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Increasing knowledge about nutrition and health in the elderly and cadres in Banguntapan Village, Bantul

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ABSTRACT The increasing number of elderly is one of the social problems that require the attention of all involved parties. Health care efforts are now aimed at keeping the elderly healthy, active, independent, and productive socially and economically for themselves, their families and their community. Elderly is an age group where a person has experienced various decreases in body functions that can affect appetite, which ultimately leads to malnutrition. We designed community service-based study to increase the elderly health in the Banguntapan Village through increasing the awareness of the elderly about managing their health, the knowledge and skill to take care elderly of the families who have elderly on their care in Banguntapan Village. The method applied in this activity is counseling with pre-test and the first post-test and distribution pocket of about nutrition and elderly health. To be able to measure the retained knowledge after the activities, we also carried out the second post-test four weeks after the first meeting. The data were analyzed by descriptive analysis, and a paired t-test was performed to test the pre-test and post-test data. The total participants who participated in this activity were 144 people consisting of all cadres in Banguntapan Village, plus the elderly and families who have elderly in Karangbendo Hamlet. This research showed that there was an increase in knowledge about health and nutrition between the 1st pretest-posttest; between the 1st post-test and 2nd post-test; and between the second pretest and posttest (11.14; 14.86; 28.03)%. The counseling, discussion, and distribution of pocketbooks can increase the knowledge of the elderly, family and volunteer in Banguntapan and Karang Bendo Village.

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1. Introduction

The most recent developments in the medical and pharmaceutical world have shifted towards a healthy paradigm of preventive action before illness, namely healthy behavior through exercise awareness, healthy and nutritious food, healthy thoughts, and so forth. This shift has an impact on the emergence of the industrialization of products such as healthy food labels, food supplements, and functional food. Nutraceutical food, the provision of nutrients to regulate the body's biological functions, is also included in the industrialization of products that currently appears after the era of food supplements. Nutrition is an organic substance that plays a role in all work systems in the body so that the process takes

place regularly. Nutrition also plays a role in growth and maintaining a healthy body.¹

In Indonesia, there are still many cases of malnutrition in toddlers, children, adults, and even the elderly. The elderly is one of the social problems that require attention and handling from all parties of the community. Indonesian Central Bureau of Statistics (BPS) 2013 projects an estimate that the number of older people (60+) will increase to 27.1 million by 2020, 33.7 million by 2025, and 48.2 million by 2035.² Long-term Development Plan in the health sector (RPJPK) 2005-2025 aims to increase awareness and the willingness to live a healthy life for everyone to realize the highest degree of public health improvement.³⁻⁴ Elderly is an age group where a person has experienced various declines in bodily functions that can affect appetite, which ultimately leads to eating disorders and malnutrition. Malnutrition is the result of insufficient and/or

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inadequate nutritional intake.⁵ Malnutrition in the elderly causes serious health problems, such as the impaired function of the organs, digestive system, and immunity so that it is susceptible to infection, can trigger low levels of albumin in blood serum. The long-term malnutrition also associated with increased risk of death.⁶⁻⁷

Based on the description above and referring to the Regional Strategy for Healthy Aging 2013-2018, which is a global and regional commitment, a National Strategy and National Action Plan for Elderly Health have been prepared. The immediate targets are the elderly (45-59 years old), the elderly (60-69 years old), and the high-risk elderly (> 70 years old or \geq 60 years old with health problems) while the indirect targets are families, communities, non-governmental organizations, community organizations, special groups, and the private sector, across programs, and sectors.⁸

Based on the population profile of Bantul District in 2018, the number of older people in Bantul reached 138,103 people consisting of 64,585 men and 73,518 women.⁹ Banguntapan Village is one of the villages in Bantul Regency, which consists of 11 hamlets with a population of 37,726 people, a total of 12,240 household heads, and a total of > 60 years old people of 6,600 in 2016. Of all the elderly in the village of Banguntapan, only 25.1% were frequently examined for their health, with the most cases being hypertension, followed by the common cold.¹⁰

The low number of elderly visits to elderly healthcare center (*posyandu lansia*) triggers ignorance of knowledge about elderly health that has an impact on decreasing the health of the elderly in the Banguntapan Village. Therefore community service conducted on August 12, 2018, is designed to raise the awareness of the elderly for their health. The effort is through increasing the knowledge and skills of the elderly, families who have elderly, and elderly cadres in the Banguntapan Village about the importance of nutritional intake in the elderly and its dangers if the elderly are malnourished.

Based on data from the Primary Health Center (*Puskesmas*) Banguntapan III in 2016, the number of older people in the coverage area of the *Puskesmas* Banguntapan III was 6,660, while only 1,673 were

fostered or only 25.1%. Also, the percentage of first level *posyandu lansia* in the coverage area of the *Puskesmas* Banguntapan III is still quite high at 25%.¹⁰ The data shows that the activities of the *posyandu lansia* in the area are still not independent. This situation has the potential for the elderly not to understand the importance of health, including the importance of nutrition to support their health. Providing refresher counseling and demonstration about the benefits of nutrition for the health of the elderly is expected to motivate the elderly to attend health service places including *puskesmas* and *posyandu lansia*. In addition to increasing knowledge about nutrition for health in the *Bina Keluarga Lansia* (BKL) [guidance to older person families] group, the pre elderly and the elderly, as well as efforts to optimize the BKL group in the Village of Banguntapan, so that the community can apply this activity relay

A community service was carried out on August 12, 2018, by providing a pretest, counseling, posttest, and giving a nutrition pocketbook for the elderly. One month later, the second posttest was conducted. Pretest and posttest data were analyzed to find out the increase in the level of knowledge before and after counseling, and the increase in the level of knowledge again after being given a pocketbook on elderly health and nutrition. The purpose of this study is to examine the impact of counseling on increasing the knowledge of the elderly, families who have elderly, and elderly cadres. The focus of the material is the danger of malnutrition so that the health of the elderly in the Village of Banguntapan can be improved to achieve a happy old age in family and community life.

2. Method

The population in this study were all cadres who were invited from 11 hamlets in Banguntapan Village, plus the elderly and families who have elderly in Karangbendo Hamlet so that there were 144 people. This research has received a recommendation from the Faculty of Medicine, Public Health, and Nursing, Universitas Gadjah Mada No. ethics commission. Ref: KE / FK / 0099 / EC / 2019.

This research is a retrospective analytic study with a pre-experimental approach using secondary

data from the results of questionnaires at the time of counseling and demonstration in the context of community service in Karangbendo Multipurpose Building, Banguntapan, Bantul, 12 August 2018 (Figure 1). A retrospective approach with a pre-experimental one is a study with secondary data retrieval that has been done first. It only measured the cause variables that have occurred in the past. This pre-experimental design is comparing the knowledge level of the respondent group without the control group between pre-test (before intervention) and the first post-test (after intervention) with taking subjects without randomization. The intervention was the provision of counseling and pocketbook on the health and nutrition of the elderly, shown in Figure 2.

The difference or effect of counseling on the respondent's knowledge level was measured through the pretest and posttest immediately after the counseling. In addition, an analysis was also

carried out to see the effect of giving a pocketbook to increase knowledge through a second post-test conducted one month after counseling took place. To clarify, the design of this study can be seen in Figure 3.

Data analysis was performed descriptively analytically and processed using SPSS version 2.1. Pre-test and post-test values were tested with paired-samples t-test. Education, age, and occupational data were analyzed descriptively.

3. Results

Based on the data in Table 1, it was found that out of 144 participants consisting of elderly, elderly family, and elderly cadres in Karangbendo, Banguntapan, Bantul, dominated by the 45-59 years old age group (40.3%), with the most education being senior high school (50.7%), and most jobs are housewives as much as 27.8%.

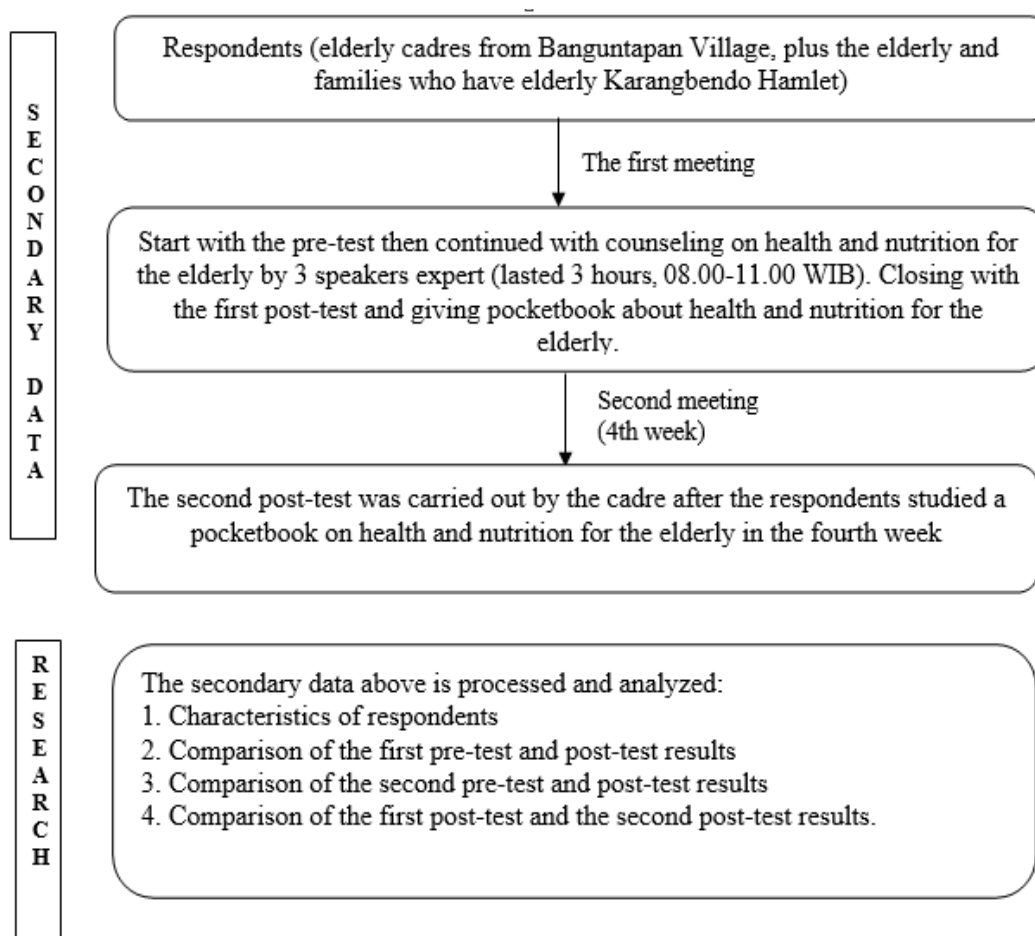


Figure 1. Research design



Figure 2. Health and nutrition of the elderly pocketbook

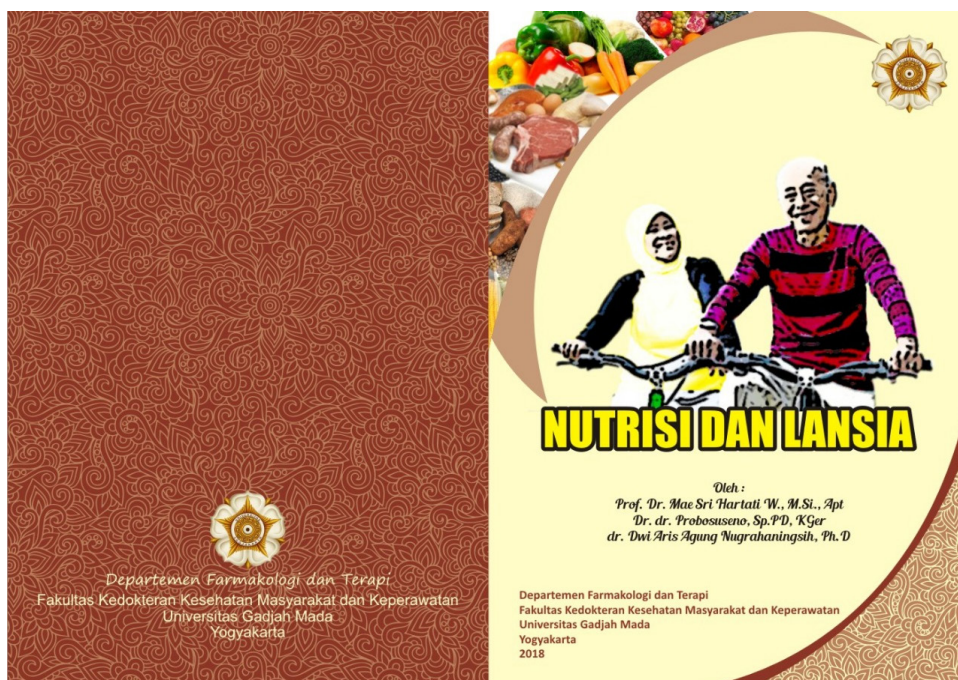


Figure 3. Pocketbook cover for elderly cadres and BKL cadres

The knowledge of participants about illness and nutrition in the elderly, the pre-test, the first post-test, and the second post-test are presented in Table 2. Furthermore, a score between the pre-test and the first post-test, the first post-test and the second post-test, and the pre-test and the second post-test were calculated.

There is an increase in the average value from

the pretest to the first post-test that is equal to 8.33, and when calculated in percent, the percent increase is 11.14%. The mean value also increased from the first post-test to the second post-test as well as from the pre-test to the second post-test score. The increased score in the first post-test to the second post-test was 12,36 (14.86%). The increase from pretest to the second posttest was 20,70 (28.3%).

4. Discussion

The target population in this community service is the elderly, families who have elderly and elderly cadres throughout the village of Banguntapan, Bantul. The pre-elderly age group aged 45-59 years dominated the arrival of this counseling (40.3%). This is because the participants/respondents of that age were represented by elderly cadres in the village of Banguntapan, Bantul and also family members who have elderly (younger siblings, children, or grandchildren from the elderly) in Karangbendo Hamlet. In contrast, the genuinely elderly are only 40 people (34.0%). This is because only the elderly from the Karangbendo hamlet were present in the counseling program.

The number of elderly visits participating in counseling has doubled compared to the average visit to the *posyandu lansia* per month, which only reaches 15-20 people. The most interesting thing is the number of elderly visits to *posyandu* for the elderly after counseling was held in August 2018 had increased compared to before counseling was held. The increase occurred due to the elderly health monitoring through the elderly nutrition card, which was filled in in every elderly *posyandu* activity. Anthropometric measurements (body weight, height, etc.), as well as questions about elderly nutrition, can stimulate the spirit of the elderly to be present at the elderly *posyandu*.

The results of the pretest assessment showed that before counseling, most respondents were well aware of nutrition and illness in the elderly. This can be seen from the average pre-test results, which are already quite high, namely 74.79 ± 17.58 . When the results of the first pre-test and post-test were compared, there was an increase in scores, but only 11.14%. This happened because the level of education of the majority of respondents was high school (50.7%), and even the number of bachelor was also quite large (15.9%). A person's education level influences the results of the respondents' questionnaire evaluation.

The second post-test was conducted to find out the respondents' understanding after being given a pocketbook about diseases related to nutrition for one month. The result turned out to be a reasonably

Table 1. Characteristics of the elderly, families who have elderly and elderly cadres in the Village of Banguntapan, Bantul (n=144)

Variable	n (%)
Academic background	
Elementary school (SD)	24 (16.6)
Junior high school (SMP)	21 (14.6)
High school (SMA)	73 (50.7)
Associate's degree (D3)	1 (0.7)
Bachelor's degree (S1)	23 (15.9)
Master's degree (S2)	2 (1.4)
Age group	
<44 years	6 (4.2)
Pre elderly (45-59 years)	58 (40.3)
Elderly (60-69 years)	49 (34.0)
High-risk elderly \geq 70years	31 (21.5)
Occupation	
Laborers	30 (20.8)
Teachers	2 (1.4)
Housewife	40 (27.8)
Employee	5 (3.5)
Retired	30 (20.8)
Civil servants	1 (0.7)
Entrepreneurs	2 (1.4)
Other	34 (23.6)

Table 2. Pre-test, post-test 1, and post-test 2 (n=144)

	Mean \pm SD
Pre-test	74.79 ± 17.58
Post-test 1	83.13 ± 14.46
Post-test 2	95.49 ± 8.01

high increase. The increase may also be due to the respondent's high level of education, namely high school and even bachelor's. Knowledge is the result obtained from information, then understood, cared for, and remembered. Education can be a variety of things, including formal education and non-formal education, which can take the form of daily conversation, or come from other life experiences.¹¹

Factors that can influence the results of nutritional knowledge are techniques or methods of delivering nutrition education materials.¹² Research on increasing the knowledge of the elderly can be done using peer education methods. This peer education method is very effective for increasing knowledge and balanced nutrition behavior in the elderly compared to the counseling method. Based on these studies, the average knowledge score before peer education was 64.5 ± 25.9 elementary school then increased to 70.5 ± 29.5 elementary schools after an intervention with the peer education

method.¹³

Another method that has also been proven effective in increasing respondents' knowledge is the method of active mother learning (CBIA). CBIA is a community education method that is oriented towards the active role of students in finding information, fostering attitudes, and changing behavior. This CBIA method is a method based on an independent learning process that requires several components consisting of facilitators, resource persons, and respondents.¹⁴ Research on the knowledge, attitudes, and behaviors of antibiotic use with respondents of Bina Keluarga Balita (BKB) [guidance to children families] who also use the CBIA method also showed that education on the CBIA method was proven to be able to increase the knowledge, attitudes, and behavior of antibiotic use compared to the lecture method alone.¹⁵

5. Conclusion

After counseling and pocketbooks on nutrition and health, there was an increase in respondents' knowledge between the pre-test and the first post-test, the first post-test and second post-test, and the second pre-test and post-test. Further research needs to be done to see the effect of increasing knowledge about the nutrition and health of the elderly on healthy living behavior and health of the elderly in the village of Banguntapan.

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Developing a system to utilize a surveillance data for evidence-based public health interventions: Sleman HDSS's experience

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HDSS
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Population-based data

ABSTRACT Health interventions aim to improve health status in a community. Factors that influence the effectiveness and success of intervention programs include the characteristics of problems and the target population. Sleman Health and Demographic Surveillance System (HDSS) collects data on demographics and public health status annually. By 2018, we have conducted four cycles of data collection from 5,147 households. Results from Sleman HDSS could provide important information regarding the characteristics of target populations and health-related problems they face. The present paper describes how we develop a system that uses the data from a surveillance system to inform the development of health intervention programs. Aside from collecting survey data, Sleman HDSS field staff also recorded statements from respondents and community leader regarding health issues which they thought needed to be addressed. We used both quantitative and qualitative information to identify problems and locations that should be the priority. This priority list then distributed to the academic communities in the Faculty of Medicine, Public Health and Nursing Universitas Gadjah Mada, (FMPHN-UGM) Yogyakarta, Indonesia. By 2018, we have completed 20 health educations and 10 community empowerment activities in collaboration with academic communities of the FMPHN-UGM. We concluded that health surveillance activities could support the development of effective evidence-based health intervention programs.

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1. Introduction

Indonesia faces multiple burdens of diseases, from infectious diseases and increasing prevalence of non-communicable diseases. Therefore, effective and efficient intervention programs should be developed and implemented immediately. Prior to developing an intervention program several aspects need to be explored, such as the characteristics of the problems and the target groups, feasibility of the intervention types, proper implementation process, and evaluation procedures.¹ This process highlights the importance of good quality data to support the early stages of an intervention program development.

Models of health intervention programs that use data as its core source of current information are also known as evidence-based public health

interventions. In general, activities of development, implementation, and evaluation in evidence-based public health practice apply scientific reasoning with the latest in information technology. In this practice, data and information systems were used systematically. Behavioral science theory and program planning models were also utilized to support information derived from data.² Evidence-based approaches have several benefits such as providing information on best practice options, increasing the potential of successful prevention programs and policies, and promoting human resource productivity and efficient use of public and private resources.³

The sources of data for evidence-based intervention programs may include research, peer-reviewed research publications, and grey literature.⁴ Another important source of data is surveillance. Surveillance is the regular collection, analysis, use and sharing of data to prevent and control disease and injury. Surveillance systems usually track health

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problems such as both infectious and non-infectious diseases and health conditions, risk factors and exposures.⁵ As surveillance continuously collects data in the general population, it may provide a solid, reliable evidence on public health problems, the need for health intervention, and measures for the results of interventions.⁶

Indonesia has several national surveys (e.g. Riset Kesehatan Dasar/Indonesia Basic Health Survey -RISKESDAS and Program Indonesia Sehat-Pendekatan Keluarga/Healthy Indonesia Program-Family Approach-PISPK) that could provide reliable evidence to mitigate public health problems even when the direct cause of a problem has not been identified, as showed historically by the cholera outbreak case in London in 1854.⁷ However, the utilization of these data has not been optimal in district level.

Sleman Health and Demographic Surveillance System (HDSS) is a survey that monitors health and population conditions in the Sleman Regency, Yogyakarta Province, Indonesia since 2015 with the population of 5,147 households. Sleman HDSS provides qualified data on population health by conducting regular data collection on demographics, health problems, and health services. Demographic data collected includes information on migration, birth, death, causes of death and socio-economic data. While health-related data collected include infectious diseases, non-communicable diseases, reproductive health, maternal and child health, health behavior data and the use and accessibility of health services.⁸

We aimed to provide a practical example of survey data utilization to support evidence-based population health intervention. This paper describes the use of surveillance system data from Sleman HDSS, in the development of pilot evidence-based public health intervention activities.

2. Methods

Our evidence-based health intervention protocol was developed in accordance with the context, Sleman regency, and organizational culture in FMPHN-UGM. In this paper we explain every step in our protocol by comparing it with the guidelines to develop evidence-

based health intervention programs proposed by the European Centre for Disease Prevention and Control, namely *evidence cycle linked to the risk assessment process*, (Fig. 1, column 2).⁹ Then we will discuss the feasibility of using PIS-PK data to design evidence-based health interventions.

The *evidence cycle linked to the risk assessment process* comprises several steps. *First*, preparatory information, in which the possible sources of valid data should be set up and the data gathered should regularly reviewed to develop evidence. In our case, the data source includes routine Sleman HDSS survey data and qualitative data from field team's notes. This qualitative data include information such as the description of physical environment, social relationships characteristics and health issues in Sleman HDSS' clusters. Our Interviewers and field supervisors use observation and interview methods to gather this data.

Second, in the risk detection and verification stage, the evidence is processed to detect potential problems. The quantitative data from Sleman HDSS survey was analyzed to gain information on the distributions of disease morbidity and other health conditions by sociodemographic status and region.

Third, the risk assessment stage includes identification of the priority health problems, its risk factors and the high-risk groups. In this stage, our experts derived a priority list from the qualitative and quantitative information. *Fourth*, the developing advice stage, experts review and weigh the evidence to advise on feasible interventions and its assessment tools. Guidelines are then developed accordingly. The next step is implementation then followed by monitoring and evaluation.

In this paper, we showed the example of qualitative data gathered between 2016-2018. However, only quantitative data from the 2017 (Release version 8-0-0) Sleman HDSS was used as the example. And thus, only the 2017 priority list example was presented.

3. Results

Figure 1 (column 1) depicts the process of evidence-based public health intervention in Sleman HDSS with the corresponding stage of *evidence cycle linked to*

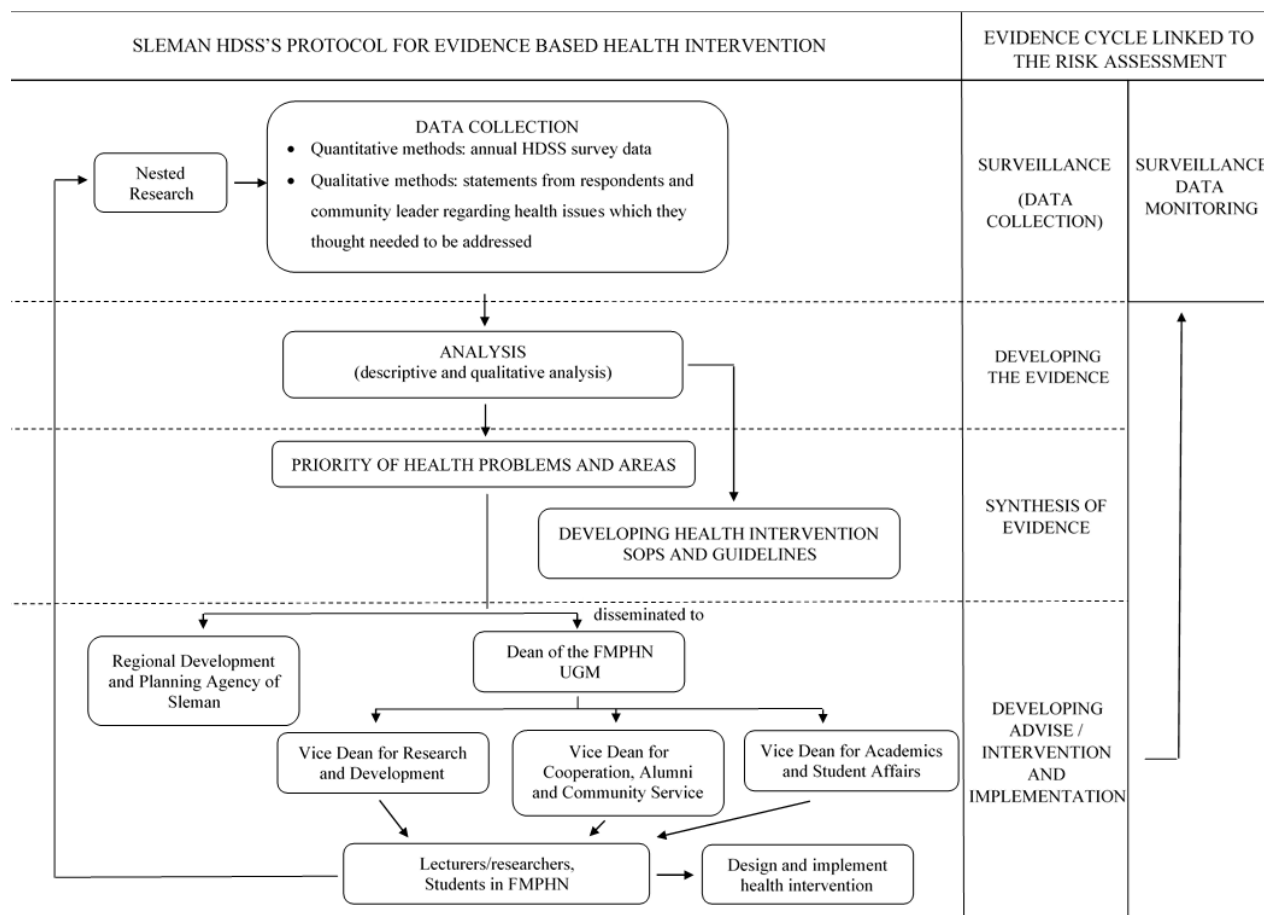


Figure 1. Evidence-based health intervention process in Sleman HDSS

the risk assessment process (Figure 1, column 2). The description of these steps is as follows: developing the evidence; synthesis of evidence; processing the demand to FMPHN system; and developing advice, intervention, and implementation.

3.1 Developing the evidence

3.1.1 Quantitative data

The Sleman HDSS Survey in 2017 found that the common education level of Sleman residents was the high school (35%), while the main occupation was students (21%), and the average age of first marriage was 22 years (women) and 25 years (men).

Data on utilization of health services and health insurance in 2015, 58.5% of respondents reported ownership of health insurance, and this figure increased to 69% in 2017 and 77% in 2018. Most of the respondents reported that they did not go to health facilities when they are sick (33.5% in

2016 and 26% in 2017). Among respondents who went to see health practitioners, general physician practice was the main choice (19% in 2016 and 25% in 2017). The main reason for not seeking treatment from health facilities was because they felt that their condition was not severe enough (61%) or because they medicate themselves (25%).

Figure 2 shows the main diseases of Sleman HDSS population in 2017. Compared to other diseases, Respiratory Infections (ARI) were the infectious disease with the highest prevalence, followed by dengue fever, tuberculosis, leptospirosis, and malaria. As for non-communicable disease, hypertension was the most common health condition reported by adults in Sleman.

To gain more insight on hypertension in this population, we assessed the respondents' sociodemographic characteristics by their hypertension status (Table 1). We found that hypertension was more common among people age

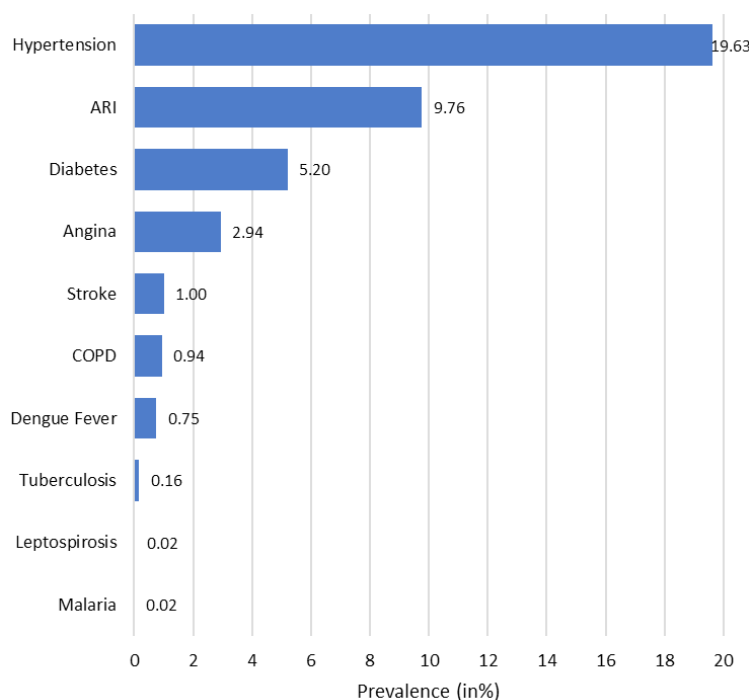


Figure 2. Prevalence of infectious and non-communicable diseases reported by respondents in Sleman HDSS in 2017. Note: We only collected data on most prevalent and most preventable diseases according to the District Health Office. Data on the prevalence of non-communicable diseases were obtained from sub populations, 1 person per households aged older than 25 years (n= 4,446); COPD= chronic obstructive pulmonary disease, ARI = acute respiratory infection; we obtain data on the prevalence of infectious diseases from the whole Sleman HDSS populations (all ages)

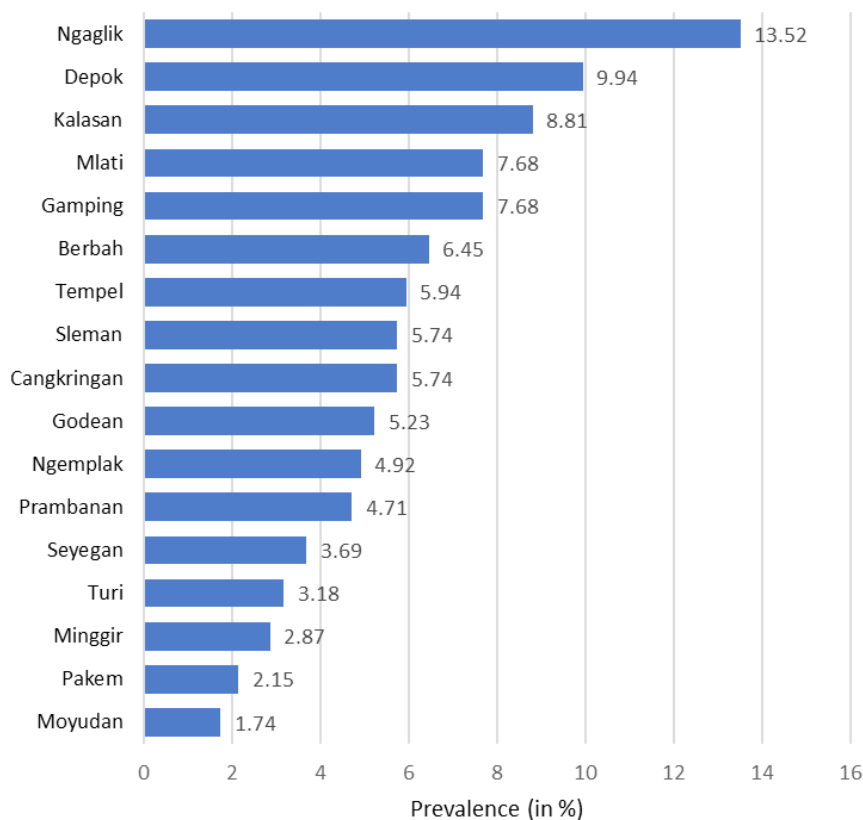


Figure 3. Prevalence of hypertension in Sleman HDSS' respondents aged 25+ years old by sub district in 2017

Table 1. Respondents' characteristics by hypertension status in 2017

	With hypertension		Without hypertension	
	n	%	n	%
Age Groups				
25-34	32	3.3	471	13.6
35-44	123	12.7	929	26.8
45-54	278	28.7	925	26.7
55+	535	55.3	1,145	33.0
Gender				
Men	340	34.8	1,565	44.4
Women	636	65.2	1,961	55.6
Marital status				
Single	233	23.9	680	19.3
Married	742	76.1	2,846	80.7
Education level				
Low	355	36.6	1,018	29.0
Middle	483	49.9	1,927	54.9
High	131	13.5	565	16.1
Household wealth index				
Q1	206	21.1	703	19.9
Q2	200	20.5	736	20.9
Q3	176	18.0	677	19.2
Q4	202	20.7	700	19.9
Q5 (Richest)	192	19.7	710	20.1
Health insurance ownership	758	78.3	2,569	73.3

55+, were women, single, and had low education level. Analysis at the sub-district level (Figure 3) revealed that Ngaglik, Depok, and Kalasan may need immediate intervention as the prevalence of hypertension was the highest in those sub-districts. In practice, other health problems were also explored and were considered in determining the priority list.

3.1.2 Qualitative data

Table 2 presents several of the health problems that our respondents were concerns about. Most of these statements corresponded to the results of quantitative data analysis, such as those concerning NCDs and the tendency of citizens to choose self-medication when sick. In addition, residents also raised other health issues, such as skin health and food security.

3.2 Synthesis of evidence

3.2.1 Developing health problem priority list

Sleman HDSS' division of community engagement conducted meetings between researchers and experts in health promotion to derive a priority list from the results of quantitative and qualitative data analysis. As examples, we present the priority list in 2017 (Table 3).

The list of health problems (Table 3) was then reported to the FMPHN Dean who was then being delegated to the Vice Dean of Academic and Student Affairs, the Vice Dean of Cooperation, Alumni and Community Service and the Vice Dean of Research and Development.

3.3. Processing the demand to FMPHN system

3.3.1 Gaining further information through nested research

The Vice Dean of Research and Development offered the priority list of health-related problems in the Sleman HDSS areas to lecturers and students as a potential topic for further research. They can perform secondary data analysis of Sleman HDSS data to gain more insights into the priority problems. Furthermore, they can collect additional information from Sleman HDSS respondents through nested research scheme in Sleman HDSS. Doing so will deepen their analysis and understanding of problems they are interested in.

A total of 14 nested researches have been conducted in Sleman HDSS area between 2015-2018 (data not shown). Several topics covered by nested research were NCDs, death events, maternal and child nutrition, elderly health, dental health, and healthy city modeling. Most of those nested researches received a grant from FMPHN UGM. Findings from secondary data analysis and nested research enrich the main findings from Sleman HDSS which then will also improve our evidence-based public health interventions.

3.4 Developing advice, intervention and implementation

3.4.1 Implementing evidence-based health intervention program through teaching activities

Master students from School of Public Health in Health Promotion Major carried out community

Table 2. Examples of qualitative data on health problems reported by the community in 2017

Locations (sub-village, village, Sub-district)	Identified problem from respondents and field staff notes
Pundong 2, Tirtoadi, Mlati	Some residents prefer to buy their own medicine without a doctor's prescription, use drugs that are still available from previous examinations. They tend to pay little attention to drugs storage and expiration date. Smoking and low physical activity were common in the community. Majority of respondents are available in the afternoon.
Pundong 1, Tirtoadi, Mlati	Lack of knowledge about HIV / AIDS. Houses are close to each other. Most feasible time for visits is in the afternoon.
Candiwinangun, Sardonoharjo, Ngaglik	Respondents want to know about skin diseases and how to prevent them. Also, regarding hygiene and healthy lifestyle. Residents and the community leader are very cooperative.
Karang Malang, Catur Tunggal, Depok	Lack of knowledge about non-communicable diseases among the older adults. High density housing, residents very cooperative, there is a well-manage POSYANDU <i>Lansia</i> (integrated health post for older adults) with a high participation rate.
Mrican, Catur Tunggal, Depok	Residents wanted to know about reproductive health, especially related to cervical cancer.
Samirono, Catur Tunggal, Depok	Residents were aware that hypertension and diabetes were a common health problem in their community. Cadres of POSYANDU <i>Lansia</i> felt that they had limited ability in performing their tasks.
Nglaban, Sinduharjo, Ngaglik	Residents were concern about the high number of hypertension cases in their community, especially among the older adults. Low participation of older adults in <i>POSYANDU Lansia</i> .

Table 3. Example of health problems priority list in 2017

Location	Description of the health problem
Catur tunggal, Depok	High prevalence of hypertension and diabetes mellitus. Require intervention programme to increase awareness about NCDs and preventing NCDs' risk factors.
Pundong 2, Tirtoadi, Mlati	Require health education regarding the danger of self-medication.
Pundong 1, Tirtoadi, Mlati	Require health education to increase the correct understanding about HIV/AIDS
Sinduharjo, Ngaglik	Require intervention programme to address the high prevalence of hypertension and the low participation in POSYANDU <i>Lansia</i>
Sardonoharjo, Ngaglik	Needs health education regarding personal hygiene.
Mrican, Catur Tunggal, Depok	Needs health education regrading reproductive health with more focus on cervical cancer

empowerment activities in Sleman HDSS' area as their compulsory practical assignment of community empowerment and networking course. In these community empowerment activities, masters students with the local residents of Sleman HDSS area worked together to solve the health-related problems in their neighborhood. By taking part in all development an implementation steps of community empowerment activities, the residents were expected to be able to manage and improve the programs implemented by themselves.¹⁰

Residents from various age groups and organizations involved in problem identification, planning, implementation, and program evaluation.

In problem identification stage, master students shared the findings from Sleman HDSS, and the residents were asked to share their thoughts on health-related problems in their community. Through several discussions, the main theme and intervention activities were decided. Table 4 presents the summary of community empowerment activities conducted between 2016-2018, the more detail information regarding each community empowerment activity are available in Sleman HDSS website (<https://hdss.fk.ugm.ac.id/>).

3.4.2 Implementing evidence-based health intervention program through community service activities

Table 4. Community empowerment projects conducted in 2016-2018

Date	Place	Project Title
July-October 2016	Sembung, Purwobinangun, Pakem	Child <i>jumantik</i> (larvae surveyors) to prevent dengue fever
March-October 2016	Bedoyo, Wukirsari, Cangkringan	Dengue fever prevention by implementing <i>Community-based Total Sanitation</i> programme
September-October 2017	Sembung, Purwobinangun, Pakem	Health cadre's capacity building to improve services in POSYANDU Balita (Integrated health service for under-five children)
September-October 2017	Nglaban, Sinduharjo, Ngaglik	Preventing hypertension through healthy diets and increase older adults' participation in POSYANDU Lansia
September-October 2017	Samirono, Catur Tunggal, Depok	Health cadre's capacity building to prevent non-communicable diseases' risk factors
September-October 2017	Pundong 2, Tirtoadi, Mlati	Community' actions to prevent hypertension
March-September 2018	Sembung, Purwobinangun, Pakem	Healthy joints, NCDs gone
March-September 2018	Nglaban, Sinduharjo, Ngaglik	Health cadre's capacity building to maintain older adults' health
March-September 2018	Pundong, Tirtoadi, Mlati	Health promotion in Pundong II
March-September 2018	Jaten, Sendangadi, Mlati	School for Jaten's health cadre

Table 5. Health educations conducted in 2016-2018

Date	Place	Theme
April 2016	Nglaban, Sinduharjo, Ngaglik	Stroke prevention
May 2016	Pundong 2, Tirtoadi, Mlati	Children's oral hygiene
May 2016	Krapyak, Margoagung, Seyegan	Food nutrition and safety
May 2016	Jengkelingan and Putrowangsan, Sidoarum, Godean	Personal hygiene
June 2016	Kopen Becici, Wonokerto, Turi	Hypertension prevention
August 2016	Kuningan, Karangmalang, Catur Tunggal, Depok	Dementia
August 2016	Kuningan, Karangmalang, Catur Tunggal, Depok	Non-communicable diseases risks screening
August 2016	Kuningan, Karangmalang, Catur Tunggal, Depok	Non-communicable diseases prevention
April 2017	Kajor, Nogotirto, Gamping	Skin health and cosmetics safety
April 2017	Pundong 2, Tirtoadi, Mlati	Self-medication
May 2017	Candiwinangun, Sardonoharjo, Ngaglik	Personal hygiene and health
May 2017	Sekarsuli, Sendangtirto, Berbah	Stroke prevention and care
July 2017	Pundong 1, Tirtoadi, Mlati	HIV/AIDS
August 2017	Karangmalang, Catur Tunggal, Depok	Older adult's health
September 2017	Mrican, Catur Tunggal, Depok	Reproductive health
May 2018	Pangkalan, Tridadi, Sleman	Health during Ramadhan
May 2018	Candi winangun, Sardonoharjo, Ngaglik	Health during Ramadhan
July 2018	Kentungan, Condongcatur, Depok	Older adult's oral hygiene
August 2018	Kuningan, Karangmalang, Catur Tunggal, Depok	Older adult's health

Under the Vice Dean of Cooperation, Alumni and Community Service the priority list were offered as potential issues that lecturers can address through community service as part of their *Tri Dharma* obligations. Sleman HDSS also directly invited lectures to join community service activities managed by

HDSS' division of community engagement. Lecturers have liberty to design the intervention programs according to their expertise. During the intervention program development, Sleman HDSS team helps in obtaining permission from the local leaders, arranging schedule, and other administrative requirements. By

the end of 2018, there have been 20 health education activities by lecturers and students of UGM (Table 5).

3.4.3 Utilization of data for intervention by the government

Every year, we present the results of quantitative data analysis to Sleman BAPPEDA and other related agencies, such as the Health Office, Sleman Hospital, Prambanan Hospital, Social Service, P3AP2KB Office (Women's Empowerment and Child Protection, Population and Family Planning Control). These governmental agencies used Sleman HDSS data in evaluating their programs in the previous period. Also, in creating the next period development planning, these agencies take into account the information from Sleman HDSS aside from the routine register data they own. Through this activity, Sleman HDSS promotes the importance of population health survey data in planning and evaluating government intervention programs.

4. Discussion

Results from quantitative data analysis on Sleman HDSS survey data revealed that Sleman Regency is facing an epidemiological transition, where increasing non-communicable diseases (NCDs) is a major health problem, but on the other hand, infectious diseases have not been well addressed. Even the condition of the epidemiological transition in Sleman was seen earlier than other regions in Indonesia. One of the factors supporting this is Sleman Regency's higher life expectancy than the national rate (82.85 years compared to 70.81 years).¹¹ The high life expectancy results in an increase in the proportion of the elderly population accompanied by an increase in the prevalence of NCDs.¹² RISKESDAS 2013 showed that Sleman Regency has the highest prevalence of diabetes mellitus and cancer in Indonesia.^{13,14}

In the present paper, we described how we used the population survey data in the designing of evidence-based public health intervention programs. The protocol we developed was generally in line with guidelines to develop evidence-based health intervention programs, namely *evidence cycle linked to the risk assessment process*, by The European Centre for Disease Prevention and Control (Fig. 1). We present example qualitative data analysis that

focused on hypertension. But as showed in Table 3 and Table 4, the intervention activities also addressed other health issues. Some of those issues were mainly based on qualitative information from respondents and community leaders. We acknowledge that qualitative data enriched the information we got from quantitative data.

Quantitative data provides information about the magnitude of health problems, where and when it occurs and what are the characteristics of the people who are impacted by that health problems. While qualitative data provides an understanding of why and how a social phenomenon occurs in the community and public concerns related to health problems and their potential solutions.¹⁵ In practice, qualitative information was very important in deciding the targeted group and the type of health intervention activity.

Other important lessons learned from Sleman HDSS experience are the importance of integration with the existing system and cooperation across disciplines. Sleman HDSS disseminates the list of priority health problems, through the UGM Vice Dean's office to ensure that most of the lecturers and students receive this information. In the implementation stage, to increase participation health intervention activities organized by Sleman HDSS usually are integrated with the regular activities in the community. The health-related problems emerged from HDSS data are diverse. It often requires experts not only from within FMPHN UGM but also from other faculties. As currently there are no established protocols to disseminate the list of health problems to other faculties, Sleman HDSS staff directly contact the experts from other FMPHN faculties when needed.

PIS-PK data to design evidence-based health interventions

Sleman HDSS' experiences in using surveillance data for evidence-based intervention programs development show that other surveillance data in Indonesia also have potential in providing evidence. Healthy Indonesia Program with Family approach (Program Indonesia Sehat-Pendekatan Keluarga/PIS-PK) is one survey with this potential. PIS-PK

priority programs include: 1) reducing maternal and infant mortality, 2) improving child nutrition status especially stunting, 3) eradicating infectious diseases, especially HIV, tuberculosis and malaria, and 4) controlling NCDs such as hypertension, diabetes, obesity, mental disorders, and cancer.

PIS-PK team, usually PUSKESMAS doctors and nurse, visits every household in their PUSKESMAS working area. They collect data on family health profiles and perform preventive activity (e.g. health education) and curative-related activities.¹⁶ The survey part of PIS-PK collects data covering the healthy family's 12 indicators. They store and update this data in PUSKESMAS' family database. PIS-PK has a data pooling system to compile all data from PUSKESMAS to the Health offices in regency level, province level, and national level in The Health Ministry office. Currently, data from PIS-PK is mainly used to inform Healthy Life Movement (Gerakan Masyarakat Hidup Sehat-GERMAS) and to produce health indicators such as Healthy Individual Indicators (Indikator Individu Sehat /IIS), Healthy Family Index (Indeks Keluarga Sehat /IKS), Healthy Community Indicators (Indikator Masyarakat Sehat /IMS), Healthy Villages / Districts, Healthy Districts / Cities, Healthy Provinces, and Healthy Indonesia.¹⁷

PIS-PK data are very rich and dynamic. If it is managed and analyzed properly, relevant stakeholders can use PIS-PK data to design effective and efficient health intervention programs.¹⁸ Similar to surveillance data, as PIS-PK collects data continuously, it may also capture the effect of health intervention programs implemented before the current survey.

Sleman HDSS also has demonstrated that the use of mixed methods (quantitative and qualitative data) results in gaining a better understanding of what the target population needs thus improving the adoption of the health programs.¹⁹ The field of public health has long been dominated by positivistic (quantitative) approaches to prove the existence of health problems (what, where, who and when), but has a weakness to understand why and how social phenomena such as people in communities behave in a certain way related to health problems. An understanding of why and how on a social phenomenon becomes

very important in tackling NCDs- related problems as they are closely associated with social problems. The shift in the need for this approach calls for a shift in epidemiology to social epidemiology. Academics and stakeholders in the public health field need to understand the importance and perform mixed methods research to improve health intervention programs.²⁰

Besides home visits for data collection, PIS-PK also organizes several activities to maintain a good rapport with the communities in their working area. Those activities include focus group discussion for a *dasawisma* (a group of 10 households who live in the same area), and health counseling in forums that already exist in the community.¹⁷ These activities have the potential to become another means to collect qualitative data to enrich PIS-PK survey data.

5. Conclusion

Surveillance data and could provide valuable information on the burden of diseases in a population. In Sleman HDSS, both infectious, such as respiratory infection, and non-communicable diseases, such as hypertension and diabetes mellitus, were prevalent. We showed that qualitative data was as valuable as quantitative data in designing effective public health intervention programs. This approach can also be implemented by using data from PIS-PK. Considering the importance of qualitative research, we encourage PIS-PK to collect qualitative data as well as quantitative data to be combined with HDSS related findings.

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Conflict of interest

There is no conflict of interest.

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Knowledge enhancement about pregnancy complications: Optimizing the role of high risk pregnancy prepared cadres

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Early detection
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High-risk pregnancy
Pregnancy complications

ABSTRACT Maternal death rate is one of the important health development indicators. Indonesian maternal mortality is still high due to both direct and indirect causes that occur during pregnancy and childbirth. High-risk pregnancy can present complications for both the mother and fetus, and demands early detection. Early detection requires involvement of the community, health cadre, medical officers, and government. There is a need to increase the community health cadre competency in the detection of pregnancy complications, especially high-risk pregnancy knowledge. This study used a quasi-experimental design without control group to determine the effect of training regarding pregnancy complications on community health worker's knowledge in Wijimulyo, Nanggulan, Kulon Progo, Yogyakarta in October 2018. The research subjects were community health cadre workers chosen by purposive random sampling. There were 43 research subjects who were given pretests, training about complications of pregnancy, and posttests. The instrument used was a knowledge questionnaire about complications during pregnancy that consisted of 23 items with reliability of 0.865. There was significant difference between community health cadre's knowledge about complications of pregnancy at pretest and posttest. These results indicate that training about pregnancy complications increases the knowledge of community health cadre workers concerning complications of pregnancy. Further research is needed to assess community health cadre's skills in making early detection of pregnancy complications.

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1. Introduction

The target of *Program Sehat Indonesia* for 2015-2019 is to improve the health level and nutritional status of the community through health development programs, community empowerment, financial protection and equity of health services.¹ One indicator of health development in the Sustainable Development Goals (SDG) is the Maternal Mortality Rate (MMR). According to the Intercensal Population Survey (SUPAS) data in 2015, the number of Indonesian MMR was still high at 305/100,000 live births.² Maternal mortality is caused by direct causes including bleeding (28%), eclampsia (24%), and infection (11%), and also caused by indirect causes namely, lack of chronic energy (37%) and anemia

(40%). Other indirect causes are cancer, kidney and heart troubles, tuberculosis or other maternal diseases.³

Yogyakarta is one of the provinces in Indonesia which has a fairly high MMR. In 2011, it was found that there were 56 cases of maternal deaths in Yogyakarta with the main causes of bleeding, eclampsia, and sepsis.⁴ Whereas, the mortality rate of the Yogyakarta provincial capital in 2017 was 84/100,000 live births.⁵ The data showed a decline compared to 2015 which was 125.88/100,000 live births.⁶ In 2011, the number of mothers who underwent treatments for complications was 7.44%.⁴

Kulon Progo is one of the districts in Yogyakarta with a population of 417,570 in 2015.⁷ Based on data from the Kulon Progo District Health Office, MMR in 2016 reached 136.98/100,000 live births (seven cases). That number increased significantly compared to 2015 which was recorded at 38.22/100,000 live

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births (two cases).⁶ In addition, there were still problems with several health indicators, including K4 visit coverage was only 90.24% (from 95% national target), Fe₁ coverage was 91.07%, and Fe₃ coverage was 85.66%.⁷

Nanggulan is one of the sub-districts in Kulon Progo Regency with a population density of 712 people/ km². Based on data from the Kulon Progo Health Office in December 2014, the number of teenage pregnancies in 2013 was 261 people and the number of teenage childbirths was 84 people. The teenage pregnancy rate in 2014 was 206 people with the majority aged 15-19 years. Unwanted teenage pregnancies in the Nanggulan sub-district are the highest in Kulon Progo.⁸ Pregnancy in adolescents increases the risk of low birth weight, premature childbirth, and severe disruption in the development of neonates.⁹

The number of pregnant women in Nanggulan District in 2015-2016 was high, with 476 pregnant women (from 7.67% of pregnant women in Kulon Progo). In 2015, the number of pregnant women in Nanggulan Sub-district who received Fe₁ was 347 people (72.90%) and Fe₃ was 379 people (79.62%). In 2016, there were 381 pregnant women with 29 who (7.61%) encountered chronic energy deficiency and 79 who (20.73%) were considered having a high childbirth risk. In addition, in 2016, the number of married women less than 16 years old in Kulon Progo was 11.96%, while in Nanggulan Subdistrict, there was only one case. Furthermore, the number of married women between 17-21 years old was 46 cases and the number of married women more than 36 years old was 17 cases.¹⁰ The high number of teenage pregnancies increases the possibility of a risky pregnancy in the area.

Kulon Progo Regency Government has implemented various programs to overcome this problem. The community has played a role through community-based health efforts, which includes *Posyandu* (integrated toddler services). The number of *Posyandu* in Kulon Progo Regency in 2015 was relatively high. There was 266 units (27,71%) classified in *Posyandu Purnama* and 597 units (62.19%) classified in *Posyandu Mandiri*.⁷ Nanggulan District has one public health center with basic

accreditation and one private hospital.

Wijimulyo is one of the villages in the Nanggulan Subdistrict which has a high-risk early detection program established by the Nanggulan Public Health Center and the health cadre of the Wijimulyo. The program is called *Kader Kelambu Siti* which means Rescue Group of High Risk Pregnant Women. Early detection of high-risk pregnancies is needed to determine the specific care that will be provided, so that the condition of the mother and fetus are safe. Copland conducted a high-risk pregnancy assessment based on reproductive history, medical history or surgical history, and current pregnancy conditions.¹¹

The cadre of *Kelambu Siti* in Wijimulyo has a visit reporting format containing demographic data of pregnant women (name, address, HPL, mother's age, type of risk, husband's name), date of visit, results of visit, report date, report recipient filled in by the health cadres and reported to Nanggulan Public Health Center staffs. However, the report format used is still very simple and some health cadres are still new, therefore they have never received a training/seminar/material related to the role of the cadre in the detection of signs of pregnancy complications in high-risk pregnant women. The health cadres can play a major role in improving maternal and child health by helping to monitor and make early detection of pregnancy complications. Therefore, it requires a knowledge enhancement about pregnancy complications to improve early detection efforts of maternal and child health problems. The optimization of the role of health cadres in *Desa Bunda Siaga* is expected to encourage the area of Wijimulyo to be a Healthy, Inspirational, Safe and Responsive Village for Mothers and Children particularly toward one of the maternal health problems, that is high-risk pregnancy. The objective of this study was to know the effect of training concerning pregnancy complications on knowledge enhancement of health cadres about pregnancy complications in Wijimulyo, Nanggulan, Kulon Progo, Yogyakarta.

2. Method

This research was a quasi-experimental study with non-equivalent (pretest and posttest) without

control group design. It aimed to know the effect of training concerning pregnancy complications on knowledge enhancement of health cadres about pregnancy complications in Wijimulyo, Nanggulan, Kulon Progo, Yogyakarta which were conducted with community service activities held by the Department of Nursing, Faculty Of Medicine, Public Health and Nursing, Universitas Gadjah Mada titled, "Optimizing the Role of *Posyandu* Health Cadres in the Establishment of *Desa Bunda Siaga* on High Risk Pregnancy in Desa Wijimulyo, Nanggulan, Kulon Progo, Yogyakarta" in October 2018. The study was conducted with primary data analysis of pretest and posttest scores of maternal health cadre knowledge about pregnancy complications.

The samples chosen had fulfilled the criteria and were selected by purposive sampling during October 2018. The number of cadres who attended the training activities were 44 people, but there was one who was late in the activity so she did not take the pretest and then was excluded. The respondents were 43 maternal health cadres randomly selected from 11 hamlets in the Wijimulyo Sub-District, Nanggulan, Kulon Progo based on predetermined inclusion and exclusion criteria. Nanggulan District's number of high-risk pregnancy was high. Wijimulyo is one of the villages in Nanggulan Subdistrict which has a high-risk early detection program that was developed by the community and Nanggulan Public Health Center. The inclusion criteria were: (1) the individual was active as a cadre in the field

of maternal and child health in Wijimulyo, (2) willing to be a respondent and following the intervention until completion. The exclusion criteria were cadres who were ill and unable to answer the questionnaire properly.

The respondents were given treatments in the form of a pretest (Figure 1), three sessions of training concerning complications in pregnancy (Figure 2), and a posttest after the training was completed. The pretest and posttest were conducted for 60 minutes. The material presented was the physiology of pregnancy and childbirth preparation, postpartum care, and high-risk pregnancy and pregnancy danger signs delivered by two speakers from the Department of Nursing, Faculty of Medicine, Public Health and Nursing, Universitas Gadjah Mada, Yogyakarta, Indonesia.

The questionnaire used for the pretest and posttest was a questionnaire compiled by Handayani in 2010 in her research titled, *Hubungan Pengetahuan Ibu Hamil tentang Komplikasi Kehamilan dengan Sikap Ibu Hamil terhadap Komplikasi Kehamilan dan Deteksi Dininya di Puskesmas Seyegan, Sleman, Yogyakarta* (Relationship between Knowledge of Pregnant Women about Pregnancy Complications and Their Attitudes of Against Pregnancy Complications and Detection of Their Forms at Seyegan, Sleman Public Health Center, Yogyakarta). The questionnaire consisted of 23 items with a choice of right and wrong answers. Each favorable question is worth 1 score for the "right" answer and



Figure 1. Pretest before training activities



Figure 2. Training activities on pregnancy complications

0 for the “wrong”. The total score ranges from 0-23. The knowledge is categorized into three categories namely: less knowledge if <8, adequate if 8-15, and good if ≥16. The questionnaire had been tested for validity by Pearson product moment’s test and reliability by Alpha Cronbach’s test with the reliability of the instrument at 0.865 which was classified as very high. The data were analyzed by univariate and bivariate analyses using computer programs. This activity had received the approval from the Medical and Health Research Ethics Committee of the Faculty of Medicine Universitas Gadjah Mada with Ref: KE/ FK/1342/EC/2018.

3. Results

3.1 Respondents’ characteristics

The total number of respondents who participated in the training about pregnancy complication was 43 persons. Table 1 shows the respondents’ characteristics.

The respondents’ average age was 43.47 and average time as a cadre for 9.95 years (Table 1). Most of the respondents had higher educational background (72.1%), unemployed (79.1%), had not obtained the information about the role of being cadres and maternal and child health (76.7%), and had obtained the information about the role of being cadres and maternal and child health from seminar or training (67.4%) (Figure 3). Figure 4 shows that 2.33% of the health cadre had a lack of knowledge, 32.56% had good knowledge and 65.12% had adequate knowledge before the training.

3.2 Knowledge enhancement on pregnancy complications

The results of the normality test using Shapiro-Wilk tests showed that the pretest data were normally distributed ($p = 0.179 > 0.05$) while the posttest data were not ($p = 0.000 < 0.05$). Table 2 shows the result of the Wilcoxon test, which obtained a significance value of $p = 0.000 (< 0.05)$, thus it can be concluded that there was a significant difference in knowledge about pregnancy complications between before and after receiving the training on pregnancy complications. As seen from the comparison of the average knowledge score at the posttest and the

pretest, it was found that there was an increase in the health cadres’ knowledge score about pregnancy complications in the posttest compared to the pretest with an average increase of 6.84 ± 3.154 .

3.3. The relationship between respondents’ characteristics and knowledge enhancement

The results of the normality test for knowledge enhancement were normally distributed ($p = 0.327 > 0.05$), age was normally distributed ($p = 0.163 > 0.05$), and the duration for being a cadre was abnormally distributed ($p = 0.000 < 0.05$). Table 3 shows that the results of the correlation test between knowledge enhancement and the duration for being a cadre with Spearman rho analysis obtained $p = 0.096 (> 0.05)$, which means that there was no significant relationship between being a cadre and knowledge enhancement during the training. The results of the correlation test between knowledge enhancement and age with Pearson’s test obtained $p = 0.135 (> 0.05)$, which means that there was no significant relationship between age and knowledge

Table 1. The respondents’ characteristics based on ages and the duration for being a cadre

Characteristics	Mean ± SD	Minimum-maximum
Ages	43.47 ± 8.169	25-57
Duration for being a cadre	9.95 ± 9.371	0-31

Table 2. The score comparison between pretest and posttest on pregnancy complications knowledge

Variable	Score (Mean ± SD)		Δ Mean	p-value
	Pretest	Posttest		
Knowledge on Pregnancy Complications	14.37 ± 2.928	21.21 ± 11.846	6.84 ± 3.154	0.000*

*Wilcoxon Test

Table 3. Knowledge enhancement based on ages and the period for being a cadre

Variables	Knowledge enhancement
	p
Age (years old)*	0.135
The period for being a cadre (years)**	0.096

* Pearson; ** Spearman’s rho

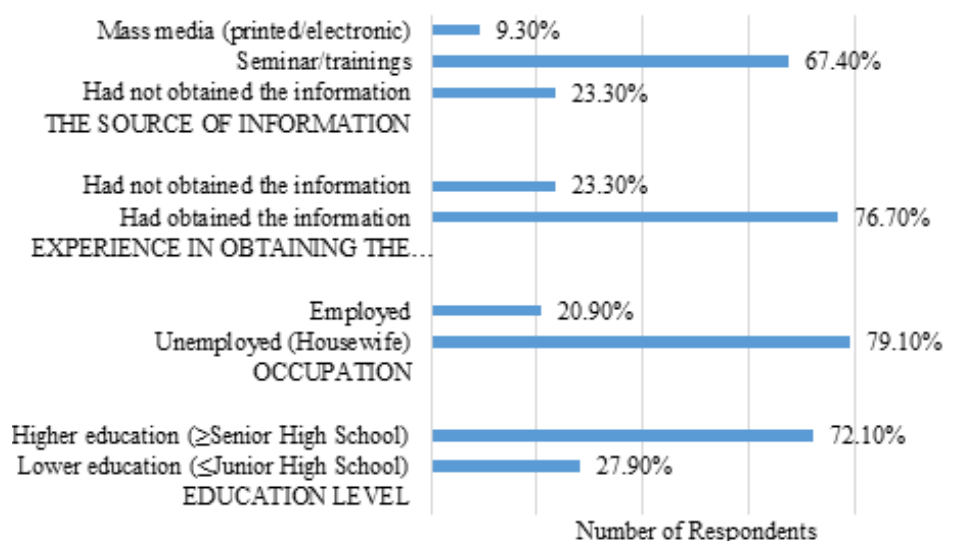


Figure 3. Participants’ characteristics based on education level, occupation, experience in gaining information about the role of being cadres and maternal and child health, source of information about the role of being cadres and maternal & child health that has been obtained

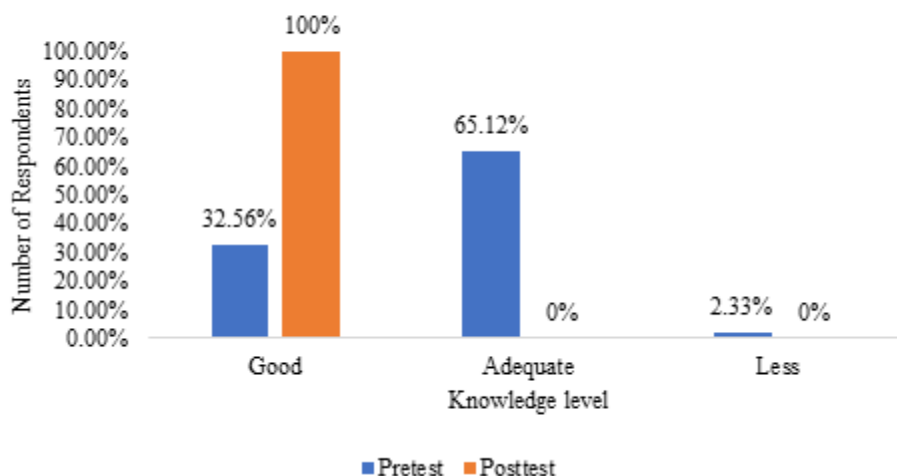


Figure 4. Description of respondents' knowledge before and after given training about pregnancy complications

enhancement during training.

Table 4 shows the differences in knowledge enhancement about pregnancy complications based on the characteristics of respondents in education levels, occupation, experience in obtaining information about the role of cadres also maternal and child health, and sources of information that had been obtained. It was found that there was a significant difference ($p = 0.041 < 0.05$) between the

knowledge enhancement from respondents who had a higher and lower educational background, with mean difference of 2.31.

4. Discussion

High-risk pregnancy is a condition that threatens the safety of both the mother and fetus, and some of the concerns is pregnancy less than 19 years or more than 35 years.¹³ Delay in handling high-risk

Table 4. Knowledge enhancement based on education, occupation, experience in obtaining the information, and source of information that was obtained

Variables	Knowledge enhancement		p
	Mean ± SD	Δ Mean	
Education*			
Lower education (≤JHS)	5.17 ± 2.691	2.31	0.041
Higher education (≥SHS)	7.48 ± 3.118		
Occupation*			
Unemployed	6.62 ± 3.201	1.05	0.557
Employed	7.67 ± 3.000		
Experience in obtaining the information*			
Had not	7.70 ± 3.713	1.12	0.111
Had	6.58 ± 2.979		
Sources of information that have been obtained **			
Had not	7.70 ± 3.713	0.94 (had not and seminar/training)	0.131
Seminar/training	6.76 ± 3.101	2.45 (had not and mass media)	
Mass media (printed electronics)	5.25 ± 1.500	1.51 (seminar/training and mass media)	

* Mann-Whitney; ** Kruskal Wallis Test; Junior High School (JHS), Senior High School (SHS)

pregnancies can also cause a danger to both the mother and fetus.¹⁴ There has been no effort to empower the community to encourage high-risk early detection of pregnancy or government financial support for the implementation of early detection by the community.¹⁵

Wijimulyo, Nanggulan, Kulon Progo, Yogyakarta has initiated a collaborative program between Nanggulan Community Health Center staff and health cadres by forming a *Kader Kelambu Siti*, namely the Rescue Group for High Risk Pregnant Women. *Kader Kelambu Siti* is a cadre who gets debriefing and mentoring from health officers from the Public Health Centre to document pregnant women at risk of complications in the area where they live. Furthermore, the health cadre reports the data on high-risk pregnancy cases to the Public Health Centre. After finding out about high-risk pregnancy cases, the health cadres were given the task of conducting home visits and motivating clients to carry out antenatal care. The actions taken by cadres during the visit are to record the age of the mother and complaints during pregnancy, then report the results to the responsible health officers.

Antenatal care is one of the pillars of the WHO safe motherhood program in the mother-baby package since 1994. Antenatal care must be done early to ensure that mother and fetus are safe and have no problems. Pregnant women are

recommended for examinations at least 4 times during pregnancy, starting from <12 weeks of gestation for a normal pregnancy (low risk). The WHO recommends that health officers should be able to work with community leaders to ensure public understanding of the benefits of prenatal care. Interventions to improve the understanding of community leaders are needed, so that pregnant women would be more likely to carry out pregnancy checks.¹⁶

The health cadres are people who voluntarily help health programs in their neighborhoods and work together with the local Public Health Centre. The formation of competent cadres who are realizing the existence of pregnancy cases and that comprehend complications risk and knowledge about the dangers of pregnancy, can help in increasing people’s motivation to routinely check their pregnancy. The cadres are individuals of the community who understand health and their position is very close to the community, making it easier to provide health information. In addition, the health cadres are better in understanding the characteristics of the community in their environment, so that they can deliver health information in accordance with cultural conditions, hence it can be more easily accepted and implemented.

Skills improvement and fulfillment of facilities are needed by Female Community Health Volunteers

(FCHVs) in early pregnancy detection support in making appropriate referrals to reproductive health services. FCHVs requires networks to be able to carry out detection and referrals. Therefore, they need the availability of facilities and awareness about the availability of appropriate health care facilities.¹⁸ With appropriate training, Community Health Workers (CHWs) are enabled to work with health officers to improve the health status of vulnerable populations. It is known that pregnant women who had been accompanied by CHWs said that their health behaviors had received feedback and they were feeling an increase in health care.¹⁹

Appropriate health promotion training can help to improve cadre's knowledge and skills in promoting the health of pregnant women (for example: counseling) and change their attitudes towards pregnant women during integrated toddler service activities. They feel more confident in negotiating health principles and the importance of prenatal care and childbirth with health officers. They will get appreciation from the community for carrying out their duties very well, and this further motivates cadres to continue in improving the quality of their services. It needs to be a participatory approach with ongoing supervision to evaluate changes and sustainability of health programs.

The establishment of the *Kelambu Siti* cadres who help in documenting high-risk pregnancy cases is a large investment that is owned by the village. However, there is a change in cadres due to age, thus not all cadres who are currently in charge of this responsibility are used to making high risk pregnancy detection. It can be seen from the results of the analysis, that 23.30% of respondents had never received health information about high-risk pregnancies, either through seminars, training, or mass media (printed or electronic). The experience in obtaining health information affects the knowledge and skills of the health cadres in providing health services at the integrated toddler service.

A counseling training could increase the knowledge and skills of the community health cadres. In addition, it was found that there was also an increase in the number of pregnancy visits after they experienced a knowledge enhancement.

The health cadres from the local community are able to increase the tendency of pregnant women to conduct examinations because they are native people who have a good understanding of lifestyle and community beliefs, especially religious and cultural principles, which may affect the attitudes and knowledge of pregnant women regarding prenatal care. Notwithstanding, there are some of women who get late pregnancy examination because they think their pregnancy was normal, do not understand the benefits of pregnancy examinations, experience shame, and fear the cultural influence of supernatural powers. Therefore, an ongoing training and supervision are needed for the health officers and the community involved.¹⁶

The respondents in this activity received training on pregnancy complications that was done in a form of lecture methods and power point media along with guidebooks for cadres. It was found that there was a significant increase in the knowledge score about pregnancy complications in the posttest score compared to the pretest with an average increased score of 6.84 ± 3.154 . It is believed that the use of appropriate methods and media would support the learning process.²¹ With the lecture method, the presenters could deliver the material effectively and did not need to bring a lot of assistive devices/visual aids, besides they could also emphasize the important aspects with personal sharing.²² In addition, with the lecture method the presenters could explain many important points, while the programs are easy to implement and could be followed by a large number of participants.²³

There is a relationship between a person's level of education towards knowledge about danger signs in pregnancy. In this activity, most of the respondents (72.10%) had higher education. Education is known to form a person's attitude to be more positive in receiving information.²⁴ Education is an important factor to facilitate understanding of health information from various different sources. In addition, education also increases one's autonomy regarding reproductive health issues and the use of health care because it can increase one's awareness of health conditions.²⁵ However, one also can obtain knowledge from formal and informal education.²⁶

From the results of data analysis, it can be seen that there was no significant difference in the increase in respondents based on age characteristics, length of time being a cadre, employment, experience in getting information, sources of information that had been obtained. This is not in accordance with some of the previous theories which stated that age is known as one of the factors that influence a person's perception and mindset, therefore growing older could affect the development of thinking and create a better knowledge perception.²⁷ The average age of cadres who participated in cadre training in this activity was 43.47 years, with the youngest age of 25 years and the oldest was 57 years.

Knowledge can be formed through a process of reciprocal interaction between individuals and the environment.²⁸ According to Notoatmodjo, in one's work it is possible to interact with others, so it encourages someone to increase their knowledge.²⁹ In this activity, most of the respondents (79.10%) were unemployed or housewives. However, even though the majority of respondents were unemployed, they had many opportunities to interact through various activities in the community because of the prevalent culture of mutual cooperation.

Most respondents stated that they had received material on maternal and child health from seminars/training (67.40%) and printed/electronic from mass media (9.30%). The presence of several cadres (23.30%) who have never received maternal and child health material was probably because they had not been assigned as cadres for a long time. It shows the need for the community to hold material refreshment activities for cadres, so that older cadres can recall the information and the younger ones can get provision in carrying out their duties. Although not all health cadres had received material on maternal and child health, currently cadres can access most information from mass media or social media. Nowadays, people can access various kinds of information easily and can interact with other people even if they are unemployed.³⁰

Knowledge increases along with the enhancement in one's experience.³¹ The cadres in this activity have had the experience of being a cadre for an average of 9.95 years with the shortest period

of 0 years and the longest was 31 years. Experience provides an opportunity for someone to increase knowledge by repeating the knowledge gained in solving a problem.²⁸ However, the cadre regeneration program is very much needed by the community, therefore the continuity of health service activities by and from the community which are working together with the Public Health Centre is expected to be continued regularly. In that way, the cadres who have just entered can learn together with cadres who have more experience.

Training on pregnancy complications in this research was effective to enhance of health cadres's knowledge. It will assist health cadres in providing home visit services to high-risk pregnant women and assist government programs to conduct early detection of pregnancy's danger signs and reduce maternal and neonatal mortality. Due to some time and financial constraints, there were some limitations in this study, including the lack of knowledge retention follow-up after the training.

5. Conclusion

Most of health cadres' knowledge on pregnancy complications before training was adequate and increased afterwards. There was a significant increase in cadres knowledge score about pregnancy complications after training. Conducting further research is suggested to examine cadres' knowledge and skills in early detection of pregnancy complications immediately after the training was done, and the retention of knowledge following the training.

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Progression of myopia among medical students: A one-year cohort study

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Myopia progression
Refractive errors

ABSTRACT Myopia is a common refractive disorder in literate countries related to education and higher occupational groups. External factors affecting myopia and its progression remain questionable. Myopia onset and progression occur during childhood and teenager. This study aimed to determine the progression of myopia and its associated factors in the medical student of Faculty of Medicine UGM, Yogyakarta, Indonesia, through a one-year cohort study. An initial observational and cross-sectional survey conducted as baseline data. Correlation calculated using Chi-square and the Spearman correlation coefficient analysis. A longitudinal cohort study conducted 12 months later to the initial survey. Myopia determined with an autorefractor without cycloplegia. BMI, intraocular pressure, and corneal curvature evaluated as factors related to progression. Five hundred five students (98%; 505 of 515; 317 from the school of medicine (SoM), 188 from the school of nursing and nutrition (SoNN)) age 15-20 years were examined. Prevalence of myopia among SoM students was 69.4% (n=220 of 317) and 41.4% (n=78 of 188) in SoNN. Myopia (SER \geq -0.5 D) found in 298 students, 81 boys (27.2%) and 217 girls (72.8%). Chi-square test revealed that myopia more common in Chinese than Javanese and other (p=0.006) but a similar proportion in gender (p = 0.785) and age (p=0.369). The average change of myopic progression was -0.401 D and -0.094 D per year in SoM and SoNN, respectively (p = 0.000). The average change of myopia of boys and girls was -0.138 D and -0.117 D, respectively (p = 0.871). There was no statistically significant correlation between subjective refraction change and factors related to progression. The progression of myopia in Yogyakarta relatively similar to Western countries. Progression in the school of medicine was higher than the school of nursing and nutrition, but similar between boys and girls. No related factor correlated with the progression of myopia expects further studies.

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1. Introduction

Visual impairment due to uncorrected refractive error affects 200 - 250 million people in the world. Myopia is eyesight threatening disease that leads to blindness and accounts for 80% to 90% incidence in East Asia.¹ Myopia is a standard refractive error in the literate countries. There is a hereditary influence on the different components of the refractive elements of the eye. However, the influence of various external factors on myopia and its progression is still under discussion. That myopia is related to education and the higher occupational groups would seem to be

established. Accommodation, convergence, or both have most often been advanced as the reasons for these relationships.² Myopic refractive error is the most common visual disorder affecting both children and adults in the world. It is a seemingly benign ocular disorder but tends to worsen as irreversible vision loss such as retinal detachment and macular atrophy.¹

Nowadays, uncorrected refractive error is increasingly recognized as a significant cause of avoidable visual impairment worldwide, as suggested by the inclusion of uncorrected refractive error as one of the prioritized eye diseases of Vision 2020: The Right To Sight a global initiative launched by a coalition of non-government organizations of the World Health Organization.² It is imperative to

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plan corresponding public health strategies based on the knowledge of the prevalence of refractive error worldwide through understanding its etiology, epidemiology, and various treatment regimens to modify current care as contributors to the reduction in morbidity from progressive myopia.³ However, it has a substantial social, educational, and economic impact. Myopia is one of important public health problem in Asian countries such as Taiwan, Japan, Hongkong, Singapore, including Indonesia.

It is well known that the prevalence of myopia has a significant increase globally and related to hereditary influence on the refractive elements of the eye, but environmental exposure is recognized as a major risk factor for myopia.⁴ This factor will lead the presence of refractive errors, such as myopia. There are several studies about factors that may contribute to the different individual variations in myopia progression.³ However, the influence of various external factors on myopia and its progression is still not well understood.^{5,6} As myopia has an onset and progresses in childhood, and it is important to focus research on these age groups.⁶⁻⁹ Prevention and healthcare planning for next-generation in decades will be much facilitated if data about this refractive error are available¹⁰.

The purpose of the study was to determine the progression of myopia and its associated factors in the medical student of Faculty of Medicine UGM, Yogyakarta, Indonesia.

2. Method

2.1 Study Population

This was a one-year cohort study of medical student batch 2012. An observational, cross-sectional survey was initially conducted. As baseline data, demographic data and clinical findings were carried out. Prevalence and demographic data were reported descriptively, correlation was calculated using Chi-square and the Spearman correlation coefficient analysis. A longitudinal cohort study was then conducted six months later. Myopia was determined with an autorefractor without cycloplegia. Body Mass Index, intraocular pressure, and corneal curvature were evaluated as factors related to progression.

2.2 Procedures

All the students eligible to participate had to give inform consent and fill the questionnaire then followed by eye examination including visual acuity, anterior segment examination using slit-lamp, posterior segment examination using a direct ophthalmoscope, auto-refractometry, keratometry, tonometry, body weight and height examination. The corneal radius was determined with a keratometer. Intraocular pressure (IOP) was determined with non-contact tonometry.

Inclusion criteria in this study are medical students of the Faculty of Medicine UGM batch 2012 and confirm to be a subject in this study by signing the informed consent form. Exclusion criteria in this study are uncooperative subjects and subjects who suffered other eye abnormalities than refractive errors.

2.3 Definition

Myopia is defined as decreased visual acuity that is improved by adding negative spherical lenses with SER (spherical equivalent refraction) of -0.50 D or less. Spherical equivalent (SE) was used for calculations of refractive error. The SE is derived by adding the spherical component of refraction to half of the cylindrical component.

Myopia progression is defined as the final SER reduced by initial SER. Mild, moderate, and severe myopia is defined as -0.50 to 2.99 D, -3.00 to 5.99 D, and -6.00 or more, respectively.

Because there was a high correlation between the fellow eyes ($p < 0.001$), and because the results based on right eyes and left eyes were similar, data from right eyes only were reported.¹⁰

2.4 Statistical Analysis

The prevalence of myopia in subjects with different characteristics was expressed in percentages of the study population. The correlation was calculated using Chi-square and the Spearman correlation coefficient analysis. Myopic progression was calculated using ANOVA. All data analyses were performed with a commercial statistical software package (SPSS 16.0 for windows).

3. Result

A total of 505 (98%; 505 of 515; 317 from the school of medicine, 188 from the school of nursing and nutrition) students aged 15-20 years were examined. The prevalence of myopia among students of the school of medicine was 69.4% (n=220 of 317) and 41.4% (n=78 of 188) in the school of nursing and nutrition (Table 1.). Table 1 shows the proportion of low myopia from the "school of medicine" myopia group was 59.1% (n= 130 of 220) and moderate myopia was 40.9% (n=90 of 220). This finding was comparable to the "school of nursing and nutrition" myopia group, low and moderate myopia proportion was 67% and 33% consecutively. Chi-square test revealed that myopia was more common in Chinese than Javanese and other ($p = 0.006$), but a similar proportion in that of sex ($p = 0.785$) and age ($p = 0.369$) (Table 2.)

In this study, IOP was not correlated with spherical equivalent refraction (Spearman correlation, $r = -0.037$, $p = 0.413$) (Figure 1.). The mean IOP in students with emmetropia (15.0 mm Hg), low myopia (14.8 mm Hg), and moderate myopia (15.3 mm Hg) were similar ($p = 0.556$). The scatter plot for the relation between IOP and refractive error of right eyes (Figure 1), emphasizes that no correlation exists (Spearman correlation, $r = -0.037$, $p = 0.413$).

The difference between 2 corneal radius was correlated with spherical equivalent refraction (Spearman correlation, $r = -0.284$, $p = 0.000$) (Figure 2.). The mean corneal-radial-difference in students

with emmetropia (0.91), low myopia (1.06), and moderate myopia (1.47) was different ($p = 0.00$). The scatter plot for the relation between corneal radius and refractive error of right eyes (Figure 2), emphasizes that correlation exists (Spearman correlation, $r = -0.284$, $p = 0.000$).

Another part of the study is a one-year longitudinal cohort study. All students who participated at the beginning of the study were re-examined. The total new myopic children were 2.1 % of all schools in one year (Table 3).

Table 4 shows the average rate of myopic progression as measured by subjective trial lens examination was -0.401 D (± 0.052) and -0.094 D (± 0.028) per year in the "school of medicine" and "school of nursing and nutrition," respectively ($p = 0.000$). This difference was statistically significant ($p < 0.001$). There is no difference in the average change of myopia between boys and girls ($p = 0.871$).

Table 5 presents the factors that thought had a relationship with myopia progression, including body mass index, intraocular pressure, and corneal curvature. There were no statistically significant associations between subjective refraction change and BMI, intraocular pressure and corneal curvature, with p -value were 0.188, 0.077, and 0.137 consecutively.

4. Discussion

To our knowledge, this is the first cross-sectional and longitudinal study examining the progression of

Table 1. Demographic data

		School of medicine (n= 317)	School of nursing and nutrition (n= 188)
Age (years, mean \pm SD)		17.8 \pm 0.90	18.0 \pm 0.57
Sex	Male	117	18
	Female	200	170
Race	Javanese	200	169
	Chinese	51	5
	Other	66	14
Refractive error	Emmetropia ($-0.5D < SE < 1.0D$)	97 (30.6%)	97 (51.6%)
	Myopia ($SE < -0.5D$)	220 (69.4%)	78(41.4%)
	Low myopia ($-3.0D < SE < -0.5D$)	130	53
	Moderate myopia ($SE < -3.0D$)	90	25

SD: Standard deviation; SE: Spherical equivalence

Table 2. Factor associated with refractive error; proportion test using Chi-square (right eye data).

		Emmetropia	Myopia	p-value
Age	15	0	1	0.369
	16	7	10	
	17	40	72	
	18	128	161	
	19	27	39	
	20	5	15	
Sex	Male	54	81	0.785
	Female	153	217	
Race	Javanese	162	207	0.006
	Chinese	22	44	
	Other	33	47	

Table 3. New cases in a one-year in each school

School	New case of myopia (%)
School of medicine	7 (2.2)
School of nursing and nutrition	4 (2.1)
Total	11 (2.1)

myopia in medical students, the age when growth spurt happened in human development. The last study was not focused on this specific age group.^{11,12} In 2007, Triharyo conducted a study on elementary school-age children. On 2013, Prayogo conducted a study to junior high school-age children.¹³

In this study, a high prevalence of myopia was found in students in the school of medicine. The prevalence of myopia among students of the school of medicine was 69.4% (n=220 of 317) and 41.4% (n=78 of 188) in the school of nursing and nutrition.

This study demonstrated that the prevalence of myopia in medical students was high and comparable to those in China. Shifei Wei *et al.*¹⁴ found a prevalence of 83.2% of myopia and 11.1% high myopia (SE \leq 6.0 D) in central Chinese university students. Not only in college students, but shanghai also had a high prevalence of myopia in preschool children.⁹ Similar pattern discovered in India, high prevalence refractive errors related to behavioural habits.¹⁵

We found a similar rate of myopia among boys and girls. Studies in Taiwan reported a lower prevalence and less myopic refractive error among boys.¹⁶ The proposed explanation would be that girls

tend to be more diligent in writing and reading, at least at the primary school level. The subsequent increase in near-work predisposes them to myopia development. However, further studies are warranted to confirm such a proposition.

Our one-year cohort study found the new case of myopia to be 2.1%. As a comparison, the study in Taiwan reported the incidence of myopia 46.7% (95% confidence interval: 45.9, 47.5%).¹⁶ The average change of SER for myopic children (SER \geq -0.50 D) was -0.401 D and -0.094 D per year in the "school of medicine" and "school of nursing and nutrition," respectively. This significant different progression of myopia may be caused by more exposure to high technology equipment such as television, computer, laptop, cellular phone, and another device that tends to promote near work activity in the school of medicine students.^{1,8} Parssinen *et al.* reported a relationship between myopic progression and time spent on reading and close work and also between myopia and reading distance. It was assumed that time spent and close work in that of medical students (school of medicine) was higher than those in the school of nursing and nutrition. Besides, less time spent on sports and outdoor activities in childhood correlated to myopia progression in adult.¹⁷

There are many factors that may contribute to different individual variations in myopia progression. Near-work activity may be one factor related to myopia progression; objects that are viewed nearby may cause the eye to elongate further to maximize the sharpness of images on the retina.¹⁸

In this study, a similar proportion of myopia was found in both men and women. Parssinen *et al.* reported that progression was faster among the girls than among the boys.¹⁷ Cheng *et al.* reported that women had a higher prevalence of hyperopia than men.¹⁹ This may be because women's eyes have a shorter axial length and shallower anterior chamber depth than those of men, and hence a higher probability of being hyperopic.

Environmental and genetic factors have both been postulated to cause myopia.⁸ We hypothesized that biological measurements such as body mass index (BMI), intraocular pressure, and corneal curvature had some effect in myopia progression.

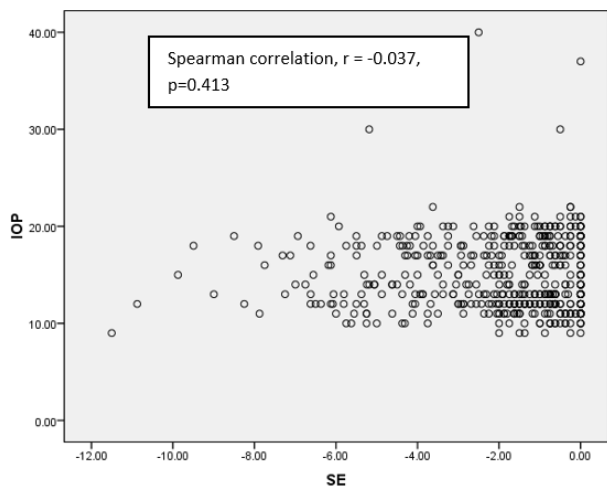


Figure 1. Correlation between intraocular pressure and spherical equivalent (right eye data).

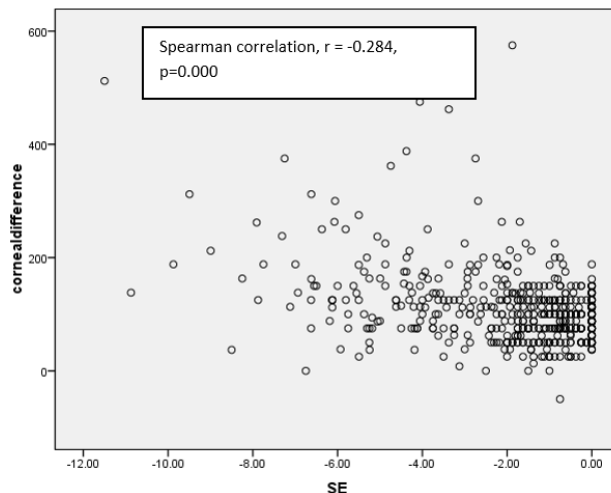


Figure 2. Correlation between difference between 2 corneal radius and spherical equivalent (right eye data).

Table 4. Progression of myopia among medical students of the Faculty of Medicine, Universitas Gadjah Mada

Area	Myopia progression* (SD)			p-value
	Right Eye	Boys	Girls	
School of medicine	-0.401 D (0.052)	-0.138 D	-0.117 D	0.000
School of nursing and nutrition	-0.094 D (0.028)	$p = 0.871$		

*in Spherical Equivalent Refraction; SD: Standard deviation

Table 5. Factor associated for myopia progression

Factor		Progression (n myopia = 298)		p-value
		Yes (n = 63)	No (n = 235)	
Body mass index	>20	28	84	0.188
	≤20	39	151	
Intraocular pressure	>20 mmHg	3	32	0.077
	≤20 mmHg	60	203	
Corneal curvature	High	25	65	0.137
	Low	38	170	

However, our study may not find a relationship between these biological characteristics. A study about myopia and stature reported that BMI had an association with myopia.²⁰ The Singapore Cohort Study of the Risk Factors for Myopia (SCORM) reported that there was no association between intraocular pressure and myopia progression.¹² No studies reported an association between corneal curvature, the axis of astigmatism and progression of myopia. Further studies are warranted to confirm such a proposition.

In this study, IOP was not correlated with spherical equivalent refraction. Lee et al. reported findings that do not support an association between

IOP and refractive error or axial length in children.¹² In Asian-Africans, but not European subjects, associations between IOP and refractive errors have been found. In white populations, the relation between IOP and refractive error or myopia has been documented.

5. Conclusion

The progression of myopia in Yogyakarta was relatively similar to Western countries. Progression in the school of medicine was higher than the school of nursing and nutrition, but similar between boys and girls. No related factor had an association with the progression of myopia warrants further studies.

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The association of six-minutes walking test (6MWT) with cardiovascular disease risk among older women with type 2 diabetes mellitus in a rural primary health care: A pilot observational study

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ABSTRACT Recent systematic review found that cardiovascular events contributed to approximately half of all deaths among patients with type 2 diabetes mellitus (T2DM). Several studies suggested that the six-minutes walking test (6MWT) could be a valuable prognostic tool for predicting cardiovascular disease (CVD) events in particular diseases. However, less is known concerning the role of 6MWT in predicting CVD events among patients with T2DM. Thus, this pilot observational study aimed to test the feasibility of conducting the 6MWT and to examine the association of measures collected during 6MWT with ASCVD risk estimator parameters for predicting CVD events among T2DM patients. Fourteen older women with T2DM in a rural primary health care were enrolled in this cross-sectional study. Blood pressure measurement, heart rate measurement, and blood sampling for HDL, LDL, and total cholesterol measurement were carried out during rest. Both heart rate and distance were measured at the end of the following 6MWT. Feasibility data were collected. Recruitment rate and measurement completion rate were 85.7% and 40% respectively. No adverse events during the 6MWT were reported. Patient's heart rate at the end of 6MWT was correlated with diastolic blood pressure ($r = 0.5$ $p = 0.48$). Multivariate analyses suggested that every one-meter increase in distance of 6MWT, there is a decrease in diastolic blood pressure of -0.9 mmHg ($p = 0.01$; 95% CI = -1.6 to -0.2). In conclusion, 6MWT is a feasible simple test which could provide a valuable prediction of ASCVD risk among older women with T2DM. Thus, this test should be considered to be conducted as a part of routine examination. Cohort study with a larger sample could be suggested to establish the usefulness of the 6MWT in predicting CVD risk.

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1. Introduction

Nowadays, researches put an increased focus on cardiovascular disease (CVD) complication in the management of T2DM. The risk of developing CVD increased with age.¹ Among older adults, the prevalence of CVD in women is higher than in men due to the decline of estrogen and its receptor.² In addition, women constitute a larger proportion

of the elderly population in which the prevalence of CVD is greatest since they have a longer life expectancy than men.³ A recent systematic review found that approximately half of all deaths among patients with T2DM were attributed to CVD.⁴ Given the mortality burden of CVD among T2DM patients, comprehensive actions should be taken to provide a better prediction of CVD among T2DM patient than the traditional approach.

A scientific statement from the American Heart Association (2016) suggested that the addition of cardiorespiratory fitness (CRF) measurement to

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traditional risk scores significantly improves the prediction of CVD in the general population.⁵ Several mechanisms were postulated to explain the link between CRF and CVD, including improvement of insulin sensitivity, blood lipid, body composition, inflammation markers, vascular elasticity, and autonomic nervous system. Whilst the adding value of CRF measurement in the prediction of CVD among general populations is well identified, routine measurement of CRF is not readily available in both clinical and field settings because of the feasibility concerns, including cost, equipment, time, and expertise availability.

The six-minutes walking test (6MWT) is a practical test for estimating CRF, which is time-and-cost-effective. Several studies suggested that the walking distance during the 6MWT could provide a valuable prediction of CVD among stable coronary heart disease patients or chronic obstructive pulmonary diseases.^{6,7} Despite its simplicity and its valuable prediction of CVD in particular diseases, the addition of heart rate measurement during 6MWT was also suggested by several authors to improve its accuracy.⁸ Also, the usefulness of 6MWT in the management of patients with T2DM is not well-studied.

The aim of this pilot observational study is examining the recruitment rate of 6MWT, measurement completion rate and the association between the 6MWT and CVD risks among women with T2DM in a rural primary health care. Walking distance and heart rate response will be measured in the 6MWT. This study will utilise the ASCVD risk estimator plus tool since this tool has been widely used for predicting cardiovascular events among patients with T2DM.

2. Method

2.1 Subject and design

This is a cross-sectional study design to investigate the association between the walking distance and heart rate response during 6-MWT with CVD risk measured using ASCVD risk estimator plus tool among older women with T2DM. Patients were eligible if they were women 55 years or older, had

T2DM and registered in Program Pengelolaan Penyakit Kronis (Prolanis) at Puskesmas Banguntapan II, Bantul. Patients were excluded if they had physical disabilities which obstructed them to walk one block and had a history of T2DM complications. There were 51 patients (16 men, 35 women) registered in Prolanis who were eligible for this study. This study has been approved by the Faculty of Medicine, Public Health, and Nursing Research Ethics Committee (KE/0001/01/2020). A written informed consent was obtained from the participant.

2.2 Study Protocol

As a pilot study, the recruitment rate, measurement completion rate, and adverse event were collected. Recruitment rate was defined as the proportion of eligible patients who agreed to participate in the 6MWT. Measurement completion rate was defined as the proportion of recruited participants who were able to complete all measurements.

A single 6MWT without practice was administered according to a standard guideline.⁶ Patients were instructed to walk continuously on a premeasured field 33m in length. Health professional who was administering the test provided encouragement every minute in a standardised fashion. Total distance walked in six minutes was recorded. Patients' heart rate before the test was recorded using finger pulse oximetry in sitting position.⁹ Patients' heart rate at the end of 6MWT were recorded in standing positions.

Patients' weight, body fat percentage, visceral fat, and muscle mass were measured using Omron BF508 bio-impedance analyser.¹⁰ Patients' height was measured using a height scale. Body mass index (BMI) was calculated based on patients' weight and height. Patients' blood sample was collected for HbA1c, fasting blood glucose, total cholesterol, triglyceride, and HDL-cholesterol. LDL-cholesterol was estimated using a Friedewald calculation.¹¹ Blood pressure was measured using an Omron blood pressure monitor in a sitting position.¹²

2.3 Statistical analysis

We measured all variables as continuous data and descriptively presented them in mean and standard

deviation. Participants were also grouped by hypertension category and t-test was conducted to examine the difference among them. We conducted a Pearson correlation test to examine the association between 6MWT measures with ASCVD risk estimator plus measures. Multiple linear regression tests were conducted to predict the value of ASCVD risk estimator plus parameters from the 6MWT results. The regression was adjusted from patients' BMI.

3. Result

3.1 Feasibility measures

We mailed 35 women patients an invitation to participate, and 30 responded a week later with interest resulting in a recruitment rate of 30/35 (85.7%). Of those responding, 9 participants could not be reached for the 6MWT scheduling (6MWT completion rate of 70%), 7 participants had missing laboratory and body composition measurement data (laboratory examination completion rate of 66.7%). In total, 14 patients were able to complete all measurements resulting in a measurement completion rate of 14/35 (40%). There were no adverse events resulting from the 6MWT.

3.2 Outcome variables

Patients in this study were 59 (7.5) years old on average. Their average BMI was 23.7 (4.2) kg/m². Patients' average systolic blood pressure, diastolic blood pressure, total cholesterol, HDL-cholesterol, and LDL cholesterol were 148 (25.3) mmHg, 77.2 (11.7) mmHg, 186 (31.6) mg/dl, 56.9 (10.6) mg/dl, and 94.9 (23.1) mg/dl, respectively. Characteristics of the patients in this study were presented in Table 1. There was no difference on age, body composition, lipid profile and 6MWT results between normotensive and hypertensive patients ($p > 0.05$).

Pearson correlation test showed that only heart rate response at the end of 6MWT had a significant association with systolic blood pressure ($r=0.676$ $p=0.008$) and diastolic blood pressure ($r=0.632$ $p=0.015$) which were parameters measured for ASCVD risk estimator plus (Table 2). After adjusted with participants' BMI, multiple linear regression showed that walking distance had a probability of being associated with a difference in patients' diastolic blood pressure (Coefficient -0.93 95% confidence interval -1.64 to -0.22) (Table 3). A more prominent predictive value of 6MWT was found among normotensive patients (Table 4). Both exercise heart

Table 1. Characteristics of participants

Variable	All		Hypertensive		Normotensive	
	Mean	SD	Mean	SD	Mean	SD
Age (years)	59	7.5	59.8	9.7	58.0	3.3
BFP (%)	34.8	3.9	36.3	3.4	32.7	4.0
VF (point)	8.2	4.6	9.9	4.9	6.0	3.3
LM (%)	22.6	1.6	22.1	1.5	23.2	1.5
BMI (kg/m ²)	23.7	4.2	25.1	4.5	22.4	3.6
SBP (mmHg)	148.1	25.3	164.9	17.5	125.7	13.8
DBP (mmHg)	77.2	11.7	83.6	8.6	68.7	9.9
TC (mg/dl)	186.1	31.7	181.6	25.3	192.0	40.4
HDL-C (mg/dl)	56.9	10.6	60.6	10.8	51.8	8.7
LDL-C (mg/dl)	94.9	23.1	91.8	19.1	98.9	28.9
TG (mg/dl)	166.1	48.4	146.1	26.8	192.7	60.0
RHR (x/minute)	85.2	17.0	86	21	84	11
EHR (x/minute)	104.9	16.9	111	17	97	14
Exercise intensity (%MaxHR)	65.3	11.2	69.4	11.7	59.8	8.4
WD (m)	161.0	7.5	160.2	9.7	162	3.3

BFP: body Fat Percentage; VF: Visceral Fat; LM: Lean Mass; BMI: Body Mass Index; SBP: Systolic Blood Pressure; DBP: Diastolic Blood Pressure; TC: Total Cholesterol; HDL-C: High Density Lipoprotein Cholesterol; LDL-C: Low Density Lipoprotein Cholesterol; TG: Triglyceride; RHR: Resting Heart Rate; HER: Exercise Heart Rate; WD: Walking Distance

Table 2. Association between 6MWT and ASCVD risk estimator plus variables

6MWT	ASCVD risk estimator plus (r coefficient)				
	SBP	DBP	TC	LDL	HDL
RHR	0.482	0.506	0.249	0.204	0.260
EHR	0.676**	0.632*	0.292	-0.061	0.292
Walking Distance	-0.114	0.187	0.17	0.026	0.-238

*Significant ($p < 0.05$); ** Significant ($p < 0.01$)

SBP: Systolic Blood Pressure; DBP:Diastolic Blood Pressure; TC: Total Cholesterol; HDL-C: High Density Lipoprotein Cholesterol; LDL-C: Low Density Lipoprotein Cholesterol; RHR: Resting Heart Rate; HER: Exercise Heart Rate.

Table 3. Multiple linear regression among all participants

6MWT	ASCVD risk estimator plus (Coefficient [95% Confidence Interval])				
	SBP	DBP	TC	LDL	HDL
RHR	-0.71 (-1.95 to 0.53)	-0.38 (-0.73 to -0.02)*	1.55 (-0.78 to 3.88)	-4.72 (-45.38 to 35.95)	0.07 (-6.70 to 6.84)
EHR	0.70 (-0.56 to 1.96)	0.14 (-0.23 to 0.49)	-0.43 (-2.79 to 1.93)	0.42 (-13.21 to 14.06)	-0.57 (-2.83 to 1.70)
Walking Distance	-2.06 (-4.51 to 0.39)	-0.93 (-1.64 to -0.22)*	1.37 (-3.24 to 5.98)	0.417 (-2.29 to 1.46)	0.17 (-0.14 to 0.48)

*Significant ($p < 0.05$)

SBP: Systolic Blood Pressure; DBP:Diastolic Blood Pressure; TC: Total Cholesterol; HDL-C: High Density Lipoprotein Cholesterol; LDL-C: Low Density Lipoprotein Cholesterol; RHR: Resting Heart Rate; HER: Exercise Heart Rate.

Table 4. Multiple linear regression among normotensive patients

6MWT	ASCVD risk estimator plus (Coefficient [95% Confidence Interval])				
	SBP	DBP	TC	LDL	HDL
RHR	-2.92 (-52.71 to 46.88)	-0.81 (-1.12 to -0.51)*	7.33 (-156.21 to 100.89)	6.42 (-51.67 to 64.51)	-0.02 (-14.26 to 14.22)
EHR	1.01 (-28.22 to 30.24)	0.21 (0.02 to 0.39)*	7.33 (-68.60 to 83.26)	-3.21 (-37.31 to 30.89)	0.75 (-7.61 to 9.11)
Walking Distance	-4.34 (-64.19 to 55.49)	-0.94 (-1.31 to -0.57)*	18.71 (-72.54 to 109.96)	10.87 (-58.94 to 80.68)	4.36 (-12.76 to 21.47)

*Significant ($p < 0.05$)

SBP: Systolic Blood Pressure; DBP:Diastolic Blood Pressure; TC: Total Cholesterol; HDL-C: High Density Lipoprotein Cholesterol; LDL-C: Low Density Lipoprotein Cholesterol; RHR: Resting Heart Rate; HER: Exercise Heart Rate.

rate and walking distance could predict patients' diastolic blood pressure with coefficient of 0.21 (0.02 to 0.39) and -0.94 (-1.31 to -0.57) respectively.

4. Discussion

The primary aim of this pilot study is to investigate the feasibility of adding a 6MWT into routine measurement in a rural primary health care. The high recruitment rate (85.7%) represented a high demand of the 6MWT among women patients with T2DM. Also, there were no adverse events. To be feasible, participation of subjects in the outcome measurements is important. Due to the administration of a 6MWT in an additional day

from the routine visit, there was a high burden on participants resulting in a low measurement completion rate (40%). Thus, future studies and practices should consider conducting the 6MWT in the same day with the routine visit to minimize burden on participants.

Our study also found association between 6MWT results and CVD risk factors. Pearson correlation test and multiple linear regression also suggested an association between 6MWT measures and blood pressure as a part of CVD risk factors. A strong linear correlation was found between heart rate response after 6MWT and blood pressure. This association is in agreement with the previous study. A cohort

study of 10418 healthy men found that the risk of hypertension increased in men with higher exercise heart rate response.¹³

After adjustment for participants' BMI, heart rate still had an association with blood pressure. Participants' resting heart rate was inversely correlated with their diastolic blood pressure. Every 1 point increase in heart rate could result in a 0.38 mmHg decrease in diastolic blood pressure. This finding contrast with several previous studies. Several cross-sectional with large samples found that resting heart rate positively correlated with blood pressure.^{14,15,16} The disagreement in the relationship between resting heart and blood pressure in this study could be attributed to a Hawthorne effect. Since participants' resting heart rate was recorded on a similar day with the 6MWT schedule, participants became aware that they would be examined. It could result in an autonomic nervous system response which could influence their resting heart rate.

Walking distance covered during 6MWT were inversely correlated with participants' diastolic blood pressure after adjustment for their BMI. Every one 1 meter increase of walking distance could result in a 0.93mmHg decrease in diastolic blood pressure. Walking distance in the 6MWT reflected the aerobic capacity of the participant. A previous study found that higher aerobic capacity could reduce the risk of arterial stiffness.¹⁷ Since arterial stiffness resulted in a greater influence on diastolic blood pressure than systolic blood pressure¹⁸, this mechanism could explain the inverse association between walking distance with participants' diastolic blood pressure.

Whilst the predictive value of 6MWT became prominent among normotensive patients, there was lack of association between 6MWT and traditional CVD risks among hypertensive patients in our study. Baroreceptor impairment among hypertensive patients could reduce the sensitivity to the 6MWT load.¹⁹ A submaximal aerobic test could result in a better sensitivity than 6MWT but the risk should be considered. The weak association of aerobic fitness test in predicting CVD risks among hypertensive patients is in agreement with a previous cohort study²⁰. Whilst normotensive patients with high aerobic fitness were associated with 2.27 times less

risk of CVD mortality, hypertensive patients with high aerobic fitness were only associated with 1.1 times less risk of CVD mortality.²⁰ Similar with that cohort study, the presence of pharmacotherapy among hypertensive patients could be the confounding factor between aerobic fitness and other CVD risks. Thus, considering for pharmacotherapy as a confounding factor could be suggested to future studies.

We also found lack of association between 6MWT result and blood lipid profile. However, previous prospective cohort found that patients with high fitness level were associated with lower risk of the incidence of dyslipidemia.²⁰ Since blood lipid was also strongly associated with several factors that were not controlled in our study, such as diet and family history, these could be confounding factors that interfere between 6MWT and blood lipid.

This cross-sectional study also found that older women patients with T2DM in a rural primary health care also had hypertension as comorbidity. In average, their systolic blood pressure and diastolic blood pressure were 148 (25.3) mmHg and 77.2 (11.7) mmHg respectively. Whilst they did not have a good blood pressure control, they had a good control of blood lipid. Their average total cholesterol, HDL-cholesterol, LDL-cholesterol, and triglyceride were in a normal range. Based on mean BMI, participants had healthy weight. However, their mean visceral fat was categorised as a high level. In average, the 6MWT resulted in 65.3% of participants' maximum heart rate. Thus, this test represents a moderate intensity activity that could be used for predicting cardiorespiratory fitness in T2DM patients.

The results from this study suggested an additional value of a simple fitness testing which could be associated with traditional CVD risks particularly in normotensive T2DM patients. However, the findings from this study should be applied with cautious. This study did not show a causal relationship. Longitudinal studies with a large sample and cardiovascular events-related outcome should be conducted to investigate the predictive value of 6MWT on CVD risk among T2DM patients. Several confounding factors such as pharmacotherapy, diet, and family history should also be considered. Statistical analysis for

adjustment of the missing data was not conducted in this study. This could result in a high risk of bias. Thus, further study should consider missing data in statistical analysis.

5. Conclusion

This pilot study provided evidence that 6MWT is feasible to be conducted in a rural primary health care. Implementation of 6MWT among older women with T2DM could provide additional values for predicting CVD risk, but large longitudinal study with a rigorous method should be conducted in the future. Considering its additional values and the high demand of this test, stakeholders should consider to include this test into routine examination among older women with T2DM in primary health care.

Competing interests

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Development of school canteen and school gardens guidelines as prevention against cardiovascular disease

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ABSTRACT Cardiovascular diseases are considered as the deadliest diseases in the world. According to WHO data, deaths caused by coronary heart disease in Indonesia reached 138,380 or 9.89% of the total deaths. The age adjusted mortality rate is 82.30 per 100,000 population with Indonesia ranked #97 in the world. Kulon Progo Regency is located in the western part of the Special Region of Yogyakarta. The average monthly food expenditure in Kulon Progo is Rp365,012 (\$27.49). While a healthy diet is known and promoted to benefit health, only a small portion is used to buy fruits and vegetables (2.24% and 1.76%). Cardiovascular disease is the main cause of morbidity in Kulon Progo. This study aimed to examine the process of developing guidelines for healthy school canteens and school gardens and promote fruit and vegetable consumption. This study used a qualitative research design. The data were collected through in-depth interviews and focus group discussions. A preliminary survey was conducted in 10 private and public schools in Kulon Progo district, Yogyakarta Province, Indonesia. Guidelines related to healthy lifestyles through Canteen- and school garden were successfully arranged for in-school programs. Interviews and focus group discussions explored possibilities of permanently establishing the programs with local and national funding. Some disagreement was voiced concerning the loss of revenue incurred by local food vendors. Stakeholder involvement is crucially important for the preparation and development of the school canteen - and school gardens guidelines. Follow-up is recommended to carry out the dissemination of the guidebook.

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1. Introduction

Cardiovascular disease (CVD) is the number one cause of death (COD) in the world and places a huge burden on regional and national health systems as well as on the patients suffering from the disease. The most common CODs are stroke (21.2%) and heart attacks (8.9%).¹ CVD can cause premature death as a result of increased blood pressure, elevated levels of blood fat and blood sugar, which are caused by lack of physical activity, smoking habits, poor diet, and

alcohol abuse.² On Java island in Indonesia, Kulon Progo is one of the 5 Regencies/ Cities in the Special Region of Yogyakarta (DIY). The area's Medium-Term Development Vision is "The realization of a healthy, independent, high-achieving, fair, safe, and prosperous Kulon Progo Regency based on faith and piety." Optimum health is one of the priorities to be achieved through the current vision of the Kulon Progo district.

Based on the results of the recent National Health Survey (*Riskesdas*) in 2018,³ the incidence of coronary heart disease in Indonesia was 2.0%; heart failure 2.0%; and stroke 7/mille. In the provincial area of DIY, the incidence of coronary heart disease was 0.6%; heart failure 0.25%; and stroke 10.3/

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mile. Whereas in Kulon Progo, coronary heart disease incidence was 0.4%; heart failure 0.7%; and stroke 14.2/mile.⁴ Based on recent research in Kulon Progo Regency, the highest cause of death was stroke (22.1%) followed by hypertension (9.4%).⁵ These data are in accordance with the data on the prevalence of stroke in Kulon Progo Regency that indicated the highest prevalence was in DIY with 33.7%. Meanwhile, the prevalence of hypertension in Kulon Progo Regency ranks the third-highest among the four other districts in the Province of DIY, amounting to 27.3%.

Diet control is one of the most appropriate interventions to be done in efforts to prevent CVD, especially by increasing consumption of fruits and vegetables.^{6,7} Based on the results of a systematic study conducted to determine the effectiveness of giving fruits and vegetables to children and adolescents at school and home, it was concluded that interventions conducted at school were more effective in increasing fruit and vegetable consumption than at home.⁸

Riskesdas data showed that only 18.2% of school-age children (10-14 years old) consume the 3-4 servings/day of vegetables and fruit that are recommended. In Yogyakarta, people who consumed vegetables and fruits ≥ 5 servings were only 7.7% and school-age children (10-14 years) who consumed fruits and vegetables ≥ 5 servings were only 4.2%. Whereas in Kulon Progo, people who consume more than 5 servings of fruits and vegetables per day are only 14.4%.²

The high prevalence of stroke and hypertension in Kulon Progo Regency is in line with the low proportion of fruit and vegetable consumption as one of the main risk factors that can increase stroke and hypertension. The number of people who consume fruits and vegetables more than 5 servings a week is still very low, and most residents only consume 1-2 servings or 3-4 servings of fruits and vegetables a week.⁹ Increasing consumption of fruits and vegetables in the school environment can be done through the procurement or improvement of the school canteen or cafeterias as the main provider of food in schools. A healthy canteen is one that meets food and beverage standards, is clean and safe, while

providing a menu that looks fresh and attractive, tastes good, and varies with seasoning according to the taste of the type of food. The composition of vegetables can be increased gradually, while new menus and recipes are developed, and if necessary cooked more by using oven roasting and steam to preserve the nutritional value. With a district-wide school program, food can be processed in a central location and distributed immediately to other places for equal accessibility among all schools.

Health promotion is one of the primary prevention efforts to change public health behavior and prevent future diseases. Health promotion needs to be done efficiently and effectively so that it prioritizes diseases that cause a high health burden and thereby save health care costs. The most effective step of health promotion is through habituating healthy behaviors that are acquired early in a person's life, namely at the school age, whether elementary, junior high, or high school.¹² Unfortunately, in the Kulon Progo Regency there are still no CVD prevention school programs nor healthy diet and lifestyle promotion programs that target school-age children even though these ages are the ideal time to form healthy habits and behaviors.

Based on the high prevalence of CVDs in Kulon Progo Regency, early intervention is needed at the primary level, especially in school-age children particularly targeting CVD early prevention. Prevention can be done in the form of procurement or improvement of the school canteens in order to increase the availability and affordability of fruits and vegetables for daily consumption.

This program aimed to develop an implementation guideline that schools can practice to shape the consumer behavior of active and healthy children and thereby increase the consumption of fruits and vegetables. The implementation guidelines that were formed are divided into two parts, namely the Implementation Guidelines for Healthy Canteens and the Implementation Guidelines for School Gardens. After the implementation of the guidelines, efforts can be continued with the socialization and educational promotion of the new programs which should engage key leaders in the schools and related stakeholders.

2. Method

The program began with a preliminary survey phase of representatives of elementary schools in Kulon Progo Regency consisting of 10 schools. The selection of schools was based on the location and status of the school, where one school from each area was selected to represent urban, rural, mountainous, lowland, public schools, and private schools reaching a total of 10 schools.

The preliminary survey was conducted to see the current implementation of school canteens and school gardens in the ten schools. The qualitative methods used included interviews and direct surveys of the state of the school environment. We used open questions to conduct the interviews. The standard of healthy canteen is the one made by *Badan POM* (Indonesian Food and Drugs Agency) and The *Ministry of Education and Culture* (Kemendikbud). The participants in this study consisted of principals, School Health Unit (UKS), teachers, students, school canteen managers, and food sellers outside the

school. Direct surveys were done by looking directly at the canteen in the schools and the vendors outside the school related to the menu being sold. This activity was expected to provide a clear and accurate picture of the behavior of students in consuming fruits and vegetables and see the extent to which the school supports the program of a healthy canteen.

The next stage was a cross-sectoral meeting in the Kulon Progo Regency which involved, among others: The Health Service, the Education Service, the Agriculture Service, the Food Security and Agricultural Extension Service, the Agency for Regional Development, the Local Parliament, and related sectors. This meeting discussed what was needed to implement a healthy canteen program and school gardens. It also discussed sources of funds that will support these activities. Next, a Drafting Team of the Instructional Guidelines and Technical Guidelines started organizing healthy canteens in schools in Kulon Progo Regency.

Outputs and indicators of success of this activity are data in the form of an initial description of the



Figure 1. The atmosphere of eating at school



Figure 2. The atmosphere of processing food at school



Figure 3. Meeting with school personnel



Figure 4. Meeting with representatives

behavior of consuming fruits and vegetables in school children in Kulon Progo Regency and the formation of a Guideline Team for the Implementation of healthy canteens and school gardens.

The source of funds for the application of the implementation guidelines was obtained by submitting further research proposals to relevant partners. In addition to partners, it is hoped that there will be a collaboration with the Kulon Progo Regional Government and the school committee to help maintain the funding for the long-term sustainability of the program. Ethical approval was granted from the appropriate institutional review board in DIY. Informed consent included permission to use photos and interview statements which were given by all participants, including parents and guardians of the school-age children.

3. Result

A preliminary survey was conducted with 10 schools in Kulon Progo which included elementary, schools spread out in several different districts. The ten schools have different facilities but all of them expressed their agreement with the plan for the healthy canteen, but only 2 schools objected to the school garden. This is due to the insufficient planting area and the difficulty to keep the garden from being destroyed by younger children.

All school principals, school committees, teachers, student guardians, and students agreed with the existence of a healthy canteen program and a school garden because it can help children to learn the importance of eating a healthy and nutritious diet. Unfortunately, funding continues to be a significant problem. Therefore, several schools have proposed making a legal basis for the use of School Operational Assistance (BOS) for healthy canteens and school gardens, or else it can become an education program for all parents of students. Some canteen managers, canteen food sellers, and vendors outside the school refused to support the healthy canteen. The rejection of a healthy canteen occurs because of feelings of fear of losing their livelihoods, so it is advisable to offer them jobs as healthy canteen employees which is being considered as a

viable option and solution to this challenge.

The survey was conducted through interviews with several parties related to the school including the principals, school committee, teachers, students, canteen managers, and vendors outside the school, and student guardians. The first question was: "*Do you agree if the cafeteria program is implemented?*". Most of the subjects expressed agreement with the provision of the program on the grounds that it is more controlled and the nutrition intake of children is better, but there were some participants in the meeting who disagreed such as canteen managers and food vendors outside of school for economic reasons.

S1: "*I strongly agree with this cafeteria because the children's food is maintained and the children can control their healthy food.*"

S2: "*Disagree because my main income is from the school canteen other than as a school guard.*"

Good enthusiasm from various parties was followed by concerns about several aspects, namely the lack of funds, location, and cafeteria management. The cafeteria program is planned to be given free of charge. However, stakeholders expressed questions about the source of funding. Some subjects answered that they could not collect fees from their parents. Other subjects answered that if they use BOS funds, they cannot be arbitrary because there is a separate allocation for BOS funds. Also, the presence of cafeterias requires additions to the workforce and a secure source of payroll. Therefore, the school can discuss with student guardians and should work together across sectors to discuss the issue of the funding needed.

Cafeteria location is also a matter of consideration. Some schools claim to have an empty room or vacant land that can be used. However, if it is still in the form of land, the development also requires funds. As for the school garden program, observations concluded that there was not much land that could be used for growing vegetables. But some schools also have their own gardens planted with flowers or vegetables. In addition, if minimal land exists then space can be planted in a polybag planting or the use of vertical gardening techniques.

S3: "The RAPBS also cannot be budgeted, so cooperation with policymakers is needed. The committee might agree, but if there are parents for example 10 people don't agree it could be a problem. If there is a grant from the district available to make the cafeteria building, land doesn't matter. Even existing rooms can also be transformed. Cafeteria management is absolutely necessary in order to run continuously."

Some subjects said there had to be a collaboration with the school committee to supervise the provision of food in the cafeteria even though the school was the organizer. Supervision can be done by checking regularly what foods or drinks are sold in the canteen. Then, the food provided for the cafeteria is ensured to be healthy and balanced so that it can meet the nutritional needs of the students. Schools should also work together with cross sectors such as BPOM to conduct supervision. This is because several schools have been routinely visited by BPOM for checking but some schools already have a canteen, unfortunately there is no checking from the BPOM.

S4: "Agree as long as there is a cooperation between the school committee and the school. School as the executor."

S5: "The canteen is examined by the POM agency every 2 years and the school is invited to socialize from the POM every two years and it is attended by UKS teachers."

Before the cafeteria discussion and planning were held, several schools already had a school canteen. Some schools allow traders to sell outside

the fence, but some prohibited this vending because the food and drinks sold contain sweeteners, preservatives, and coloring that can harm children. The existence of an in-school canteen is also an option for students because the break time is not long so that the closer location makes students choose to shop at the school canteen. In addition, there is also the manager of the guardian of students so that the food provided is clean and guaranteed.

S6 : "There used to be snacks outside for the children with lots of chiki-chikis (junk food), with preservatives and sweeteners, eventually schools and committees deliberated to set up a canteen where food was provided by the guardians of students who still had sons at school, because if the sons ate the food provided it was automatically healthy food. The canteen is also environmentally friendly by providing self-made food and reducing food sold in plastic."

After the interviews, several suggestions for the cafeteria program emerged, such as students want the program for lunch cross because some had skipped breakfast at home. Also, there is initial education by other sectors such as the health department on healthy food and balanced nutrition so students will be interested in the food provided. The type and amount of food provided vary so students do not become bored. In addition, there is periodic supervision from the BPOM to determine the quality of food produced from the canteen and cafeteria.

After the preliminary survey, the team held a cross-sector team meeting to discuss writing the implementation guidelines. The cross-sector meeting was attended by representatives from the Health Service, Education Office, Agriculture Office,



Figure 5. School canteen handbook



Figure 6. School garden handbook

Legal Bureau, and Food Security Office. This agenda produced conclusions to make operational and technical guidelines in an implementation manual so that at the end of the activity, two guidebooks were created, namely the School Canteen Implementation Guidelines and the School Garden Implementation

After the discussion of the guidelines implementation, the process continued with meetings with some school representatives and representatives of the cross-sector team to explain the points that exist within the guidelines. The government in the area of Kulon Progo promised to follow up the guidelines for implementing to be a legal decree by the Head of the District called "*Peraturan Bupati*" and using district funds for the implementation of this program. He also urged that the manufacture of "*Peraturan Bupati*" be done quickly and precisely so that it can be included in the book guideline implementation for dissemination to the schools.

At present, the implementation guidelines have been completed in the form of an implementation manual so that all that remains is waiting for the "*Peraturan Bupati*" from the Kulon Progo Regency Government. After the district head's regulation is available, the next step is to socialize these guidelines to the schools and ensure that there are sources of funding that can be used by schools to practice this program.

4. Discussion

The result of a preliminary survey conducted in several schools included in this study found that many schools and students strongly support having a healthy canteen and school garden. The provision of healthy canteens and school gardens can help children to learn the importance of a healthy diet. As a result, students appear to be healthier and perform better in school and daily life activities.

With the increased consumption of vegetables and fruit, participants of this program met the fiber intake recommendations for a healthy diet. Research on fruit and vegetable consumption habits in five countries in Asia, including Indonesia, still show that the amount of fruit and vegetable consumption in rural populations is low,⁹ leading to increased risk of

CVD. Regular consumption of vegetables and fruit together or consumed separately in varied portions is proven to reduce the incidence of CVD and cancer.⁷ Many programs can be implemented to increase the awareness of school children about the importance of fruit and vegetable consumption.¹⁰ Two of these health interventions include a healthy canteen and a school garden program. As stated in the introduction, insufficient fiber intake may result in increased CVD risk. The most feasible way to overcome this issue may be done by early habituation and introduction in healthy eating habits and improving the relation to fiber-rich foods, such as vegetables and fruits. As carried out in this study, implementation of the healthy breakfast in combination with healthy canteens and school gardens may support this.

Breakfast time is important but sometimes it is missed due to several reasons including, being in a hurry to go to school, having stomach problems or food that is less appetizing. In fact, the energy from breakfast can increase concentration when receiving lessons at school. A unique breakfast program was tested with students in Minnesota called Grab and Go Breakfast. This program allows students to be able to have breakfast at school at a low price. The number of students participating in this activity increased by around 21.9%.¹¹ The breakfast program at school is also conducted at kindergartens in the state of Utah in the USA. The teachers were asked for opinions about this program and stated that this program could significantly reduce hunger for children in school. However, generally, teachers prefer traditional breakfasts at home compared with those provided in schools and consider there may be a potential for waste in such in-school programs.¹²

In this study found that several suggestions for the cafeteria program emerged, such as students want the program for lunch because some students did not have the habit of eating breakfast at home. School food contributes significantly to healthy eating behavior because it can form healthy eating habits and increase preference for new and diverse foods. The program can run smoothly if supported by guidelines and regulations which regulate the provision of food in schools. The lunch program conducted by several schools in San Diego, California, also has a positive impact on students. When the

consumption of food from home is compared with food at school, it is seen that there is a higher quality of food provided at school. In addition, consumption of dairy products and fruits was also more than those consumed when at home.¹³

Therefore, it is necessary to have a policy or regulation regarding healthy food consumption as a guideline in a healthy food program implemented by the schools so that children's food intake can be guaranteed and quality assured.¹⁴ Several countries such as the United Kingdom, Sweden, and Australia have provisions, regulations, and improvements to preschool and elementary school meals. Many countries' laws require the provision of nutritious food, but Australia and surrounding areas are adopting specific guidelines for school cafeteria food, especially using a "traffic light" approach, providing information about foods that are recommended and not recommended. Unfortunately, most children bring food from home which is less nutritious. Therefore, with a good healthy diet program, policies and implementation must be added consistently so that children can be provided a healthy diet and balanced food intake.¹⁵

Further, it was found that a school garden is an innovative strategy to provide more healthy food choices and become more knowledgeable about varieties of fruits and vegetables. Additionally, school gardens create educational opportunities for fun physical activity during gardening. Implementation guidelines and local regulations regarding school gardens are urgently needed. One recent study shows that the existence of local regulations that support school gardens can facilitate some of the supply needs for the implementation of nutrition services in schools.¹⁶

During this study the government in the area of Kulon Progo promised to follow up the guidelines for implementing to be a legal decree by the Head of the District called "*Peraturan Bupati*" and using district funds for the implementation this program. He also urged that the manufacture of "*Peraturan Bupati*" be done quickly and precisely so that it can be included in the guideline book of implementation for dissemination to the schools.

5. Conclusion

The preparation of the Healthy Canteen Implementation Guidelines and the School Garden Implementation Guidelines involves many parties, including teachers, parents, students, teacher group stakeholders, as well as representatives from the Department of Primary and Secondary Education. The guideline is accompanied by funding requirements as one of its provisions. These guidelines were made as a pilot project. Active stakeholder involvement is urgently needed to ensure the implementation of this guideline runs smoothly. After the implementation guidelines are established, it should be applicable in other cities or districts in Indonesia. Follow-up requires dissemination of the manuals to schools with relevant stakeholders so that the guidebooks can be immediately implemented. Besides that, there needs to be a commitment from policymakers in the district so that the canteen programs and school gardens can be run continuously in the schools, and even become a reference standard for other regions outside of Indonesia.

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Conflict of interest

There is no conflict of interest.

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Short movie of adolescent reproductive health based on friendly of local wisdom for junior high school

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ABSTRACT The lack of information and in-depth knowledge about adolescent reproductive health (ARH) has a negative impact on junior high school (JHS) students during puberty that can develop into unhealthy reproductive behaviors, such as risky sexual behavior in dating and consumption of pornography through online media. Meanwhile, there is a lack of facilities and infrastructure to accommodate the interests and talents of students that are friendly with local wisdom. Accordingly, a partnership program is needed between schools and universities to improve student creativity by coaching ARH through the empowerment of the school environment. The creation of the short movie program "Healthy ARH" with local wisdom-friendly content was conducted for six months at JHS 2 and JHS 3 Tamanan, Bondowoso. A total of 36 students, 34 parents, and six teachers participated in this program. The series of activities consisted of community school consultations, training to make a short film, education and training for ARH, and monitoring and evaluation of the program. Program assessments for students were done through quantitative measurements using Chi-squared tests for analyses of the differences in knowledge, attitudes, and behavior concerning ARH, as well as knowledge of HIV at the beginning of month 1, month 3, and month 6, whereas the qualitative evaluation was done through content analysis of focus group discussions to improve the program. Among 36 students who took part in this program, there were significant differences in ARH understanding before and after participating in the creation of the short film "Healthy ARH" based on local wisdom-friendly content, in terms of knowledge ($X^2= 33.6; p<0.001$), attitudes ($X^2= 16.2; p=0.001$), behavior ($X^2= 24.3; p<0.001$), and knowledge of HIV ($X^2= 11.9; p=0.008$). We concluded the short film "Healthy ARH" based on local wisdom-friendly content can improve the knowledge, attitudes, and behavior concerning ARH, as well as students' HIV knowledge.

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1. Introduction

Adolescence is a critical time for a person's growth and development when teenagers sometimes engage in risky sexual behavior, especially in terms of adolescent reproductive health (ARH).¹ During this period, adolescents may begin consuming pornography, engage in risky dating behavior, develop a sexual orientation disorder (LGBT), and become pregnant outside marriage.²⁻⁴ Basic Health Research of Indonesia (*Riskesdas*) in 2010 found indications

of pre-marital sexual behavior in 5% of adolescents aged 10-24 years.⁵ Meanwhile, the prevalence of the actual reproductive behavior of adolescents in the Jember Regency is 50.6%,¹ negative response during puberty in 39.0%, and immaturity during adolescent development in 20.3%.⁶ This situation relates to the lack of ARH education both in families and schools because the discussion of ARH problems is considered taboo in most families and communities and there is no in-depth knowledge of reproduction problems in adolescents.⁷ This challenging condition shows the magnitude of the ARH problem among adolescents who need better role models from their family, community, and school.

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On the other hand, much of an adolescent's time is spent in school. Accordingly, schools are the ideal setting for providing health education, especially concerning ARH problems. ARH education programs for students are more effective with peer approaches through the provision of information and peer counseling.⁸ For example, the Community Partnership Program (CPR) which is based in schools can be used as partners for empowering students to improve their knowledge, attitudes, and behaviors concerning ARH. This program is essential for shaping adolescents' resilience in reproductive health issues because, in the future, many will form a family based on local wisdom.

CPR in Bondowoso Regency is focused in the Junior High School (JHS) 2 and JHS 3 Tamanan because the rural areas are where knowledge of ARH is still low due to ignorance, unwillingness to learn about ARH, and the inability of students in schools to respond and adapt to changes during puberty. This situation may have an impact on risky sexual behavior, unwanted pregnancy, and early marriage, which could cause reproductive problems and negatively affect the formation of family generations in the future.

The analysis of the situation in the location of research showed that the teachers provided ARH education through religious and biological subjects according to the school curriculum guidelines. Meanwhile, the students still were lacking in understanding of information and knowledge related to ARH problems, because students claimed it is challenging to understand biology textbook explanations about ARH based on their experience of physical changes during puberty (menstruation or wet dreams). As a result, many students said they often accessed ARH information from social media and online media or shared their experiences with their peers. This situation allows the information obtained by students to be less relevant to what is really needed by students. Furthermore, schools and students have required ARH education media, which is suitable for the needs of JHS students regarding their religious, social, and cultural norms in a local wisdom-friendly context during puberty.

During their development period, JHS students

usually experience a developmental period of fine motor skills related to creativity or art. Student creativity needs to be well facilitated in realizing other positive skills such as communication during their development.⁹ One of the activities for supporting students' creativity is through making ARH short films based on a local wisdom-friendly approach.¹⁰ ARH education materials can be packaged in a short film that is local wisdom-friendly. As a result, it can facilitate both teachers and students to learn more about ARH. Using ARH short films based on local wisdom-friendly content, students' life skills will be healthier, and their creativity will be accommodated adequately in the activities of making the ARH short films.^{11,12}

Furthermore, there is a need for CPR to engage JHS students through the making of an ARH short film that is friendly to local wisdom. Accordingly, this CPR aimed to create a short film about ARH based on local wisdom-friendly content for JHS students, to improve the access and quality of ARH education. This CPR was created by, managed by, and made for students including the creation of the short films for other students to obtain interesting facts and contact information regarding counseling services about ARH. Implementing the CPR through coaching and empowering JHS students to create the ARH short film about appropriate ARH behavior aims at realizing healthy family planning in the future. Furthermore, the aim of community engagement is to make a short film "Healthy ARH" that is friendly to local wisdom in order to improve the students' life skills concerning ARH.

2. Method

2.1 Design

This CPR program aimed to stimulate the creativity of JHS students by making a short film about ARH that is friendly to local wisdom as a promotional media for ARH, which is a program of independent care activities created by, managed by, and made for students. The CPR program for ARH counseling services emphasizes the activities of each member who can share issues related to the fulfillment of ARH needs during adolescents' growth and development and help overcome any challenges and difficulties

through the creation of a short film. The short film about ARH is used as an education media that concerns the students' knowledge, attitudes, the behavior about ARH, and knowledge of HIV.

2.2 Procedures

The creative activities of students in making the short film "Healthy ARH" friendly to local wisdom during this PCR were done through several phases which included:

a. Community school meetings

The school community meetings were attended by teachers, students, and parents' representatives. In this forum, the ARH problems were identified, both from the perception of understanding about ARH and the implementation of the ARH health education. Then, supporting factors and constraints in the implementation of the ARH, both integrated into the curriculum of religious and biological lessons, were identified from teachers, students, and students' parents. The forum also identified students' extracurricular activities in the arts, especially acting classes, which involve watching and discussing films. Today's students prefer the digital era and self-actualization through pictures with interesting captions or engaging movies. Therefore, this situation provided the potential opportunity for planning to make a short film about ARH that is friendly to local wisdom. In this activity, parents were also asked to complete a self-administered questionnaire about the structure and function of their family in the provision of ARH education in the family setting using a standardized instrument¹³, where the measuring instrument consisted of 26 questions with a Likert scale (disagree = 1; strongly agree = 4), in which the higher the score indicates the better the role of parents in ARH education in the family.

b. Training program to make a short film about ARH

JHS students were provided with appropriate material about ARH. They were helped to identify what ARH material can be mastered based on local socio-cultural values by a CPR program team member from the Faculty of Nursing, University of Jember. The content of the material was discussed

between the proposing team with teachers, parents, and students. The material grid used in this short film was taken from a previous study of a community-based friendly clinic.⁸ Then, a short screenplay script was made, followed by a role-playing exercise, and practice in making a short film video. The duration of the training was adjusted to the ARH material provided and which was adopted into a short film lasting 5-10 minutes on each topic of the ARH discussion. The short film making training framework is described in Table 1.

c. Presentation of the short film concerning ARH

After the short film was completed it was shown to students in classes on biology and religion subjects to increase students' knowledge, attitudes, and behaviors concerning ARH as well as knowledge of HIV. In-class measurements were done using the assessment form of the Adolescent Reproductive Health Clinic.⁸ In this stage of the CPR program activity, students' knowledge, attitudes, and behaviors concerning ARH and the creativity of ARH's short film art were evaluated by other students through youth corner forums, as documented in the published results of the research conducted by the proposing team.¹⁴

d. Program supervision and evaluation

Quantitative ARH assessments of students were measured using standard measurement tools from previous research on the Adolescent Reproductive Health Clinic,^{1,8} namely in month 1, month 2, month 3, and month 4. Before implementing ARH education through short films (month 1), students were measured in terms of knowledge of ARH which consisted of 8 questions (yes = 2; no = 1). The results of measuring knowledge of ARH were categorized into two groups using the mean value (high vs. low). Attitudes towards ARH were measured using 12 questions (yes = 2; no = 1). The results of measuring the attitudes toward ARH were categorized into two groups using the mean value (positive vs. negative). Behavior of ARH was measured using 9 questions (yes = 2; no = 1). The results of measuring behavior of ARH were categorized into two groups using the mean value (risk vs. no risk). Finally, knowledge of HIV consisted of 12 questions (yes = 2; no = 1).

The results of measuring knowledge of HIV were categorized into two groups using the mean (high vs. low). All of the instruments used in this study were previously validated and considered reliable from previous studies conducted by the authors.^{1,8}

After the implementation of the ARH short film screening that was friendly to local wisdom at the end of the program, an evaluation of the activities was done through the school community consultation. This activity was attended by students, teachers, and parents in assessing the students' progress in the ARH programs which had been implemented by the school for the past 4 months independently through focus group discussions (FGD). This CPR program was approved by Ethical Review Board of the Faculty of Dentistry, Universitas Jember with No. 426/UN25.8/KEPK/DL/2019.

2.3 Quantitative and qualitative analysis

Quantitative data were presented in frequency for continuous data, while the mean and standard deviation were used for presentation of numerical data. To compare differences of knowledge, attitudes, and behavior of ARH, as well as knowledge of HIV for students during months 1, 2, 3, and 4 after short film education and training activities, analyses with Chi-squared tests were performed with a significance level set at $p < 0.05$.

The results of the assessments were presented in quantitative data related to the characteristics of the participants in this program. In addition, the

engagement of school community participation during the community service activities was presented through a qualitative analysis of the FGD with the CPR members' feedback about making creative short films that are friendly to local wisdom.

Qualitative data analysis involved thematic analysis of each participant's statement during the guided discussion and the results of the open questionnaire from the participant. Qualitative data from the school community came from open questionnaires related to local wisdom-friendly short film screening activities and were used as input in the continuation of the program.

3. Result

3.1 Characteristics of student and parents

Table 2 shows that the majority of students' ages are 14 years (50%). The majority of students get ARH information from their teachers (44.4%) and only occasionally share information about ARH with parents (58.3%). ARH education has been done in the schools (83.3%), although according to students, there needs to be additional content about ARH in schools (66.7%). There were two students identified who had smoked and one student who had consumed alcohol. Besides that, the survey of the 36 students also determined the level of ARH personal development in which most of the boys had wet dreams (72.2%) and almost all of the girls had menstruated (88.9%), and many of the teenagers were not yet dating (61.1%).

Table 1. Material and schedule for training to make the short film

No	Items	Description of activities
1	Explaining a short film or movie	Students were explained what cinema is and how it differs from images, how filmmaking is done, and shown the media facilities and infrastructure in filmmaking.
2	Duties and parts in making films	Students were explained the assignment of camera persons, film director, film lighting, and supporting crews in filmmaking. Students were allowed to hold all the equipment and try the equipment used in making films.
3	Making a movie script	Students were allowed to make a short film script with the topic of ARH. There were three topics created, namely; menstruation in adolescent girls, the dangers of using gadgets, and early marriage in adolescents.
4	Role training or acting class	Students were taught to practice acting and performing. Students learned about how to act in front of the camera with the given role.
5	Filming filmmaking	Students and teachers filmed short films based on the film scripts that were made together between students and teachers with three film themes, namely: menstruation in young women, the dangers of using gadgets, and early marriage for adolescents.

Table 2. Characteristics of student who attend ARH training (n= 36)

Variable	n (%)
Age (year)	
13 year	8 (22.2)
14 year	18 (50.0)
15 year	10 (27.8)
Gender	
Boys	18 (50.0)
Girls	18 (50.0)
Exercise habit	
Yes	30 (83.3)
No	6 (16.7)
Sources information of ARH	
Teacher	16 (44.4)
Mother	3 (8.3)
Health providers	14 (38.9)
Book or magazine	3 (8.3)
Easy to share information about ARH with parents	
Always	5 (13.9)
Occasionally	21 (58.3)
Never	10 (27.8)
Health education about ARH in schools	
Yes	32 (88.9)
No	4 (11.1)
Urgency to add material education of ARH in schools	
Too much	7 (19.4)
Less than needed	5 (13.9)
Need to add	24 (66.7)
Active in religious activity	
Always	31 (86.1)
Occasionally	2 (5.6)
Never	3 (8.3)
Regular eating habit	
Yes	26 (72.2)
No	10 (27.8)
Smoking habit	
Yes	2 (5.6)
No	34 (94.4)
Alcohol consumption	
Yes	1 (2.8)
No	35 (97.2)
Spermarche (n= 18)	
Yes	13 (72.2)
No	5 (27.8)
Menarche (n= 18)	
Yes	16 (88.9)
No	2 (11.1)
Dating (n= 36)	
Yes	14 (38.9)
No	22 (61.1)

ARH: adolescent reproductive health

Table 3 shows that among 34 parents, the average age of parents was 39.44 ± 5.37 years with the majority mothers (73.5%). Most parents of children's education were elementary school graduates (61.8%), and the majority ethnic background was Madura (67.6%). The work of the majority of parents was housewives (38.3%), and the average family income in a month was 320,588.24 IDR.

3.2 Family structure and family function for providing ARH in family context

Table 4 shows that the implementation of ARH education in the family was low in the aspects of family power, family role, family values and norms, family affective function, family healthcare function, family reproductive function, and family economic function. However, aspects of family communication and family socialization functions are sufficient. Therefore, the overall implementation of family structure and function for ARH education in the family context was still lacking.

3.3 Knowledge, attitudes, and knowledge of ARH as well as knowledge of HIV

Students who attended ARH education and training after seeing this short film were assessed to measure the success of the education and training program. Measurements were taken during four assessments, namely: before education and training (month 1), 4 weeks after school and training (month 2), 8 weeks after education and training (month 3), and 12 weeks after education and training (month 4) at the end of the program implementation. The following data in Table 5 present improvements in the knowledge, attitudes, and behavior of the ARH and knowledge of HIV among students.

Table 5 shows that there were a significantly differences in ARH among student before and after attending program creativity a short film "healthy ARH" friendly to local wisdom, in particular knowledge of ARH ($X^2= 33.6$; $p<0.001$), attitudes toward ARH ($X^2= 16.2$; $p=0.001$), behavior of ARH ($X^2= 24.3$; $p<0.001$), and knowledge of HIV ($X^2= 11.9$; $p=0.008$).

Figure 1 shows that there was an increase in the number of students who have knowledge, attitudes,

Table 3. Characteristics of parents (n= 34)

Variable	n (%)
Age (year)	
Mean \pm SD	39.44 \pm 5.37
Gender	
Men	9 (26.5)
Women	25 (73.5)
Educational background	
Not attended school	1 (2.9)
Elementary school	21 (61.8)
Junior high school	7 (20.6)
Senior high school	5 (14.7)
Occupations	
Farmers	12 (35.3)
Housewives	13 (38.3)
Seller	4 (11.8)
Driver	1 (2.9)
Entrepreneur	3 (8.8)
Teacher	1 (2.9)
Salary per month (IDR)	
Mean \pm SD	320,588.24 \pm 89,143.86
Ethnic	
Javanese	9 (26.5)
Madurese	23 (67.6)
Osing	1 (2.9)
Balinese	1 (2.9)

and behaviors of ARH and a good understanding of HIV during the four months of the program. At the beginning of the program, 80.6% of students were knowledgeable, although, at the end of the program, 83.3% of students were highly knowledgeable about ARH. At the beginning of the program, 52.8% of students had positive attitudes of ARH, and at the end of the program, it increased to 80.6%. Nearly 50% of students engaged in risky behaviors related to ARH at the beginning of the program, while at the end of the program, students all behaved without risk pertaining to the practice of ARH. Additionally, the majority (58.8%) of students were initially with high knowledge associated with HIV and at the end of the program this increased to 88.9%.

3.4 Results of focus group discussions during community school meetings

a. Before implementation program

The results of theme identification with open-ended questions and in focus group discussions from

the school community consultations before the implementation of the CPR service learning program about ARH obtained the following data.

Theme 1. ARH education program in schools

The smoking habit in the school environment has been banned by the teachers, and the teachers at the Tamanan Schools said that some students actually smoked or used to smoke when going to school, and when the teacher gave a reprimand to the students they answered that at home their parents allowed them. The cooperation between parents and teacher training was not good enough to forbid children to smoke, even though the teacher asked for help from the parents' cooperation. Some students were also found to often help their parents at their work, and the teachers could not prohibit smoking because they thought it was the right of the parents.

Theme 2. Early marriage among adolescents

In the case of early marriage in the school environment, usually 8th or 9th grade students have already been married because of the beliefs and traditions of the parents of students in the neighborhood since when a young girl rejects the marriage proposal the first time, it is thought to lead to bad events, so even though they are still junior high school students when there are already people who come to propose marriage to the parents then the children must accept the proposal. For relationships between the opposite sex in the school environment, the teacher stated that there were already some children who had started to date and were allowed to sit together alone in a place either in a crowded or quiet atmosphere in the classroom, but there were still limits.

Theme 3. Use of gadgets on devices and alcohol consumption

The use of devices for students in schools has been prohibited by teachers except for students with reasons due to examinations and other learning needs. The teachers forbid students from carrying gadgets, and they also often conduct raids to discipline students. Also, if some students have these devices, they will be confiscated and the contents of these gadgets checked. If a student is found to have

Table 4. Family structure and family function for providing ARH in family context (n= 34)

Variable	Mean±SD	P ₂₅	Md	P ₇₅	Interpretation
Family structure					
Family communication	9,00±3.06	6.00	9.00	11,00	Enough
Family power	7,59±2.50	6.00	8.00	9.25	Low
Family role	5,91±1.83	4.00	6.00	8,00	Low
Family value and norms	6,79±1.47	6.00	7.00	8,00	Low
Total scores	29,29±7.08	24.50	31.00	33.75	Low
Family functions					
Family affective	10.62±2.07	9,00	12,00	12,00	Low
Family socialization	7.06±1.69	6,00	7,00	7.25	Enough
Family healthcare	8.79±2.11	7,00	9,00	10.25	Low
Family reproduction	9.09±2.51	7.00	10,00	11.25	Low
Family economic	10.50±2.44	8,00	12,00	12,00	Low
Total scores	46.06±8.46	40.50	48.50	52.25	Low
Total score family structure and function	75.35±13.83	66,00	78,00	84.25	Low

Table 5. The differences of knowledge, attitude, behavior of ARH, and knowledge of HIV among students (n= 36)

Variable	Month 1	Month 2	Month 3	Month 4	X ² (p-value)
	n (%)	n (%)	n (%)	n (%)	
Knowledge of ARH					
High	7 (19.4)	22 (61.1)	25 (69.4)	30 (83.3)	33,6 (<0.001)
Low	29 (80.6)	14 (38.9)	11 (30.6)	6 (16.7)	
Attitude toward ARH					
Positive	19 (52.8)	13 (36.1)	24 (66.7)	29 (80.6)	16.2 (0.001)
Negative	17 (47.2)	23 (63.9)	12 (33.3)	7 (19.4)	
Behavior of ARH					
Risk	18 (50.0)	10 (27.8)	8 (22.2)	0	24.3 (<0.001)
No risk	18 (50.0)	26 (72.2)	28 (77.8)	36 (100.0)	
Knowledge of HIV					
High	21 (58.3)	28 (77.8)	31 (86.1)	32 (88.9)	11.9 (0.008)
Low	15 (41.7)	8 (22.2)	5 (13.9)	4 (11.1)	

ARH: adolescent reproductive health; HIV: human immunodeficiency virus

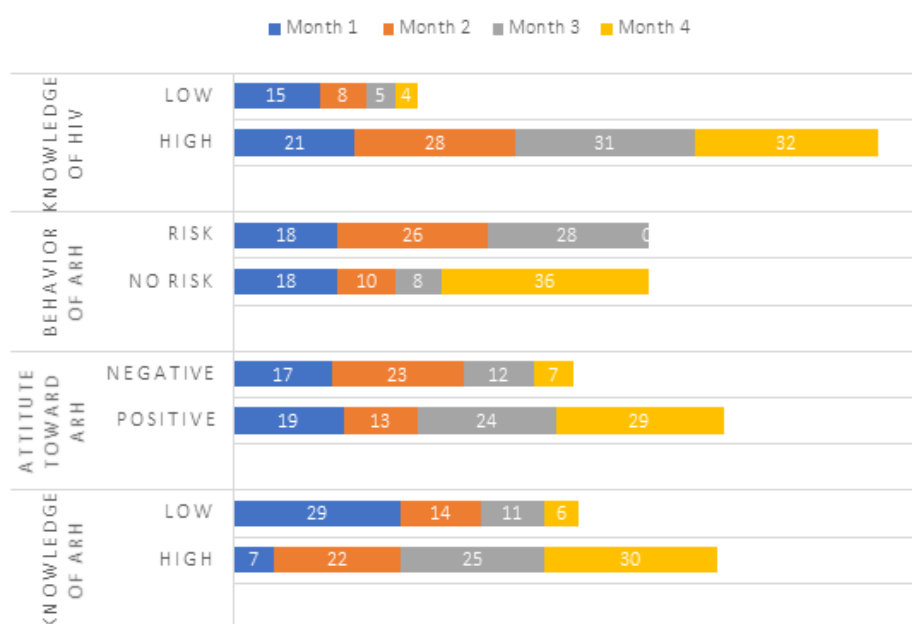


Figure 1. The differences of knowledge, attitude, behavior of ARH, and knowledge of HIV among students (n= 36)

a video or image that is not good on his cellphone then the teacher will call the parents of the students involved. The teachers explained that the results of the raid could prevent students from having pornographic content on their cellphones.

Experiments with the consumption of liquor are also found in the school environment. The teacher said that some students had tried to mix some drinks with alcohol. The teacher also said that this was due to the influence of teenagers outside of school who did not receive an education. The teachers also stated that sometimes there are students who do not sleep at their homes but stay at a friend's house without the knowledge of their parents.

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b. During the implementation of the ARH program

The results of theme identification with open-ended questions and in focus group discussions from the school community consultations during the implementation of the program obtained the following data.

Theme 4. ARH education method

Some teachers are sometimes still confused about how to convey information related to reproductive health in detail because they are afraid that their students are not ready to accept it even though the teacher also knows sometimes some students already are exposed to the information through social media or gadgets. The teachers also said that the role of parents is sometimes lacking because some parents think there is no need to teach reproductive health to children. Some parents believe the students will know more by themselves when it is time.

The teachers also said that if students experience technology shock and the role of parents is lacking because there is no limitation in the use of technology and gadgets, and this may be due to

the existence of some parents who are less familiar with the technology. The teachers suggested the content in the film can demonstrate how to manage the use of gadgets and the dangers of smoking. The films raised some important issues related to menstruation, the risks of using devices for teens and about early marriage.

Theme 5. Contents of ARH education

The description of ARH material in the schools was given through biology lessons to 9th-grade students in the chapter on the reproductive system, and some students wanted to ask about growth and development, changes in their reproductive organs, and problems with reproductive organs such as vaginal discharge. Besides that, education related to how to cleanse themselves for girls and boys is also taught at school, and the teacher also provides training regarding how to maintain the cleanliness of the body for female students who menstruate such as the number of times a pad should be changed, the limits that must be made by both male and female students when they are puberty, with explanations of the cycle and duration of menstruation. At school, some 7th-grade students are married but are limited in their interactions. At school, teachers have given lessons on reproductive health both in biology and physical education, but sometimes some students still consider it to be a taboo subject.

c. After implementation of ARH program

The results of theme identification with open-ended questions and in focus group discussions from the school community consultations after the implementation of the program obtained the following data.

Theme 6. To confidently teach ARH

Impressions and messages from students conveyed that from this program many gained new knowledge about ARH. From the quizzes given related to physical and psychological changes both for young men and women they had begun to understand and know the changes that usually occur.

Impressions and messages from students indicated that they feel this program not only increased their knowledge related to reproductive

health but with the excitement of the filming event, they can better enjoy the course of this activity. From the quizzes given about adolescent reproductive health, students had begun to identify changes both physically and psychologically at puberty.

4. Discussion

The CPR community service program in the form of a youthful "reproductive health" creative short film program with local wisdom went according to plan. The school community could engage in joint partnership activities in the promotion of ARH, where the knowledge, attitudes, and behavior of ARH and the knowledge of students' HIV increased after the intervention of the ARH short film program that is friendly to local wisdom. The results of this activity are the same as the previous activities in which youth corner activities can improve students' ARH life skills¹⁴, and community-based youth health clinics can improve knowledge, attitudes, and skills of ARH.⁸ These results indicate that community empowerment activities with local environmental resources can increase the awareness, willingness, and ability of the school community to behave in a healthy manner concerning ARH.

Knowledge, attitudes, and behavior of ARH students in this partnership program are enhanced in forming adolescents who are active in reproductive health issues because, in the future, these teens will create a family.¹⁵ For this reason, there is a need for adolescent ARH guidance through partnerships between schools and health centers and BPPKB in increasing student creativity to improve adolescent life skills in ARH.¹⁶⁻¹⁹ The media for making "youthful reproductive health" short films that are friendly with local wisdom is used as an approach in the promotion of these community service activities because visualization in ARH education is better able to increase students' understanding and skills.²⁰ Student creativity is encouraged in making this short film as a medium for promoting ARH health education, which is an independent CPR program managed by and made by, and for students who are friendly with local wisdom.

The ARH short film which is friendly with local wisdom contains ARH material, including: (1) what

is adolescent reproductive health; (2) why physical changes occur when entering puberty; (3) why teenagers can menstruate and have wet dreams; (4) why adolescents often change their emotions quickly; (5) what is pregnancy; (6) what is a sexually transmitted disease; (7) what is HIV / AIDS; (8) how does LGBT occur; (9) how to maintain the cleanliness of the reproductive organs; and (10) how the juvenile life is safely accomplished during puberty.^{8,20,21} The material in this short film is played by middle school students and is harmonized with the local wisdom culture according to the local social culture.^{22,23} Therefore, students can explore the role in the film by internalizing and practicing ARH in their lives.

The CPR service program about ARH emphasizes the activities of each member who has the desire to share issues related to the fulfillment of ARH growth and development needs and the activities help them overcome challenges through creating a short film. From the qualitative analysis, teachers and students have learned ARH material and new methods to share new information. Therefore, the PCR during this time also facilitated the formation of ARH short films in the schools that were integrated with the school curriculum and the school health program, both intracellular and extracurricular.^{18,24,25} From this program, it is hoped that the formation of media for promoting ARH through school short films are integrated with school health activities as well as engaging the cooperation between school with Puskesmas and BPPKB facilitated by the University of Jember. In this PCR activity, the school as a partner participated in the implementation of the program through the provision of human resources, namely students and teachers in making the ARH short film in accordance with local wisdom. Besides that, the schools were also involved in providing support for the provision of space and time for PCR program activities.

5. Conclusion

The local wisdom-friendly "Healthy ARH" short film creativity program is able to improve the knowledge, attitudes, and behavior of the ARH, as well as the students' HIV knowledge. The short film "Healthy ARH" with local wisdom-friendly content can be

used as a medium for ARH education in schools by integrating with the school health program. In the future, the schools can be more involved in developing health promotion media for short films about ARH for school students by coordinating with the BPPKB and the local Puskesmas and building networks with NGOs concerned with adolescent issues by creating a Memorandum of Understanding (MoU) and implementing activities in the MoU. The schools can also encourage the development of students' creative interest activities by developing ARH short films that are friendly with local wisdom.

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Conflict of interest

The authors declare that there are no conflicts of interest.

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The effect of midwife training in strengthening the mental health of postpartum mothers

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ABSTRACT Most midwives in the Cangkringan Community Health Center and Pakem Health Center are not familiar with the symptoms of blues depression. They do not have the knowledge and skills to handle it, and social and spiritual support are not provided to postpartum women. Data showed that in the Cangkringan Community Health Center, blues depression occurs in 60% of perinatal patients; there were 2 cases due to delayed treatment, and one mother almost killed her baby. In the Pakem Health Center area, blues depression occurs in 48.1% of perinatal patients; there were 2 cases who experienced postpartum depression due to late handling, and one mother tried to commit suicide. If blues depression is not handled properly and immediately, it can cause postpartum depression, which has one of the worst complications, namely postpartum psychosis. One effort to overcome this serious social problem is by providing midwife training on early detection and handling of blues depression accompanied by social support. In this study, social support and spiritual training were done in six sessions, with meetings once a week over 1.5 months. The tools in this research included instruction with an early detection for blues depression module, social support and spiritual training for blues depression prevention, as well as the administration of the Edinburgh Postnatal Depression Scale questionnaire. Research methods in this study used presentations, discussions, role plays, practice, meetings/gatherings, and implementation. Data analysis used a quantitative descriptive approach. Research subjects consisted of 47 midwives from the Cangkringan Community Health Center and Pakem Health Center areas and 67 postpartum women from the Cangkringan Community Health Center and Pakem Health Center areas. The results showed that the average value of blues depression prevention knowledge was 43.45 before the training and afterwards, it increased to 85.20. The average value of blues depression early detection knowledge was 57.56 before the training and afterwards, it increased to 91.27. The average value of blues depression prevention skills was 36.45 before the training and afterwards, it increased to 80.25 while the average value of blues depression early detection was 51.30 before the training and afterwards, it increased to 90.20. Blues depression in postpartum women in the Cangkringan and Pakem health centers was 57%. Additionally, the average value of knowledge about blues depression control before the training was 43.45% which changed to 85.20% after the training with an increase of 41.75. The average value of skills regarding prevention and early detection of blues depression before the training was 36.45 which changed to 80.85 after the training with an increase of 44.40. The whole series of training for the midwives in the Cangkringan Community Health Center and Pakem Health Center areas could improve the knowledge and skills of midwives to overcome blues depression in postpartum women, reduce the incidence of blues depression in postpartum women, and reduce maternal and child mortality due to postpartum mental disorders.

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1. Introduction

One of the causes of high Maternal Mortality Rate (MMR) and Infant Mortality Rate (IMR) is the existence

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of mothers' mental health problems. Maternal blues depression is the beginning of the occurrence of mental disorders in postpartum mothers which later can adversely affect the mother and baby.³ If blues depression is not handled properly and immediately, it can cause postpartum depression, which in turn will cause one of the worst complications, namely

postpartum psychosis. Severe psychiatric disorders after childbirth can increase the risk of suicide by up to 70 times compared to other causes, especially in the first year after delivery. More than 50% of perinatal patients experience blues depression, which is the most common mood disorder in the postpartum period. Blues depression affects about 50-80% of postpartum women which usually appears on the first day and increases for three to five days.¹

Cangkringan Health Center is 13.5 km from the summit of Mount Merapi while Pakem Health Center is 14 km from the summit of Mount Merapi. After the 2010 eruption of Mount Merapi in Cangkringan District, Sleman Regency, 60% of postpartum women experienced blues depression.² In Jetis District, Bantul Regency, after the earthquake, 52% of postpartum women experienced blues depression.² The eruption of Mount Merapi, which caused many casualties, tremendous damage, loss of residences, loss of work and having to move to a new place of residence, became a major stressor that further exacerbated the concerns of mothers in the perinatal period. Psychiatric disorders after disasters can be prolonged, and some will even become post-traumatic disorders for a period of more than 30 years.³ Socio-economic changes due to disasters affect the harmony of husband and wife. The husbands often have to work more to provide social support to their wives when they are pregnant and after giving birth, so that the wife has increased risk of experiencing blues depression due to isolation.¹

For teenagers after the eruption of Mount Merapi, there were mainly the influences of the Lava Tour environment, workplaces on the Gendol River, and peer behavior. These risks increase the number of early marriages and extramarital pregnancies which add to the potential for blues depression. In the Cangkringan maternity clinic among perinatal patients, 60% of cases had blues depression, and there were two cases of blues depression which were due to delays in treatment that became postpartum psychosis with attempts to kill the baby.¹ In Puskesmas Pakem, pregnancy rates outside of marriage are quite high.⁴ In 2015, cases of early pregnancy amounted to 20 cases at risk of becoming blues depression, 2 cases of late handling of cases of blues depression, and one case of a mother committing suicide.⁵ It was

found that 48.1% of postpartum women had blues depression.⁵ Childbirth care costs covered by the new Universal Health Plan (BPJS) applies only to treatment for the first 24 hours and has a negative impact on the physical, psychological and social conditions of most mothers who are actually not ready to independently care for their babies. Additionally, the inability to care for themselves at home and for their child after delivery are severe stressors and triggers the emergence of blues depression.

Accordingly, this study aimed to see the effect of specialized training given to midwives in strengthening the mental health in postpartum mothers.

2. Method

This study used data taken from activities conducted between June to October 2018, in the Cangkringan Health Center and Pakem Health Center, Sleman, Yogyakarta. The study subjects consisted of 47 midwives and 67 postpartum mothers. The tools included a blues depression early detection module, social and spiritual support for blues depression management, the Edinburgh Postnatal Depression Scale (EPDS) questionnaire, the skills and knowledge of blues depression early detection questionnaire, and the social and spiritual support questionnaire. The methods used were lectures, discussions, role playing, practice, mentoring, and implementation. Data analysis combined both qualitative and quantitative approaches.

3. Result

3.1 Characteristics of Subjects

Midwife training was conducted in the Cangkringan Puskesmas and Pakem Puskesmas. The Cangkringan Puskesmas area covers Cangkringan Puskesmas, PKU Muhammadiyah Cangkringan, and the Azizah Midwife Clinic. The Pakem Puskesmas area includes the Puskesmas Pakem, PKU Muhammadiyah Pakem, the Felisiana Clinic, and the Fitri Nurul Clinic with as many as 47 total people.

The number of midwives who participated in the training from the Cangkringan Community Health Center which included the Cangkringan Health Center, Muhammadiyah Cangkringan PKU, and the

Table 1. Distribution of midwifery in Cangkringan and Pakem Health Centre

Characteristics	N	%
Work office		
Cangkringan Health Centre	23	52.00
Pakem Health Centre	24	48.00
Age (years)		
20-29	25	53.10
30-39	12	25.50
40-49	8	17.20
≥50	2	4.20
Education level		
Diploma 3	24	51.00
Diploma 4	22	46.00
Bachelor Degree	1	3.00
Total	47	100

Table 2. Characteristic of postpartum mothers in Cangkringan and Pakem Health Centre

Characteristics	N	%
Age (years)		
<20	3	4.47
21-35	50	74.64
>35	14	20.89
Education level		
Junior High School	3	4.47
Senior High School	46	68.80
Higher Education	18	26.73
Occupation		
Government employees	21	31.34
Farmer	15	22.40
Entrepreneur	3	4.47
Housewife	28	41.79
Parity		
Primipara	45	67.2
Multipara	22	32.8
Total	67	100.0

Azizah Midwife Clinic was 24 people (52%) and the Pakem Health Center area included the Pakem Health Center, Muhammadiyah PKU Hospital, Felisiana Clinic, and Fitri Nurul Clinic. Most of the midwives' age were between 20-29 years, with 25 people or 53.1% (Table 1). Most education was D3, which were as many as 24 people (51%).

From the respondents' characteristics questionnaire (Table 2), it was found that there were women who married early, as many as 3 people (4.47%) of 67 postpartum mothers. Most of the

postpartum mothers are women of childbearing age in the age range of 21-35 years, which was as many as 50 people (74.60%). The most education was high school with as many as 46 people (68.8%). The most common work was as housewives with 28 mothers (41.79%). Parity was more prevalent with 45 primigravids (67.1%).

3.2 Level of knowledge of midwives

After the training, a measurement of knowledge about social support, early detection and prevention of blues depression was done for midwives in the Cangkringan Health Center and Pakem Health Center. After being given training with lectures, discussions, simulations, and group presentations, there were changes in the average value of knowledge about prevention and early detection of blues depression from 43.45% before the training to 85.20% after the training (Table 3). Additionally, the knowledge of blues depression detection changed from 57.56% before the training to 91.27% after the training.

3.3 Midwife skill level

After the training, skills were measured in the early detection and management of blues depression among midwives in the Cangkringan Puskesmas and Pakem Puskesmas areas. There were changes in the average value of knowledge about prevention and early detection of blues depression from 36.45 before the training to 80.85 after the training, with an increase of 44.40 (Table 3).

3.4 Tendency to blues depression in postpartum women

The tendency of blues depression in postpartum women in the Cangkringan Community Health Center and Pakem Health Center Area changed after the training of midwives. The tendency of blues depressions in postpartum women in the Cangkringan Puskesmas and Pakem Puskesmas areas decreased by 57% to 24%, or decreased by 16 people (33.00%) (Table 4). Mothers who had no tendency of blues depression increased from the previous 29 people to 41 people with an increase of 12 people (17.30%).

Table 3. Distribution of midwifery' knowledge and skills items mean of scores regarding blues depression intervention dan early detection of blues depression.

Variable	Pretest	Posttest	Changes
Knowledge of blues depression intervention	43.45	85.20	+41.75
Knowledge of blues depression early detection	57.56	91.27	+33.71
Social support skill	36,45	80,85	+44,40
Early detection skill	51,30	90,20	+30,90

Table 4. Score changes in the tendency of blues depression in postpartum mother

Variable	Pretest		Posttest		Changes	
	F	%	F	%	F	%
No tendency of blues depression	29	43	41	60,70	+12	+17.30
Blues Depression	38	57	16	24.00	-16	-33.00

4. Discussion

Increased knowledge of midwives will have an impact on preventing blues depression disorders in pregnant women in Puskesmas in Pakem and Cangkringan. This result is supported by the statement of several midwives that with training they can understand the true support of appreciation in the form of giving praise to postpartum mothers. Midwives can understand true and complete instrumental social support, understand information support with advice on how to provide baby care, enjoyable food to prevent blues depression, and better understand social companionship support and religious support. Before the training was held, midwives did not know about complete religious support. Usually midwives only advised mothers to accept life (*dhikr*), but did not pray to reduce their pain and suffering. After the training, the midwife learned that there was a need for religious support from the midwife by reciting prayers to reduce pain with gentle contact by stroking her stomach.

After training, midwives can provide empathy with social support and appreciation support as well as giving praise to the women who will give birth. Social support helps mothers develop and apply their personal maternal abilities and adapt better in difficult situations in order to reduce stress.⁶

Midwives can provide instrumental support in the form of touches of affection by stroking the mother's waist, shoulders, and forehead. In addition, midwives can provide religious support by giving

prayers to reduce suffering, supportive advice by providing information related to how to breastfeed properly in order to increase the attachment between the mother and her baby and how to add food and drinks that increase good, healthy feelings to prevent blues depression.

Midwives who assist in childbirth in the Cangkringan Health Center and Pakem Health Center can provide social companionship support by diverting the mother's pain by sharing fun stories with sweet memories that are uplifting. After the training, there were changes in the knowledge about the early detection of blues depression using EPDS from the initial score of 51.30 to 90.20, with an increase of 30.90. Increased knowledge and skills of midwives in providing social support for the prevention of blues depression and early detection will have an impact on preventing the occurrence of blues depression disorders in postpartum women in Puskesmas in Pakem and Cangkringan.

Midwives can provide prevention and treatment of blues depression through preparation of food intake that contains sufficient iron and drinks that can increase the good, healthy feelings in postpartum mothers so as to prevent the occurrence of blues depression. In addition, providing care during the time of pregnancy until the delivery process includes attentiveness, emotional support, appreciation (support awards), touch of affection, touch to sooth delivery (instrumental support), providing advice for strength, and boosts for endurance of the mother

and baby (information support). The midwives can also provide prayers to reduce pain and facilitate labor (spiritual support). By inviting mothers to talk about something fun (social companionship support) they can provide prayers to reduce pain, facilitate childbirth, shift attention with funny stories, and share happy times for patients to divert pain, anxiety, in the face of childbirth.

The results of midwives' social support training in the Cangkringan Puskesmas and Pakem Puskesmas areas in the form of emotional support, rewards, instrumental advice, helpful information, social companionship and religious support were found to reduce the degree of blues depression in postpartum women. Providing emotional social support from midwives was done in the form of giving attention with affection. Social support rewards were done by giving compliments on the strengths and successes of mothers in undergoing labor. Instrumental support was done by giving a gentle touch on the belly, and caresses for postpartum mothers. Information support was done by providing advice on baby umbilical cord care, perineal care (birth canal), and eating foods that make the mothers feel healthy and happy, how to breastfeed properly and demonstrating ways to improve the attachment of the mother and her baby.

Social support provided by midwives will increase the mothers' feelings of calmness and satisfaction, increase dopamine, which will increase feelings of happiness, and security, and increase the hormonal endorphins which will ultimately reduce stress and depression.⁸ Providing social support from midwives during childbirth, time to go home and initial time of baby care was done in the form of giving attention, affection, prayer, appreciation, advice and preparing husbands to provide support during childbirth which can make postpartum women become more confident, increase self-esteem and calmness.⁸ These supports will reduce stress hormones, and cortisol levels which in turn will reduce the degree of blues depression.

The husband's social support that was given by midwives in providing social support during the postpartum period for postpartum mothers took the form of instrumental support, which included among

others ways: helping to care for the baby, massaging if the mother is tired, holding the baby, changing diapers at night and helping to pray to reduce pain if the mother experiences pain in the breast and uterus. Emotional support involves paying attention to the mother's needs, calming the mother when she is restless, she does not feel happy, feeling sad, or angry, and comforting her when she feels insecure and anxious.^{9,10}

Research has showed that social support from midwives and husbands will reduce the potential for a mother to have severe blues depression.^{1,7,11,12,7} Women who feel cared for, valued, and loved, will increase their confidence and self-esteem so that they can reduce blues depression. Satisfaction from social support that is obtained by postpartum women will increase their comfort, help them relax, reduce fear, anxiety, and stress which in turn can reduce blues depression.¹³

Biologically, the satisfaction of social support is due to the chemical bonding between dopamine and dopamine receptors in the nucleus accumbens which can reduce cortisol secretion and stimulate oxytocin release.¹⁴ Decreasing cortisol and increasing oxytocin reduce sympathetic nerve activity. This biological process will create a sense of comfort, relaxation, reduce the state of stress, fear and anxiety, thereby reducing the physiological effects of postpartum stress which in turn will reduce blues depression.^{15,16}

5. Conclusion

Midwife training can improve midwife knowledge and skills in early detection and prevention of blues depression in postpartum mothers in the Cangkringan Puskesmas and Pakem Puskesmas, and as a result, there was a decrease in the tendency for blues depression in postpartum mothers in the Cangkringan Puskesmas and Pakem Puskesmas. The outcomes obtained from this community service project are expected to be part of the permanent program of the Puskesmas or maternity clinics in the Cangkringan Puskesmas and Pakem Puskesmas areas. Midwives should be more skilled in early detection of blues depression and skilled in providing social support in post-natal services in order to prevent serious episodes of postpartum depression.

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Conflict of interest

The authors declare that there are no conflicts of interest.

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