

The Use of Health Empowerment as Moderation Variable between Health Literacy and Health Behavior

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ABSTRACT

This article aims to examine the effect of health literacy on health behavior and the use of health empowerment as a moderating variable. This research was conducted in Blitar City, which has implemented the Healthy City program since 2011. The research method used a quantitative approach with data methods in the form of a questionnaire. Data analysis method used in this research is inferential statistical analysis using the structural equation modeling (SEM) PLS. The results showed that health literacy carried out as part of the Healthy City Program had a positive and significant impact on public health behavior, which is 0.268. The health behavior variable consists of health maintenance, health seeking behavior, and environmental health behavior. Of the three indicators, health maintenance is the dominant indicator that shapes health behavior, which is 0.921. Findings indicated that health empowerment also has a significant effect on health behavior amounting to 0.402. Meanwhile, result of moderating variable test indicate that health empowerment process is a moderating quasi variable which has a significant effect on the relationship between health literacy and health behavior.

Keywords

Health literacy; Health empowerment; Health behavior.

Introduction

Health is one of the pillars of successful development in a country. The degree of public health will affect the productivity of society, both in the economic, social and cultural fields. Blum, 1981 explained that there are four main factors that influence the degree of public health, namely behavioral/lifestyle factors, environmental factors (economics, politics, culture), health service factors and genetic/ heredity factors. Many studies have been conducted stating that a person's health status is influenced by their health behavior (Cho, Young & Lee, Shoou-Yih & Arozullah, Ahsan & Crittenden, Kathleen, 2008).

The recent outbreak of COVID 19 has shown the importance of healthy living behavior in the community. In general, behavior is influenced by two factors, internal and external. More specifically related to the health sector, a health behavior theory developed by Lawrence W. Green (1980) emerged. Green distinguishes two

determinants of health problems, namely behavioral factors and non-behavioral factors. Factors shaping behavior, among others: Predisposing factor, are factors that facilitate or predispose a person's behavior, including knowledge, attitudes, beliefs, values and traditions. The next factor is called enabling factors (factors that enable or facilitate behavior or action). It consists of age, socio-economic status, education, infrastructure and facilities and resources. While, the last factor is called reinforcing factors (factors that encourage or reinforce the occurrence of behavior, for example by the existence of community leaders who become role models).

As developing country, Indonesia is still experiencing many health problems. Based on Riskesdas 2018, the prevalence of non-communicable diseases has increased when compared to Riskesdas 2013, including cancer, stroke, chronic kidney disease, diabetes mellitus, and hypertension. Cancer prevalence increased

from 1.4% (Riskesdas 2013) to 1.8%; the prevalence of stroke increased from 7% to 10.9%; and chronic kidney disease increased from 2% to 3.8%. Based on examination of blood sugar, diabetes mellitus increased from 6.9% to 8.5%; and the results of blood pressure measurements, hypertension rose from 25.8% to 34.1%. The increase in the prevalence of non-communicable diseases is related to lifestyle, including smoking, alcohol consumption, physical activity, and consumption of fruits and vegetables.

Since 2013 the prevalence of smoking among adolescents (10-18 years) has continued to increase, namely 7.2% (Riskesdas 2013) and 9.1% (Riskesdas 2018). Data on the proportion of consumption of alcoholic drinks also increased from 3% to 3.3%. Likewise, the proportion of physical activity also increased from 26.1% to 33.5% and 0.8% of consuming excessive alcoholic drinks. Another thing is the proportion of fruit and vegetable consumption that is still lacking, where the 5 year old population is still very problematic, namely 95.5%. As for dental and oral health, Riskesdas 2018 recorded the proportion of dental and oral problems of 57.6% and 10.2% of those who received services from dental medical personnel. The proportion of proper brushing behavior was only 2.8%.

Another thing that shows that Indonesia still has problems with health is related to environmental health. This can be seen from the use of water per day and waste management. Compared to Riskesdas 2013, in households, water use <20L per person per day decreased from 5% to 2.2% (Riskesdas, 2018). For waste management, households that manage by burning are 49.5%. This shows that most people have not carried out proper waste management and are still wasteful in water use. Meanwhile, regarding access to health services, Riskesdas 2018 data shows the proportion of household knowledge on easy access to hospitals as follows; easy 37.1%; difficult 36.9%; and very difficult 26%. The data is based on the type of transportation, travel time and costs. Based on the health data above, it can be concluded that the status of public health and the health environment in Indonesia is still not good and must be improved. Some of them are caused by public health behavior, low public

knowledge about health and limited access to health services.

Methods

This research is an explanatory research with a quantitative approach. The research location is Blitar City, East Java Province, Indonesia. Respondents of the study were the people of Blitar City who were ≥ 18 years old. This age was chosen because the age of 18 years is the age of entering early adulthood, where a human being has started to show the process of maturity emotionally and psychologically. In addition, the perceptions and stored memories have been fixed, so that the individual can provide a picture of his perception of the object under study. A total of 156 respondents were randomly selected from three sub-districts, namely Sananwetan District, Sukorejo District and Kepanjenkidul District. Methods of data analysis using Partial Least Square (PLS) analysis

Results

1. Validity Testing

Validity testing is done by calculating convergent validity and discriminant validity. Convergent validity is known by loading factor. An instrument fulfills the convergent validity test if it has a loading factor above 0.6. The results of the convergent validity test are presented in the following table :

Table 1. Validity Testing

Variabel	Indikator	Loading Factor	SE	P value
Health Literacy	X1.1	0.751	0.068	<0.001
	X1.2	0.898	0.066	<0.001
	X1.3	0.896	0.066	<0.001
Health Empowerment	M1.1	0.648	0.070	<0.001
	M1.2	0.770	0.068	<0.001
	M1.3	0.849	0.067	<0.001
	M1.4	0.855	0.066	<0.001
	M1.5	0.781	0.068	<0.001
	M1.6	0.696	0.069	<0.001
Health	Y.1	0.921	0.066	<0.001

Behavior	Y.2	0.729	0.068	<0.001
	Y.3	0.854	0.066	<0.001

Based on the table above, it can be seen that the variable level of health literacy is measured by three indicators, including functional health literacy, communicative health literacy, and critical health literacy, where the three indicators have a loading factor value greater than 0.6. Thus the indicator is declared valid in measuring the variable level of health literacy. Community empowerment variables are measured by six indicators including authority, confidence and competence, trust, opportunity, responsibility, and support, where the six indicators have a loading factor value greater than 0.6. Thus the indicator is declared valid in measuring the community empowerment variable. Health behavior variables are measured by three indicators, including health maintenance, health seeking behavior, and environmental health behavior, where the three indicators have a loading factor value greater than 0.6. Thus the indicator is declared valid in measuring health behavior variables. Convergent validity can be seen not only through loading factors, but also through Average Variance Extracted (AVE). An instrument fulfills the convergent validity test if it has an Average Variance Extracted (AVE) above 0.5. The results of the convergent validity test are presented in the following table:

Table 2. Convergent Validity Test

Variable	AVE
Health Literacy	0.724
Health Empowerment	0.593
Health Behavior	0.703

Based on the table above, it can be seen that the variable level of health literacy, community empowerment, and health behavior results in an Average Variance Extracted (AVE) value greater than 0.5. Thus the indicators that measure the variables of the level of health literacy, community empowerment, and health behavior are declared valid.

Meanwhile, the discriminant validity is calculated using cross loading. The criteria was used if the loading factor value is greater than the correlation between the indicator and other variables, then the

indicator is declared valid in measuring the corresponding variable. The results of the cross loading calculation was presented in the following table:

Table 3. The Discriminant Validity

	X1	M	Y
X1.1	0.751	-0.067	-0.407
X1.2	0.898	0.047	0.165
X1.3	0.896	0.009	0.176
M1.1	-0.223	0.648	0.074
M1.2	-0.108	0.770	-0.147
M1.3	-0.055	0.849	0.085
M1.4	-0.299	0.855	-0.017
M1.5	0.278	0.781	0.085
M1.6	0.450	0.696	-0.085
Y.1	-0.081	0.039	0.921
Y.2	-0.156	0.077	0.729
Y.3	0.221	-0.108	0.854

Based on the measurement of cross loading in the table above, it can be seen that the overall indicators measuring the variables of the level of health literacy, community empowerment, and health behavior produce a greater loading factor compared to cross loading on other variables. thus the indicators that measure the variables of the level of health literacy, community empowerment, and health behavior can be declared valid.

2. Reliability Testing

Calculations that can be used to test construct reliability is composite reliability and Cronbach's alpha. The test criteria stated that if composite reliability is greater than 0.7 and Cronbach's alpha is greater than 0.6, the construct is declared reliable. The results of calculating composite reliability and cronbach's alpha can be seen through the summary presented in the following table:

Table 4. Reliability Testing

Variable	Composite Reliability	Cronbach's Alpha	Inf.
Health Literacy	0.887	0.807	Reliabel
Health Empowerment	0.897	0.860	Reliabel

Health Behavior	0.876	0.784	Reliabel
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Based on the table above, it can be seen that the composite reliability value on the variable level of health literacy, community empowerment, and health behavior is greater than 0.7. Thus, based on the calculation of composite reliability, all indicators measuring the variable level of health literacy, community empowerment, and health behavior are declared reliable.

Furthermore, the Cronbach's alpha value on the variable level of health literacy, community empowerment, and health behavior is greater than 0.6. Thus, based on Cronbach's alpha calculation, all indicators that measure the variables of the level of health literacy, community empowerment, and health behavior are declared reliable.

3. Measurement Model

The conversion of a path diagram into a measurement model can be seen through the following explanation:

a. Measurement Model of Health Literacy Variable

According to Table 1, The model for measuring the variable level of health literacy is as follows:

$$X1.1 = 0.751 X1$$

$$X1.3 = 0.898 X1$$

$$X1.4 = 0.896 X1$$

Based on the measurement model above, it is known that

1. The loading factor value of the functional health literacy indicator (X1.1) is 0.751. This means that the diversity of health literacy level variables can be represented by the functional health literacy indicator (X1.1) of 75.1%. In other words, the contribution of the functional health literacy indicator (X1.1) in measuring the health literacy level variable was 75.1%.
2. The loading factor value for the communicative health literacy indicator (X1.2) is 0.898. This means that the diversity of health literacy level variables can be represented by the indicator of communicative health literacy (X1.2) of

89.8%. In other words, the contribution of the indicator of communicative health literacy (X1.2) in measuring the variable level of health literacy was 89.8%.

3. The loading factor value for the critical health literacy indicator (X1.3) is 0.896. This means that the diversity of health literacy level variables can be represented by the critical health literacy indicator (X1.3) of 89.6%. In other words, the contribution of the critical health literacy (X1.3) indicator in measuring the health literacy level variable was 89.6%.
4. The measurement model for the variable level of health literacy is also able to inform that the critical health literacy indicator (X1.3) has the greatest loading value, which is 0.898. This means that the critical health literacy indicator (X1.3) is the most dominant indicator in measuring the health literacy level variable.

b. Measurement Model of Health Empowerment Variable

The indicators for measuring the variable of health empowerment can be seen in the table 1. It can be explained as follows:

$$M1.1 = 0.648 M1$$

$$M1.2 = 0.770 M1$$

$$M1.3 = 0.849 M1$$

$$M1.4 = 0.855 M1$$

$$M1.5 = 0.781 M1$$

$$M1.6 = 0.696 M1$$

Based on the measurement model above, it is known that:

1. The value of loading factor indicator of authority (M1.1) is 0.648. This means that the diversity of health empowerment variables can be represented by the authority indicator (M1.1) of 64.8%. In other words, the contribution of the authority indicator (M1.1) in measuring the health empowerment variable was 64.8%.
2. The loading factor value for the confidence and competence indicator (M1.2) is 0.770. This means that the diversity of health empowerment variables can be represented by the confidence and competence (M1.2) indicator of 77.0%. In

other words, the contribution of the confidence and competence (M1.2) indicator in measuring the health empowerment variable was 77.0%.

3. The value of the loading factor for the trust indicator (M1.3) is 0.849. This means that the diversity of health empowerment variables can be represented by the trust indicator (M1.3) of 84.9%. In other words, the contribution of the trust indicator (M1.3) in measuring the health empowerment variable is 84.9%.
4. The value of loading factor for the opportunity indicator (M1.4) is 0.855. This means that the diversity of community empowerment (health sector) variables can be represented by the opportunity indicator (M1.4) of 85.5%. In other words, the contribution of the opportunity indicator (M1.4) in measuring the health empowerment variable is 85.5%.
5. The loading value of the responsibility indicator factor (M1.5) is 0.781. This means that the diversity of health empowerment variables can be represented by the responsibility indicator (M1.5) of 78.1%. In other words, the contribution of the responsibility indicator (M1.5) in measuring the health empowerment variable was 78.1%.
6. The loading factor value of the support indicator (M1.6) is 0.696. This means that the diversity of health empowerment variables can be represented by the support indicator (M1.6) of 69.6%. In other words, the contribution of the support indicator (M1.6) in measuring the health empowerment variable is 69.6%.
7. The health empowerment variable measurement model is also able to inform that the opportunity indicator (M1.4) has the greatest loading value, which is equal to 0.855. This means that the opportunity indicator (M1.4) is the most dominant indicator in measuring the health empowerment variable.

c. Measurement Model of Health Behavior Variable

As shown in Table 1, The model for measuring health behavior variables is as follows:

$$Y.1 = 0.921 Y1$$

$$Y.2 = 0.729 Y1$$

$$Y.3 = 0.854 Y1$$

Based on the measurement model above, it is known that

1. The loading factor value of the health maintenance indicator (Y.1) is 0.921. This means that the diversity of health behavior variables can be represented by the health maintenance indicator (Y.1) of 92.1%. In other words, the contribution of the health maintenance (Y.1) indicator in measuring the health behavior variable was 92.1%.
2. The loading factor value for the indicator of health seeking behavior (Y.2) is 0.729. This means that the diversity of health behavior variables can be represented by the indicator of health seeking behavior (Y.2) of 72.9%. In other words, the contribution of the indicator of health seeking behavior (Y.2) in measuring health behavior variables was 72.9%.
3. The value of loading factor for environmental health behavior indicator (Y.3) is 0.854. This means that the diversity of health behavior variables can be represented by the environmental health behavior indicator (Y.3) of 85.4%. In other words, the contribution of the environmental health behavior indicator (Y.3) in measuring the health behavior variable was 85.4%.
4. The health behavior variable measurement model is also able to inform that the health maintenance indicator (Y.1) has the greatest loading value, which is 0.921. This means that the health maintenance indicator (Y.1) is the most dominant indicator in measuring health behavior variables.

5. Converting the Path Diagram into a Structural Model

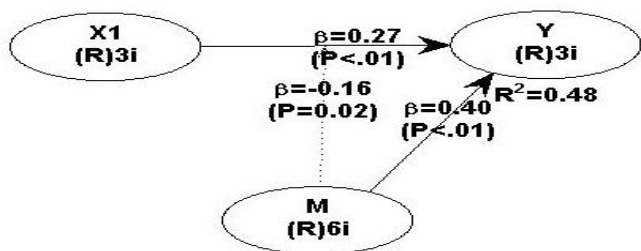


Figure 1. The Path Diagram

The path diagram conversion in the measurement model is intended to predict the effect of exogenous variable on endogenous variable as presented in the following table:

Table 5. The Effect of Exogenous Variable on Endogenous Variable

Exogenous	Endogenous	Direct Coefficient
Health Literacy	Health Behavior	0.268*
Health Empowerment	Health Behavior	0.402*
Health Literacy*Health Empowerment	Health Behavior	-0.164*

* (Significant)

Based on the table above, it can be seen that the structural model formed is:

$$\text{Equation: } Y = 0.268 X1 + 0.402 M - 0.164 XM$$

From the above equation, it can be seen that

1. The path coefficient of the level of health literacy on health behavior is 0.268, which states that the level of health literacy has a positive and significant effect on health behavior. This means that the better the level of health literacy, the more likely it is to improve health behavior.
2. The path coefficient of community empowerment on health behavior is 0.402, which states that community empowerment has a positive and significant effect on health behavior. This means that the more effective community empowerment is, the more likely it is to improve health behavior.
3. The interaction path coefficient between community empowerment (in health field) and the level of health literacy on health behavior is 0.164, which states that the interaction between community

empowerment and the level of health literacy has a negative and significant effect on health behavior. This means that the better the level of health literacy, the more likely it is to improve health behavior, but the increase will decrease with the existence of health empowerment (community empowerment in health field) as a moderating variable.

Discussions

Often, A development through empowerment does not get a good appreciation from the community because the community do not understand the benefits of existing programs. According to Laverack (2009), health empowerment is 'the process by which helpless people work together to increase control over the events that define their lives and health'. To get good results from the empowerment process carried out, the role of information cannot be ignored. For this reason, the community must have easy access to health-related information, either orally, printed, audio or audio-visual so that it can be used in making decisions related to their health and to improve their health status

Community involvement can be done by increasing their awareness of their rights and responsibilities in environmental management. The awareness of clean, comfortable, and healthy environment are not only limited to the rights of every citizen, but there is also a logical consequence of the obligation and responsibility to care for and protect it. Efforts that can be made consist of education, sensitivity training and providing feedback.

The results of this study also support the health literacy theory of Sorensen *et al.*(2013) stated that health literacy “requires community knowledge, motivation and competence to access, understand, assess, and apply health information to make judgments and make decisions in everyday life related to health care, disease prevention and promotion, health to maintain or improve the quality of life during the course of life”. Health literacy has a large enough role in the health sector so that achieving health literacy is a shared responsibility at the individual and community

levels. While Baker (2006) and Nutbeam (2008) stated that The measurement of a person's health literacy is carried out on knowledge attitudes, motivation, behavioral intentions, personal skills, and self-efficacy related to health so that it leads to new knowledge, more positive behavior, greater self-efficacy, positive health behavior and better health. It was line by Kindig, Panzer & Nielsen-Bohlman (2004) that For an individual, health literacy is determined by the level of education, culture, and language. However, besides that, communication skills and assessing interactions with other people are also needed related to health and the ability of the media, market and government to provide health information correctly.

The results of this study are also in line with study of Notoatmodjo (2012). He stated that limited knowledge can reduce a person's motivation to behave healthily. Furthermore, with limited knowledge, a clean and healthy lifestyle is not considered a necessity. While Fitriani (2011) said that Knowledge is an important domain in shaping one's actions. Furthermore Achmadi (2013) stated that without knowledge, a person does not have a basis for making decisions and determining actions against their problems. Based on experience and research, it is found that behavior that is realized by knowledge is more lasting than actors who are not aware of knowledge (Maulana, 2009). It can be said that knowledge is a guideline in shaping one's actions (over behavior).

According to Barrett et al, the concepts of awareness, choice, freedom and involvement are interrelated. Mindfulness and freedom to act deliberately guide one's participation in making choices and setting health goals. Supported by beliefs that change a person's ability to participate intentionally in health and health care decisions, it manifests itself in one's behavior and awareness of the choice to participate in change as a core component of the health empowerment process (Nelma B Crawford Shearer (2009)). While D'Onofrio (1992) said that "Environmental settings and social systems affect personal behavior by ... influencing the information of close relationships."

In another study conducted by Staci Young et al (2015), they stated the importance of applying empowerment theory and sustainability principles towards religion-based partnerships as an effort to improve and change public health. This shows that empowerment will be able to influence and change public health behavior. And for its sustainability, it requires commitment and partnership from many parties.

According to Nelma B. Crawford Shearer(2009), The theoretical view of health empowerment is basically based on four principles: (1) empowerment is an inherent and sustainable power of the individual, (2) empowerment is a relational, expressive process of togetherness between people and the environment; (3) sustainable empowerment of a process of change that is continuously innovative; and (4) expressive empowerment of a pattern of prosperous human health. This suggests that health empowerment emphasizes efforts to facilitate a person's awareness of his or her ability to participate consciously in health and health care decisions.

Conclusion

The development of empowerment concepts and practices arises because of powerlessness and inequality in the community. Along with the increasing role of community participation in development, the concept of empowerment is also increasingly becoming one of the activities that cannot be avoided by the government, NGOs, academics and business institutions in development, including in relation to health development. Degree and good health status is one of the keys to the successful development of a country. This is manifested through public health behavior. Whether it is related to health maintenance, health seeking behavior and environmental health behavior. Based on the results of the above analysis, literacy and health empowerment have a positive and significant impact on public health behavior. The higher a person's health literacy, the better their health behavior. It is the same regarding the relationship between health empowerment and health behavior. However, in its function as a moderating variable, the existence of health empowerment actually weakens the relationship between the

level of health literacy and health behavior. That is, when a person's health literacy level is high, then empowerment efforts must be reduced in order to bring positive and significant effects to one's health behavior. Otherwise, if a person's health literacy level is low, then health empowerment efforts must be increased to be able to bring changes in their health behavior.

Limitations and Future Studies

This research was conducted in one district in Indonesia and was limited to one health empowerment program. In the future, It can be developed to more extensive research by using more varied health empowerment programs.

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