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Strengthening ILP Standards Through Education And Simulation Of Diabetes Mellitus Screening Based On E- Health Center In Sukosari Village

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Abstract

This increase in cases of diabetes mellitus as part of non-communicable diseases requires strengthening primary health care-based screening, including through optimizing the role of health cadres at the village level. However, the limited knowledge and skills of cadres are one of the obstacles in implementing early detection. This community service activity aims to improve the competence of cadres through the SINERGI (Simulation and Education for Diabetes Screening) program. The method used is descriptive quantitative with total sampling techniques on 27 health cadres who participated in the training. The evaluation was conducted through pre-tests and post-tests to measure changes in knowledge before and after the intervention. The results showed an increase in the average score from 46.29 (poor category) to 80 (good category), and 96% of cadres experienced an increase in their scores. These findings indicate that a combination of role-play-based education and simulation is effective in improving the capacity of cadres in diabetes mellitus screening at the village level.

Keywords: Diabetes Mellitus, Health Cadre, ILP, Role play, Screening.

INTRODUCTION

Non-communicable diseases (NCDs) are diseases or conditions that cannot be transmitted from one individual to another (Zulseferiandi et al., 2023). Currently, NCDs are a serious global challenge, marked by the continued increase in new cases and high mortality rates year after year (Maliangkay et al., 2023). The magnitude of this impact is reflected in the contribution of NCDs to approximately 41 million deaths annually, equivalent to 74% of the total global death rate. Of these, approximately 17 million deaths occur in the age group under 70, and 86% of these premature deaths occur in low- and middle-income countries (Lungan et al., 2024). In Indonesia, this situation is increasingly worrying because one NCD, diabetes mellitus (DM), has become a major problem, placing significant pressure on the public health system.

A comparison of the 2018 Basic Health Research (Riskesdas) and the 2023 Indonesian Health Survey (SKI) data shows an increasing trend in the prevalence of diabetes, especially in the age group 15 years and above, reaching 11.7%, a significant increase compared to 10.9% in 2018 (Kamri, 2025). The urgency of this problem is further reinforced by projections from the International Diabetes Federation (IDF, 2025), which note that Indonesia is one of the five countries with the highest number of diabetes sufferers in the world, with an estimated 20.4 million people aged 20-79 years living with the condition. Of this total, approximately 73.2% of cases are estimated to be undiagnosed, indicating a significant hidden burden (Zein, 2025). Furthermore, this disease burden is increasingly significant considering that diabetes is the third leading cause of death in Indonesia, contributing 6.7% to total deaths (Kamri, 2025).

At the regional level, the increase in DM cases is also reflected in Sukosari Village, Ponorogo Regency. Health service data at the Ngrandu Community Health Center shows a high number of new cases of Diabetes Mellitus in the age group >20 years, with a total of 77 new cases in the period July–December 2024. This increase in findings indicates that DM has become a significant health problem even at the village level and requires special attention to address it. As a form of commitment to strengthening public health, the Indonesian government is transforming health services through the

integration of primary health services (ILP) as an effort to organize and coordinate various primary health services with a focus on meeting health service needs based on the life cycle of individuals, families, and communities (Minister of Health Decree, 2023). ILP positions community health centers and their networks, including sub-health centers and integrated health posts (Posyandu), as centers for life cycle-based health services. In its implementation, ILP emphasizes the importance of disease promotion and prevention as a primary effort to reduce the burden of public health problems, especially non-communicable diseases. However, the achievement of promotive and preventive services in community health centers still faces various challenges, both in terms of human resources, supporting facilities, and community participation.

The most frequently encountered obstacle is the limited training received by health cadres, particularly in remote areas and areas with limited access to health education facilities (Kamri, 2025). Furthermore, specific obstacles arise from differences in knowledge and skill levels among cadres, as well as inconsistent attendance at each training stage (Endrawati et al., 2025). Therefore, this study aims to strengthen ILP standards at the Sukosari Village level by improving competency and knowledge related to Diabetes Mellitus screening based on the E-Puskesmas application. Furthermore, this study can also evaluate the extent of cadres' understanding of appropriate DM screening methods.

RESEARCH METHODS

The method used in this study was descriptive quantitative. The descriptive quantitative approach aims to systematically and objectively describe the conditions and changes that occurred before and after program implementation (Fadhlain et al., 2025). Sampling used a total sampling method, with all 27 training participants serving as respondents. This technique was chosen due to the relatively limited population and to obtain a comprehensive picture of changes in knowledge before and after program implementation. The training cadres came from three hamlets in Sukosari Village: Kropak, Ndungkul, and Karanggayem.

Problem identification used a situational analysis based on a systems approach. This systems approach encompasses input, process, output, outcome, and impact aspects, aiming to identify the relationships between interconnected factors. A priority list of problems and their causes was then determined through Focus Group Discussions (FGDs) with village officials, where the root causes of the problems were depicted using a fishbone diagram. Alternative solutions were determined using the Multiple Criteria Utility Assessment (MCUA) method, which calculates weights based on the severity, magnitude, and trend of the problem. The selected alternative solutions are calculated using the MEER method which assesses the methodology, effectiveness, efficiency and relevance of the existing problem.

RESULTS AND DISCUSSION

The activity was carried out during the PKL (Field Work Practice) as one of the programs implemented in Sukosari Village, Kauman District, Ponorogo Regency in January 2025. The program of this activity is called SINERGI (Simulation and Education of Cadres for Diabetes Screening). This activity aims to improve the knowledge and skills of health cadres in conducting diabetes mellitus (DM) screening based on the E- Health Center application. The activity stages began with filling out a pre-test using Google Form to measure the initial level of knowledge of cadres regarding DM and proper screening procedures. Next, material was provided by the person in charge of Non-Communicable Diseases (PTM) of the Ngrandu Health Center as the health center that oversees the community of Sukosari Village. The material presented included basic DM concerts, factors, risks and screening flows according to primary health care standards. After the presentation of the material, the

activity continued with a short question and answer session and a DM screening simulation as well as data input into the E-Puskesmas application.

Figure 1. Provision of Material by the PJ PTM Ngrandu Health Center

After the presentation, the activity continued with a hands-on simulation of DM screening and data input into the E-Puskesmas application. This simulation used a role-play method, facing each other, where health cadres took turns playing the role of the community to be screened and the cadres who would conduct the screening and data input. The implementation of DM screening was adjusted to the screening card used during the ILP implementation, which included name, NIK, height, weight, and GDA during the DM screening implementation. Then, the data would be input into the E-Puskesmas application and continued with the DM screening questions available in the E-Puskesmas application. After the simulation activity ended, all cadres and health workers present would receive a pin as a reward and a sign of having participated in the DM screening training to support the strengthening of ILP. The activity then concluded with a post-test as a final evaluation and joint documentation.

Gambar 2. Simulasi dan *Role Play* Skrining DM melalui E-Puskesmas

Figure 3. Joint Documentation of Cadres and Health Workers

Table 1. Table 1. Assessment Categories

Value Range	Category
80-100	Good
51-79	Enough
<50	Not enough

The scores from the pre-test and post-test will be categorized based on their scores. There are three categories in the evaluation: good, sufficient, and poor. A good score is in the range of 80-100, indicating the cadre has good knowledge. A sufficient score is in the range of 51-79, indicating the cadre has adequate understanding. A poor score is <50, indicating the cadre has poor knowledge regarding diabetes and diabetes screening.

Table 2. Pre-Test Assessment Results

No.	Knowledge	F	%
1.	Good	0	0
2.	Enough	15	55,6
3.	Not enough	12	44,4
Total		27	100

The pre-test results showed that of the 27 health cadres, the majority (15 people, 55.6%) had adequate knowledge of diabetes mellitus screening, while 12 (44.4%) were in the poor category, and no cadres were in the good category. This indicates that prior to the educational and simulation activities, the cadres' understanding of diabetes screening was still suboptimal.

Table 3. Post Test Assessment Results

No.	Knowledge	F	%
1.	Good	19	70,4
2.	Enough	8	29,6
3.	Not enough	0	0
Total		27	100

Based on the post-test results, it was found that the majority, namely 19 of the 27 cadres, had good knowledge (70.4%), then the remaining 8 cadres (29.6%) had sufficient knowledge and there were no cadres with insufficient knowledge. This indicates that the implementation of health education through interactive lectures combined with simulations (role play) is effective in improving the competence and knowledge of cadres. These results are in line with research by Ningsih, Sumiatin

(2023) which stated that the role play method in practical sessions has proven to be an effective approach in training practical skills, because it provides participants with the opportunity to apply theory directly through situations that resemble real conditions. In addition, digital-based training is considered capable of increasing cadres' confidence in utilizing technology that contributes to honing cadres' critical thinking skills, so they are better able to sort out accurate information. With this competency, cadres can act as agents of information verification and

Table 4. Comparison of Frequency Analysis of Pre-Test and Post-Test

Question	Pre Test Answers (%)		Post Test Answers (%)	
	Correct	Wrong	Correct	Wrong
What is the frequency of Diabetes Mellitus screening services?	18,5	81,5	85,2	14,8
What interventions are given to residents who have blood sugar levels < 100?	33,3	66,7	88,9	11,1
Who is the primary target for diabetes mellitus screening?	33,3	66,7	92,6	7,4
The examinations carried out in a comprehensive diabetes mellitus screening examination include:	55,6	44,4	88,9	0
The applications used to enter screening results are:	66,7	33,3	100	22,2
Based on the examination results criteria, the random blood sugar value that indicates diabetes mellitus is	44,4	55,6	77,8	37
What interventions are given to patients with random blood sugar (GDS) of 140–199 mg/dL?	63	37	92,6	7,4
Classic symptoms of diabetes mellitus include, except:	81,5	18,5	88,9	11,1
Supporting examinations for the diagnosis of diabetes mellitus include, except:	18,5	81,5	48,1	51,9
Patients with fasting blood sugar (FBS) of 100–125 mg/dL are categorized as:	18,5	81,5	66,7	33,3

The frequency of responses from the pre-test and post-test comparisons showed a significant increase in the percentage of correct answers across all questions. In the pre-test, some cadres still demonstrated a low to moderate level of understanding, as evidenced by the highest percentage of incorrect answers for classic symptoms of diabetes mellitus (81.5%). After education and simulation, post-test results showed a significant increase in correct answers, with more than 85% of cadres answering most questions correctly, with some even reaching 100% correct answers for questions related to the application used to input screening results.

The most significant improvement was seen in questions regarding the frequency of diabetes mellitus screening services, where the percentage of correct answers increased by 66.7%. Despite this significant improvement, several indicators still showed incorrect answers in the post-test, particularly questions regarding diagnostic tests for diabetes mellitus and categorizing patients with fasting blood sugar levels of 100-125 mg/dL. This indicates that the material is relatively complex and requires further reinforcement.

The success indicators for this activity were 75% participation by Sukosari Village cadres and an increase in their pre-test scores by 80%. Both indicators were achieved, with 27 (90%) of the 30 cadres attending, and 96% of the cadres, or 26 of the 27, experiencing an increase in their post-test scores. The pre- and post-test results indicated an increase in cadre knowledge. Prior to the presentation and implementation of the screening, the average cadre score was 46.29, categorized as poor, but then increased to 80, categorized as good.

In terms of its suitability to the Sukosari Village community, this activity excels in its applicability and relevance to field conditions and needs, given the significant role of health cadres in early detection of non-communicable diseases at the village level. The implementation of screening and data entry through the e-Puskesmas (e-Puskesmas) also supports the transformation of digital-based health services and data integration in the implementation of the ILP. However, some obstacles were encountered during the activity, including limited digital literacy among some cadres and technical challenges such as unstable internet connections. Nevertheless, this activity offers significant opportunities for development, including ongoing mentoring, periodic training, and expanding training related to disease screening within other ILP programs. The results of this activity can be said to be effective in improving the knowledge and perceptions of cadres in Sukosari Village to support the strengthening of ILP standards.

CONCLUSION

Based on the results of the SINERGI (Simulation and Education for Cadres for Diabetes Screening) program, this activity has proven effective in improving the knowledge and competency of health cadres related to the implementation of diabetes mellitus screening according to ILP standards. This is indicated by an increase in the average post-test score from previously in the poor category to the good category. In addition, 96% of cadres have experienced an increase in scores after participating in a series of education and simulations, indicating that the applied learning method is able to meet the needs of capacity building for cadres at the village level. These findings indicate that an educational approach accompanied by direct practice based on role play can be an effective strategy in supporting the strengthening of cadre capacity and supporting the optimization of non-communicable disease screening according to ILP standards at the primary health care level.

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