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Strengthening Simanis Cadres' Competence in Blood Glucose Screening

Agus Wiwit Suwanto[1*], Endang Purwaningsih[1], Heru Wiratmoko[1]

[1] Politeknik Kesehatan Kemenkes Malang, Indonesia

ABSTRACT

Background: *Diabetes mellitus remains a major public health problem in Indonesia due to its high prevalence and risk of severe complications. Health volunteers play a strategic role in primary health care, particularly in early detection and community-based prevention efforts. Strengthening cadres' skills in blood glucose measurement is essential to support effective screening and health promotion activities. This community service aims to enhance the practical skills of health cadres in performing accurate blood glucose measurements to improve early detection and prevention of diabetes in the community.*

Methods: *The Simanis cadre team from Kutuwetan Village, consisting of 10 members, participated in this community service activity. This community service activity employed a participatory approach through training and direct mentoring. The program involved health volunteers who received theoretical instruction and hands-on practice in blood glucose measurement. Cadre skills were evaluated using pre- and post-training assessments.*

Results: *The program involved ten health volunteers. The proportion of cadres with good blood glucose measurement skills increased from 83.85% before the intervention to 100% after mentoring, indicating a measurable improvement in cadre competency.*

Conclusion: *Mentoring-based training effectively improved health volunteers' skills in blood glucose measurement. It is recommended that cadres apply these skills routinely in community health activities, with periodic re-evaluation every 3–6 months, and that further training be provided on fasting blood glucose and oral glucose tolerance testing to enhance early diabetes detection.*

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CONTACT
Agus Wiwit Suwanto
aguswiwitsuwanto@poltekkes-malang.ac.id
Politeknik Kesehatan Kemenkes Malang, Indonesia
Ijen Street No. 77C, Oro-oro Dowo, Klojen, Malang City, East Java 65119, Indonesia

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INTRODUCTION

Diabetes Mellitus is a disease that affects many Indonesians. In fact, Indonesia ranks fifth in terms of the prevalence of this disease (1). This disease is characterized by high blood glucose levels in patients. It is usually chronic, meaning that it occurs over a period of more than 6 months, even years. Prolonged high blood glucose levels cause changes that lead to pathological conditions in the blood vessels of Diabetes Mellitus patients (2).

These macroangiopathy complications hinder patient recovery and often lead to death (3), with the disease causing a significant number of deaths worldwide. According

to the WHO, diabetes contributes to approximately 1.5 million deaths each year, with one life loss every five minutes due to this disease. This figure reflects the high mortality rate due to diabetes complications affecting various organs, including the heart, blood vessels, kidneys, and nerves (4).

Given the high mortality rate among diabetics, as shown by the data, it is necessary to implement preventive measures at the community level. This disease requires regular blood sugar monitoring to avoid the early onset of macroangiopathy complications. Therefore, it is important to increase the capacity of the community to conduct blood sugar checks, especially at the level of health cadres who act as liaisons between the community and primary health services (5).

Health cadres are an integral part of village-level healthcare, tasked with early detection and providing health information to the community about diseases. Blood sugar testing skills are important for cadres because they can help with the early detection of diabetes or prediabetes in the community, which is very useful for preventing the development of this disease (6). In addition, health cadres who have blood sugar testing skills can facilitate continuous health monitoring in the community (7)(8).

The challenge faced in self-monitoring blood sugar levels is that not all health cadres have sufficient skills or understanding of blood sugar testing techniques. Based on previous research, most health cadres in rural areas have not been trained in blood sugar testing, so they still depend on formal health services to perform these tests (9). Therefore, providing guidance on blood sugar testing skills to Simanis cadres in Kutuwetan Village is a strategic step that needs to be taken to increase community independence in blood sugar monitoring.

The objective of this community service activity is to assist and train Simanis cadres in Kutuwetan Village in blood sugar testing skills so that they are able to provide basic testing services to the local community. With this mentoring program, it is hoped that Simanis cadres will be able to perform blood glucose tests as trained and play a more active role in preventing and monitoring diabetes risks in their communities independently, as well as supporting the achievement of *the Sustainable Development Goals* (SDGs), particularly in the aspect of community health.

METHODS

This community service activity was carried out through a participatory training approach with direct mentoring aimed at improving the skills of Simanis cadres in independently measuring blood sugar levels. The activity involved 10 Simanis cadre members from Kutuwetan Village. The steps in this method included preparation, implementation, and evaluation, which were designed so that the cadres could master blood sugar level measurement techniques and understand the importance of routine monitoring in maintaining the health of the Kutuwetan Village community.

Preparation Stage

In the preparation stage, the community service team identified the needs and mapped the potential of the village, including determining the cadres who would participate in the mentoring. The team also prepared the tools and materials needed for training, such as a skills checklist, lancets, *alcohol swabs, gloves*, and *tissues*.

The skill checklist contained the steps for measuring blood sugar, namely (a) wearing gloves; (b) replacing the lancet needle used; (c) turning on the blood sugar

measuring device or machine; (d) inserting the blood sugar stick into the measuring device; (e) selecting the finger to be pricked and wiping it with an alcohol swab; (f) waiting for the alcohol to dry before pricking the finger; (g) pricking the finger with the lancet needle and massaging the finger to draw blood; (h) discarding the first drop of blood with tissue into a special waste bin; (i) pressing the pricked area of the finger to draw a second drop of blood; (j) placing the drop of blood on the test strip in the meter; (k) reading the measurement results from the machine; (l) writing the measurement results on the patient documentation sheet; and (m) disposing of the used stick and needle in a prepared used water bottle. All of these steps are formulated using Google Forms to facilitate the assessment of participants' skills.

Implementation Stage

The next stage is the implementation stage, which is carried out in two stages. The first stage is to directly train cadres in the proper use of glucometers. After the Simanis Cadres are trained, the second stage is to provide assistance when the Simanis Cadres measure the blood sugar levels of Kutuwetan Village residents. This assistance is provided so that the Simanis Cadres receive direct guidance when they encounter difficulties or make mistakes in measurement, thereby improving their skills.

Evaluation Stage

Next is the third stage, which is evaluation. The evaluation stage aims to assess the success of the activity, namely the cadres' ability to measure blood sugar levels. This evaluation is carried out by observing the practices of the Simanis Cadres with the help of a checklist formulated in the form of a Google form to make it easier for the team to tabulate the evaluation results carried out by the observers.

RESULTS

The Simanis cadres of Kutuwetan Village are special cadres formed to carry out health services for residents with diabetes mellitus. There are 10 Simanis cadres, all of whom are women. They are housewives with educational backgrounds ranging from junior high school to university. Data on the Simanis cadres can be seen in Table 1.

Table 1. Basic Characteristics of Simanis Cadres (n = 10)

Variable	n	Percentage
Gender		
Male	0	0
Female	10	100
Educational Background		
Elementary School	0	0
Junior High School	3	30
Senior High School	4	40
Higher Education	3	30
Occupation		
Housewife	10	100
Civil Servant	0	0

Variable	n	Percentage
Private Sector	0	0
Entrepreneur	0	0

Based on Table 1, it can be seen that the educational background of Simanis cadres is mostly above junior high school level, with 70% consisting of 40% high school and 30% college graduates. With this educational background, according to the researcher, it is a good foundation for community empowerment, especially for Simanis Cadres to be trained in a skill, namely blood sugar measurement, to help villagers with diabetes mellitus more easily access one of the pillars of DM management, namely routine blood sugar control.

This community service was carried out in accordance with the stages mentioned in the implementation method. The preparation stage of this community service was carried out outside Kutuwetan Village, the implementation stage was divided into two stages and carried out in Krajan Timur Hamlet and Sidorejo Hamlet, and the third stage, which was the evaluation, was carried out in Krajan Barat Hamlet, Kutuwetan Village, Jetis District, Ponorogo Regency, East Java, and all activities were attended by 10 Simanis Cadres.

The activity continued with an evaluation or post-test conducted in Krajan Barat Hamlet, Kutuwetan Village. This stage was carried out after the cadres measured the blood sugar levels of 50 participants in two stages of community service implementation. In this evaluation stage, Simanis cadres measured the blood sugar levels of the villagers again while being evaluated by observers using a checklist that had been entered into a Google form.

During this evaluation, it was apparent that the researchers' education about the dangers of blood splashes during blood sugar measurements was well understood, as all cadres wore gloves during the examinations. The cadres revealed that after being informed that blood can transmit disease, they became motivated to always wear gloves when measuring blood sugar levels to avoid contracting diseases from residents.

At the evaluation stage, the cadres' skills were seen to have improved. This can be seen in Table 2 below.

Table 2. Pre and Post-Test Evaluation Results of Blood Sugar Level Measurement Skills of Simanis Health Workers (n = 10)

Activity	Pre-test (%)	Post-test (%)
Wearing gloves	70	100
Changing lancet needles	70	100
Turning on the blood glucose meter	100	100
Inserting the blood glucose test strip into the meter	100	100
Selecting a finger, swabbing	100	100
Wait for the alcohol on your finger to dry	30	100
Prick your finger with a lancet and massage your finger to draw blood	100	100
Dispose of the first drop of blood by wiping it with an alcohol swab, then throw the tissue into a special waste bin.	20	100

Activity	Pre-test (%)	Post-test (%)
Press down on the area around the finger that was pricked to collect the second drop of blood.	100	100
Place the blood on the stick attached to the measuring machine	100	100
Reading the measurement results	100	100
Writing the results from the measuring device onto the patient documentation sheet	100	100
Dispose of used sticks and needles in a used water bottle	100	100
Average	**83.85**	**100**

Based on Table 2, it can be seen that when Simanis cadres first conducted blood sugar checks, the things that were not done properly were wearing gloves (70%), changing lancet needles (70%), waiting for the alcohol to dry (30%), and discarding the first drop of blood (20%). After rigorous mentoring, Simanis cadres' skills in checking blood sugar levels improved, with all steps of the blood sugar level check being performed.



Figure 1. Pre-Post Test of Blood Sugar Level Measurement by Simanis Cadres

DISCUSSION

The community service activity involving Simanis cadres in Kutuwetan Village focused on improving blood sugar testing skills. As cadres who play a direct role in community health services, mental preparedness and technical skills are very important. Many cadres initially experienced doubts and fears because they had never performed examination procedures involving direct blood sampling from patients. Therefore, a systematic training approach, combining theory, hands-on practice, and intensive mentoring, became the main strategy to ensure the cadres' ability and confidence in performing blood sugar checks accurately and safely.

The preparation stage was carried out by the Community Service team to identify potential Simanis cadres and prepare the necessary tools and materials. The results of the identification showed that the Simanis village head had already been given information about diabetes mellitus and the 5 pillars of diabetes mellitus management and had been taught how to measure blood sugar levels but did not yet have the confidence to do so (10,11).

The next stage was the implementation of the first phase, which was carried out at the Kutuwetan Village Hall (Krajan Timur) with a blood sugar measurement training session followed by direct practice of measuring blood sugar levels of villagers while being assessed as a pre-test and accompanied by the team. During the implementation of the Community Service in this first phase, many cadres were still hesitant to measure blood sugar levels because they were afraid of hurting people and making mistakes.

It is natural for Simanis cadres to experience these doubts and fears because they have never performed any health checks that involve taking blood directly from people. This is in line with research conducted by Kirani (2023), which states that work experience and educational background have a positive and significant effect on a person's performance (12,13). The researcher's analysis shows that education and experience are absolutely necessary in any field of work. Without education, work will be done carelessly, and without experience, work will not be done skillfully and efficiently and will tend to be dangerous, both to oneself and to others.

The community service team then provided education and direct examples of how to measure blood sugar levels in front of the cadres, then assigned the Simanis Cadres to try to do it with close supervision. This aimed to increase the courage and skills of the Simanis Village Head in conducting blood sugar checks. This is in line with the results of research stating that there was an increase in the skills of the Cadres after being given training (14,15).

The researchers agreed with this study, which found that in order to perform any action correctly, it is necessary to practice independently and receive training from others. Through hands-on practice, the Simanis cadres could clearly see the steps being demonstrated and, with the guidance of other cadres, receive feedback if they made mistakes during the practical session.

Next was the implementation of the second stage, which was carried out in Dukuh Sidorejo, Kutuwetan Village. The activity involved Simanis cadres measuring the blood sugar levels of villagers with the assistance of the Community Service team. This activity was intended to give Simanis cadres more experience in measuring blood sugar levels so that, hopefully, the action would be carried out in accordance with the procedures that had been demonstrated.

The results of the study show that the number of working hours affects a person's performance, which means that the longer the work experience, the more skilled a person will be in doing their job (16,17). According to researchers, work experience, or what is often referred to as flying hours, is something that is very much needed for a person to work well. The more flying hours, the more work skills will improve, and the results will be better.

In phase 2 of the activity, some cadres still forgot to wear gloves. The team clarified why this happened. According to Simanis, the cadres were still not used to it. The team then motivated the cadres in another way, explaining that gloves serve to prevent the transmission of diseases that may be contained in the patient's blood. The researcher believes that if cadres are educated about the dangers of blood splashes, it will increase their compliance in protecting themselves by wearing gloves.

Performing work while minimizing the risk of dangerous incidents is the main principle of infection prevention and control (IPC). These measures include the use of personal protective equipment (PPE), one of which is gloves. The use of personal protective equipment such as gloves is an essential component of *standard precautions*

to ensure the safety of both patients and healthcare workers (18). In this book, in addition to the use of personal protective equipment, decontamination is a measure that must be taken to prevent cross-contamination of diseases. An appropriate measure for this in blood sugar testing is to replace the lancet needle for each person.

After the safety of the cadre and patient is ensured, another important thing to note is to wait for the alcohol to dry and discard the first drop of blood. Alcohol that has not evaporated when the fingertip is pricked with a lancet needle can contaminate the blood sample and alter the blood sugar level test results. Likewise, the first drop of blood that is immediately tested is likely to contain alcohol, so the results obtained will not be accurate. If the readings are inaccurate, the test is of no benefit to the community, especially those at risk or who actually have diabetes mellitus.

After rigorous mentoring, all blood sugar level test steps that were previously ignored were carried out diligently by Simanis cadres. This shows that continuous mentoring intervention is very effective in increasing compliance with the test procedure. The results of the study show that the mentoring method is very effective in increasing learning motivation and improving skills for participants (19).

This is in line with research stating that mentoring activities can improve the performance of participants (20). Researchers argue that mentoring is an activity carried out by experts in a field for "learners." The term "learner" in this community service refers to Simanis cadres who need to learn how to measure blood sugar levels correctly in order to serve villagers, especially those with diabetes mellitus.

Through direct practice with mentoring, mistakes made by cadres when checking blood sugar levels can be immediately given *feedback* to correct the errors. Activities such as this will leave a lasting impression so that in subsequent testing activities, mistakes that have been corrected will not be repeated. Another impact of this mentoring is that blood sugar level test results will also be more accurate, and the range of people served by blood sugar level testing will also be wider, and macroangiopathy complications can be prevented early on.

A barrier to this activity is that some cadres were initially hesitant and forgot to use gloves due to lack of experience and habit, which became an obstacle to the implementation of safety procedures. Future recommendations include increasing the frequency of hands-on training, strengthening strict mentoring, and providing ongoing education on the importance of self-protection and standard procedures so that the skills and compliance of cadres can be consistently maintained.

CONCLUSIONS AND SUGGESTIONS

The community service activity in the form of blood sugar testing assistance for Simanis cadres in Kutuwetan Village, Jetis District, Ponorogo Regency succeeded in improving the skills of cadres in measuring blood sugar levels independently and according to procedures. The training approach accompanied by direct assistance proved to be effective in correcting technical errors and improving the competence of cadres in community health screening activities.

Future activities recommend that Simanis cadres apply and evaluate their blood sugar measurement skills regularly every 3–6 months. Further skill development, such as fasting blood sugar measurement and oral glucose tolerance test, is also recommended through training and gradual mentoring to strengthen the role of cadres in early diabetes detection at the village level.

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DECLARATION OF USE OF AI IN SCIENTIFIC WRITING

AI tools were used solely for grammar and language editing. The authors take full responsibility for the content and integrity of the manuscript.

CONFLICT OF INTERESTS

The author declares that there is no conflict of interest regarding the results of this community service activity.

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