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The Influence of Flood Education on Student Awareness at State Junior High School 34 Medan

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ABSTRACT

Floods are the most frequent hydrometeorological disasters in Indonesia and have a wide impact on health, environment, and educational activities. This study aims to determine the influence of flood education in the school environment on the awareness of SMPN 34 Medan students. The research method uses a quantitative approach with *a one group pre-test post-test design*. The research subjects were 31 students in grade IX. Data collection was carried out using knowledge questionnaires before and after the provision of flood education. The results of the study showed that there was an increase in students' knowledge after being given flood education, including understanding of the causes of flooding increased from 77.4% to 96.8%, understanding of the role of waste in drainage blockages increased from 71.0% to 93.5%, and understanding of preparedness measures before and during floods increased from 74.2% to 90.3%. In addition, students' understanding of the impact of floods on health has also increased from 67.7% to 87.1%. Based on the results of the statistical test using a paired t-test, a *p-value* of < 0.05 was obtained, which shows that there is a significant influence on increasing students' knowledge and awareness in flood disaster mitigation efforts. This counseling has proven to be effective in improving students' disaster literacy. Therefore, it is recommended that flood education activities be carried out in a sustainable and integrated manner in school activities to maintain and increase student preparedness for flood disaster risks.

INTRODUCTION

Floods are hydrological disasters that occur due to the overflow of river water, drainage channels, or other water bodies that are unable to accommodate water discharge due to high rainfall and other environmental factors (WHO, 2023). The impact of floods is not only in the form of physical damage, but also increases the risk of environment-based diseases, causes psychological disorders, and hinders the teaching and learning process (WHO, 2023). Therefore, floods cannot be seen only as a natural event, but as a multidimensional problem that requires a comprehensive mitigation approach (UNDRR, 2022).

According to the *World Risk Report 2025*, Indonesia is still included in the group of countries with a high level of disaster risk in the world (Birkmann et al., 2025). This condition

is influenced by Indonesia's geographical location which is in the tropics, is passed by many large rivers, and has high rainfall almost all year round (BNPB, 2025). In addition, global climate change has contributed to the increase in the intensity of extreme rainfall which has a direct impact on the increase in the incidence of hydrometeorological disasters, especially floods (BMKG, 2024). Floods are one of the most frequent disasters and have a wide impact on social, economic, public health, and the sustainability of the education process (WHO, 2023).

Data from the National Disaster Management Agency (BNPB) shows that from 2024 to 2025, more than 99% of disaster events in Indonesia are hydrometeorological disasters (BNPB, 2025). Floods are recorded as the type of disaster with the highest frequency of occurrences and almost always occur every year in various regions of Indonesia (BNPB, 2024). Although the number of disaster events in 2025 fluctuates compared to the previous year, the intensity and impact of floods tend to be more widespread, especially in urban areas with high population density and inadequate drainage systems (Birkmann et al., 2025).

A major flood event occurred again on November 27, 2025 in a number of areas of the island of Sumatra, especially North Sumatra and Aceh Provinces. Extreme rainfall that lasts for several days causes major rivers to overflow and inundate residents' settlements, public facilities, and transportation access (BNPB, 2025). In Aceh Province, floods were reported to have hit many districts/cities and caused tens of thousands of people to be affected and had to be displaced (BNPB, 2025). In addition to material losses, the flood also caused disruption of educational activities because a number of schools were submerged in water and could not carry out teaching and learning activities normally (Ministry of Education and Culture, 2023).

In North Sumatra Province, the flood event at the end of November 2025 also had a significant impact, especially in areas around watersheds and urban areas. Some areas are reported to experience high enough waterlogging that disrupts community activities and the educational process in schools (BNPB, 2025). This condition shows that floods are a real threat that can occur at any time and require the preparedness of all elements of society, including school residents (UNDRR, 2022).

Floods can be prevented through education, Education is a planned and systematic process that aims to increase knowledge, form attitudes, and develop individual or group skills through continuous learning activities, so as to be able to influence behavior in a more positive and responsible direction. In the context of disasters, education is directed to increase public understanding of disaster risks, foster awareness of the importance of mitigation efforts, and equip individuals with the ability to take appropriate actions before, during, and after disasters occur, so as to reduce the impact of losses and risks caused (Notoatmodjo, 2014; UNDRR, 2022; Ministry of Education and Culture, 2023).

Adolescents are a group that has a strategic role in disaster risk reduction efforts because they have the ability to receive information quickly, think critically, and disseminate knowledge to the surrounding environment (Susanto & Nugroho, 2021). However, the low level of knowledge and awareness of adolescents on flood risk is often an obstacle in disaster preparedness (Pramudito & Lestari, 2020). Without adequate understanding, adolescents have the potential to become a vulnerable group when floods occur (UNDRR, 2022).

Schools are one of the most effective means in the implementation of disaster education because they are places to form student knowledge, attitudes, and behaviors (Kemendikbudristek, 2023). Flood mitigation education in schools is expected to be able to increase students' knowledge about the causes and impacts of floods, foster environmental care, and form preparedness to face disaster risks (Pramudito & Lestari, 2020). Disaster education provided systematically also helps students understand the steps before, during, and after floods (UNDRR, 2022).

Various studies show that disaster education in schools has a positive influence on increasing students' knowledge and awareness and encouraging better mitigating behaviors

(Susanto & Nugroho, 2021). Therefore, flood education is an important strategy in efforts to reduce school-based disaster risk (Ministry of Education and Culture, 2023).

SMPN 34 Medan was chosen as the research location because it is located in an environment close to the watershed and has the potential for flooding, especially during high rainfall. In addition, based on initial observations, students of SMPN 34 Medan have never received formal education about flood disaster mitigation, so educational interventions are needed as a preventive effort to increase student knowledge and awareness (UNDRR, 2022).

Based on this background, this study aims to determine the influence of flood education in the school environment on the knowledge and awareness of SMPN 34 Medan students as an effort to support school-based disaster preparedness (Kemendikbudristek, 2023).

RESEARCH METHODS

This study uses a quantitative method with One Group Pre-test Post-test Design. The research will be carried out at SMPN 34 Medan in 2025. The research subjects were grade IX students with a sample of 31 students who were selected using purposive sampling techniques based on attendance criteria and participated in the entire research series.

The research instrument was in the form of a closed questionnaire consisting of 20 questions, including 10 knowledge questions and 10 awareness questions about floods. Measurements were carried out twice, namely before (pre-test) and after (post-test) flood education.

Data analysis was carried out using univariate analysis to describe respondent characteristics and bivariate analysis using the Paired Sample t-test to determine the difference in average scores of students' knowledge and awareness before and after flood education.

RESULTS

This study involved 31 students in grade IX of SMPN 34 Medan who were divided. General information The characteristics of the respondents include gender and age presented in the following table.

Table 1. Respondent Characteristics

Categories	F	%
Gender		
Male	14	45,2
Women	17	54,8
Age		
14 Years	9	29,0
15 Years	18	58,1
16 Years	4	12,9
Classes		
IX	31	100
Quantity	31	100

Based on Table 1, it can be seen that the characteristics of the respondents in this study are all grade IX students with a total of 31 respondents (100%). Based on gender, respondents were dominated by women as many as 17 students (54.8%), while male respondents amounted to 14 students (45.2%). This shows that the participation of female respondents is slightly higher than that of male respondents.

Judging from age, the majority of respondents were in the age group of 15 years, which was 18 students (58.1%). Furthermore, 14-year-old respondents amounted to 9 students (29.0%), and 16-year-old respondents were the least group, namely 4 students (12.9%). The age distribution showed that most of the respondents were in their middle teens which was in accordance with the level of education in grade IX of junior high school.

The frequency distribution of students' knowledge levels before and after the provision of flood education is presented in Table 2.

Table 2. Frequency Distribution of Students' Knowledge Levels

Categories	Pre-test (f)	%	Post-test (f)	%
Knowledge				
Good	22	71,0	27	87,1
Enough	9	29,0	4	12,9
Less	-	-	-	-
Total	31	100	31	100

It can be seen from table 2 that the level of knowledge of students before being given an intervention (pre-test) was mostly in the Good category, namely 22 students (71.0%), while 9 students (29.0%) were in the Sufficient category. There are no students with a level of knowledge in the Less category.

After being given an intervention in the form of counseling (post-test), there was an increase in the number of students with the knowledge level of the Good category to 27 students (87.1%). Meanwhile, the number of students in the Sufficient category decreased to 4 students (12.9%), and there were still no students with the Less category.

The frequency distribution of students' attitude levels before and after flood education is presented in Table 3.

Table 3. Distribution of Frequency of Student Attitudes

Categories	Pre-test (f)	%	Post-test (f)	%
Attitude				
Good	26	83,9	27	87,1
Enough	5	16,1	4	12,9
Less	-	-	-	-
Total	31	100	31	100

It can be seen from Table 3, it can be seen that at the time of the pre-test, most of the students had an attitude in the Good category**,** which was 26 people (83.9%). Meanwhile, students with the Sufficient attitude category amounted to 5 people (16.1%). There are no students with the Less attitude category.

After the landslide disaster counseling was carried out **(**post-test), the percentage of students with the Good attitude category increased to 87.1% (27 people), while the Fair attitude category decreased to 12.9% (4 people). In the measurement after the intervention, no students were found with the attitude category Less**.**

However, to see the change in attitudes more deeply, further analysis is needed through the comparison of the average values to be analyzed using hypothesis tests.

Table 4. The Influence of Flood Education on Student Knowledge

Measurement	N	Mean Deviation	Std. Deviation	p-value
Before	31	78,6	6,21	0,001
After	31	88,9	5,41	

It can be seen from Table 4 that the results of measuring students' knowledge level before being given flood education had an average value (mean) of 78.6 with a standard deviation of 6.21. After being given flood education, the average value of students' knowledge increased to 88.9 with a standard deviation of 5.47.

The results of the statistical test showed a p-value of 0.001. This value is smaller than the significance limit ($p < 0.05$), so it can be concluded that there is a significant influence of flood education on improving student knowledge**.**

Table 5. The Influence of Flood Education on Student Attitudes

Measurement	N	Mean Deviation	Std.Deviation	p-value
Before	31	83,4	6,02	0,006
After	31	87,2	5,89	

It can be seen from Table 5 that the results of measuring students' attitudes before being given flood education had an average value (mean) of 83.4 with a standard deviation of 6.02. After being given flood education, the average score of students' attitudes increased to 87.2 with a standard deviation of 5.89.

The results of the statistical test showed a p-value of 0.006. This value is smaller than the significance limit ($p < 0.05$), so it can be concluded that there is a significant influence of flood education on changes in students' attitudes.

DISCUSSION

The Effect of Flood Education on Student Knowledge

The results of the study show that the provision of flood education in the school environment has a significant influence on increasing the level of knowledge of SMPN 34 Medan students. This is evidenced by an increase in the average score of students' knowledge from 78.6 before the intervention to 88.9 after the intervention, with a p-value of 0.001 ($p < 0.05$). These findings show that the flood education provided is able to increase students' understanding of the basic concept of flooding, the causes of flooding, the impacts caused, and the mitigation and preparedness measures that can be taken.

This increase in knowledge indicates that disaster education delivered systematically and contextually can be well received by students. Educational materials that are relevant to the conditions of the environment around the school help students relate the information obtained to real experiences, thus facilitating the process of understanding and storing information. This is in line with research by Lestari et al. (2023) which states that disaster education based on local contexts has proven to be effective in improving students' knowledge because the material presented feels closer to their daily lives.

The findings of this study are also consistent with the results of research by Prakoso and Hidayat (2024) who found that flood education in junior high schools can significantly increase student knowledge, especially in the aspects of risk recognition and preventive measures before disasters occur. The study emphasized that students who received disaster education had a better understanding than students who had never received similar material.

In addition, research by Kurniawati et al. (2025) shows that the increase in student knowledge after disaster education is influenced by interactive and communicative methods of delivering material. Educational methods that involve discussions and real-life case examples are able to encourage students to be more active in the learning process. This strengthens the results of this study that flood education is an effective intervention in improving students' disaster literacy.

This significant increase in knowledge is an important factor in building disaster preparedness from school age. According to UNDRR (2023), knowledge is a key component in disaster risk reduction, because individuals who have a good understanding tend to be better prepared and able to make the right decisions when facing emergency situations. Therefore, the results of this study confirm the importance of flood education as part of school-based disaster mitigation strategies.

The Influence of Flood Education on Student Attitudes

In addition to affecting knowledge, the results of this study also show that flood education has a significant influence on changes in students' attitudes. This is shown by the

increase in the average score of students' attitude from 83.4 before education to 87.2 after education, with a p-value of 0.006 ($p < 0.05$). This increase reflects a change in students' attitudes towards a more positive direction in responding to flood disaster risk.

This change in attitude shows that students are becoming more caring, vigilant, and have a higher awareness of the importance of disaster preparedness. Although the increase in attitude scores is not as significant as the increase in knowledge, this change is still meaningful because attitude is an affective component that forms the basis for the formation of behavior. This is in line with research by Handayani and Putri (2023) which states that disaster education is able to form positive attitudes of students towards mitigation efforts, although changes in attitudes tend to occur gradually.

The results of this study are also in line with the research of Rahmawati et al. (2024) which found that students who received flood education showed an increase in attitudes of responsibility towards the environment, such as maintaining clean drainage and not littering. This attitude reflects students' increasing awareness of the relationship between human behavior and the risk of flooding.

Another study by Yusuf and Maulana (2025) shows that disaster education carried out in schools can improve students' preparedness attitudes, especially in terms of willingness to follow evacuation procedures and comply with directions when disasters occur. These findings support the results of research that flood education contributes to the formation of more responsive and proactive student attitudes.

This positive change in attitude can also be explained through a psychosocial approach, where an understanding of risk will affect an individual's perception and attitude. When students understand the impacts and dangers of flooding more deeply, they tend to develop a more serious and responsible attitude towards disaster prevention and mitigation efforts (Sutrisno et al., 2024).

Overall, the results of this study confirm that flood education is an effective intervention in increasing knowledge and shaping students' attitudes towards disaster preparedness. A significant increase in knowledge is a major factor that drives a change in students' attitudes in a more positive direction. This shows that cognitive and affective aspects are interrelated in the process of forming disaster preparedness.

These findings are in line with the research of Wulandari et al. (2024) who stated that school-based disaster education has a strategic role in building a disaster awareness culture from an early age. Education provided on an ongoing basis will help students not only understand disaster risk, but also form attitudes and values that support mitigating behavior.

CONCLUSION

Based on the results of the research, it can be concluded that the provision of flood education in the school environment has a significant effect on increasing knowledge and changing the attitude of SMPN 34 Medan students. The results of the statistical test showed that there was a difference in the average score of students' knowledge and attitudes before and after being given flood education, which indicates that flood education is an effective intervention in increasing students' awareness and preparedness for flood disaster risks.

Increasing student knowledge is the main factor that encourages a change in attitudes towards a more positive and proactive direction in dealing with potential flood disasters. Flood education that is delivered systematically and relevant to the conditions of the school environment is able to help students understand the risks, impacts, and appropriate mitigation measures.

ADVICE

It is hoped that the school can continue and develop flood education programs in a sustainable manner, both through learning activities, disaster simulations, and the integration

of disaster materials in the school curriculum. In addition, the involvement of related parties such as teachers, parents, and disaster agencies needs to be increased so that students' preparedness for flood disasters can continue to be maintained and increased.

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