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Research Article

# The Effect Simba Puzzle on Student's Self Efficacy Level in Flood Disaster Preparedness

**Juan Prasetyo Pamula[1], M. Hanif Prasetya Adhi[1]*, Meida Laely Ramdani[1], Ninuk Angelia[1]**
[1]Nursing Science Study Program, Faculty of Health Sciences, Universitas Muhammadiyah Purwokerto, Purwokerto 53181, Indonesia

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**Correspondence**

Phone: (+62)856-0000-6609
E-mail:
*hanifprasetya01@gmail.com*

**Website**

https://journal.umtas.ac.id/index.php/healtcare/index

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**ABSTRACT**

Floods are among the most frequent natural disasters in Indonesia, including in Sirau Village, Kemranjen District, Banyumas Regency, Central Java Province. These recurring floods, occurring almost annually, result in significant infrastructure damage, economic losses, and health challenges for the affected communities. Moreover, the lack of preparedness, particularly among children, remains a critical issue. Preliminary interviews with the principal and students at MI Muhammadiyah 01 Sirau revealed that most students exhibit low levels of self-efficacy regarding flood disaster preparedness. This study employed a quantitative pre-experimental design with a one-group pretest-posttest approach. The population comprised 40 fourth- and fifth-grade students from MI Muhammadiyah 01 Sirau, with total sampling used as the sampling method. Research instruments included the SIMBA (Siaga Menghadapi Banjir) puzzle and a self-efficacy questionnaire. Data were analyzed using the Wilcoxon test. The analysis revealed a significant improvement in students' self-efficacy levels after using the SIMBA puzzle, with a p-value of 0.001 (p 0.005). This finding confirms that the SIMBA puzzle effectively enhances students' confidence and preparedness in dealing with flood disasters. The SIMBA (Siaga Menghadapi Banjir) puzzle is an effective educational tool for improving self-efficacy among school-age children in flood disaster preparedness.

## INTRODUCTION

Disasters can be defined in various ways, both by experts and normatively. Law No. 24/2007 on Disaster Management, for example, defines disaster as an event that threatens people's lives, whether caused by

natural, non-natural, or human factors, and which results in loss of life, environmental damage, material loss, and psychological impact. Disasters have indeed become part of our society, and many even say that Indonesia is a "disaster paradise" due to its vulnerability to various disaster risks.

The United Nations Office for Disaster Risk Reduction (UNDRR states that disasters are serious disruptions that result in major losses to people, the economy and the environment, especially when hazardous events meet vulnerable communities that are not adequately prepared to deal with them. A very common example we experience is flooding. Flooding is a disaster that frequently occurs in various areas when water overflows beyond its capacity. This situation leads to inundation in areas that are typically dry, such as agricultural land or residential areas, often causing significant impacts on both human life and the local economy (Zulfa & Adhi, 2023). Over time, ignorance of environmental aspects in business and industry has worsened the condition of nature (Sulaiman et al., 2020). In addition, climate change is causing the intensity of heavy rains in many regions, including Asia, to become more frequent and intense, with the greatest impact felt by countries such as Indonesia, China, and India, which have large populations in flood-prone areas (Rentschler et al., 2022).

Based on data from (BNPB, 2023), Indonesia recorded 1,255 flood events throughout 2023, slightly lower than the previous year which reached 1,531 events. Central Java, in particular, is one of the regions with the highest incidence of flooding along with North Sumatra, West Java and Riau. Banyumas Regency in Central Java, for example, recorded 23 flood events during the period October to March 2023, due to its geographical position flanked by mountains and large rivers such as the Serayu River, which fertilizes the region but also increases the risk of flooding (PUSDATARU, 2023).

In the Banyumas region, Sirau Village in Kemranjen Sub-district experiences flooding impacts almost every year. Located on the delta of the Serayu River, the village becomes the flow path of water from various surrounding rivers during high rainfall, including the Tipar River. Flooding causes huge losses to residents: homes and schools are submerged, infrastructure is damaged, agricultural crops fail, and economic activities are disrupted. Not only that, health problems also often arise due to the lack of shelters and limited medical services (Lutfi & Adhi, 2024).

The National Coordinating Agency for Disaster Management revealed that a lack of public awareness, an insensitive attitude towards disaster risk, and a lack of preparedness to deal with emergency situations can make us more vulnerable when disasters occur. Indifference to avoid disasters also has the potential to increase the risks faced (Haristiani et al., 2023). People's knowledge and attitude of preparedness usually come from their experience in dealing with flood disasters that occur almost every year. This experience gives them a better understanding of flood disasters and influences their attitude and concern to always be prepared for possible disasters in the future (Hidayanto, 2020). One factor that can help improve this preparedness is self-confidence or self-efficacy (Wahyudin, 2024). The experience of facing floods every year does provide people with practical knowledge, but preparedness also requires self-efficacy, the confidence in dealing with disasters that helps a person act quickly and effectively when unexpected situations occur. This self-efficacy can be improved through group guidance, which strengthens self-confidence and resilience in the face of difficult situations (Sithoresmi et al., 2022; Dan, 2021).

In the initial study at MI Muhammadiyah 01 Sirau on August 6, 2024, it was found that many students did not understand disaster preparedness. Of the six students interviewed, four of them were unable to identify the risks and impacts of disasters

around them. The principal added that flooding is common in this area, particularly between September and November, when rainfall is high. In response to this, education activities for children should use a different approach. The information delivered must be familiar and liked by them, so it is necessary to use appropriate media, methods and learning models. An appropriate preparedness education method for children is important, and puzzles can be an appropriate medium because they can improve children's motor skills and social-emotional skills (Prayogi, 2022).

Therefore, the proposed solution is the use of the "SIMBA" or Siaga Menghadapi Banjir puzzle as an interactive and fun educational tool to help children increase self-efficacy in facing flood disasters in Sirau Village.

## METHOD

This research uses a quantitative approach with a pre-experimental design. The design used was One Group Pre-test and Post-test, which means that the research involved only one experimental group without a comparison group. The population of this study were all fourth and fifth grade students at MI Muhammadiyah 01 Sirau, consisting of 40 students. Because the number was not too much, all of these students were included as research samples, using the total sampling technique. This study used two instruments, namely the "SIMBA" puzzle Preparing to Face Floods and the Flood Disaster self-efficacy questionnaire. The SIMBA puzzle has passed the expert test conducted on 3 experts by showing the results of 94.9% with the category very feasible to use as educational media. The self-efficacy questionnaire contains 10 questions with 6 favorable questions and 4 non-favorable questions which have been tested for validity and reliability with the results of the Cronbach's alpha value of 0.711 which means that the questionnaire is valid and reliable.

Data collection in this study was carried out with 3 meeting sessions for the first meeting held on October 3, 2024 in this first session, a pre-test was carried out first, then the provision of the "SIMBA" puzzle education for Siaga Menghadapi Banjir and the respondents were asked to play the puzzle, for the second meeting held on October 7, 2024 at this meeting observing the respondent's ability to assemble the puzzle, then at the third meeting held on October 9, 2024 at this meeting the last education was carried out regarding the SIMBA puzzle then the respondents were given a post-test as a closing.

## RESULTS

This study involved 40 respondents. The characteristics of respondents such as gender and age are as follows:

Table 1. Characteristics of respondents age and gender

| **Age** | **Frequency (n)** | **Precentage (%)** |
|---|---|---|
| 9 Years Old | 6 | 15 |
| 10Years Old | 27 | 67.5 |
| 11 Years Old | 7 | 17.5 |
| **Gender** | **Frequency (n)** | **Precentage (%)** |
| Male | 25 | 62.5 |
| Female | 15 | 37.5 |
| **Class** | **Frequency (n)** | **Precentage (%)** |
| Class IV | 18 | 45 |
| Class V | 22 | 55 |

From table 1, it is known that the number of respondents consists of class IV and V with 18 respondents from class IV and 22 respondents from class V. The age of the respondents is in the range of 9 - 11 years. The age of respondents is in the range of 9 - 11 years. Based on the data above, it can be seen that the number of respondents is 40 people with the age of 9 years 6 people (15%), 10 years 27 people (67.5%) and age 11 years there are 7 people (17.5%). The gender of the respondents consisted of 25 (62.5%) male respondents and 15 (37.5%) female respondents.

Table 2. The effect of "SIMBA" Puzzle education on students' self-efficacy level in dealing with flood disasters.

| | **Pre-test** | **Post-test** | ***P Value*** |
|---|---|---|---|
| Mean | 18,73 | 28,03 | |
| Std. Deviation | 2,219 | 1,271 | 0,001 |
| Min-Max | 12-24 | 25-30 | |
| Median | 18 | 28 | |

From table 2, the average value of self-efficacy before education is 18.73 and after the "SIMBA" puzzle education, the average value increases to 28.03 with a maximum value of 30. The minimum value at the time of the pretest was 12, at the time of the posttest was 25, while the maximum value at the time of the pretest was 24 and at the time of the posttest the maximum value was 30. The results of the Hypothesis test using the Wilcoxon Test, obtained data p value 0.001 which means that H0 is rejected and H1 is accepted.

**DISCUSSION**

The results showed that the students' self-efficacy level increased after being given education using the "SIMBA" (Siaga Mengapi Banjir) puzzle. The pre-test and post-test results show that both the minimum and maximum values have increased. This directly affects the average value, which shows an increase in the pre-test and post-test. In the data analysis process, previously the data normality test was carried out first and it was found that the data was not normally distributed so that the data analysis used the Wilcoxon test with a p value of 0.001. These results show that H1 as an alternative hypothesis is accepted, which means that there is an effect of the "SIMBA" puzzle education on the level of student self-efficacy in dealing with flood disasters at MI Muhammadiyah 01 Sirau.

With this increase, it is hoped that students will be better prepared to deal with disasters, especially floods (Zahrani & Wardhani, 2024) explained that disaster is a serious problem for students who experience it. When students successfully overcome disasters, they will feel more optimistic about their abilities in the future. Therefore, knowledge about disasters is very important to be given to children, considering that disasters can happen to anyone, regardless of age. Socialization about disasters is needed so that children can recognize danger signs and know how to be prepared.

Of the 40 respondents in this study, 25 were male and 15 were female. Interestingly, female students who got good scores were more dominant. This could be because women tend to use their right brain more, which allows them to see situations from multiple perspectives and draw conclusions quickly. Women can absorb information five times faster than men. On the other hand, men generally have better motor strength.

According to (Hayati, 2021) children experience cognitive development in several phases, including the motor and operational phases. Elementary school students, who are usually active and love games, will be more easily involved in learning that uses concrete media such as puzzles. With puzzle media, students can learn while playing, so they are more involved in flood disaster preparedness education. The use of puzzles as a learning tool can attract students' attention and increase their participation in the education process. Research by Perdana and Adhi (2024) shows that students' self-efficacy can be improved through learning that enriches their knowledge, so they are better prepared to face unexpected situations such as floods. During the education process, the steps taken by teachers also serve as motivation for students to better understand the material (Hasriani, 2015).

Overall, this study confirms that education using the "SIMBA" puzzle is effective in increasing students' self-efficacy in dealing with flood disasters at MI Muhammadiyah 01 Sirau. Learning media should be able to

create a pleasant experience and meet the unique needs of each student, because everyone has different abilities. There are various types of media that can be used, including visual, audio-visual and computer-based. One visual media that is very suitable to support learning about natural disasters is puzzles. Puzzles are an art form that many children enjoy, so they can be an effective tool for education and to help increase student confidence.

The results of this study are in line with Kholisoh's research (2023), which states that education through puzzle media increases students' knowledge and preparedness. This is also supported by Prayogi's research (2022), which shows that the use of puzzles is very effective in disaster preparedness education, especially for children. With a fun learning approach, children can learn while playing, so their learning experience becomes more meaningful.

## CONCLUSIONS AND RECOMMENDATION

This study shows that there is an effect of puzzle education "SIMBA" Siaga Menghadapi Banjir on the level of self-efficacy of students in facing flood disasters at MI Muhammadiyah 01 Sirau as evidenced by an increase in the pre-test and post-test of the self-efficacy questionnaire. The problem in this study is that the use of puzzle media as a flood disaster preparedness education has an influence on Self Efficacy attitudes towards disaster preparedness, but the educational method using puzzle-based learning media only lasts for a short period of time.

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