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Strengthening Community Awareness of Communicable and Non-Communicable Diseases through Education for Sustainable Development to Promote Healthy and Independent Villages

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Abstract: This community service activity aims to increase public knowledge and awareness of infectious and non-infectious diseases as part of efforts to establish an ESD-based Healthy Independent Village in Muktiharjo Kidul Village, Semarang City. The methods employed included health education and awareness campaigns through interactive outreach sessions conducted in collaboration with the Semarang City Health Department, case discussions, post-activity questionnaires, and the distribution of educational pamphlets containing information on disease types, risk factors, and preventive measures for both infectious and non-infectious diseases. The activity was evaluated using quantitative and qualitative descriptive analysis techniques. The results indicated strong support from the village government regarding program sustainability, as well as high levels of community enthusiasm toward the activities. Initial assessments showed that the knowledge levels of health cadres varied considerably, with notable gaps in several topics, particularly scabies (14.89%) and leptospirosis. Following the educational intervention, the community demonstrated positive responses, active participation, and increased awareness of the importance of behavior- and environment-based disease prevention. In addition, the activity produced educational pamphlets that were used as tools for disseminating information at the family and community levels. The ESD approach also encouraged the active involvement of health cadres as agents of change in supporting the sustainability of community-based health programs.

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Introduction

Communicable and noncommunicable diseases remain major challenges in global and national health development. Mau *et al.*, (2024) state that despite progress in controlling infectious diseases, communicable diseases such as tuberculosis, dengue fever, and diarrhea are still the leading causes of illness in developing countries, especially in areas with high population density and inadequate environmental sanitation. On the other hand, non-communicable diseases account for approximately 82% of total global deaths, with cardiovascular disease, diabetes mellitus, cancer, and chronic respiratory disease being the leading causes (World Health Organization, 2025).

Indonesia faces the phenomenon of the double burden of disease, where communicable diseases are not yet fully controlled, while the prevalence of non-

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communicable diseases continues to increase significantly. Data from the Indonesian Ministry of Health shows that the prevalence of hypertension, diabetes mellitus, and obesity has increased sharply in the last decade, in line with changes in lifestyle, urbanization, and consumption patterns (Kementerian Kesehatan, 2024; Kementerian Kesehatan, 2025). This condition has a direct impact on the burden on the health system, community productivity, and the quality of life of the population.

At the community level, particularly in neighborhoods or villages and peri-urban areas, health issues are often influenced by low health literacy and limited access to accurate and sustainable information. Communities tend to be reactive to disease, focusing more on treatment than prevention. However, various studies confirm that community-based prevention is the most effective and sustainable strategy for reducing the burden of disease (Haldane et al., 2019; Hassan, Kagwanja, Diallo, & Oyando, 2025; M et al., 2025).

Muktiharjo Kidul Village, Pedurungan District, Semarang City, is an area with complex social and environmental characteristics. As a transitional area between urban and densely populated settlements, this village faces challenges in environmental sanitation, lifestyle changes, and an increased risk of communicable and non-communicable diseases. These conditions require a health approach that is not only curative but also promotive and preventive, based on community empowerment. Additionally, it has a high population density in Semarang City, with 25 RW and 218 RT within it (Badan Pusat Statistik, 2023). In addition, several areas in the Muktiharjo Kidul village have experienced outbreaks of both communicable and non-communicable diseases, as well as poor sanitation conditions.

Some of the most common infectious and non-infectious diseases in Muktiharjo Kidul Village include Dengue Hemorrhagic Fever (DHF), Tuberculosis (TB), stunting, malnutrition, diabetes mellitus, hypertension, and hepatitis. Infectious diseases such as DBD have the highest number of cases in RW 8. TB cases are highest in RW 8 and RW 12. Furthermore, regarding stunting, this villaget has the highest prevalence rate in the city of Semarang, with the latest data from January to August 2025 showing 17 infants per month suffering from stunting. Furthermore, this village also has the highest vulnerability rate regarding infant malnutrition issues in the city of Semarang. For hypertension and diabetes mellitus cases in Muktiharjo Kidul village, the areas with the highest combined vulnerability are RW 1, RW 3, and RW 12. For hepatitis cases, the vulnerable areas in Muktiharjo Kidul village are RW 01, RW 03, RW 08, RW 12, and RW 16. For diarrhea, the vulnerable area is RW 1. The highest incidence of pneumonia is in RW 03 and RW 12 (Pemerintah Kota Semarang, 2025).

In addition to common diseases, sanitation and environmental quality also require attention. Regarding environmental quality, test results from the community health center showed that, out of 7,924 drinking water samples, only 1,473 met the standards. Regarding adequate sanitation in the Muktiharjo Kidul area, 6,077 out of 7,924 samples met the standards, meaning 1,847 samples still had inadequate sanitation. Regarding access to healthy housing, there are 339 homes in this village that are still considered unhealthy. This inadequate sanitation is likely due to frequent flooding, which results in poor sanitation quality. This highlights the need for improvements to sanitation in the Muktiharjo Kidul village. (Puskemas Tlogosari Kulon, 2024).

The concept of Healthy Independent Villages emphasizes the importance of community independence in maintaining and improving health through active participation, strengthening local capacity, and cross-sector collaboration. Education for Sustainable Development (ESD) is an educational approach that emphasizes the development of attitudes,

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skills, and knowledge of the community so that they are able to make conscious and responsible decisions regarding the social, economic, and ecological environment around them (Olsson, Gericke, & Boeve-de Pauw, 2022; UNESCO, 2021). In the context of health, ESD serves as a medium for improving public health literacy through action-based learning (Trevisan *et al.,* 2024). This approach places health as an integral part of sustainable development.

In the context of implementing health programs at the local level, various health education programs have in fact been carried out by community health centers and local health departments, particularly regarding the prevention of communicable and noncommunicable diseases. However, the approaches used still tend to be one-way (top-down), focusing on the dissemination of information without being accompanied by sustained capacity-building for the community. Furthermore, the approaches applied have not yet integrated sustainability aspects that link health behaviors, environmental conditions, and community social dynamics. This situation highlights a gap in the implementation of community-based health education that is not only informative but also transformative and sustainable.

The integration of infectious and non-communicable disease education within the ESD framework enables communities to understand the interrelationship between behavior, environment, and long-term health. ESD-based health education not only transfers knowledge but also encourages changes in attitudes, values, and sustainable healthy living practices (Baena-Morales, Vásquez-Echeverría, Gavilán-Martín, & Villora, 2024; Oe, Yamaoka, & Ochiai, 2022; UNESCO, 2021). Therefore, this community service activity is designed to strengthen community health literacy while encouraging the independence of Muktiharjo Kidul Village in facing health challenges.

Method

This community service program employs an educational and participatory approach based on the principles of Education for Sustainable Development (ESD. The target group for this activity was the community health workers of Muktiharjo Kidul Village. The sampling technique used was purposive sampling, which involves selecting respondents based on specific criteria, such as active community health workers, representatives from each Neighborhood Unit (RW), and those willing to participate in the entire series of educational activities. A total of 47 community health workers participated in this activity. The primary methods applied consist of health socialization and education focusing on communicable and non-communicable diseases. The implementation of the community service program followed the stages proposed by Giyantolin *et al.,* (2018; 2019), namely pre-implementation, implementation, and post-implementation phases (Figure 1).

Figure 1. Stages of implementation of community service in Muktiharjo Kidul Village

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The pre-implementation phase was conducted through preliminary studies and target group surveys, involving dialogue with local government authorities and community health centers regarding the community service program and the education to be provided based on the needs of the community. This phase aimed to address issues from both the program providers' and the community's perspectives, thereby identifying shared objectives. In addition, after the program agreement, it is necessary to prepare facilities and infrastructure to support the activities, such as educational pamphlets on health related to infectious and non-infectious diseases.

The implementation stage was carried out through interactive counseling, group discussions, and question and answer sessions. The material on infectious diseases covered non-communicable diseases in collaboration with the Semarang City Health Office and infectious diseases & PHBS practices by the community service team. The materials provided in this education program are tailored to the characteristics of the village so that they are more targeted and increase public understanding. The educational media used are seminar kits and pamphlets designed with simple language, informative visuals, and key messages on disease prevention. The pamphlets serve as a means of reinforcing the message so that the information can be disseminated within families and the surrounding community.

The post-implementation phase involved evaluating the activities quantitatively and qualitatively through questionnaires, participation observations, participant responses, and reflective discussions with the community and health cadres. The questionnaire used in this activity measures the cognitive aspects (knowledge) of health cadres regarding communicable and noncommunicable diseases, including disease types, risk factors, prevention, and early detection.

The data obtained from the questionnaire were analyzed using quantitative descriptive analysis techniques by calculating frequency distributions and percentages for each indicator of respondents' knowledge regarding communicable and noncommunicable diseases. The results of the analysis are presented in tabular form to facilitate the interpretation of the health cadres' level of understanding. Meanwhile, the qualitative data obtained from participant observation and participant responses were analyzed using qualitative descriptive methods to describe the level of engagement, enthusiasm, and changes in community awareness following the educational activity.

Result and Discussion

Muktiharjo Kidul Village is located in Pedurungan District, Semarang City, Central Java Province. This area is a residential area with characteristics transitional between urban and peri-urban areas, marked by the highest population density in Semarang City at 33,915 people per km2, socioeconomic heterogeneity, and complex environmental dynamics (Badan Pusat Statistik, 2020, 2023a, 2024). Administratively, Muktiharjo Kidul Village borders densely populated residential areas and small to medium-scale economic activity zones, which results in relatively high population mobility (Badan Pusat Statistik, 2023a, 2024). Demographically, the community of Muktiharjo Kidul Village is dominated by productive and elderly age groups, with diverse educational backgrounds and 25 neighborhood associations (RW) and 218 family associations (RT) (Badan Pusat Statistik, 2024). Most residents work in the informal sector, trade, services, and home industries. This condition affects daily activity patterns, lifestyles, and access to information and health services. High workloads are often a factor that hinders the consistent implementation of clean and healthy living behaviors, especially those related to the prevention of non-communicable diseases.

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From an environmental perspective, Muktiharjo Kidul Village faces sanitation and environmental management challenges that are typical of urban-peri-urban areas. High population density has led to a shortage of green open spaces and suboptimal drainage systems in several areas. These conditions have the potential to increase the risk of environmentally-based infectious diseases, such as dengue fever, leptospirosis, and gastrointestinal diseases. The presence of standing water and the lack of fully integrated household waste management are major risk factors for the development of disease vectors.

In the context of local epidemiology, the combination of environmental conditions, population mobility, and lifestyle changes makes Muktiharjo Kidul Village vulnerable to the double burden of disease. Infectious diseases remain a public health problem, such as pulmonary tuberculosis and dengue fever, which are still present in Muktiharjo Kidul Village, while non-communicable diseases show an increasing trend, especially among adults and the elderly (Dinas Kesehatan Kota Semarang, 2024). This condition is exacerbated by low public awareness of early detection and prevention of non-communicable diseases, such as types of NCDs and their risk factors. This is evidenced in Table 1.

Table 1. Results of the Survey on the Knowledge of Neighborhood Cadres on Non-Communicable Diseases and Communicable Diseases in Neighborhoods in Semarang City

No	Types of Diseases	Knowledge	True (%)	False (%)
1	Non-communicable diseases (NCDs)	Type of Non-communicable diseases	85.11	14.89
		Risk Factors for NCDs	82.98	17.02
		GERMAS	95.74	4.26
		Early Detection of Non-Communicable Diseases	93.62	6.38
		Behavior	97.87	2.13
2	Communicable Diseases (CD)	TBC	97.87	2.13
		DHF	97.87	2.13
		Leptospirosis	93.62	6.38
		Scabies	14.89	85.11
		Measles	95.74	4.26

In general, the results in Table 1 show that the health cadres' level of knowledge is relatively good for most indicators, particularly regarding infectious diseases such as tuberculosis and dengue fever. This indicates that health programs that have focused on national priority diseases have been quite effective in improving the cadres' understanding. However, there are still variations in knowledge levels across several indicators, particularly regarding risk factors for noncommunicable diseases and certain less-known diseases, which suggest gaps in the distribution of health information at the community level. The disparity in knowledge levels between infectious and non-communicable diseases also indicates a tendency for the public to be more familiar with diseases that are frequently the focus of public health campaigns. Meanwhile, understanding of risk factors and early detection of non-communicable diseases remains uneven. This situation underscores the need for a more comprehensive and sustained educational approach to address the full spectrum of diseases.

Table 1 shows that the knowledge of 47 health cadres is still below 95% correct. However, a health cadre must have excellent knowledge to be able to disseminate information to the community. This may be due to a lack of repetition or reminders regarding knowledge of infectious and non-infectious diseases, particularly knowledge about NCD risk

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factors, early detection of NCDs, leptospirosis, and scabies. Regarding scabies, it turns out that 85.11% of the community is unaware of this disease. This requires more attention to the Muktiharjo Kidul village in terms of knowledge about scabies. The low level of public awareness regarding scabies (14.89%) can be attributed to the environmental conditions and social characteristics of the Muktiharjo Kidul village, which has a high population density, dynamic community mobility, and limited sanitation in some areas. As a contact- and environment-based disease, scabies often receives less attention compared to other diseases such as tuberculosis or dengue fever, which are more frequently the focus of health programs. Furthermore, the low level of health literacy regarding skin diseases indicates that previous educational efforts have not addressed health aspects that are more specific and contextual to the community's conditions. From the perspective of Education for Sustainable Development (ESD), this situation highlights the importance of an educational approach that is not only informative but also transformative and sustainable. ESD enables the integration of health knowledge, environmental awareness, and long-term behavioral change within the community, thereby enhancing understanding of previously overlooked diseases, such as scabies, through active community engagement and context-based learning.

The health education program will help health cadres to refresh their knowledge and learn new things. This activity was carried out in collaboration with the Semarang City Health Office, the Tlogosari Kulon Community Health Center, and the Community Service Team (Universitas Nasional Karangturi, Semarang). During this activity, each neighborhood association (25 neighborhood associations) was represented by at least one health cadre. The outreach activity included three main educational topics: non-communicable diseases, non-communicable diseases, and prevention practices. These three main topics provided a broader understanding of the knowledge and practices involved, making it easier for the community to comprehend the information. It is hoped that the information shared can be disseminated to the community in each RW.

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Figure 2. Educational Outreach Activities for Health Cadres

Figure 2 shows an educational activity on communicable and non-communicable diseases for health cadres in Muktiharjo Kidul Village. This activity included the distribution of pamphlets and explanations related to the content of the pamphlets. The results of this activity showed that most participants had limited understanding of the relationship between the environment, lifestyle, and disease risk before the intervention was carried out. Following the educational activity, there was an increase in public awareness regarding the importance of preventing infectious diseases through environmental management, sanitation, and mosquito breeding site eradication. This was evidenced by several verbal statements from Mrs. A (pseudonym): "I am very happy and now know more about communicable and non-communicable diseases and the factors that can cause them. I will also use this knowledge to educate the community in my role as a health cadre at the integrated health service post (posyandu) and family planning service post (posbindu)," which was then supported by a statement from Mrs. B (pseudonym): "This is the kind of education we need, because it is very important and helps remind us of the importance of applying PHBS principles in our daily lives. Hopefully, this will motivate the cadres to promote and socialize what they have learned today". Community-based education for health cadres will have a positive impact on the community and can reduce both communicable and non-communicable diseases. This is in line with previous studies showing that community-based education is effective in improving practices for preventing communicable and non-communicable diseases (Hidayah, et. al., 2025; Mohammad et al., 2020; Ogolla et al., 2025; Suprayitno et al., 2021).

The ESD approach strengthens the learning process by linking health with environmental and social sustainability. Participants begin to understand that individual health contributes to community well-being and sustainable village development. The active involvement of health cadres increases the sustainability potential of the program, as emphasized by community empowerment theory (Koskan et al., 2013)

The distribution of pamphlets and seminar kits to cadres played an important role in expanding the reach of information. Participants reported that printed materials made it easier for them to share knowledge with other family members. This supports the concept of health literacy as an important determinant in disease prevention (Giguère et al., 2020; Park et al., 2025; Sudirman, 2022).

Overall, this activity demonstrates that integrated education on communicable and non-communicable diseases based on ESD provides health knowledge in support of the realization of Healthy Independent Neighborhoods. However, the sustainability of the program requires policy support, ongoing assistance, and cross-sector collaboration.

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Conclusion

An educational program on communicable and noncommunicable diseases based on Education for Sustainable Development (ESD) in the Muktiharjo Kidul neighborhood demonstrated that the community service objective of improving the knowledge and awareness of health cadres had been achieved. This was supported by the results of a knowledge assessment, which revealed knowledge gaps on several topics, such as scabies and leptospirosis, as well as the participants' positive responses and active participation during the educational activities. The interventions carried out were able to improve cadres' understanding of the importance of behavior- and environment-based disease prevention, as well as strengthen the role of cadres as agents of change in the community. Thus, the ESD approach is not only effective in improving health literacy but also has the potential to become a sustainable strategy in realizing a Self-Reliant Healthy Village.

Recommendation

Based on the results of the activities, the Muktiharjo Kidul village, in collaboration with the Tlogosari Kulon Community Health Center, is recommended to develop a health education program based on Education for Sustainable Development (ESD) on an ongoing basis through the establishment of an ESD Education Center at the village or neighborhood (RW) level to serve as a hub for education and training of community health workers. This program can be integrated into routine activities such as Posyandu and Posbindu using a participatory approach, particularly to improve understanding of diseases with low awareness, such as scabies and leptospirosis. Additionally, capacity building for community health workers, the development of educational materials, and a community-based monitoring and evaluation system are needed to ensure the program's sustainability.

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