

Effectiveness of the PERMAJA Educational Program in Enhancing Adolescent Reproductive Health Knowledge During Disasters

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ABSTRACT

Background: Adolescents are among the most vulnerable groups during disasters, often facing increased risks of sexual violence, poverty, and other reproductive health threats. These risks are compounded by the lack of private spaces for changing clothes, unsecured shelters, and shared toilet facilities for males and females in evacuation areas. **Objective:** This study aims to assess adolescents' knowledge of reproductive health in disaster situations and to develop empowerment activities through the PERMAJA (Peduli Kespro Masa Remaja) program. **Methods:** A quantitative descriptive study with a cross-sectional design was conducted involving 160 adolescents from three flood-prone areas in Central Java: Grobogan, Demak, and Semarang. The study was carried out from July to September 2024. Data were collected using a structured questionnaire and analyzed with univariate analysis to measure changes in knowledge before and after the educational intervention. **Results:** Among the 160 adolescent participants, the average knowledge score increased from 6.28 to 6.34 following the intervention. Although the numerical increase was modest, the difference was statistically significant ($p = 0.026$). The greatest improvement—28.1%—was observed in understanding the national health sub-cluster, indicating the effectiveness of the PERMAJA program in enhancing reproductive health knowledge during disasters. **Conclusion:** The PERMAJA program effectively improved adolescents' knowledge of reproductive health in disaster contexts. This targeted educational intervention highlights the importance of youth empowerment and contextualized learning in strengthening disaster preparedness among vulnerable populations.

Keywords: Reproductive Health, Adolescents, Empowerment, Disasters

INTRODUCTION

Indonesia is highly vulnerable to various disasters due to its geological, geographical, hydrological, and demographic characteristics. Disasters—whether caused by natural, non-natural, or social factors—can significantly damage the environment, result in material losses, and cause casualties. In the aftermath of a disaster, health crises often emerge, including deaths, physical injuries, psychological trauma, malnutrition, and the spread of infectious diseases (Kemenkes, 2017). Reproductive health is also among the aspects affected during such crises. Large-scale disasters can disrupt entire health service systems, including reproductive health services, which are critical for vulnerable populations. The demand for these services remains high and often increases during emergencies, underscoring the need for their continuous availability under all circumstances.

Northern Central Java, especially coastal regions adjacent to the Java Sea, frequently experiences environmental issues such as flooding, tidal inundation, erosion, land subsidence, and saltwater intrusion, placing residents at high risk (Desinta and Sitorus, 2021). Floods are among the most common disasters in Indonesia, exacerbated by the tropical climate and high rainfall (Marfai *et al.*, 2021); (Restianto, Poniman and Supriyatno, 2024); (Salim and Siswanto, 2021). Unfortunately, reproductive health needs are often overlooked during floods, with immediate priorities typically focused on survival, food, water, and shelter. However, reproductive health issues—ranging from safe deliveries and access to contraception to protection from gender-based violence—must not be neglected, as they have long-term impacts on individuals and communities (Fitriyasyah *et al.*, 2022).

Adolescents, defined as those aged 10-19 (UNESCO, 2019), constitute a significant portion of the population and

represent both a vulnerable group and a potential force for positive change. In disaster contexts, adolescents face heightened risks of violence, displacement, and reproductive health challenges (Hammad *et al.*, 2023). Conditions in evacuation shelters often lack privacy, sanitation, and gender separation, placing adolescents—particularly girls—at increased risk ((Hammad *et al.*, 2023); (Kobeissi *et al.*, 2022); (Stephens and Lassa, 2020).

Given these challenges, this study aims to assess adolescents' knowledge of reproductive health in disaster situations and to develop empowerment strategies that strengthen their roles as informed, resilient agents of change in flood-prone coastal areas.

METHODS

This study employed a quantitative research design with a cross-sectional approach conducted from July to September 2024. It involved 160 adolescents aged 11 to 18 years, selected from three flood-prone areas in Central Java: Demak (n=60), Grobogan (n=40), and Semarang (n=60). Participants were randomly selected from upper elementary, junior high, and senior high schools located in areas with high flood potential using a random sampling technique. The study aimed to measure adolescents' knowledge of reproductive health in disaster situations and to evaluate the effectiveness of educational interventions.

Data collection was carried out in three stages: pre-test, educational intervention, and post-test. A set of 10 true-or-false questions was developed based on the PPAM (Minimum Initial Service Package) for reproductive health during health crises. During the pre-test, participants responded to each question using visual answer sheets while blindfolded to minimize response bias. The educational session was delivered in person using PowerPoint presentations and covered key topics related to adolescent reproductive health during emergencies. After the session, a post-test was administered using the same instrument and procedures.

Data were analyzed using descriptive univariate statistics and inferential analysis. A paired t-test was performed to assess the statistical

significance of changes in knowledge scores before and after the intervention. All analyses were conducted using Microsoft Excel and SPSS version 26, with a significance level set at $p < 0.05$.

The intervention was conducted in collaboration with the Indonesian Family Planning Association (PKBI) and the United Nations Population Fund (UNFPA). Subject-matter experts from both organizations facilitated the educational content and group discussions. The collaborative effort aimed to enhance adolescents' awareness and preparedness in responding to reproductive health challenges in flood-prone regions.

Ethical approval for this study was obtained from the Health Research Ethics Committee of Universitas Negeri Semarang (Approval No: 929/KEPK/KLE/2025). Written informed consent was obtained from all participants and their parents or legal guardians prior to data collection. All procedures adhered to the principles of the Declaration of Helsinki.

RESULTS AND DISCUSSION

The respondent group showed a balanced distribution between male and female participants. According to Table 1, there were a total of 160 respondents, consisting of 78 males and 82 females. The most common age was 14 years, with 48 respondents—25 males (32.1%) and 23 females (28%). The second-largest age group was 15 years, comprising 46 respondents—22 males (28.2%) and 24 females (29.3%). Although the distribution is relatively even, the age groups of 14 and 15 years had the highest number of participants. This may be related to the stage of adolescence, which is more susceptible to issues such as reproductive health and disaster preparedness. Additionally, this age group may be more receptive to information on these topics.

Table 1. Age and Gender Distribution of Respondents

Age (years)	Gender			
	Male		Female	
	n	%	n	%
11	3	3,8	3	3,7
12	4	5,1	3	3,7
13	10	12,8	12	14,6
14	25	32,1	23	28
15	22	28,2	24	29,3
16	8	10,3	11	13,4

Age (years)	Gender			
	Male		Female	
	n	%	n	%
17	4	5,1	6	7,3
18	2	2,6	0	0
Total	78	100	82	100

Table 2 shows that there was an increase in knowledge across most of the questionnaire items. The item with the highest improvement was item 2, which addressed the national health sub-cluster, showing an increase of 28.1%. Conversely, the item with the lowest improvement was item 7, which focused on the main emphasis of the MISP (Minimum Initial Service Package) on adolescent reproductive health, with an increase of only 0.6%. This minimal change was due to the fact that nearly all adolescents (n = 159) answered correctly in the pre-test, and all participants (n = 160) answered correctly in the post-test. Although item 7 showed little improvement, this was expected since the participants were already familiar with the MISP's focus on reproductive health. Overall, these results indicate the effectiveness of the educational program in enhancing adolescents' knowledge about their reproductive health needs during disasters.

Table 2. Percentage of Correct Answers in Pre-Test and Post-Test

Question Item	Pre-Test		Post-Test		Change		Material Topic
	n	%	n	%	n	%	
1	6	3,8%	20	12,5%	14	8,7%	Definition of disaster
2	28	17,5%	74	45,6%	46	28,1%	National health sub-cluster
3	14	91,9%	15	96,3%	1	4,4%	Reproductive health sub-cluster
4	15	93,8%	15	96,9%	0	3,1%	Self assessment
5	0	0,0%	3	1,9%	3	1,9%	Priority steps for comprehensive services
6	15	96,3%	15	97,5%	2	1,2%	Additional MISP priorities
7	15	99,4%	16	100,0%	1	0,6%	Main focus of MISP on adolescent reproductive health

Question Item	Pre-Test		Post-Test		Change		Material Topic
	n	%	n	%	n	%	
8	15	97,5%	15	98,8%	2	1,3%	Individual kits
9	15	93,8%	15	98,8%	8	5,0%	Needs assessment
10	9	5,6%	22	13,8%	13	8,2%	Access to MISP during disaster situations

Based on Figure 2, there was an increase in participants' understanding, particularly in items 1 and 2, with the number of correct answers rising from 6 to 20 and from 28 to 74, respectively. These improvements may be attributed to the clear and engaging presentation of the material, which helped participants grasp previously unfamiliar concepts. Items 3 and 4 showed smaller improvements, while item 5 increased slightly from 0 to 3 correct responses. Items 6, 7, 8, and 9 also demonstrated near-maximum improvement. Additionally, item 10 increased from 9 to 22 correct answers. Overall, these results indicate the effectiveness of the educational intervention.

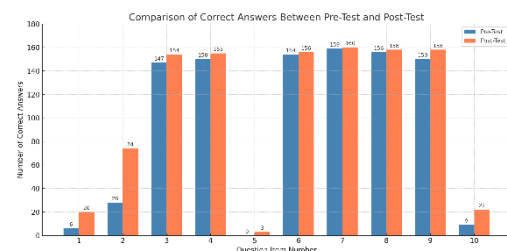


Figure 1. Comparison of Correct Answers According to the Answer Key in the Pre-Test and Post-Test

Overall, the results indicate that the educational intervention successfully improved adolescents' understanding, especially for question items with the correct answer marked as "true." However, some items, particularly those with the correct answer marked as "false," showed only a slight increase in comprehension. For example, item 5, which addressed priority steps for comprehensive services, showed a minimal increase of 1.9%, possibly because participants did not perceive it as immediately relevant.

Table 3. Frequency Distribution of Pre-Test and Post-Test Results

Test	n	Mean	Standard Deviation	Minimum	Maximum
Pre-Test	160	6,28	0,653	4	8
Post-Test	160	6,34	0,690	5	8

Based on Table 3, among the 160 participants who completed both the pre-test and post-test, the average pre-test score was 6.28 with a standard deviation of 0.653, indicating relatively little variation among participants. The minimum score was 4, and the maximum was 8. In the post-test, the average score increased slightly to 6.34 with a standard deviation of 0.690. Although the variation in post-test results was higher, the minimum score increased to 5, while the maximum remained at 8. Therefore, there was an overall improvement following the implementation of the PERMAJA program intervention. Additionally, a paired sample t-test was conducted to assess the statistical significance of this improvement. The test results showed a significant difference between pre-test and post-test scores ($t(159) = 2.24$, $p = 0.026$), indicating that the PERMAJA educational intervention had a statistically significant impact on adolescents' reproductive health knowledge during disaster situations.

The results of this study demonstrate a statistically significant improvement in adolescents' knowledge of reproductive health during disaster situations following the PERMAJA educational intervention. Although the numerical increase in mean scores from 6.28 to 6.34 appears modest, the paired t-test result ($t(159) = 2.24$, $p = 0.026$) confirms that this change is unlikely due to chance. This validates the intervention's impact from a statistical perspective.

The pre-test and post-test results revealed an increase in adolescents' knowledge across most items related to reproductive health in disaster situations. For example, the item on the national health cluster during disaster situations (Item 2) showed an increase of 28.1%, and the item on needs assessment (Item 9) increased by 5%. Although several items demonstrated only minor or statistically insignificant improvements—such as the item on comprehensive service prioritization steps (1.9%) and the focus of MISP on adolescents (0.6%)—these findings still indicate that the interactive

PowerPoint media facilitated knowledge change, particularly on topics that participants had previously misunderstood. Interactive PowerPoint media effectively increases students' interest, leading to enhanced knowledge. Previous studies have shown that using PowerPoint for disaster education improved students' scores in both mitigation and adaptation (Sholichah *et al.*, 2023), as well as flood preparedness training for high school students (Istiroha and Basri, 2020).

From a health promotion perspective, the success of this program can be explained through the model of knowledge enhancement and individual empowerment, which are core pillars of health promotion as outlined in the Ottawa Charter for Health Promotion (Organization, 1986).

The PERMAJA program not only served as a tool for information delivery but also empowered adolescents to recognize their rights and needs in the context of disaster preparedness. The interactive PowerPoint media delivered information in an engaging and accessible manner, tailored to the characteristics of the target group—adolescents—thus aligning with the principle of developing personal skills in health promotion (Fitriyasyah *et al.*, 2022).

Furthermore, the improved knowledge on topics such as the reproductive health sub-cluster, access to services during disasters, and the importance of needs assessments suggests the emergence of critical consciousness, as outlined in empowerment theory (Djoko and Irawan, 2022; Hasdiansyah, 2023). Adolescents were not merely passive recipients of information; they began to recognize their position as a vulnerable group entitled to reproductive health services even in crisis situations (Handayani *et al.*, 2019); (Nugroho, Nisa, *et al.*, 2025). Consequently, the program contributed to strengthening individuals' control over the factors influencing their health—an essential goal of health promotion.

The use of PowerPoint media as the primary tool can also be associated with the Health Education Communication Theory, which emphasizes that visual and interactive media are particularly effective for adolescent audiences and outperform one-way communication methods (Nugroho, Istiada, *et al.*, 2025).

These findings align with previous studies by (Sholichah *et al.*, 2023) and (Istiroha and Basri, 2020), which demonstrated that educational interventions utilizing PowerPoint improved students' understanding and preparedness in disaster contexts. Additionally, a study by (Batjo, Arsyad and Admasari, 2022) reported increased knowledge about disaster preparedness related to reproductive health through PowerPoint-based education that incorporated lectures, question-and-answer sessions, and demonstrations for adolescent girls, pregnant women, and women of reproductive age. The results showed that 70% of participants achieved a moderate level of preparedness, while 30% reached a high level.

Taking the health promotion approach into account, the PERMAJA program may be considered effective because it:

- Enhances individual capacity through relevant and contextual knowledge;
- Strengthens adolescents' ability to make informed health decisions, particularly in crisis situations; and
- Facilitates the transfer of values and skills for disaster preparedness, with a focus on reproductive health—an area often overlooked in similar interventions.

CONCLUSION

Based on the data analysis, it is evident that the intervention impacted adolescents' knowledge of reproductive health during crisis situations. Overall, adolescents demonstrated an improvement, as reflected in the increase in post-test scores compared to pre-test scores—from 6.28 to 6.34. Although this numerical increase appears modest, the statistical analysis ($t(159) = 2.24$; $p = 0.026$) confirms that the improvement is significant and not due to chance. The use of interactive PowerPoint media played a crucial role in increasing participants' interest and engagement, especially on topics that were previously unfamiliar. The PERMAJA program succeeded not only in delivering reproductive health information but also in empowering adolescents to recognize their rights and roles in disaster preparedness. It is hoped that reproductive health education can be comprehensively provided to adolescents,

particularly those living in disaster-prone areas. Not only as beneficiaries, but they can also become active participants in disseminating health information to their peers. Additionally, other communication media can be explored and utilized to further enhance the effectiveness and reach of such educational activities.

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