



Original Research

Fishbowl Health Education Improved Mothers' Knowledge of Recurrent Acute Respiratory Infection Prevention in Toddlers

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ABSTRACT

Background: Recurrent acute respiratory infections (ARI) remain a common health problem in early childhood and are closely associated with inadequate maternal knowledge of preventive practices. Fishbowl education is an interactive group learning method in which a small inner circle actively discusses a topic while the outer circle observes and provides feedback. This study aimed to examine the effect of fishbowl-based health education on mothers' knowledge regarding the prevention of recurrent ARI among toddlers.

Methods: A quasi-experimental study with a pretest-posttest control group design was conducted in Kertayasa Village, Central Java, Indonesia. Sixty mothers of toddlers with a history of recurrent ARI were assigned to an intervention group receiving fishbowl-based health education ($n = 30$) or a control group receiving lecture-based education ($n = 30$) through lottery allocation. Mothers' knowledge was measured using a validated and reliable questionnaire. Data were analyzed using the Wilcoxon signed-rank test and the Mann-Whitney U test.

Results: Knowledge increased significantly in the intervention group after fishbowl-based education ($p < 0.001$). Posttest scores in the intervention group were also significantly higher than those in the control group ($p < 0.001$), indicating that the fishbowl method was more effective than the lecture method.

Conclusion: Fishbowl-based health education significantly improved mothers' knowledge regarding recurrent ARI prevention among toddlers and may be a useful strategy for community health promotion.

ARTICLE HISTORY

Received: January 07th, 2026

Accepted: July 21st, 2026

KEYWORDS

acute respiratory infection, health education, knowledge, mother, toddler;

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Cite this as: Fishbowl Health Education Improved Mothers' Knowledge of Recurrent Acute Respiratory Infection Prevention in Toddlers. (2026). JKG (JURNAL KEPERAWATAN GLOBAL), 11(2), 125-140. <https://jurnalkeperawatanglobal.com/index.php/jkg/article/view/1366>

INTRODUCTION

Acute respiratory infection (ARI) remains a significant cause of morbidity and mortality among children under five years of age worldwide. According to the World Health Organization (WHO, 2021), ARI ranks as the third leading cause of death in this age group, with a substantially greater burden observed in developing countries. In

Indonesia, ARI continues to be the most prevalent infectious disease affecting toddlers. Data from the Indonesian Health Survey (2023) reported 877,531 ARI cases among toddlers, with a national prevalence of 4.8%. Considerable regional variation has been observed, with higher prevalence rates reported in Central Papua (11.8%), Highland Papua (10.7%), and East Java (8.8%). In Central Java, the prevalence reached 6.7%, while Tegal Regency alone recorded 75,852 ARI cases in 2023 (Kemenkes RI, 2021; Nabilah Muhammad, 2024).

Beyond its high incidence, recurrent ARI poses a substantial public health concern. Children in rural areas may experience ARI episodes three to five times per year, whereas those in urban settings may experience six to eight episodes annually. Recurrent ARI is associated with serious adverse outcomes, including increased mortality, a higher risk of pneumonia, impaired growth and development, and long-term respiratory complications (Lazamidarmi et al., 2021; Sagala & Fauziah, 2021; Yuliana Sianipar et al., 2022). In Central Java, health surveillance data in 2023 placed the province sixth among the ten regions with the highest ARI prevalence in toddlers, with Tegal Regency identified as one of the most affected areas.

Toddlers with a prior history of ARI are particularly vulnerable to recurrent episodes. The occurrence of recurrent ARI is influenced by multiple factors, including environmental conditions, nutritional status, household behaviors, and caregiving practices. Among these determinants, maternal knowledge plays a critical role in the prevention and early management of ARI. Evidence suggests that inadequate maternal knowledge is strongly associated with poor preventive behaviors and delayed care-seeking. (Indriana et al., 2024) reported that 57.3% of toddlers in Banda Aceh experienced recurrent ARI, while Sormin et al., (2023) found that nearly half of mothers of toddlers in Kupang had insufficient knowledge regarding ARI prevention. These findings are consistent with those of (Pangaribuan et al., 2024), who demonstrated that maternal knowledge significantly influences preventive health behaviors for children.

Health education is widely recognized as a strategic approach to improving maternal knowledge and promoting preventive health behaviors (Rohmani et al., 2025). However, conventional lecture-based education is often characterized by one-way information delivery, which limits participant engagement and reduces knowledge retention. Behavioral learning theories emphasize that active participation, social interaction, and experiential learning are essential for effective knowledge acquisition and behavior change. Approaches grounded in social learning theory and adult learning theory suggest that individuals learn more effectively when they are actively involved in discussions, share experiences, and reflect collectively on health-related issues.

One educational approach that aligns with these theoretical perspectives is the fishbowl discussion method. The fishbowl method is an interactive group discussion technique in which a small group actively engages in discussion while others observe, followed by role rotation. This method encourages peer learning, critical thinking, and reflective dialogue, thereby facilitating deeper understanding. Previous studies have shown that the fishbowl method improves learning outcomes and participant engagement by promoting active involvement rather than passive listening (Mufidah et al., 2022; Nurlailah, 2022). In the context of health education, this method has the potential to enhance mothers' understanding of disease prevention by enabling them to exchange experiences, clarify misconceptions, and reinforce key preventive messages (Sukma Senjaya et al., 2022).

Despite the availability of educational media such as posters and leaflets in community health centers (puskesmas), these materials have notable limitations. Printed media often restrict interaction between health providers and participants, generate limited interest, and may not adequately convey complex preventive information (Rahmad et al., 2023; Widiastuti et al., 2024). Consequently, there is a need for more interactive and participatory educational strategies to improve maternal knowledge and support sustained preventive behaviors.

A preliminary assessment conducted at the Bangungalih Community Health Center in 2024 recorded 1,253 ARI cases among toddlers, with Kertayasa Village reporting the highest number (191 cases), including 60 recurrent cases. Interviews with ten mothers revealed that 70% had never received health education related to ARI and were unaware of preventive measures, while the remaining 30% had limited understanding of ARI prevention. These findings indicate that preventive efforts targeting recurrent ARI in Kertayasa Village remain insufficient and that maternal knowledge regarding ARI prevention is suboptimal.

Given the high incidence of recurrent ARI, several previous studies have shown that health education can improve mothers' knowledge of ARI prevention, particularly when delivered through interactive and participatory methods (Sormin et al., 2023; Yusran et al., 2024). However, most existing interventions have relied on conventional lectures, leaflets, or general discussion formats, while evidence on the fishbowl method in maternal-child health education remains limited (Rahmad et al., 2023; Rohmani et al., 2025). The novelty of this study lies in the application of the fishbowl method as an interactive educational strategy specifically for mothers of toddlers with recurrent ARI in a community setting. This study contributes to the literature by providing empirical evidence that a participatory learning model can improve mothers' knowledge more effectively than conventional lecture-based education (Nurlailah, 2022). In addition, the findings offer practical implications for primary health care and community health workers in designing more engaging health education programs for ARI prevention (Octaviana & Ramadhani, 2021).

MATERIALS AND METHOD

This research adopted a quantitative quasi-experimental design with a pretest-posttest control group framework because it allowed the researcher to measure changes in mother's knowledge before and after the intervention while comparing the effect of fishbowl-based education with conventional lecture-based education. This design was appropriate for community-based settings where random assignment was limited, yet a comparison group was still needed to strengthen the validity of the findings (Denny et al., 2023). This approach was utilized to assess the impact of fishbowl-based health education on mothers' knowledge related to the prevention of recurrent acute respiratory infections (ARI).

The study was conducted in Kertayasa Village, Tegal Regency, Central Java, Indonesia, from July 24 to 25, 2025. The study consisted of two groups, namely an intervention group and a control group, both of which completed pretest and posttest assessments. Participants in the intervention group received health education through the fishbowl method, whereas those in the control group were provided with identical educational content delivered via a conventional lecture approach.

The study population included all mothers of toddlers living in Kertayasa Village. A total of 60 participants were recruited based on data obtained from the community

health center on toddlers with a history of recurrent ARI, followed by confirmation and recruitment assistance from village health cadres. Participants who met the inclusion criteria were enrolled using total sampling. Participants were eligible if they: Were mothers of toddlers with a documented history of recurrent ARI; Had no diagnosed mental health disorders; Were willing to participate and provided informed consent; Exclusion Criteria; Were not permanent residents of Kerayasa Village; Had communication or cognitive impairments that could interfere with questionnaire completion

Participants were allocated into the intervention and control groups using a lottery system. The independent variable in this study was fishbowl-based health education, while the dependent variable was mothers' knowledge regarding the prevention of recurrent ARI among toddlers. Each participant was assigned as an individual unit of analysis, with 30 mothers in the intervention group and 30 mothers in the control group.

Ethical clearance for this study was granted by the Health Research Ethics Committee of Universitas Bhamada Slawi (Approval No. 280/Univ.Bhamada/KEP.EC/VII/2025). Prior to data collection, written informed consent was obtained from all participants. Each participant was fully informed about the study aims, procedures, voluntary nature of participation, and data confidentiality. Data were collected using a knowledge questionnaire on recurrent ARI prevention, consisting of 19 multiple-choice items. The questionnaire was developed based on ARI prevention guidelines and had undergone validity and reliability testing prior to the study.

Validity testing was conducted on 30 respondents on July 15, 2025. Of the initial 25 items, 19 items were retained as valid, with corrected item-total correlation values ranging from 0.365 to 0.731, exceeding the critical r-value of 0.361. Reliability testing using Cronbach's alpha yielded a coefficient of 0.775, indicating good internal consistency and confirming the questionnaire's reliability. Educational aids used during the intervention included a fishbowl container with numbered question cards, PowerPoint slides, a projector, and printed questionnaires to ensure structured and engaging material delivery.

On July 24, 2025, participants in the intervention group completed a pretest prior to the educational session. Health education was delivered for approximately 30 minutes, followed by an interactive discussion using the fishbowl method. Participants were divided into two groups: an inner circle (small group) that actively discussed the questions drawn from the fishbowl, and an outer circle (large group) that observed, provided feedback, critiques, and summaries. After the discussion session, participants completed the posttest questionnaire. This method was designed to promote active participation, peer learning, critical thinking, and improved comprehension. The discussion layout is illustrated in Figure 1.

On July 25, 2025, participants in the control group completed the pretest followed by health education delivered through a lecture method without interactive discussion. The session used PowerPoint slides and a projector and lasted approximately 30 minutes. After the lecture, participants completed the posttest questionnaire. For both groups, the pretest and posttest were administered on the same day to measure immediate changes in knowledge following the intervention.

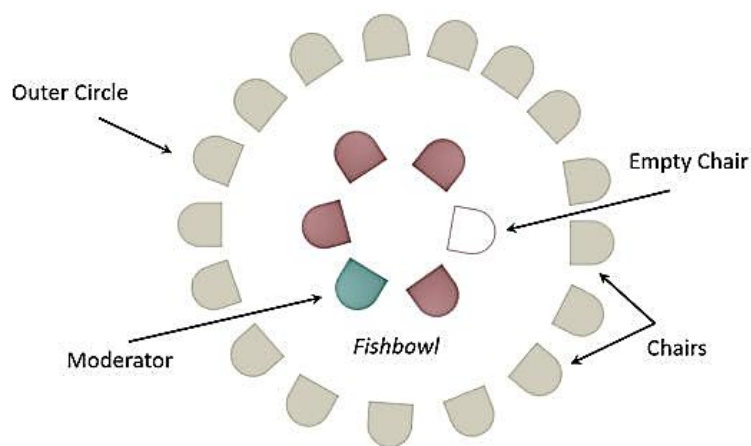


Figure 1. Layout for fishbowl method

The primary outcome of this study was mothers' knowledge regarding the prevention of recurrent ARI, measured using the validated knowledge questionnaire. Higher scores indicated better knowledge. Blinding of participants and intervention providers was not feasible due to the nature of the educational intervention. Participants were aware of the educational method they received, and the researcher who delivered the intervention could not be blinded. To minimize potential measurement bias, outcome assessment was standardized using the same validated knowledge questionnaire and identical data collection procedures for both groups.

Data analysis comprised both univariate and bivariate procedures. Univariate analysis was conducted to describe participants' characteristics and knowledge scores. Data distribution was examined using the Shapiro-Wilk normality test, as the sample size in each group was fewer than 50 participants. The results showed that the data did not follow a normal distribution ($p \leq 0.05$).

Accordingly, non-parametric statistical tests were employed. The Wilcoxon signed-rank test was applied to evaluate changes in knowledge scores before and after the intervention within each group, while the Mann-Whitney U test was used to compare posttest knowledge scores between the intervention and control groups. All analyses were performed using SPSS version 25, with statistical significance defined as $p < 0.05$.

A total of 60 mothers were assessed for eligibility and all met the inclusion criteria and consented to participate. Participants were allocated into the intervention ($n = 30$) and control ($n = 30$) groups using a lottery method. All participants received the allocated intervention and completed the pretest and posttest assessments. No participants were lost to follow-up or excluded from the analysis.

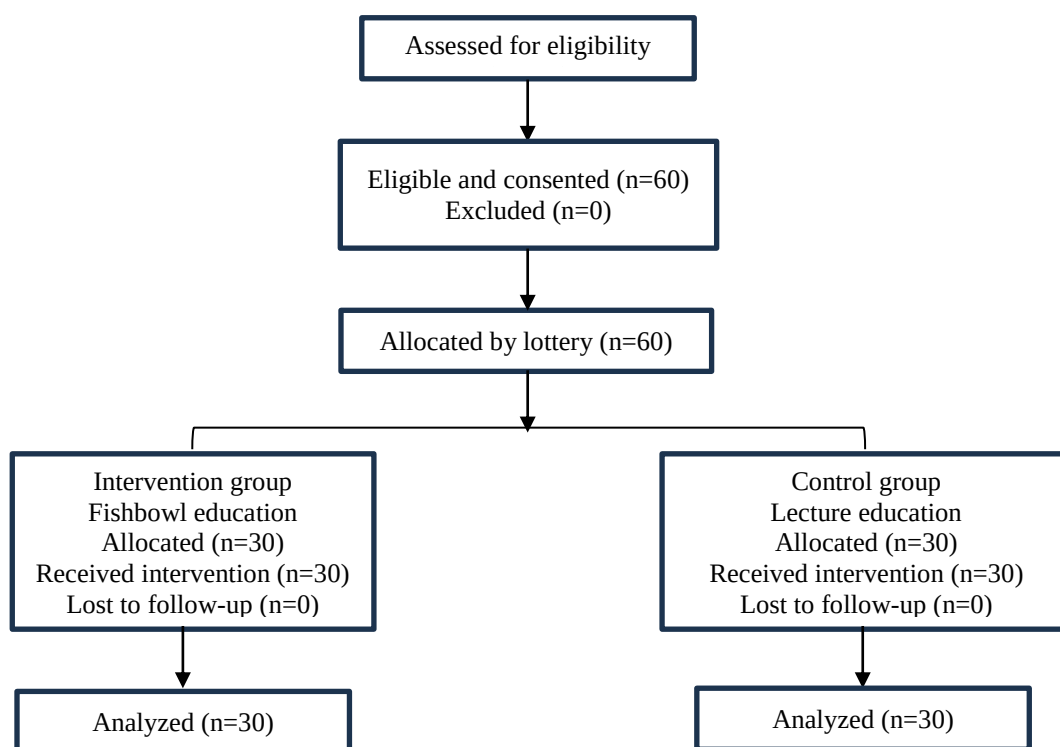


Figure 2. Participant flow TREND

Participant recruitment and data collection were conducted from July 24 to July 25, 2025. The intervention group was recruited and received the intervention on July 24, 2025, while the control group was recruited and received the intervention on July 25, 2025.

RESULTS

Mothers' Knowledge on the Prevention of Reccurent ARI in Toddlers in the Intervention Group

The results showed that among the total of 30 respondents, the minimum score obtained was 7 and the maximum score was 14, with a mean score of 10.80, a median of 11.00, and a mode of 10. This indicates that before receiving education using the *fishbowl* method, the respondents' average knowledge level was categorized as moderate. The study results after the intervention showed that the minimum score obtained by respondents was 12 and the maximum score was 19. The average (mean) score was 16.70, with a median of 18.00 and a mode of 18. This indicates that after receiving education through the fishbowl method, the respondents' average knowledge level increased to the good category.

Table 1. Mean, Median, Modus Pre-test and Post-test in Intervention Group

	N	Min	Max	Mean	Median	Modus	SD
Pre-test	30	7	14	10.80	11.00	10	1,648
Post-test	30	12	19	16.70	18.00	18	2.120

Based on the research findings, before receiving education using the *fishbowl* method, the majority of respondents had a moderate level of knowledge regarding the

prevention of recurrent ARI in toddlers, with 23 respondents (76.7%) falling into this category. Based on the study results after the intervention, it was found that following the educational session using the fishbowl method, the majority of respondents—26 respondents (86.7%)—had good knowledge regarding the prevention of recurrent Acute Respiratory Infections (ARI) in toddlers. The detailed data are presented in Table 2.

Table 2. Frequency Distribution of Mothers' Knowledge in the Intervention Group

Knowledge Level	Frequency (n)	Percentage (%)
Pre-Test		
Good	2	6.7 %
Moderate	23	76.7%
Poor	5	16.7%
Total	30	100%
Post-Test		
Good	26	86.7%
Moderate	4	13.3%
Poor	0	0%
Total	30	100%

Mothers' Knowledge of Recurrent ARI Prevention in Toddlers Before Receiving Education in the Control Group

The study results showed that, from a total of 30 respondents, the minimum score obtained in answering the questionnaire was 7, and the maximum score was 15. The mean score was 9.93, with a median of 9.50 and a mode of 9. These results indicate that, prior to receiving educational intervention, respondents in the control group generally demonstrated a moderate level of knowledge regarding the prevention of recurrent Acute Respiratory Infections (ARI) in toddlers. The study results after the educational intervention showed that out of a total of 30 respondents, the minimum score obtained was 11 and the maximum score was 17. The average (mean) score was 13.10, with a median of 13.00 and a mode of 13, indicating that after receiving education, the respondents' average knowledge level increased to the moderate (sufficient) category. The detailed data are presented in Table 3.

Table 3. Mean, Median, Modus Pre-test and Post-test in Control Group

	N	Min	Max	Mean	Median	Modus	SD
Pre-test	30	7	15	9.93	9.50	9	1.911
Post-test	30	11	17	13.10	13.00	10	1.647

Based on the study results, it was found that prior to receiving educational intervention, the majority of respondents had low knowledge regarding the prevention of recurrent Acute Respiratory Infections (ARI) in toddlers, with 15 respondents (50.0%) categorized as having low knowledge. Based on the study results, it was found that after the educational intervention, the majority of respondents—20 respondents (66.7%)—had moderate knowledge regarding the prevention of recurrent Acute Respiratory Infections (ARI) in toddlers. The detailed distribution of respondents' knowledge levels is presented in Table 4.

Table 4. Frequency Distribution of Mothers' Knowledge in the Control Group

Knowledge Level	Frequency (n)	Percentage (%)
Pre-Test		
Good	2	6.7 %
Moderate	13	43.3%
Poor	15	50.0%
Total	30	100%
Post-Test		
Good	10	33.3%
Moderate	20	66.7%
Poor	0	0%
Total	30	100%

The Effect of the Fishbowl Method as an Educational Strategy for Preventing Recurrent Acute Respiratory Infections (ARI) in Toddlers on Mothers' Knowledge in the Intervention Group Compared to the Lecture Method in the Control Group

The Wilcoxon signed-rank test results indicated a statistically significant difference between pretest and posttest knowledge scores in both the intervention and control groups regarding mothers' knowledge of recurrent acute respiratory infection (ARI) prevention in toddlers. In the intervention group, mothers' knowledge showed a marked improvement following fishbowl-based health education. The Wilcoxon analysis produced a Z value of -4.799 with a p-value of 0.000 ($p < 0.05$), confirming a significant increase in knowledge after the intervention. The mean posttest score rose to 15.50 , reflecting enhanced understanding, and the majority of participants in the intervention group transitioned from a moderate to a good knowledge category.

The Wilcoxon test results for the control group also indicated an improvement in mothers' knowledge after receiving education through the lecture method, with a value of $Z = -4.893$ and a p-value = 0.000 ($p < 0.05$), suggesting a significant difference between the pre-test and post-test scores. The mean post-test score increased to 15.50 , demonstrating that the lecture method also had a positive effect on improving mothers' knowledge. However, most respondents in the control group shifted from the low category to the moderate category after the educational intervention.

In conclusion, the Wilcoxon test results revealed that both the fishbowl and lecture methods were effective in enhancing mothers' knowledge regarding the prevention of recurrent ARI in toddlers. However, the fishbowl method proved to be more effective, as the majority of respondents in this group moved from the moderate to the good category, whereas in the lecture method group, most respondents improved only from the low to the moderate category. These findings demonstrate a clear difference between the intervention and control groups following the educational intervention. The detailed analysis is presented in Table 5.

Table 5. Bivariate Analysis Wilcoxon Sum Rank Test

Variable	Mean Rank	Sum of Ranks	p value	Z	N
Pre-post-test in intervention group	15.50	465.00	0,000	-4,799	30
Pre-post-test in control group				-4,893	

The Mann–Whitney U test revealed a statistically significant difference in posttest knowledge scores between the intervention and control groups regarding mothers’ knowledge of recurrent acute respiratory infection (ARI) prevention in toddlers. The mean rank of the intervention group was 42.18, compared with 18.82 in the control group. The analysis yielded a Mann–Whitney U value of 99.500, a Z score of -5.232 , and a p-value of 0.000 ($p < 0.05$), indicating a significant disparity in knowledge levels between the two groups following the educational intervention. These findings demonstrate that the fishbowl-based educational approach was more effective in enhancing mothers’ knowledge of recurrent ARI prevention than the conventional lecture method. A detailed summary of the results is presented in Table 6.

Table 6. Bivariate Analysis Mann-Whitney

Variable	Mean Rank	Mann-Whitney	p value	Z	N
Pre-post-test in intervention group	42.18	99.500	0,000	-5.232	30
Pre-post-test in control group	18.82				

DISCUSSION

Mothers’ Knowledge Before Educational Intervention

Before the intervention, mothers in both groups generally had limited to moderate knowledge regarding recurrent Acute Respiratory Infections (ARI) prevention in toddlers. This finding suggests that many participants had not yet fully understood the key preventive measures needed to reduce the risk of ARI recurrence. The relatively low level of baseline knowledge may be related to limited exposure to health information, low educational background, and the lack of prior interactive health education in the community.

A previous study conducted by Sormin et al., (2023) in the working area of Oesapa Public Health Center revealed that most mothers with toddlers still had a low level of knowledge regarding Acute Respiratory Infections (ARI). Out of 98 respondents, 47 respondents (48.0%) demonstrated poor knowledge, only 31 respondents (31.6%) showed good knowledge, and the remaining 20.4% had moderate knowledge. The lack of knowledge was primarily related to the definition, causes, and symptoms of ARI, indicating that mothers had not fully understood the fundamental aspects of the disease. This limited understanding was influenced by several factors, including low educational attainment and the limited provision of health education or counseling from local healthcare workers. Most of the mothers in the study had completed only elementary school education, which affected their ability to comprehend health-related information in depth (Sormin et al., 2023).

A study conducted by Yusran et al., (2024) among mothers in Watunggarandu Village revealed that respondents generally demonstrated a low level of knowledge regarding Acute Respiratory Infections (ARI). The pre-test results indicated that most participants did not fully understand ARI, including its causes, symptoms, and preventive measures. The average pre-test score was 8.08 out of 10 questions, with a standard deviation of 1.730, reflecting variations in comprehension levels among respondents. The limited knowledge was influenced by several factors, such as insufficient access to health information, low educational attainment, and minimal exposure to direct health education from medical professionals. Some mothers were

unaware that ARI can be prevented through clean and healthy living behaviors, proper home ventilation, and the importance of immunization and exclusive breastfeeding.

This lack of awareness contributed to the high incidence of recurrent ARI among children in the area. These findings indicate that before receiving educational interventions, most mothers lacked adequate understanding of ARI, making them prone to misinterpreting early symptoms and taking inappropriate preventive measures. Therefore, educational interventions are crucial to enhance mothers' awareness and knowledge, as they play a key role in maintaining children's health within the household (Yusran et al., 2024).

There are two main factors that influence an individual's knowledge: internal factors, which originate within the individual, and external factors, which come from the surrounding environment. Internal factors include gender and age. As individuals grow older, their cognitive abilities and thinking maturity tend to increase. Gender also plays a role in information processing; women are generally more adept at absorbing and contextualizing information within social settings compared to men. Meanwhile, external factors encompass education, work environment, experience, sources of information, interests, and socio-cultural context (Perangin-angin et al., 2024).

Education plays a crucial role in shaping critical thinking and problem-solving abilities. The work environment and personal experiences contribute to knowledge formation through both direct and indirect interactions. Diverse sources of information—such as mass media and digital platforms—expand access to knowledge. Interest acts as a motivational drive that encourages individuals to explore new topics, while the social and cultural environment influences how individuals perceive and process information. Individuals from closed or restrictive environments may face barriers in acquiring new knowledge. Therefore, knowledge is shaped by multiple interrelated factors that arise from the dynamic interaction between the individual and their environment (Octaviana & Ramadhani, 2021; Ridwan et al., 2021).

Mothers' Knowledge After Educational Intervention

After the intervention, mothers in the fishbowl group showed a clear improvement in knowledge regarding recurrent ARI prevention in toddlers, and most of them reached a good level of understanding. This suggests that the fishbowl method was effective in promoting active participation, strengthening comprehension, and helping participants retain preventive information more effectively. In the control group, knowledge also improved after the educational session, but the increase was more modest and remained mostly at a moderate level. This indicates that lecture-based education can still provide benefit, although it may be less effective than the fishbowl method in encouraging deeper understanding and better knowledge retention.

From the post-test results, it can be concluded that the increase in knowledge was more significant in the intervention group compared to the control group. This finding indicates that the fishbowl education method is effective in enhancing mothers' knowledge regarding the prevention of recurrent ARI (Acute Respiratory Infection) in toddlers. Sugiarto, (2024) also reported similar findings in his study, where there was a notable improvement in respondents' knowledge, including mothers with toddlers, about ARI prevention. Before receiving education, the majority of participants were in the *low knowledge* category (46.6%), and only 26% demonstrated *good knowledge*. However, after being provided with structured education through lectures and interactive discussions supported by educational media such as leaflets and projectors,

there was a significant improvement: the percentage of respondents with *good knowledge* increased to 41.1%, while those with *low knowledge* decreased to 20.5%. This improvement suggests that a well-structured and communicative lecture method can effectively clarify information, strengthen understanding, and encourage active participation during health education sessions (Sugiarto, 2024).

The study conducted by (Hutauruk & Padang, 2024) demonstrated that the fishbowl method is effective in enhancing participants' critical thinking skills. Through a structured two-way group discussion, participants were encouraged to express opinions, analyze issues, and respond to arguments logically. Following the intervention, there was a notable improvement in participants' ability to articulate opinions, engage in discussions, and draw conclusions. This finding proves that the fishbowl method not only serves as a means of delivering information but also actively trains participants to develop reflective and critical thinking patterns (Hutauruk & Padang, 2024).

Effectiveness of the Fishbowl Method on Mothers' Knowledge

The Wilcoxon test analysis yielded a significance value of 0.000 ($p < 0.05$), indicating a statistically significant difference in mothers' knowledge between the intervention and control groups following the educational intervention. Mothers in the intervention group, who received fishbowl-based education, demonstrated a greater increase in knowledge compared to those in the control group. These results suggest that the fishbowl method is more effective in improving mothers' understanding of recurrent acute respiratory infection (ARI) prevention in toddlers. The method encourages mothers to engage in discussions, express their opinions, and listen to the experiences of others, thereby making the learning process more interactive, memorable, and easier to comprehend. In contrast, the control group, which did not receive fishbowl-based education, also showed an increase in knowledge, but the improvement was not as significant as that of the intervention group. This reinforces the notion that active participation in educational interventions yields greater knowledge gains than passive learning or traditional lecture-based methods.

The findings also revealed that applying the fishbowl method in the intervention group had a stronger influence on improving mothers' knowledge compared to the control group. In the intervention group, the mean pre-test score was 10.80, which increased to 16.70 after education. Moreover, the majority of participants (86.7%) achieved a "good" knowledge category after the intervention. The effectiveness of the fishbowl approach lies in its open discussion format, where participants exchange ideas, clarify misunderstandings, and construct shared understanding through dialogue. This process not only enhances information retention but also promotes deeper and more reflective comprehension. Meanwhile, the control group, which received education through a conventional lecture method, showed only moderate improvement—from an average score of 9.93 to 13.10, with 66.7% of respondents categorized as having "moderate" knowledge. This suggests that without participatory educational approaches, improvements in maternal knowledge tend to be slower and more limited.

Previous research has also demonstrated that interactive educational approaches are effective in enhancing maternal knowledge regarding acute respiratory infections (ARI). A study employing the snowball learning method reported a significantly greater improvement in knowledge scores among participants in the intervention group compared to those who received lecture-based education. Statistical analysis confirmed

a significant difference between the two groups, with a p-value of 0.000 ($p < 0.05$). The snowball method was shown to be more effective because it actively involves participants in discussions and collaborative learning, allowing them to better understand and retain the material. Both methods—fishbowl and snowball—positively influence knowledge enhancement; however, participatory methods such as these are proven to produce more optimal learning outcomes than passive approaches (Sastriani et al., 2025).

Research by (Hutauruk & Padang, 2024) further supports these findings, demonstrating that the fishbowl method significantly improves participants' critical thinking skills. Participants engaged in structured two-way discussions that required them to analyze issues, present arguments, and respond logically to others' viewpoints. Statistical results indicated a p-value of 0.000 ($p < 0.05$), confirming the significant effect of the fishbowl method on critical thinking development. The study revealed that the fishbowl technique not only enhances content understanding but also cultivates analytical, evaluative, and reflective thinking abilities. By encouraging active involvement—both in presenting and responding—the method trains participants to analyze problems, assess arguments, and think logically and critically. Therefore, fishbowl discussions can serve as an effective educational strategy for fostering higher-order cognitive skills (Hutauruk & Padang, 2024).

The findings of this study are also consistent with those of Nurlailah, (2022), who implemented the fishbowl method in classroom learning to improve students' academic performance. The study recorded an increase in the average score from 73.00 to 82.82, and the learning achievement rate rose from 75% to 90% after the intervention. This demonstrates that the fishbowl method encourages active participation and helps learners grasp material more effectively through structured group discussions. These results align with the present study, in which the fishbowl method significantly improved mothers' knowledge of ARI prevention—from a mean score of 10.80 to 16.70, with the majority (86.7%) achieving a “good” level of understanding. Both studies confirm that active participation in the learning process greatly enhances comprehension, whether in formal education settings or in community health education contexts.

Previous research conducted by Mufidah et al., (2022) indicated that the fishbowl method can enhance students' engagement and learning outcomes. In the first cycle, student engagement reached only 60%, but it increased to 100% in the second cycle, reflecting a 40% improvement. Moreover, students' learning outcomes also showed a significant increase, with mastery of learning rising from 65% initially to 100% following the implementation of the fishbowl method. These findings suggest that the fishbowl approach can create a more dynamic learning environment, encourage participants to ask questions, respond, and engage in discussions, as well as develop critical thinking skills. Therefore, the application of the fishbowl method is relevant for this study, as it not only improves knowledge but also fosters active participation among respondents in the learning process.

The Mann–Whitney U test analysis yielded a p-value of 0.000 ($p < 0.05$) and a Z score of -5.232 , indicating a statistically significant difference between the intervention group that received fishbowl-based education and the control group that was provided with lecture-based instruction. Meanwhile, the control group received education through the lecture method. Although an improvement in knowledge was also observed, the increase was not as significant as in the intervention group. The lecture method, which

is one-way in nature, tends to make participants more passive. Even though the information was delivered clearly, not all mothers were able to fully comprehend and retain the material. Therefore, the educational intervention using the snowball method proved to be more effective than the lecture method in improving mothers' knowledge about acute respiratory infections (ARI). This finding indicates that participatory and collaborative educational approaches are more suitable to be applied in community health education activities, particularly in enhancing mothers' understanding of ARI (Sastriani et al., 2025).

Although the lecture method is often used because it is practical and can reach a large number of people in a short time, this method has several weaknesses. One of its main limitations is its one-way nature, where participants only listen without being actively involved. This can cause participants to become easily bored and less able to understand the material in depth. In addition, the lecture method provides minimal interaction, so when there are parts of the material that are unclear, participants may hesitate or have no opportunity to ask questions. This method is also less suitable for delivering materials that require hands-on practice or specific skills. If the presentation is delivered monotonously or without the support of media, participants may lose focus and fail to absorb the information effectively. Therefore, although the lecture method is quite effective for delivering basic information, it should be combined with more interactive approaches to achieve optimal results (Hapipah & Istianah, 2023).

The results of this study showed that after providing education using the lecture and fishbowl methods in the intervention group, the number of respondents with good knowledge increased to 26. Meanwhile, in the control group, which only received education through the lecture method, there were 10 respondents whose knowledge improved to a good category. These findings indicate a clear difference between educational interventions that combine the lecture and fishbowl methods and those that rely solely on the lecture method.

Limitations

This study has several limitations that should be considered when interpreting the findings. The use of a quasi-experimental design without full randomization may have resulted in selection bias. In addition, the relatively small sample size and the inclusion of participants from a single village may limit the generalizability of the results. The study focused solely on mothers' knowledge and did not evaluate long-term knowledge retention, behavioral changes, or clinical outcomes, such as the recurrence of acute respiratory infections (ARI). Furthermore, blinding was not feasible due to the nature of the intervention, and reliance on self-reported questionnaires may have introduced response bias.

The strength of this study lies in the use of pretest-posttest control group design, which made it possible to compare changes in mothers' knowledge between the intervention and control groups and provided stronger evidence of the effect of fishbowl-based education than a single-group design would have allowed. Another strength is the community-based implementation of the intervention, which increases the practical relevance of the findings for primary health care settings.

Contribution to global nursing practice

The findings of this study support the growing evidence that participatory and collaborative educational methods are more effective than passive approaches in

improving maternal health knowledge. The fishbowl method not only enhances understanding of ARI prevention but also promotes critical thinking, communication skills, and active participation among mothers. From a practical perspective, incorporating fishbowl-based education into community health programs may improve the effectiveness of health promotion activities aimed at preventing recurrent ARI in toddlers. Given its low cost and adaptability, this method can be integrated into routine health education sessions at community health centers and integrated service posts.

For pediatric nursing, this study suggests that interactive health education methods such as the fishbowl technique can be integrated into maternal counseling sessions to improve mothers' knowledge of recurrent ARI prevention. Pediatric nurses play a key role in promoting early prevention, teaching home care practices, and encouraging mothers to seek timely care when respiratory symptoms appear. Therefore, the fishbowl method may serve as a practical educational strategy in pediatric nursing practice, especially in health promotion programs for toddlers at risk of recurrent ARI.

Overall, this study reinforces current educational and behavioral theories suggesting that active involvement in learning leads to better comprehension and retention. While both educational approaches improved maternal knowledge, the fishbowl method demonstrated superior effectiveness, highlighting its potential as an alternative or complementary strategy in community-based health education.

CONCLUSION

Fishbowl-based health education was more effective than lecture-based education in improving mothers' knowledge of recurrent acute respiratory infection (ARI) prevention in toddlers. The interactive discussion format encouraged active participation and improved understanding. The fishbowl method can be considered an alternative approach for community health education, particularly in primary healthcare and maternal-child health programs.

ACKNOWLEDGEMENT

The authors would like to express their sincere gratitude to the Bangungalih Community Health Center and the village authorities of Kertayasa Village for their support and cooperation during the study. Appreciation is also extended to all mothers who participated in this research. This research was conducted without any specific financial support from public, commercial, or non-profit funding sources.

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