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Research Article

Behavior assessment for non-communicable disease prevention; using the health belief model

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ABSTRACT

Background: *A community-based health program aims to educate and facilitate community behavior in adopting a healthy lifestyle. This study aims to evaluate whether the program positively impacts community behavior by assessing perceptions and health behavior practices based on active participation after the program has been implemented for one year. The contribution of this research can be used by program managers and as material consideration and development of further activities.*
Methods: *This was quantitative research with a cross-sectional approach. The population of this research totals 165 people, a sample of 54 people in the 36th neighborhood at Jogokariyan-Yogyakarta, Indonesia. Perception assessment using the health behavior model (HBM). The study used primary data obtained from questionnaires. This questionnaire used a Likert scale to measure the variables and was analyzed using the chi-square test.*
Results: *The results of the chi-square test showed statistical values of perceived vulnerability (p = 0.022), perceived seriousness (p = 0.012), perceived benefits (p = 0.018), perceived barriers (p = 0.007), self-efficacy (p = 0.202), and the stimulus to act (0.004).*
Conclusion: *There was a relationship between participation in activities, perceived vulnerability, perceived seriousness, perceived benefits, perceived barriers, and stimulus to act with disease-preventive behavior. There was no relationship between self-efficacy and the stimulus to act. The program managers should consider sanctions for active smokers in the house and at community gatherings.*

Keywords: *Health Belief Model; non-communicable disease; Preventive behavior*

INTRODUCTION

Today, Non-communicable diseases (NCDs) are responsible for 7 out of 10 deaths worldwide. The most significant burden is in low- and middle-income countries, where 78% of all deaths from non-communicable diseases and 85% of premature deaths occur (1). In Indonesia, heart disease, cancer, chronic lung disease, and diabetes mellitus are among the top 5 causes

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of death that impact quality of life and economic productivity. Every year the number of these cases continues to increase along with increased risk factors, such as high sugar/salt/fat consumption, smoking, and low physical activity. In 2020, health insurance spent 17.05 trillion rupiahs for the service of the disease (2). Based on the data health profile of the City of Yogyakarta in 2019, non-communicable diseases dominate the causes of death. The Integrated Disease Surveillance Report (STP) at Hospitals in DIY in 2020 obtained data on the top 10 diseases, 8 of which are non-communicable. The top ten diseases in hospitals (outpatient) are hypertension (29944 cases), type II diabetes (14090 cases), and heart disease (3566 cases) (3).

Non-communicable diseases have many risk factors. Modifiable behavioral risk factors are tobacco use, unhealthy diet, lack of physical activity, harmful use of alcohol, obesity, increased blood pressure, and elevated cholesterol. These risk factors remain a significant public health challenge in all countries, especially in low-income countries where more than three-quarters of deaths from non-communicable diseases occur (4). The Government of Indonesia creates a movement to change people's healthy lifestyles to control non-communicable diseases. It aims to improve the health status of the community through promotive and preventive efforts through physical activity campaigns, consumption of vegetables and fruit, and regular health checks (5).

A community-based health program in Jogokaryan has adopted the national movement's healthy lifestyle due to the high prevalence of hypertension in the elderly group at Jogokaryan, Yogyakarta. The program is called “Germacis," this program aims to change community behavior to love healthy life movements. The activities are smoke-free villages, health education, periodic health checks, physical activities, and advocacy to replace the snack menu at community meetings with fruit and vegetables (6).

Perceptions determine a person's behavior formation, which is essential in studying behavior (Zainal, 2019). Each individual tends to see an object differently depending on knowledge, experience, and point of view. Perception is also related to a person's perspective on a particular object differently by using their senses and then trying to interpret it. The subconscious mind will store positive and negative perceptions like a file. Previous studies using HBM have established that adult perceptions indirectly positively affect hypertension prevention behavior (7). Jorvand ((2020) found that implementing educational interventions based on Telegram messenger with an emphasis on health beliefs can lead to exercise. It means that the more patients believe in their illness, the more they encourage healthy behavior (7–12).

We hope that the experience of community-based health programs can improve the perceptions of its members and their willingness to practice. This study aimed to determine the relationship between community participation in the healthy living movement and the perception and practice of preventing non-communicable diseases using the Health Belief Model (HBM).

METHOD

This quantitative study uses the theory of health belief model to evaluate the perception and practice of healthy living in individuals based on the level of participation during community-based health programs (7). Data were collected from February until March 2021 at Mantrijeron sub-district, Yogyakarta, Indonesia. The total population is 165 people in the

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village of 36 Jogokariyan, with a sample of 54 respondents. Using a simple random technique, we found 38 active participants and 16 inactive participants.

Based on the inclusion criteria were 1) only for participants of ' the program (active and non-active participants), 2) aged 45-75 years, 3) suffering from hypertension and diabetes mellitus, and the exclusion criteria for the sample were: 1) had moved from Jogokariyan village, 2) not willing to be interviewed. The study used primary data obtained from questionnaires. a Likert scale as a measurement of the variables since it is suitable to measure a person's perception or attitude. The answer score was 1-4 (scale of 1 to disagree to 4 to agree) and vice versa for unfavorable questions. Due to the small number of samples, the variables were categorized into two groups to avoid empty cells. The scores for each variable are added and then grouped based on the: if the total score on one variable is more than the median, then it is grouped to be positive or vice versa.

This questionnaire consists of 8 types of questions. The first was community participation in community-based-program. Second, the public's perception of the susceptibility of a disease (perceived susceptibility: median when the score >=15). The third was determined the respondent's belief in the seriousness of hypertension and diabetes mellitus disease (perceived severity; when the score >=20). Fourth, the perceived benefits of healthy living practices to reduce the threat of hypertension and diabetes mellitus disease (when the score >=29). The fifth was public opinion about the barriers that can affect behavior in implementing healthy living practices (perceived barriers) when the score >=29). The sixth was people's beliefs about their abilities in healthy living practices (self efficacy= when the score>=24). Seventh was the stimulus or stimuli that make people make decisions to practice healthy living (cues to action was categorized as “good” when the score >=35). The eighth was found out the health behavior of the Jogokaryan community, with scores of 4-6.

The validity test results of community participation in community-based health programs were to be valid with an R-value of 1.00. The results of the validity test of the questionnaire on the perception of vulnerability perception, seriousness, benefits, obstacles, self-efficacy, and stimulus to act, it is known that there are two questionnaire items on the statement of vulnerability perception that are not valid with r values of 0.210 and 0.283. Invalid questionnaire items were subsequently not used for research. The results of the reliability test using Cronbach's Alpha. Reliability results were; for participation in the program with a value = 1; perceived vulnerability value = 0.613; perceived seriousness value = 0.635; perceived benefit value = 0.725; perceived obstacle value = 0.787. Self-efficacy value = 0.709; the stimulus to act value = 0.756 and the implementation of behavior in the community value = 0.732, indicating the reliability of the questionnaire reliability test results. The analysis used the chi-square test.

RESULT

The results of the univariate analysis describe the distribution of the frequency and percentage of the characteristic of respondents, perception, and prevention behavior of the non-communicable disease.

Table 1. Distribution of Respondent Characteristics Age, Gender, and Education Level in Jogokariyan Village

Number	Variable	Category	N	%
1.	Age	45 – 54 years old	15	27.8

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		55 – 65 years old	26	48.1
		66 – 74 years old	13	24.1
2.	Sex	Male	25	46.3
		Female	29	53.7
3.	Level of education	Elementary school	12	22.2
		First, middle school	14	25.9
		High middle school	19	35.2
		University	9	16.7

Respondent's ages were divided into three groups, represented most age groups were 55 – 65 years (48.1%), women (53.7%), and education level; high school or equivalent (35.2%).

Membership status

In this study, the activeness of the respondents was interpreted by participating in healthy gymnastics or participating in health checks held by the programmer team, or participating in declarations of commitment not to smoke at community meetings, in the house, and near mothers and children. In this study, the activeness of the respondents was interpreted by participating in healthy gymnastics, participating in health checks held by the programmer team, or participating in declarations of commitment not to smoke at community meetings, in the house, and near mothers and children. Table 2 can be categorized all variables:

Table 2. Frequency Distribution of variables based on category

No	Variable	Category	n	%
1.	Perceived vulnerability	Negative	23	42,6
		Positive	31	57,4
2.	Perceived seriousness	Negative	27	50
		Positive	27	50
3.	Perception of benefits	Negative	18	33,3
		Positive	36	66,7
4.	Perception of barriers	Negative	19	35,2
		Positive	35	64,8
5.	Self-Efficacy	Negative	25	46,3
		Positive	29	53,7
6.	Cues to action	Negative	23	42,6
		Positive	31	57,4
7.	Membership status	Active	38	70.4
		Non-active	16	296
8.	NCD's Prevention Behavior	Bad	21	38,9
		Good	33	61,1

Source: Data Primary, 2021

In all perception variables in this study, positive perceptions outnumbered negative perceptions. Respondents who stated positive perceptions of perceived vulnerability were 57.4%, who expressed positive perceptions of perceived vulnerability, were 57.4%.

Respondents agreed that smoking could increase the risk of hypertension and diabetes mellitus are 75.9% and agreed that unhealthy eating habits cause hypertension and diabetes mellitus is 81.5%. Respondents agree that there is no health impact if they reduce their sugar, salt, and fat consumption by 25.9%, indicating that their knowledge about managing hypertension and diabetes is still low. 76% agree that routine health checks can help early detection of hypertension and diabetes mellitus.

Respondents agreed that hypertension and diabetes mellitus are severe 50%. It can cause damage to internal organs 77.8% believe this disease will change their outlook on healthy living. However, only 44.5% of respondents agree that hypertension and diabetes mellitus will not change the respondent's daily life. 37% of respondents believe that having hypertension and diabetes mellitus will not have a significant impact on their lives and their families. 42% believe that hypertension and diabetes mellitus will not significantly impact their career, 70.4% believe this disease will change their view of healthy living 54.8%.

The categorization results based on respondents' statements about perceived benefits answered that 66.7% believed that the behaviors offered in the program were beneficial for preventing hypertension and diabetes mellitus. Most 88.8% of respondents agree that practicing healthy living can improve quality of life, and 72.1% agree that managing body weight can prevent hypertension and diabetes mellitus. Generally, people believe that avoiding smoking, limiting sugar and salt consumption, and consuming lots of vegetables and fruit can reduce the risk of hypertension and diabetes mellitus.

More than half, 64.8% of the respondents, feel confident that there are no barriers to healthy behavior. The study found that 46.3% of respondents agreed that losing weight is a new habit challenging, and 55.7% of respondents agree that being busy at work is an obstacle to regular physical activity. 42.5% of respondents think it is too troublesome to make their food.

From this study, 53.7% of respondents were unsure they could manage a healthy lifestyle to avoid the risk of disease, and 57.4% did not avoid consuming foods containing lots of salt and caffeine.

This study found that the family has an essential role as a support system for healthy behavior, but 24.1% of family members will not reprimand if the respondent smokes. 59.3% of respondents think posters and banners do not provide enough information about hypertension and diabetes mellitus.

The results show that the respondents who have good behavior 61.1%. The respondents carried out health checks at least once when the program (59.3%); respondents do not smoke (61.1%) and avoid exposure to secondhand smoke. As many as 57.4% of respondents do not routinely do physical activity for at least 30 minutes daily. Furthermore, 46.3% of respondents do not get enough rest or sleep every day, and 44.4% of respondents have not been able to manage stress well.

The relationship between participation in community-based health and the perception

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The relationship between participation in community-based health activities and the perception can be seen in table 3.

Table 3. Test Results Relationship of participation in activities community-based health with perceptions and behaviors of NCD prevention

Participation	Perceived vulnerability							
	Negatif		Positif		Total		P Value	PR (95% CI)
	n	%	n	%	n	%		
No Active	11	68.8	5	31.3	16	100	0.012	2.177 (1.228-3.861)
Active	12	31.6	26	68.4	38	100		
Perceived seriousness								
No Active	14	87,5	2	12.5	16	100	0.000	2.558 (1.585-4.126)
Active	13	34.2	25	65.8	38	100		
Perceived Benefit								
No Active	10	62.5	6	37.5	16	100	0.003	2.969 (1.440-6.119)
Active	8	21.1	30	55.6	38	100		
Perceived Barriers								
No Active	9	56.3	7	43.8	16	100	0.035	2.138 (1.077-4.242))
Active	10	26.3	28	73.7	38	100		
Self Efficacy								
No Active	9	56.3	7	43.8	16	100	0.341	1.336 (0.755-2.364)
Active	16	42.1	22	57.9	38	100		
Stimulus to action								
No Active	14	87.5	2	12.5	16	100	0.000	3,698 (2,027-6,732)
Active	9	23,7	29	76,3	38	100		
NCD prevention behavior								
No Active	12	75	4	25	16	100	0,000	3,167 (1,675-5,988)
Active	9	23.7	29	76,3	38	100		

The chi-square test results show that participation is significantly related to the perception of five components of the health belief model (HBM) in preventing hypertension and diabetes mellitus. For example, based on the results of the analysis of the relationship between participation in community-based health activities and the perception of vulnerability, there is a significant difference in the percentage of negative vulnerability perceptions (68.8%) of respondents who did not participate compared to respondents who participated (31.6%). The statistical test results obtained a p-value = 0.012, which means statistically, there is a relationship between active participation in activities and perceptions of vulnerability. Likewise, with the results of the analysis of the relationship between participation and

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perceived seriousness, the results of the statistical test obtained a value= of 0.000; perceived benefit p value = 0.003; perceived barrier 0.035; stimulus to action p value=0.000 which means that statistically there is a relationship between participation and perceptions.

The relationship between participation and the NCD prevention behavior

The results show a relationship between community participation in community-based health activities and NCD prevention behavior. The study results found a significant percentage difference between respondents who participated and did not participate in the behavior to prevent PTM. The statistical test results obtained a p-value of 0.000 which means that statistically, there is a relationship between activity participation and NCD prevention behavior. The bivariate analysis describes the relationship between participation in community-based health programs and NCD prevention behavior.

DISCUSSION

This study found that most of the elderly were aged 55-65 years. Increasing age will lead to a person's perception that they are susceptible to disease. Perceived disease susceptibility can refer to individual judgments that can encourage and motivate to behave healthily (12). The increasing age of the elderly makes their experience more mature to obtain information about health for themselves, and the elderly are aware of experiencing aging, which affects them physically and psychologically, making the elderly vulnerable to disease.

The participants of this study were more women than men. In this community health service, being in the midst of the community can be moved by part of the local community because of their awareness of their problems, so distance is not a problem. Indonesian women, in general, also have autonomy and individual attitudes in making decisions to practice healthy living. The findings of this study differ from research by Habib (2021), which states that women in Pakistan experience significant barriers to accessing TB health because of the lack of autonomy in making family decisions, problems with travel time, and lack of priority in health spending, and the lack of female health workers (13).

Knowledge is closely related to education; someone with higher education will have broader knowledge than someone with low education and knowledge about the dangers of disease, so their awareness grows to make efforts to prevent disease.

The chi-square statistical test results show a relationship between participation in this community-based program and all HBM constructs. This study is in line with (14–17) in the research showed a relationship between the effect construct health belief model and the prevention behavior. The perception of seriousness felt by respondents was influenced by the perceived threat perception. Individual perceptions influence health behavior. If the individual feels vulnerable and thinks that the disease can threaten him, then the individual will take action to protect himself or seek treatment (18).

The elderly, susceptible to hypertension and diabetes mellitus, will perceive the disease as threatening their lives. Perceptions of vulnerability and seriousness are related to disease prevention behavior, and respondents think that they are vulnerable and think that hypertension and diabetes mellitus are severe diseases and can threaten their lives. Some respondents actively participate in community-based health to carry out preventive practices through routine physical activities and health checks, are willing to replace cake snacks at community meetings by consuming fruit, and support residents not to smoke. Efforts to form a positive vulnerability perception so that residents practice healthy living to prevent

hypertension and diabetes mellitus, one of which is by strengthening communication strategies(10). Healthy living practices need to be carried out by all people. Therefore it is necessary to have the cooperation of all parties to play a role in conducting socialization and habituation of healthy living practices to prevent disease.

The health education strategy must touch vulnerable groups at high risk of developing hypertension and diabetes.

Rosenstock's theory explains that a person's beliefs about perceived vulnerability will encourage him to take action to prevent and support healthy behavior change. Change depends on the individual's belief in the effectiveness of actions to reduce the threat of disease or perceived benefits. Individuals aware of the benefits of healthy living practices will continue to take health actions (19). One effort to increase the perception of the benefits of practicing healthy living is to align this health-based program with integrated health posts.

This study'results indicate a relationship between perceived barriers and non-communicable disease prevention behavior. Most respondents have a positive perception of the barriers to healthy living practices. In line with the theory, that respondents feel that obstacles can affect the practice of healthy living. The more the individual feels obstacles in practicing healthy living, the less success he will have in practice. In line with Obirikorang research (2018), a significant predictor of non-adherence to hypertension therapy in Ghana is the high perceived barrier (20). The obstacles respondents feel to practicing healthy living are generally caused by personal obstacles. The elderly face obstacles in practicing healthy living and need support, assistance, and supervision from their families or health workers to overcome obstacles so that they elderly can practice healthy living. These efforts can provide motivation and confidence for the elderly to face obstacles in practicing healthy living. Another effort to reduce cigarette consumption is to have strict sanctions for active smokers who smoke in public places or at home. Sanctions that are applied need to be regulated jointly, regulated openly and designed to create fear of violations and provide a deterrent effect for violators.

The results of the study show statistically result that there is no relationship between self-efficacy and disease prevention behavior. Based on the data obtained from the respondents' answers, the number of lousy prevention behaviors with positive self-efficacy. This research is in line with Imtichan (2018), which explains a relationship (b = 1.51;95% dan p = 0.015) between self-efficacy and clean behavior among the elderly with hypertension. Sometimes individuals already feel confident about their ability to behave healthily, but the obstacles they face affect their efforts to behave healthily. Due to the obstacles faced, individuals with positive self-efficacy do not necessarily have good healthy behavior (21).

Bandura's theory (2002) explains that self-efficacy is always related and impacts the selection of one's behavior, motivation, and determination when facing problems. Self-efficacy can affect stress and anxiety levels through behavior that can solve problems. Individuals will feel anxious when faced with something beyond their control because of the threat that affects them. In line with research that there is a relationship between obstacles and healthy behavior, it affects individual self-efficacy. Respondents think the obstacles encountered affect their efforts to behave healthily even though they have positive self-confidence (22).

Self-efficacy can be done by increasing knowledge, strengthening community participation to reduce the risk of hypertension and diabetes mellitus, and maintaining the sustainability of healthy living practices through supervision and empowerment. Mentoring, support, and motivation will foster self-confidence and the ability to practice healthy living and face obstacles.

The results showed a relationship between the stimulus to act and disease prevention behavior. This study was in line with the research of Larki (2018), which states that there is a

stimulus relationship to act with self-care for hypertension sufferers. Respondents with low literacy have low self-confidence. Therefore they need to get stimulation from outside to practice healthy living in a supportive environment and health information through health education, mass and electronic media, and medical regulations from health workers who provide motivation and support for practicing healthy (23).

In line with the research findings, respondents received stimulation from outside through community-based health programs in the form of health education through counseling and print media (posters and wall clocks), motivation, support, and reprimand from family and closest people to carry out healthy living practices and maintain their health. It is necessary to strengthen the stimulus to act by improving health services for the elderly. Health services need to be provided early on at the pre-elderly age. Home visits to the elderly can help them obtain regular health checks. Strengthening support for the elderly is also needed; Support has a significant role in the efforts of the elderly to maintain their health status by practicing healthy living.

CONCLUSION

There is a relationship between the level of participation and perception and stimulation to act. There is no relationship between participation and self-efficacy. Health empowerment must touch vulnerable and at-risk community groups regularly. For the program's sustainability, it is necessary to involve the cooperation of all parties to take on the habituation of healthy living practices and create sanctions for active smokers at community gatherings and homes. There is a need for regular monitoring, support, and assistance from health workers so that the elderly can optimally participate in activities and can encourage the community to be more active in practicing healthy living and maintaining the sustainability of the program.

Authors' contribution

HA contributed to the research design, analysis, and manuscript. AY contributed to data collection and analysis.

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Conflict of interest

There is no conflict of interest in this research.

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