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Monitoring Toddler Development Based on Indonesian Health Survey (SKI) 2023

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Abstract
Background: Monitoring toddler development is a crucial aspect of early detection of growth and developmental issues in children. However, its implementation in Indonesia still faces various challenges, such as low parental awareness and limited access to health services. This study aims to identify factors associated with toddler development monitoring based on data from the 2023 Indonesian Health Survey (SKI). Methods: This research used a quantitative approach with a cross-sectional design involving all children aged 0–6 years across Indonesia. Data were collected through standardized questionnaires and structured interviews, and analyzed using simple linear regression to assess the relationship between socioeconomic factors, ownership and use of the Maternal and Child Health (MCH) handbook (KIA Book), and access to community health centers in relation to child development monitoring. Results: The results indicate that the most dominant factor supporting development monitoring is the ownership and use of the MCH handbook, showing a very strong and significant correlation (R = 0.781 and R = 0.788). Easy access to Puskesmas also had a significant effect (R = 0.681). In contrast, economic status showed a weaker and statistically insignificant relationship in most categories. Conclusion: These findings highlight the importance of increasing parental awareness of the MCH handbook and optimizing access to health services to support more effective child development monitoring.

Keywords: development monitoring, economic status, health access, MCH handbook, toddlers

INTRODUCTION

Geographically, Indonesia is located between two continents, namely the Asian Continent and the Australian Continent, and between two large oceans, namely the Indian Ocean and the Pacific Ocean (Reza et al., 2022). On the other hand, geologically, Indonesia is in a very strategic position because it is located at the meeting point of three major plates, namely the Indo-Australian plate, the Eurasian plate, and the Pacific plate (Syafitri et al., 2020). Indonesia is also crossed by two of the world's major volcanic routes and several of the world's folding mountain paths that meet each other in Indonesian territory. This condition makes Indonesia highly vulnerable to natural disasters like tsunamis, earthquakes and volcanic eruptions (Ayuningtyas et al., 2021).

One of the real consequences of geological conditions is that many active volcanoes are found across various regions. These mountains are part of a series of active fire mountains known as the Ring of Fire (Alfatah et al., 2024). Based on data from the Ministry of Energy and Mineral Resources (EMR), Indonesia has 127 active mountains actively monitored by the Center for Volcanology and Geological Disaster Mitigation (PVMBG) (Adri et al., 2020). Of these, there are 68 active volcanoes that PVBMG intensively monitors because they are classified as active volcanoes with high-risk potential. One of them is Mount Merapi due to continuous volcanic activity and has the potential to endanger the community (ESDM, 2025).

Mount Merapi, located in the special region of Yogyakarta, experienced a significant eruption in 2010, which resulted in the death of 223 people. In addition, as many as 236 people were injured and had to receive treatment in the hospital. This eruption also resulted in 374,202 people evacuated to 314 evacuation points. The disaster caused casualties and resulted in significant losses in the form of

damage to buildings, crops, and land, and loss of livestock owned by the community (Soekardi et al., 2020).

In disaster situations, students are one of the groups that need special attention. This is due to their limited access to resources and low independence in dealing with disasters, so they depend on the adults around them. Physically, children have small postures, lower physical strength, and suboptimal immune systems, making them more susceptible to infections. Exposure to volcanic ash (Lathu et al., 2023). They are not only physically vulnerable, but also psychosocially due to disruption of learning activities, loss of sense of security, and the emergence of post-disaster trauma (Nurhaliza et al., 2023).

Mount Merapi is divided into 3 Disaster Prone Areas (KRB), namely KRB I, as the area with the lowest eruption impact, KRB II with the medium impact level, and KRB III, which is the zone with the highest risk of danger (Samadara et al., 2023). Based on the data from BAPPENAS & BNPB, there are 394 schools in the disaster-prone area of Mount Merapi. The number of schools in this vulnerable area certainly requires substantial support, especially regarding students' understanding and ability to deal with eruption disasters. Students' adaptability in dealing with disasters is greatly influenced by the role of teachers and other education personnel as direction-givers. Therefore, schools need human resources who understand the principles of disaster management (Hadiyati et al., 2025).

As a systematic effort to increase preparedness capacity, one of the strategies that can be implemented through the sister school. The sister school program connects schools in disaster-prone areas with schools in more disaster-safe regions, in cooperation between two or more schools. This program aims to share knowledge, resources, experience and support in facing and reducing disaster risks. In addition to serving as a means of sharing knowledge and resources, the Sister School program also acts as a network of substitute schools that can accommodate students and continue the learning process in the event of a disaster (Mei et al., 2019).

Based on the results of the observations made, it is known that the implementation of the sister school program in Magelang Regency still faces several obstacles. One of the main problems is that the integration between the sister school program and the sister village program has not been optimal. As a result, the level of vulnerability to disasters, especially those that occur during school hours, is still relatively high. The implementation of this program is essential in ensuring children's educational rights, including when disasters occur.

On the other hand, the involvement of stakeholders in implementing the program has not been carried out optimally. This condition is caused by the limitations of the team that has been formed, inconsistencies in the implementation of SOPs, and referral mechanisms and support programs that cannot be implemented optimally. Therefore, in answering these problems, strategic intervention is needed in the form of assistance to school representatives to improve preparedness in disaster-prone schools.

METHOD

This service was carried out in representatives of several schools in the Mount Merapi area, namely representatives of Pre-school, Kindergarten, and Elementary School teachers in Pucungrejo Village and Sumber Village, Magelang Regency. The method used in this community service activity is participatory outreach, which is carried out through 3 stages, namely:

Preparation Stage

At this stage, coordination is carried out with the accompanying partner, namely PKBI (Indonesian Family Planning Association), and the target group to discuss the plan for implementing the activity, including determining the time, location, and facilities needed. On the other hand, the service team also conducts internal coordination to prepare materials, media and equipment for mentoring and training activities.

Implementation Stage

This stage includes mentoring activities and evaluation discussions with the team to review SOPs and referral mechanisms, develop sister school integration support programs, and conduct training to increase the team's capacity in dealing with disaster situations. This training also aims to equip teams with the ability to identify potential safety hazards, including preparedness measures in an emergency. Thus, the team is expected to be able to recognize and evaluate potential risks in the school

environment and understand how to prevent and handle them effectively.

Evaluation Stage

This activity was evaluated through discussions, the implementation of pre-tests and post-tests, and question-and-answer sessions with school representatives. The goal is to assess their enthusiasm and understanding of the mentoring and training materials that have been delivered related to efforts to prevent and handle potential hazards.

This activity has received ethical approval through a certificate of ethical feasibility from the Health Research Ethics Commission of the Faculty of Medicine, Universitas Negeri Semarang, with No. 888/KEPK/FK/KLE/2025.

RESULT AND DISCUSSION

This activity involves the participation of representatives from schools in the disaster-prone area of Mount Merapi (affected schools), as well as schools located in the regions that are relatively safe or have a low level of risk from the impact of the eruption of Mount Merapi (buffer schools). To follow up on identifying existing problems, a mentoring program focused on strengthening schools' capacity to deal with potential disasters. This assistance is carried out with a participatory approach tailored to needs, involving school representatives in each activity stage.

This program was carried out by holding discussions related to the evaluation of the structure and function of the emergency response team, followed by the determination of the tasks and roles of each team member in a more structured and functional manner, as well as comprehensive training related to disaster management. In addition, a review and update of the existing Standard Operating Procedures (SOPs) is carried out to ensure that SOPs remain relevant, adaptive to current needs, and can be implemented effectively in the field.

In addition, the preparation or review of the case referral mechanism in handling disaster events is carried out, accompanied by an evaluation of the extent to which the mechanism can accommodate the needs of vulnerable groups, especially people with disabilities. Furthermore, a supporting program was prepared to integrate sister schools with sister villages to build cooperation between regions and strengthen school resilience to disasters. Then, training was carried out for school representatives, which aimed to increase capacity, knowledge and preparedness in responding to disaster situations.

This training was carried out for Pre-school, Kindergarten and Elementary School teachers in Pucungrejo Village and Sumber Village, Magelang Regency with training materials related to safety aspects in schools both in general and in responding to disaster threats, such as; what must be prepared by schools both as affected schools and as buffer schools, which include human resources, procedures, infrastructure, collaboration mechanisms, monitoring and evaluation to reporting in disaster mitigation; In addition, a school development strategy is also given to reduce disaster risk sustainably in building a safety culture from an early age.

Based on the training results, in general, the pre-test and post-test results show an increase in knowledge among school representatives.

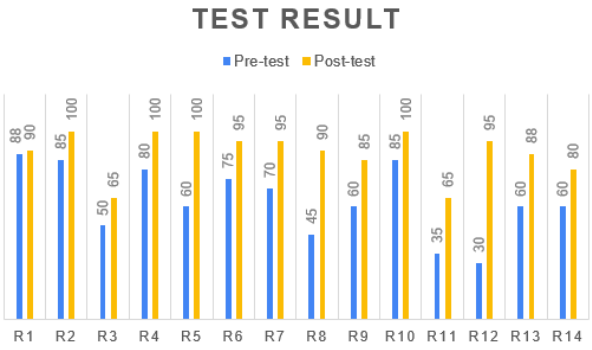

Figure 1. Tests results

The graph above shows that the training activities significantly increased the respondents' knowledge. The increase in knowledge in the respondents was demonstrated by the rise in the average score, namely from a score of 63.07 during the pre-test to 89.14 during the post-test. Therefore, it can

be concluded that there was an average increase of 26.07 points after the training.

The results of the qualitative analysis of the pre-test and post-test showed a significant improvement in understanding among school representatives of the concept of sister schools. Before the service, most respondents gave inappropriate answers in understanding the meaning, benefits and role of sister schools. Due to zoning factors, several respondents interpret sister schools as the primary reference school in the registration process for higher education. In addition, some respondents still stated that they knew nothing about sister schools. Although on the other hand, there are also respondents who already understand that sister schools are educational institutions intended to facilitate learning during disasters and as schools that serve the education of children from certain villages affected by disasters. This shows respondents' perceptions of sister schools are still very diverse and have not been referred to the correct definition. After the training, there was an increase in respondents' understanding, where most of the respondents understood that sister schools are a form of cooperation between schools that aims to ensure the continuity of the teaching and learning process when disasters occur in the affected villages and are transmitted to the buffer villages. This understanding includes the function of a buffer school as an alternative learning place for students from disaster-affected schools, which are schools that are in areas that are safer from disasters around disaster-prone villages that have a school that has readiness both in terms of infrastructure and disaster management systems to support the continuity of learning for affected schools.

From the aspect of understanding the benefits of sister schools, most respondents mentioned that buffer schools allow children to continue learning activities even though their home school is affected by a disaster, because alternative schools can be used. In addition, sister schools are also considered to function as information and coordination centers in disaster management that can provide procedural support to other schools. Some respondents stated that sister schools can expand access to education, especially in remote or disaster-prone areas, while maintaining the quality of learning, reducing teachers' workload, improving teacher competence, facilitating community participation and expanding collaboration between schools. The existence of sister schools is also considered to accelerate the evacuation process when a disaster occurs and contribute to providing disaster-related education to the surrounding community. This shows that some respondents have understood the benefits of the existence of sister schools, even though they are not optimal. After the training, the results of most of the respondents showed an understanding that sister schools have an essential role in ensuring the continuity of learning activities amid disaster situations, both through the provision of learning facilities for affected students, the protection of children's rights to continue to receive education even in disaster situations, and post-disaster recovery including psychosocial aspects. In addition, respondents also emphasized the importance of sister schools in strengthening cooperation between schools and building a proactive and structured disaster preparedness and management system in the school environment. Some respondents even have an understanding that mentions the function of sister schools as evacuation places, ready to meet the educational needs of affected residents. Overall, these results show an increased awareness of the benefits of sister schools in building education systems in disaster-prone areas.

Meanwhile, from the aspect of understanding related to the role of sister schools, it is known that the level of knowledge of respondents still varies. There are still respondents who do not understand the role of sister schools at all. Still, some respondents have identified some critical roles of buffer schools, such as readiness to provide temporary learning places for students and teachers affected by disasters, logistics readiness and other supporting infrastructure. In addition, several respondents understood the importance of cross-agency coordination, including related agencies, disaster agencies, and between schools, as well as post-disaster recovery through psychosocial support or trauma healing. However, some respondents still interpret the role of sister schools more generally, such as improving the quality of education and community welfare, direct involvement in disaster sites to help and guide affected villages, and providing warnings, gathering points, and safe evacuation routes. Although these aspects are related to the support function in disaster situations, this understanding does not reflect the concept of a comprehensive sister school as a system of cooperation between schools to ensure the continuity of education in the affected school areas. This shows that there is still a knowledge gap and the need for capacity-building efforts. Based on the answers from the respondents after the training, it was found that the respondents showed an increase in understanding which included three main aspects, namely the readiness of facilities and infrastructure in the form of the provision of temporary classrooms, sanitation facilities and learning materials, evacuation shelters for students and teachers from affected schools and safety infrastructure. Then,

human resource readiness and adaptive learning management aspects include setting learning schedules for refugee students, supporting volunteers and teachers for disaster victims and coordinating across schools and related stakeholders. In addition, respondents also showed awareness of the importance of conducting initial assessments, providing psychosocial support, and meeting logistical needs. Thus, it can be concluded that the training has increased the respondents' conceptual capacity regarding the strategic role of buffer schools.

Respondents showed a better and more comprehensive understanding of buffer schools' concept, benefits, roles and what the affected schools should do. This reflects the effectiveness of the training program in strengthening school preparedness.

Training is an educational process carried out in the short term, practically and systematically according to needs, aiming to improve participants' abilities and skills (Maulyan, 2019). Specifically, training activities aim to enhance participants' work abilities, which impact changes in participants' cognitive, attitude and skill aspects (Arin Proborini et al., 2024). According to the World Health Organization (WHO), knowledge, perception, belief and judgment of an object influence a person's attitude. Therefore, through training activities, it is hoped that individual knowledge can increase to impact a better attitude (Haryuni, 2018).

Disaster training has been proven to improve knowledge, skills, attitudes and preparedness for individuals and school communities in dealing with various types of disasters. Based on several training activities, the training improved participants' understanding and ability to respond appropriately to emergency situations, design responsive learning as needed, and showed a significant increase in knowledge and preparedness after the training was given. In addition, the training also contributes to creating a safer, inclusive and responsive school environment for disaster risk. It becomes a sustainable model for strengthening disaster risk management in the education sector (Arinata et al., 2023; Handayani et al., 2024; Rofiah et al., 2024; Yunus et al., 2023).

CONCLUSION

This training was carried out for Pre-school, Kindergarten and Elementary School teachers in Pucungrejo Village and Sumber Village, Magelang Regency with training materials related to safety aspects in schools; What must be prepared by schools both as affected schools and as a buffer school in disaster mitigation and building a safety culture from an early age.

Based on the training results, in general, there is an increase in knowledge among school representatives, as shown through the pre-test and post-test results. The average score increased from 63.07 during the pre-test to 89.14 during the post-test (an average increase of 26.07 points after the training).

In addition, from the results of the qualitative analysis, the respondents showed a better and comprehensive understanding of the concept, benefits and role of buffer schools. This reflects the effectiveness of the training program in strengthening school preparedness.

The suggestion is to carry out disaster response simulations involving affected schools and buffer schools, integrated with regular disaster resilient village simulations by involving cross-stakeholders such as BPBD, village governments, NGOs, health centers, hospitals, etc.

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