

Effective Health Screening Strategies for Overcoming Non-Communicable Diseases in Sambimulyo Village, Banyuwangi Regency

Tazkia Izzatun Az Zahra¹, Era Samudra Hambin¹, Tsabitah Virza Novirianingtyas², Tri Yoga Wicaksono², Lailia Wahyuliana³, Aulia Seftya Wardhani⁴, Kayla Juwita Qalbu Latifa⁵, Rafi Amrullah⁵, Putri Fatimahtuz Zahra Puji Anggar Wati⁶, Ayik Mirayanti Mandagi^{7*}

¹Faculty of Medicine, Universitas Airlangga, Surabaya, Indonesia

²Faculty of Pharmacy, Universitas Airlangga, Surabaya, Indonesia

³Faculty of Public Health, Universitas Airlangga, Surabaya, Indonesia

⁴Faculty of Economics and Business, Universitas Airlangga, Surabaya, Indonesia

⁵Faculty of Social and Politic Science, Universitas Airlangga, Surabaya, Indonesia

⁶Faculty of Science and Technology, Universitas Airlangga, Surabaya, Indonesia

⁷Public Health Study Program, School of Health and Life Sciences, Universitas Airlangga, Banyuwangi, Indonesia

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Abstract Non-communicable diseases (NCDs) are chronic conditions that cannot be transmitted from one person to another. These conditions do not usually cause symptoms at first, but over time they can progress and damage the affected organ, leading to complications or even death. A lack of public knowledge about NCDs is a major contributor to complications and deaths from these diseases. To address this issue, a series of activities have been organized as part of the Movement for the Control of Non-Communicable Diseases. These activities focus on understanding the definitions, risk factors, prevention methods, and symptoms of diabetes, hypertension, and hyperuricemia. This study used a descriptive observational method, collecting primary data from pre- and post-test responses and health test results. In the first intervention, information about NCDs was provided and participants' knowledge was increased by 31.25%. The second intervention was a health screening, which included measuring blood pressure and blood sugar levels. Uric acid levels were also measured at five points in Sambimulyo Village, with 129 participants. The results showed that 41.1% had high blood pressure, 29.5% were classified as diabetic, and 18.8% had high uric acid levels. These activities increased public knowledge about NCDs, provided information about the community's risk factors, and improved communication, education, and information about how to manage these conditions.

1. INTRODUCTION

At least 41 million people die from non-communicable diseases (NCDs) annually. In 2019, 7 out of 10 causes of death worldwide were NCDs. About 74% of deaths worldwide are caused by NCDs, followed by lower

respiratory tract infections and congenital conditions at birth. It is recorded that around 85% of these deaths occur in low- to middle-income countries, and 15 million of them are aged 30-69 years (World Health Organization, 2021).

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*Corresponding author: Ayik Mirayanti Mandagi

Public Health Study Program, School of Health and Life Sciences, Universitas Airlangga, Banyuwangi, Indonesia

Email: ayikm@fkm.unair.ac.id

The Indonesian state is now facing a triple burden of various disease problems, including new emerging and re-emerging infectious diseases, such as COVID-19, infectious diseases, and NCDs, where NCDs continue to increase every year and are the main cause of disease burden (Kementerian Kesehatan Republik Indonesia, 2020). At least 41 million people die from non-communicable diseases (NCDs) annually. In 2019, 7 out of 10 causes of death worldwide were NCDs. About 74% of deaths worldwide are caused by NCDs, followed by lower respiratory tract infections and congenital conditions at birth. It is recorded that around 85% of these deaths occur in low- to middle-income countries, and 15 million of them are aged 30-69 years (World Health Organization, 2021). The Indonesian state is now facing a triple burden of various disease problems, including new emerging and re-emerging infectious diseases, such as COVID-19, infectious diseases, and NCDs, where NCDs continue to increase every year and are the main cause of disease burden (Kementerian Kesehatan Republik Indonesia, 2020). NCDs are chronic diseases that cannot be transmitted and can be caused by genetic, physiological, environmental, and behavioral factors. NCDs continue to dominate as a cause of death in Indonesia, such as diabetes mellitus, heart disease, obesity, kidney disease, and malignancy (World Health Organization, 2021). NCDs are related to lifestyle changes due to modernization, urbanization, globalization, and population growth. Some of the risk factors for NCDs include smoking, lack of physical activity, unhealthy diet, and alcohol consumption. These risk factors can cause physiological changes in the human body, such as increased blood pressure, increased blood sugar, increased blood cholesterol, and obesity (Siswanto & Lestari, 2020).

Based on data from Riskesdas in 2018, an increase in the prevalence of non-communicable diseases was observed compared to data from 2013. These non-communicable diseases include diabetes and hypertension. The prevalence of diabetes mellitus, based on blood sugar examination, rose from 6.9% to 8.5%, and the prevalence of hypertension, based on blood pressure measurement results, rose from 25.8% to 34.1% (Kementerian Kesehatan Republik Indonesia, 2018). The problem of the increasing trend of non-communicable diseases is important because NCD sufferers usually do not experience symptoms, and the disease progresses until it suddenly attacks the patient through disease complications and can lead to sudden death (Purnamasari, 2018). This problem is due to lack of knowledge and public awareness about NCDs, so there is a need for early detection in high-risk populations, early treatment, and periodic control (Doll, 1995). Based on data from the Sambirejo Health Center in Sambimulyo Village, Banyuwangi Regency, the three most common diseases among the people of Sambimulyo Village are essential hypertension, type 2 diabetes mellitus, and myalgia. These three diseases are NCDs that can be prevented and treated through early detection of risk factors. Therefore, efforts to prevent and address NCDs in Sambimulyo Village include counseling related to NCDs (hypertension, diabetes

mellitus, and hyperuricemia) and health screening through blood pressure, sugar level, and uric acid level checks. It is hoped that this will increase public awareness about NCDs and enable them to promptly follow up on their health conditions at the nearest health facility.

2. METHOD

Based on the results of a survey of the three highest diseases for the period 1 January to 30 June 2022 in Sambimulyo Village, 71 residents suffered from hypertension, 83 residents suffered from myalgia, and 121 residents suffered from diabetes mellitus. These three diseases are non-communicable diseases that can be prevented by increasing public awareness & knowledge to be more concerned with the signs and symptoms of non-communicable diseases and can be screened for risk factors in the community. Therefore, it is necessary to carry out the provision of information and free health checks as a medium to overcome the dangers and complications of non-communicable diseases. This activity is packaged in a series of activities of the Movement for the Management of Non-Communicable Diseases (GULALI), which consists of 2 interventional activities, namely the provision of information on non-communicable diseases, especially diabetes, hypertension and hyperuricemia and free health check activities.

The first intervention was carried out with the provision of information about non-communicable diseases, which was carried out in the village hall with the target of the general public. The series of provision of information interventions consisted of pretest work by the provision of information participants, followed by presentations questions and answers on the provision of information related to non-communicable diseases by the speakers, then ended with the work on the posttest by the participants. Pretest and posttest work is carried out as a parameter for measuring the level of public knowledge before the intervention and after the intervention. The knowledge standard becomes good if there is an increase in the posttest value by at least 30% of the pretest value.

The second intervention was to conduct free health checks on the people in Sambimulyo Village. Free health checks are carried out in the form of checking blood pressure, blood sugar levels, and uric acid levels. The tool used is a GCU blood test kit with the easy-touch trademark. This tool uses electrode-based biosensor technology to detect the results of measurements by measuring electric current as a result of electrochemical reactions. The blood test kit works by attaching a strip to the blood test kit and then sucking the blood droplets from the skin to the strip. This intervention is carried out as a public media to find out their respective health and also provide good communication, information, and education & effective for the community to get good explanations & directions regarding the results of their health tests. This activity will be carried out five times in stages and in five different places.

3. RESULT AND DISCUSSION

Limited information and health services in Sambimulyo Village require an intervention in the provision of information and health checks to tackle and prevent the dangers and complications of non-communicable diseases. The activities carried out directly to the community are expected to increase public knowledge, identify risk factors in the community, and provide good education on the results of health checks.

3.1 Provision of information on non-communicable diseases

The non-communicable disease provision of information activity was held on 15 July 2022, at 10.00 WIB at the Sambimulyo Village Hall and was attended by 16 participants. The series of provision of information activities included pretest work, followed by the presentation of the provision of information materials, and closed with posttest work. The provision of information was carried out by presenting material on diabetes, hypertension, and hyperuricemia by medical students of the Faculty of Medicine, Airlangga University. The material presented discusses the definition, signs symptoms, and prevention methods that have been packaged in language that is easily understood by the public. This activity is also equipped with a pretest and posttest to measure the increase in participants' knowledge after and before the intervention.

Table 1. Pretest results of non-communicable diseases provision of information

Pretest Score	Frequency	Percentage %
0 - 19	2	12.5
20 -39	1	6.25
40 -59	4	25
60 - 79	7	43.75
80 - 99	2	12.5
100	0	0

From Table 1, the participants' pretest scores were obtained prior to the presentation of the provision of information. From the data above, it was found that the number of participants who got a score of 0 was 2 participants (12.5%), a score of 20 was 1 participant (6.25%), a score of 40 was 4 participants (25%), a score of 60 was 7 participants (43.75%), a score of 80 was 2 participants (12.5%), and a score of 100 as many as 0 participants (0%).

Table 2. Posttest results of non-communicable diseases provision of information

Posttest Score	Frequency	Percentage %
0 - 19	0	0
20 -39	0	0
40 -59	0	0
60 - 79	4	25
80 - 99	9	56.25
100	3	18.75

From Table 2, the posttest scores of the participants were obtained after the provision of information material was given. From the data above, it was found that the number of participants who got a score of 0 was 0 participants (0%), the value of 20 was 0 participants (0%), the value of 40 was 0 participants (0%), the value of 60 was 4 participants (25%), the value of 80 as many as 9 participants (56.25%), and a score of 100 as many as 3 participants (18.75%). By comparing the results of the pretest and posttest of the participants, it can be seen that there was an increase in the number of correct answers among the participants after the provision of information.

The percentage of the average value of the participants before the provision of information was 47.5%, while the percentage of the average value of the participants after the provision of information was 78.75%, so that an increase in the knowledge of the participants was 31.25% from before the provision of information. The increase in respondents' knowledge in this study is in line with the literature, namely increasing knowledge is one of the changes in behavior that can be improved or changed by providing information, one of which is through the extension method. The hope is that after counseling, the respondents will get the knowledge gained from sensing an exposure (Notoatmodjo, 2007). Several other studies also mentioned increasing respondents' knowledge by using extension methods. Research conducted by Rahman (2018) on class X students stated that there was an effect of counseling methods on increasing students' knowledge about vaginal discharge. Salasa et al. (2013) also produced the same thing in research. After counseling with the lecture method, there was an increase in respondents' knowledge and attitudes about PHBS in elementary schools. An increase in knowledge can be seen by giving a pretest before being given an intervention in the form of counseling and a posttest after being given counseling to the respondent (Panghiyangan et al., 2018).

3.2 Health screening

The next intervention was a free health check which was carried out at 5 points in Sambimulyo Village. This is done, so that the health test results obtained are more accurate. The aim is to do it at five different points so that people who carry out health checks can be spread evenly in every hamlet in Sambimulyo Village. Free health checks were carried out in the hamlet of Kedungrejo Lincip on 19 July 2022 at 07:30 WIB, the hamlets of Kedungrejo Wetan & West Sambirejo on 23 July 2022 at 07:30 WIB, in the hamlet of East Sambirejo on 28 July 2022 at 07.30 WIB, and in Saung Ampera on 29 July 2022 at 07:30 WIB. The free health check was attended by 129 participants who had been advised to fast from 10 pm until a health test was carried out.

In this health check, certain references are used to determine the participant's health test results. In general, optimal blood pressure ranges from 90/60 mmHg to 120/80 mmHg. Blood pressure is categorized as high if the measurement results are >140/90 mmHg and categorized

as low if the measurement result is <90/60 mmHg (National Health Services, 2019). From Table 3, 4 participants showed results with low blood pressure (3.1%), 72 participants with normal blood pressure (55.8%), and

53 participants (41.1%) with high blood pressure. Of participants with high blood pressure measurement results, 46 of them (86.6%) were participants aged >45 years.

Table 3 . Blood pressure measurement results in Sambimulyo Village

Age	Number of Participants	Low Blood Pressure (Hypotension)	Normal Blood Pressure	High Blood Pressure (Hypertension)
<30 years old	6	1	5	0
30 – 45 years old	31	1	23	7
>45 years old	92	2	44	46
Total	129	4	72	53
Percentage(%)		3.1	55.8	41.1

Blood pressure is defined as the strength of blood circulating in the walls of blood vessels which is measured using two parameters, namely systolic pressure (measured when the heart beats and blood pressure reaches its peak) and diastolic pressure (measured between the heartbeat and the lowest blood pressure) (National Cancer Institute, 2022). High blood pressure or hypertension is a condition where the results of blood pressure measurements are higher than normal, which is more than 140/90 mmHg. Hypertension is a chronic condition that causes persistent increases in blood pressure. Hypertension is also one of the most significant comorbidities that aggravate several diseases, such as stroke, myocardial infarction, heart failure, and kidney failure (Iqbal & Jamal, 2022). In a study

mentioned several risk factors that can cause hypertension in Indonesia, including gender, age, physical activity, and obesity (Khasanah, 2022). In this study, hypertension was found to be more common in the group >45 years of age. Age is one of the factors that cause hypertension. This is in line with research by Dhianawaty et al. (2017), who found that 41.94% of fishermen in Kanci Kulon Village had hypertension with an age range of 40-69 years. Increased blood pressure will increase with increasing time, especially after the age of 50 years. This happens because there is an ageing process in the walls of human blood vessels which will become stiff and cause high blood pressure (Pinto, 2007).

Table 4 . Blood sugar measurement results in Sambimulyo Village

Age	Number of Participants	Low Blood Pressure (Hypoglycemia)	Normal Blood Glucose	Pre-Diabetes	Diabetes
<30 years old	6	0	5	1	0
30 – 45 years old	31	0	15	9	7
>45 years old	92	3	29	29	31
Total	129	3	49	39	38
Percentage(%)		2.3	38	30.2	29.5

The results of blood sugar measurements can be interpreted as several categories depending on the patient's condition when checking blood sugar. The measurement results include the category of low sugar levels if the results are <70 mg/dL, normal sugar levels if the results are 70-100 mg/dL, the pre-diabetes category if the results are 100-125 mg/dL, and the diabetes category if the results are 126

mg/dL or more (Centers for Disease Control and Prevention, 2021). In this measurement, all participants were tested for fasting blood sugar. From Table 4, it was found that 3 participants showed low blood sugar levels (2.3%), 49 participants with normal blood sugar levels (38%), 39 participants in the pre-diabetes category (30.2%), and 38 participants in the diabetes category (29.5%).

Table 5 . Results of uric acid measurement in Sambimulyo Village

Ages	Number of Participants	Low Uric Acid	Normal Uric Acid	High Uric Acid
<30 years old	6	1	4	1
30 – 45 years old	31	1	25	5
>45 years old	91	1	72	18
Total	128	3	101	24
Percentage(%)		2.3	78.9	18.8

Blood glucose is the sugar in the blood which is formed from carbohydrates in food and stored as glycogen in the liver and skeletal muscles (Siregar et al., 2020). Blood sugar levels can be determined by measuring using a blood sugar measuring device paired with a test strip. The results of blood sugar measurements can determine the condition of sugar levels in the blood. Diabetes is a chronic condition that can cause various complications in target organs (Sirait et al., 2015). In this study, 24% of the sample had diabetes and were >45 years old. This finding is in line with diabetes risk factors, family history, physical inactivity, and age \geq 40 years old (Asamoah-Boaheng et al., 2019).

The measurement of normal uric acid levels is between 3.5 to 7 mg/dL. If it is less than 6.8 mg/dL, then the uric acid measurement results are normal, and the uric acid measurement results are high with results >7 mg/dL (George & Minter, 2022). From Table 5, there were 3 participants with low uric acid levels (2.3%), as many as 101 participants with normal uric acid levels (78.9%), and as many as 24 participants with high uric acid levels (18.8%).

Uric acid is a chemical that is produced when the body breaks down purines. Purines are found in some foods and drinks (National Center for Biotechnology Information, 2022). Foods high in purines include seafood, poultry, red meat, legumes, fungi, and some vegetables (Aihemaitjiang et al., 2020). Several factors can increase uric acid levels, including changes in diastolic blood pressure, serum triglycerides, creatinine, and HDL-C levels (Ni et al., 2019). In this study, the majority of the samples already had controlled uric acid levels, and this was possible due to factors of food intake consumed, people's lifestyles, or traditions. Several risk factors can increase uric acid levels, including lifestyle. Lifestyles such as consuming high-fat foods, and coffee consumption, lack of physical activity, and poor sleep patterns can increase uric acid levels in the body (Pursriningsih & Panunggal, 2015).

After a health screening was carried out, including measuring blood pressure, blood sugar levels, and uric acid levels for 129 people in Sambimulyo Village, 41.1% had high blood pressure, 18.8% had high uric acid levels, and 29.5% had high blood sugar levels. In addition to providing an overview of health in the community, this health measurement is also used as a means for the community to find out their health conditions and obtain correct information on their health outcomes. Because some participants were still found to have abnormal health conditions, it can be interpreted that some people still need to be screened regularly to discover risk factors for non-communicable diseases and prevent serious complications.

4. CONCLUSION

A series of GULALI activities consists of two interventions: providing information on non-communicable diseases and conducting health screenings by measuring blood pressure, blood sugar, and uric acid levels. From the results of the health screenings, information was obtained on the description of the health conditions in Sambimulyo Village and the community received information related to their

health conditions. After the provision of information, the participants' knowledge increased by 31.25%.

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CONFLICT OF INTERESTS

All of the authors of this manuscript declare that there is no conflict of interest. This manuscript, entitled "Effective Health Screening Strategies for Overcoming Non-Communicable Diseases in Sambimulyo Village, Banyuwangi Regency," has been proofread and approved by all authors named. Furthermore, the corresponding author is the contact person who will communicate with the editorial process until the manuscript is published.

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