), totalling 27 respondents (90%). The most common educational background is junior high school, with 11 respondents (36.7%), and the most common occupation is housewife, with 22 respondents (73.3%).

Table 2. Test of Differences in Knowledge and Skills Before and After Training in the Intervention Group (N=30)

Variable	Mean	Difference	Std. Deviation	P-Value
Knowledge				
Pre Test	14.43			
Post Test	19.07	4.633	0.890	0.000
Skills				
Pre Test	4.17			
Post Test	15.93	11.767	2.648	0.000

Table 2 shows that in the intervention group, the mean of knowledge before choking first aid training for toddler cases was 14.43, while the mean of knowledge after the training was 19.07. Thus, the difference in knowledge

before and after the training was 4.63 (SD=0.89), with a P-value from the Paired Sample T-Test of 0.000. Additionally, the mean of skills before the training was 4.17, and the mean of skills after the training was 15.93,

resulting in a difference of 11.77 (SD=2.65), with a P-Value from Paired Sample T-Test of 0.000.

These results indicate that both variables have a P-value from Paired Sample

T-Test < 0.05, leading to the conclusion that there is a significant difference in the knowledge and skills of respondents before and after the training in the intervention group.

Table 3. Test of Differences in Knowledge and Skills Before and After Training in the Control Group (N=30)

Variable	Mean	Difference	Std. Deviation	P-Value
Knowledge				
Pre Test	15.13	2.300	1.489	0.000
Post Test	17.43			
Skills				
Pre Test	4.00	9.400	1.522	0.000
Post Test	13.40			

Table 3 shows that in the control group, the mean of knowledge before choking first aid training for toddler cases was 15.13, while the mean of knowledge after the training was 17.43. Thus, the difference in knowledge before and after the training was 2.300 (SD=1.489), with a P-Value Paired Sample T-Test of 0.000. Additionally, the mean of skills before the training was 4.00, and the mean of

skills after the training was 13.40, resulting in a difference of 9.400 (SD=1.522) with a P-value from the Paired Sample T-Test of 0.000.

These results indicate that both variables have a P-value from Paired Sample T-Test < 0.05, leading to the conclusion that there is a significant difference in the knowledge and skills of respondents before and after the training in the control group.

Table 4. Test of Differences in Knowledge and Skills between Intervention and Control Group After Training (N=60)

Variable	Group	N	Mean	Mean Difference	P-Value
Knowledge	Intervention	30	19.07	1.633	0.000
	Control	30	17.43		
Skills	Intervention	30	15.93	2.533	0.000
	Control	30	13.40		

Table 4 shows that after the choking first aid training for toddler cases, the mean of knowledge in the intervention group was 19.07, while the mean of knowledge in the control group was 17.43. This resulted in a mean difference of 1.633 between the groups, with a P-value from the Independent Sample T-Test 0.000. Additionally, after choking first aid training for toddler cases, the mean of skill in the intervention group was 15.93, while the mean of skill in the control group was 13.40. This resulted in a mean difference of 2.533

between the groups, with a P-value from the Independent Sample T-Test 0.000.

These results indicate that both variables have a P-Value from the Independent Sample T-Test of < 0.05, leading to the conclusion that there is a significant difference in knowledge and skills between the intervention and control groups after the choking first aid training for toddler cases, with the intervention group showing higher mean knowledge and skill scores compared to the control group.

Table 5. The Effect of Choking First Aid Training for Toddler Cases Based on SDL-V on Mothers' Knowledge and Skills (N=60)

Variable	N	Mean of N-Gain	Std.Deviation
Knowledge	30	0.7417	0.14950
Skills	30	0.7347	0.10573

Table 5 shows that the mean of the knowledge variable's N-Gain score on the knowledge variable was 0.7417, while the mean of the N-Gain score on the skill variable was 0.7347. These results show that the SDL-V group's N-Gain score of knowledge and skills was > 0.70 (high category), so it is concluded that the choking first aid training for toddler cases based on SDL-V had a high influence on knowledge and skills.

The results of this study reveal that self-directed learning with video (SDL-V) for choking first aid training significantly impacts knowledge, as reflected in a mean N-Gain score of 0.7417, indicating a strong influence. This study also identified a significant effect of SDL-V on choking first aid training in terms of skills, with a mean N-Gain score of 0.7347, indicating a strong influence.

Training using SDL-V can effectively enhance knowledge and skills with high outcomes. This is because SDL-V is a form of adult self-directed learning that integrates Knowles' andragogy theory by fostering self-concept and motivation for learning, facilitates experiential learning, increases readiness to learn, and supports a learning orientation that leads to the achievement of learning objectives (Al-Nasseri, 2014). Moreover, SDL-V-based training is packaged engagingly, allows repeated access, is flexible regarding time and location, and boosts learners' confidence in the learning process (Charokar & Dulloo, 2022). These advantages make training based on SDL-V better than lecture-based training using PowerPoint and leaflets.

The findings of this study align with Saiboon *et al.* (2021), who stated that SDL-V has an impact on improving knowledge and skills in emergency procedures, with a p-value <0.05. Isa *et al.* (2021) also added that training based on SDL-V effectively enhances the knowledge and skills of 30 hospital personnel in conducting focused assessments using sonography for trauma in Malaysia. This claim is supported by Krämer *et al.* (2021), who noted that video-based learning effectively communicates pertinent information to the target audience quickly while preserving the focus of the learning process. In alignment with the research conducted by Meilani and Fitriana (2023) on the impact of video media on mothers' knowledge and skills regarding

choking incidents in infants at local health posts, it was found that educational interventions using video media significantly enhanced mothers' knowledge and skills in managing infant choking incidents, with a P-Value of 0.01.

According to Junli *et al.* (2023), the mechanism of changes in knowledge and skills begins with sensory input through audiovisual means, which is then transformed into knowledge and ultimately results in experience. Consequently, knowledge and experience enhance skills (Junli *et al.*, 2023). This aligns with Izzati *et al.* (2021), which indicates that higher knowledge correlates with better skills. Skills are the ability to think critically in solving problems, the aptitude for collaboration, and proficiency in effective communication (Redhana, 2019).

SDL-V holds significant potential for enhancing community knowledge and skills. However, its implementation remains limited due to the need for more research supporting the effectiveness of this method in training programs. This study is expected to serve as both an innovation and a reference in improving community knowledge and skills, particularly in community emergencies, such as choking first aid for toddler cases. Moreover, the findings of this study offer practical implications for healthcare professionals to enhance the quality of health education within the community, in line with the study by D'azzuri *et al.* (2020), which states that video can be used as an educational tool for healthcare professionals as well as a learning media in schools. For future development, it is recommended that subsequent studies explore the factors influencing the effectiveness of training based on SDL-V in the nursing context to gain deeper insights into that implementation.

Conclusion

The research findings indicate that choking first aid training for toddler cases based on self-directed learning with video (SDL-V) significantly impacted mothers' knowledge and skills in Kalisongo village. Therefore, SDL-V is recommended as an innovative method for learning. Healthcare professionals are expected to utilize SDL-V as

an effective method and media for public outreach or training programs.

Limitations of the study

This study has yet to comprehensively analyze external factors influencing the research outcomes, such as age, education level, occupation, intelligence, and individual learning methods.

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Conflict of Interest

The authors declare no conflict of interest.

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