

Booklet, Strip Comic, and Quartet Card (BOSQUE) Intervention in First Aid for Choking Toddlers : A Pre-Experimental Study

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Page 183-194

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Abstract

Introduction: Choking is one of the leading causes of accidental death in toddlers, which can be prevented through first aid education. Unfortunately, mothers' knowledge of choking management is still low, and conventional education methods are uninteresting and difficult to understand. Therefore, innovative educational media is needed to effectively improve mothers' understanding.

Methods: This study used a pre-experimental quantitative design with a one-group pretest-posttest approach. The sample consisted of 31 mothers with toddlers at Aisyiyah 11 Kindergarten in Palembang, selected using total sampling. The intervention was carried out by providing health education using BOSQUE media, which consisted of booklets, comic strips, and quartet cards. The data were analyzed using the Wilcoxon test because the data were not normally distributed.

Results: The results showed a significant increase in mothers' knowledge after the intervention. The median knowledge score before the intervention was 9.00 and increased to 15.00 after the intervention. The Wilcoxon test showed a p-value of 0.001 ($p < 0.05$), which means there was a significant difference between before and after the intervention. **Conclusion:** The BOSQUE media was effective in increasing mothers' knowledge of first aid for choking in toddlers. This media can be used as an alternative form of public health education that is fun, interactive, and easy to understand, especially for groups of mothers with low to medium levels of health literacy.

Keywords : Booklet, Strip Comic, Quartet Card, Choking

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INTRODUCTION

Choking is a common emergency condition in toddlers and can be fatal if not treated immediately with proper first aid. Toddlers are in an exploratory phase and often put food or foreign objects in their mouths without full supervision, resulting in a high risk of choking. Data shows that choking is the fourth leading cause of death from unintentional injury in children under the age of five (Asmar et al., 2023).

Unfortunately, mothers' knowledge and skills in handling choking cases are still relatively low. In a study in Palestine, although 72.9% of mothers had good

knowledge about choking, 75.9% still demonstrated inappropriate first aid practices (Asmar et al., 2023). This emphasizes that knowledge alone is not enough if it is not supported by practical skills.

Health education is an important approach to improving mothers' preparedness in handling emergency situations such as choking. Various studies have shown that educational interventions, such as hands-on training, have been proven to be significant in improving mothers' knowledge and skills in handling choking cases (Kumari & Nitakumari, 2023).

One educational method currently being developed is video-based Self-Directed Learning (SDL), which has been proven effective in improving mothers' knowledge and skills through a self-directed and visual approach. Studies show that the SDL method with videos can significantly improve mothers' knowledge and skills, compared to conventional print media such as PowerPoint and brochures (Aprioni et al., 2024).

However, the use of innovative learning media that is educational and visually appealing, such as BOSQUE (Booklet, Strip Comic, and Quartet Card), is still very limited. BOSQUE is a combination of visual and interactive educational media designed to convey health messages in a simple, interesting, and memorable way (Kore, D. M., Ariesthy, K. D., & Djogo, 2021; Maharani et al., 2022; Vina Novela, 2021). This media has the potential to increase mothers' knowledge more effectively than traditional methods because it utilizes the principles of visual learning and storytelling.

Previous studies have shown that visual media approaches such as live demonstrations and role-playing can significantly improve mothers' knowledge scores (Kunbaran et al., 2024). By adapting a similar approach in the form of BOSQUE media, it is hoped that an educational method will be created that is not only informative but also enjoyable and easy for the general public to understand.

Most studies on first aid education for choking toddlers still use single media such as videos or leaflets. In fact, visual and interactive approaches have been proven to

be more effective in improving mothers' retention and understanding of emergency actions (Aprioni et al., 2024; Kunbaran et al., 2024). To date, there has been no research examining the effectiveness of BOSQUE media (Booklet, Strip Comic, and Quartet Card) as a combination of educational media in improving mothers' knowledge of first aid for choking infants, especially in Indonesia. This indicates a research gap that needs to be filled.

This study is novel in its use of BOSQUE (Booklet, Strip Comic, and Quartet Card) as a combination of visual and interactive educational media that has not been studied before in the context of first aid education for choking toddlers, especially in Indonesia. BOSQUE combines visual literacy, narrative, and educational games to help improve mothers' understanding more effectively and enjoyably. Unlike previous studies that generally used single media such as leaflets, lectures, or videos (Aprioni et al., 2024), the BOSQUE approach offers a variety of complementary educational media to support information retention and mothers' engagement in the learning process. Furthermore, most previous studies emphasized knowledge alone without considering media formats that are contextual and appealing to the general public (Kumari & Nitakumari, 2023). By developing media tailored to local culture and visual learning styles, this research aims to address gaps in effective, applicable, and inclusive health education methods for mothers at the community level.

Research on first aid education for choking cases in toddlers has been conducted extensively, generally using a direct training approach, lectures, or single educational media such as videos or leaflets. A study by Aprioni et al shows that self-directed learning videos can significantly improve mothers' knowledge and skills (Aprioni et al., 2024). Similarly, hands-on training has been proven effective in improving mothers' preparedness for choking situations (Kumari & Nitakumari, 2023). However, these approaches tend to be one-way, less appealing to people with low literacy, and do not yet integrate narrative visual elements and educational games. No previous study has specifically developed and tested combined educational media such as BOSQUE, which combines informative booklets, educational comic

strips, and quartet card games into one interactive and fun educational package. On the other hand, studies by Sarabi & Nosratabadi and Asmar also highlight that although mothers' knowledge increases after education, practice in the field remains low due to a lack of emotional engagement and contextual understanding (Asmar et al., 2023; Sarabi & Nosratabadi, 2022).

Thus, this study occupies a unique position in the literature by offering the innovative BOSQUE media, which combines visual, narrative, and interactive approaches that have not been widely studied. BOSQUE is expected to bridge the gap between knowledge and practice and contribute to creating more effective, applicable, and enjoyable health education methods at the community level, especially for mothers of toddlers in Indonesia.

METHOD

This study is a quantitative study using a pre-experimental one group pretest-posttest design. This design was chosen because it can measure the effect of an intervention, in this case the BOSQUE media (Booklet, Strip Comic, and Quartet Card), on changes in mothers' knowledge of first aid for choking toddlers before and after education. A similar design was also used in several previous studies that successfully showed a significant increase in mothers' knowledge after first aid education, both through direct training and through independent educational video media (Aprioni et al., 2024; Kumari & Nitakumari, 2023). The population in this study were mothers who had toddlers (1–5 years old) and sampling was conducted using purposive sampling, based on the following inclusion criteria: mothers who were willing to be respondents, could read, and follow the entire education program. The number of samples used was 31 respondents.

The questions in the questionnaire were in multiple-choice format and had been tested for validity and reliability in a similar study (Sarabi & Nosratabadi, 2022). Validity testing was conducted using Pearson Product Moment correlation, with a significance level of $\alpha = 0.05$ and a r table value of 0.361. Reliability testing showed

a Cronbach's Alpha value of 0.892, indicating a very high level of reliability ($\alpha > 0.80$).

The intervention in this study was conducted to determine the effect of BOSQUE media (Booklet, Strip Comic, and Quartet Card) on improving mothers' knowledge of first aid for choking toddlers. Before the intervention, all respondents were given a pretest in the form of a knowledge questionnaire that had been tested for validity and reliability to measure their initial level of knowledge. After the pretest, respondents attended a health education session using BOSQUE media. The media consisted of a Booklet containing text information and illustrations of first aid steps, a Strip Comic with educational narratives depicting real situations of toddlers choking, and Quartet Cards as an educational game that reinforced participants' understanding through direct interaction.

The educational session lasted approximately 60 minutes and was divided into three stages: (1) presentation of material through a booklet, (2) discussion and simulation through a comic strip, and (3) reinforcement of concepts through a quartet card game. The activity was carried out in small groups in the Aisyiyah 11 Palembang. After all stages were completed, respondents were given a posttest the same questionnaire to assess knowledge improvement. To determine the effect of the intervention, the data were analyzed using the Wilcoxon Signed Rank Test, as the data were ordinal and came from the same group (pre-post). Significance was determined at a p-value < 0.05 .

This study has obtained ethical approval from the Ethics Committee of IKesT Muhammadiyah Palembang with ethical approval number 000910/KEP IKesT Muhammadiyah Palembang/2025. Prior to the study, all respondents were given a verbal and written explanation of the purpose, benefits, and procedures of the study. The researchers also emphasized that participation was voluntary and that respondents had the right to refuse or withdraw at any time without any consequences.

To maintain data confidentiality, each respondent was given an anonymous code and the research results were used for academic purposes only. There was no intervention that could potentially harm the respondents because the activities were carried out in the form of education. All research procedures were aligned with the principles of health research ethics, namely Respect for Persons (autonomy), Beneficence (goodness), Non-Maleficence (do no harm), and Justice (fairness), as outlined in the WHO (2021) research ethics guidelines and the Declaration of Helsinki.

RESULTS

This study was conducted on January 7, 2025, at Aisyiyah 11 Kindergarten in Palembang with 31 mothers who had toddlers as respondents. The study aimed to determine the effect of health education using BOSQUE media (Booklet, Strip Comic, and Quartet Card) on mothers' knowledge of first aid for toddlers who are choking. The results of the study are presented in the form of univariate descriptive and bivariate analysis as follows:

Table 1. Average Age of Respondents at Aisyiyah 11 Kindergarten in Palembang

Variabel	Mean	Median	SD	Min-Maks
Usia	40,42	10,00	5,439	30-50

Based on Table 1, it can be seen that the average age of respondents was 40.42 years, with the youngest being 30 years old and the oldest being 50 years old. The standard deviation value of 5.439 indicates that the variation in age was not too large.

Table 2. Respondents' Knowledge Before&After Receiving BOSQUE Health Education

Variabel	N	Median	Min-Maks	Std.Dev
Before	31	9,00	5 - 11	1.371
After	31	15	12 - 17	1.621

Based on Table 2, the median knowledge score of respondents before receiving health education using BOSQUE media was 9.00, with a minimum score of 5 and a maximum score of 11, and a standard deviation of 1.371. This indicates that before

receiving education, the mothers' knowledge level was still classified as low to moderate.

The median knowledge score of respondents after receiving health education using BOSQUE media increased to 15.00, with a range of 12–17 and a standard deviation of 1.621. These results indicate a significant increase in mothers' knowledge of first aid for choking toddlers.

Table 3. Testing the Normality of Knowledge Data Before and After (Shapiro-Wilk Test)

	Shapiro-Wilk		
	Statistic	df	Sig.
Before	0,869	31	0,001
After	0,879	31	0,002

Based on Table 3, the Shapiro-Wilk test shows that the significance value (p) for the knowledge data before and after is < 0.05 . This means that the data is not normally distributed, so parametric tests such as the paired t-test cannot be used.

Table 4. Knowledge Data Transformation Before and After

	Shapiro-Wilk		
	Statistic	df	Sig.
Before	0,846	31	0,001
After	0,874	31	0,002

The results of data transformation still show that the distribution is not normal because the value of sig < 0.05 , so the researcher uses an alternative non-parametric test, namely the Wilcoxon test.

Table 5. Wilcoxon Test: The Effect of BOSQUE Health Education on Mothers' Knowledge

Variabel	Median	Min	Maks	P Value
Before	9,00	5	11	0,001
After	15,00	12	17	

Based on Table 5, the Wilcoxon test results show that the p-value = 0.001 ($p < 0.05$). This indicates that there is a significant effect of health education using BOSQUE media on improving mothers' knowledge of first aid for choking toddlers.

DISCUSSION

Respondent Characteristics Based on Age

Based on the research results, it is known that the average age of respondents is 40.42 years, with an age range of 30 to 50 years. The age of the mother greatly influences the ability to receive information and experience in child care. Older mothers tend to have more experience in dealing with emergency situations such as toddlers choking, but they do not necessarily have the correct technical knowledge about first aid. This is in line with the research, which states that although most mothers are mature and knowledgeable, their first aid practices are still inadequate, indicating the need for more structured and practical training (Asmar et al., 2023).

Level of Knowledge Before and After BOSQUE Health Education

Before the health education intervention using BOSQUE media was provided, mothers' knowledge levels were moderate to low, with a median score of 9.00. After the intervention, the median increased significantly to 15.00. This shows that BOSQUE media can effectively improve mothers' knowledge of first aid measures for toddlers who are choking.

The results showed that before the educational intervention through BOSQUE (Booklet, Strip Comic, and Quartet Card) media, mothers' knowledge of first aid for choking toddlers was still low to moderate, with a median score of 9.00. This reflects that most mothers did not have sufficient understanding of the appropriate steps to take when dealing with a child who is choking. Previous studies have shown similar conditions, where even though most mothers possess basic knowledge, their practice and in-depth understanding are still lacking, so that they are often unable to provide proper assistance in emergency situations (Asmar et al., 2023).

After receiving education using BOSQUE media, there was a significant increase in the respondents' knowledge, with the median score rising to 15.00. The BOSQUE media, which combines visual (booklet), narrative (strip comic), and educational games (quartet cards) approaches, has been proven to increase learning interest and information retention. This is in line with the results of a study Aprioni, which shows

that the use of self-directed learning-based educational videos can significantly increase mothers' knowledge of first aid (Aprioni et al., 2024).

Other studies also show that demonstration-based learning methods such as role play or hands-on training can increase knowledge and skills in a more meaningful way, as found by Kumari & Nitakumari and Kunbaran. Visual and participatory approaches make information easier to understand, especially for people with limited health literacy (Kumari & Nitakumari, 2023; Kunbaran et al., 2024).

Furthermore, in a study by Younis, it was explained that demonstration- and multimedia-based intervention programs were able to improve mothers' knowledge and preparedness for choking and foreign body aspiration incidents (Younis et al., 2024). Even video-based educational media also showed a significant increase in understanding of the risk of choking (Sarabi & Nosratabadi, 2022).

Similar findings were also obtained in a study in Indonesia, which showed that health education on choking using simple media such as lectures and posters was able to significantly increase mothers' knowledge, but this approach still has limitations in terms of participant engagement (Azizah et al., 2024). BOSQUE, as an interactive medium, offers advantages because it encourages mothers' active participation in understanding the material through stories, illustrations, and educational play activities.

Statistically, the increase in knowledge was also proven to be analytically significant, with the Wilcoxon test results showing a value of $p = 0.001$, indicating a significant difference between knowledge before and after the intervention. This is also in line with the study Astilia which states that systematic education can increase mothers' knowledge scores in a short period of time (Astilia, 2024; Dias et al., 2021).

Thus, providing health education through the BOSQUE medium has been proven to significantly increase mothers' knowledge of first aid for choking infants and is more effective than conventional approaches. BOSQUE can be an innovative solution that is applicable and easy to implement in community settings such as health posts or early childhood education centers.

Statistical Test Results and Significance

Through the Shapiro-Wilk normality test, it was found that the data was not normally distributed even after transformation. Therefore, the non-parametric Wilcoxon test was used to analyze the difference in knowledge before and after the intervention. The Wilcoxon test results showed a p-value of 0.001, which means that there was a significant effect of health education using BOSQUE media on improving mothers' knowledge of first aid for toddlers who are choking (Cohen et al., 2017). These results confirm that visual and interactive educational media can be a solution in overcoming low public awareness and preparedness for emergency cases in children, especially choking. In addition, BOSQUE also provides an alternative educational strategy that is more innovative, contextual, and enjoyable than the conventional lecture or leaflet methods that have been used so far. This has also been confirmed by various previous studies that show the effectiveness of educational interventions in changing mothers' behavior and knowledge regarding first aid (Astilia, 2024; Azizah et al., 2024).

Research Implications

This study makes an important contribution to the development of public health education media. BOSQUE can be used as an alternative educational media model that can be applied in various settings such as health posts, early childhood education centers, and mothers' communities. In addition to increasing knowledge, this media can also build mothers' confidence in dealing with emergency situations. This implication is important considering that choking is the leading cause of accidental death in toddlers, which can actually be prevented through proper education (Dias et al., 2021; Nanda et al., 2022).

Research Limitations

This study has limitations in terms of the relatively small sample size and the absence of a control group. In addition, the measurements focused only on knowledge aspects without evaluating direct practice or long-term retention. Future studies are recommended to use a quasi-experimental design with two groups

(control and intervention), as well as adding skill and practice indicators as part of the evaluation of the intervention's success.

CONCLUSIONS

Based on the results of research conducted at Aisyiyah 11 Kindergarten in Palembang on 31 respondents, it can be concluded that BOSQUE media (Booklet, Strip Comic, and Quartet Card) is effective in increasing mothers' knowledge about first aid for toddlers who are choking. Before receiving health education, mothers' knowledge levels were in the low to moderate category with a median score of 9.00. After receiving the intervention, there was a significant increase with a median score of 15.00. The Wilcoxon test results showed a significant difference between knowledge before and after the intervention (p -value = 0.001), which means that BOSQUE media has a positive effect on increasing knowledge. Thus, BOSQUE media can be used as an innovative and interesting alternative to health education, and has the potential to be applied in community health learning programs to improve mothers' preparedness in dealing with emergency situations such as choking in toddlers.

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