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The Improvement of Health Behavior: Collaboration among Health Information Access, Health Literacy and Health Empowerment Variable

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ABSTRACT: Health is an important factor affecting the development of a country. Everyone is aware of the importance of health for their productivity. However, the fact is that there are still many people who show unhealthy behaviors. There are several health problem in Indonesia. It is related to accessibility, capability, capacity and affordability. This study intends to look at and explain first, the influence of health information access to health literacy and health empowerment, second, the effect of health information access to health behaviour through health empowerment and health literacy as the mediation variables. The study was conducted in Blitar City Government, which is separated into three areas of administrative sub district. The sample used in this study amounted to 278 respondents. The length of time for this research is 6 month, November 2019-April 2020. Data analysis method used in this research is inferential statistical analysis using the structural equation modeling (SEM) GeSCA. The path coefficient of health information access to health empowerment of 0.382 stated that the level of health information access has a positive and significant effect on health empowerment. The path coefficient of health information access to health literacy of 0.093 stated that the health information access has a positive and significant effect on health literacy. Meanwhile, The path coefficient of health information access to health behaviour is -0.059. It stated that health information access has no significant effect on health behaviour. But, the effect becomes significant effect with the presence of health literacy and health empowerment as a mediating variable.

KEYWORDS: Health Literacy**,** Health Information Access, Mediating Variable, Health Empowerment, Functional Health Literacy, Health Behavior

I. INTRODUCTION

With the outbreak of COVID 19 in many countries, people have revived the importance of healthy and clean living behaviors. A healthy lifestyle becomes one of the effective ways to increase immunity and avoid various diseases including COVID 19. It is undeniable that health and development have a very close relationship. The level of public health give effect on the productivity and performance of the community in the economic and educational sectors.[1] Health is the basic capital to achieve high productivity and performance. High and low health status of a country will affect the quality of development in other fields. For this reason, the government must focus on development in the health sector by providing health infrastructure, the availability of medical personnel, the quality of health services and medicines, etc. in order to achieve good quality public health.

During 75 years of Indonesian independence, It still faced many health problems. According to the Indonesian Basic Health Research (RISKESDAS) of the 2018 [2], It was only 20 percent of the total Indonesian population cared about hygiene and health, only 59.8% of households had access to sanitation facilities that were standard and the Village with ODF (Open Defecation Free) had been verified, only reaching 19,745 villages or 24.44% of the total number of villages (80,805 villages). In addition, there are several health service issues in Indonesia. It is related to accesibility, capability, capacity and affordability. The first, accessibility means that all good facilities and experts are still concentrated in big cities, so that it is not yet reached by people living in remote areas. The second is connected to an imbalance between the number of general practitioners and specialists doctor. The third is associated with the availability of medical devices with limited innovative breakthroughs. The fourth is related to the community's affordability for health costs.[2]

Based on the results of the Indonesian Basic Health Research (RISKESDAS 2018), the prevalence of non-communicable diseases in Indonesia (as cancer, stroke, chronic kidney disease, diabetes mellitus, and hypertension) has increased compared to RISKESDAS 2013. Cancer prevalence rose from 1.4 % (RISKESDAS 2013) to 1.8% (RISKESDAS 2013); stroke prevalence increased from 7% to 10.9%; and chronic kidney disease rose from 2% to 3.8%. Based on blood sugar tests, diabetes mellitus rose

from 6.9% to 8.5%; and blood pressure measurement results, hypertension rose from 25.8% to 34.1%. The increase in the prevalence of non-communicable diseases is associated with healthy lifestyles, such as smoking, consumption of alcoholic beverages, physical activity, and consumption of fruits and vegetables.[2]

Other problem is related to environmental health. It can be seen from water usage per day and waste management. Compared to RISKESDAS 2013, household water usage < 20L per person per day decreased from 5% to 2.2%. For waste management, households that manage by burning are 49.5%. Whereas related to access to health services, the result of RISKESDAS 2018 showed the proportion of household knowledge on the ease of access to hospitals as follows; easy 37.1%; difficult 36.9%; and very difficult 26%. This analysis is based on the type of transportation, travel time and costs.[2] Some data above showed that the status of public health and the environment in Indonesia is still not good and must be improved. Some of them are caused by public health behaviors, low public knowledge about health and limited access to health services.

Based on Green's theory (related to health problems), there are two determinants of health problems, namely behavioral factors and non-behavioral factors.[3] Behavior factors consist of predisposing factors, enabling factors and reinforcing factors. Predisposing factors are factors that facilitate or predispose the occurrence of a person's behavior including knowledge, attitudes, beliefs, beliefs, values and traditions. The enabling factor is the factor that allows or which facilitates behavior. These include age, socioeconomic status, education, infrastructure and facilities as well as resources. While the last factor is reinforcing factors, Reinforcing factors are factors that encourage or strengthen the occurrence of behavior such as the behavior of community leaders who are role models. This study attempts to search the effect of health information access on health behavior and utilization of health literacy and health empowerment as moderating variable in the connection between health information access and health behavior.

Kohan et al.[4], stated thar the success of health services is not only determined by the quality of the program and the health workers involved in it, but how patient understanding in accessing and using these services also plays a role in the success of health services. The ability of individuals to access, understand and use information and health services to make decisions about health care is known as health literacy. Literacy itself is an important ability for someone to have because by having even the most basic literacy abilities one can further increase knowledge and potential to achieve their goals so that they can participate more in society, both economically and socially.[5]

Furthermore, the importance of community involvement/participation in development, including in the health sector is needed for several reason. First, Community participation is an instrument for obtaining information about the conditions, needs, and attitudes of the local community. Second, It was used to get public trust. And the last, Community participation is part of the democratic right of citizens.[6] For decades, community empowerment and public participation have been central themes in health policy reform with the aim of developing a health system that is more responsive and prioritizes community needs. Church et al.[7] stated that health policy makers and practitioners have used this approach to increase accountability, increase trust, and assist in effective and efficient decision making. Public participation is the entanglement of public members in health services and health policies decisions from local to national levels.[8] Furthermore according to Loewenson “Public Participation in Health: Making People Matter", broad community participation is an important factor in improving health outcomes and health system performance.[9] Meanwhile, Cook and Macaulay explain community empowerment through ACTORS theory that consist of authority, confidence and competence, trust, opportunity, responsibility, and support. They stated that the community as a subject that can make changes by freeing someone from rigid control and giving freedom to be responsible for their ideas, decisions and actions.[10] Based on that, empowerment can be seen as a process to strengthen the realization of community independence in making a decision, including in making decisions related to their health behavior.

In general, public health behavior is one measure of success of a Health Program. Most of people agree that health is an important thing in life. Health degree will affect one's performance and productivity. Health is one of the dominant factors in maintaining the sustainability of human life and the environment. However, in fact, there are still many behaviors that do not reflect clean and healthy living behavior. It is one of the reasons behind the diversity of research related to health behavior. This research specifically tried to investigate the influence of health information access on health behaviour and the presence of health literacy and health empowerment as moderating variable between health information access and health behavior.

II. METHODOLOGY

The study was established at Blitar City Government consisting of three areas of administrative sub district. By using the Slovin’s formula, the samples of 278 respondents were obtained. Data collected from respondents aged over 18 years. The duration for this research was November 2019-April 2020. The health program chosen to measure the effect of health literacy levels and health empowerment process is the Healthy Cities Program based on Joint Regulation of the Minister of Home Affairs and the Minister of Health of the Republic of Indonesia Number: 34 of 2005 Number: 1138 / Health Minister/ PB / VIII / 2005 concerning the implementation of Regencies/Cities Healthy. The variables of the study included health information access (X1) as exogenous

variables, and health empowerment process (Y1), health literacy (Y2),) and health behaviour (Y3) as the endogenous variable. For measuring health information access, the study used four indicators that consist of ease to use, convenience, modern equipment and self reliance. In order to measure health literacy, the research used the health literacy scale (HLS-14) from Ishikawa and colleagues that consist of Functional health literacy, Communicative health literacy, and Critical health literacy. Meanwhile, health empowerment variable that used in this research based on "ACTORS" theory from Cook and Macaulay. It consists of Authority, Confidence and Competence, Trust, Opportunity, Responsibility, and Support. Meanwhile, health behavior indicators was used consist of health maintenance, health seeking behavior and health environmental health behavior. To analyze data, the research used inferential statistical analysis using the structural equation modeling (SEM)-GESCA.

III. RESULTS

1. Measurement model

In general, measurement model can be seen from **Table 1**. It provide the average and loading factor of each indicator. Based on **Table I**, It can be seen that all indicators significantly measuring their variables, severally. The results of data analysis indicated that the dominant indicator as health literacy (X1) measurement was communicative health literacy (X1.2) with a loading factor of 0.898 and an average of 3.89. It differs slightly with critical health literacy (X1.3) with a loading factor of 0.896 and an average of 4.03. Meanwhile, in the health empowerment variable (M1), it was invented that the strongest indicator was opportunity (M1.4) with a loading value of 0.855 and an average of 3.68. In the health behavior variable (Y1), it was invented that the dominant indicator as the measurement was health maintenance (Y1.1) with a loading value of 0.921 and an average of 4.10 that can be seen in table 1 below:

Table I. Results of The Descriptive Analysis and The Measurement Model of Variable

Variable	Indicators	Loading Factor	Mean	SE	CR
Health Information Access (X1)	X1.1 Ease to use	0.748	3,62	0.059	12.71*
	X1.2 Convenience	0.665	3,58	0.057	11.58*
	X1.3 Modern Equipment	0.798	3,89	0.015	53.34*
	X1.4 Self Reliance	0.782	3,76	0.009	86.01*
Health Literacy (HL) (Y1)	Y1.1(Functional HL)	0.751	3.31	0.068	15.45*
	Y1.2 (Communicative HL)	0.898	3.89	0.066	73.85*
	Y1.3 (Critical HL)	0.896	4.03	0.066	98.93*
Health Empowerment (Y2)	Y2.1 (Authority)	0.648	3.66	0.070	8.53*
	Y2.2 (Confidence and Competence)	0.770	3.70	0.068	38.51*
	Y2.3 (Trust)	0.849	3.92	0.067	31.81*
	Y2.4 (Opportunity)	0.855	3.68	0.066	17.19*
	Y2.5 (Responsibility)	0.781	3.94	0.068	91.3*
	Y2.6 (Support)	0.696	3.91	0.069	60.42*
Health Behavior (Y3)	Y3.1 (health maintenance)	0.921	4,10	0.066	64.36*
	Y3.2 (health seeking behavior)	0.729	3.97	0.068	64.34*
	Y3.3 (environmental health behavior)	0.854	4.04	0.066	37.31*

CR* = significant at .05 level

2. Analysis results

a. Hypothesis test

Hypothesis testing is used to examine the influence or effect of exogenous variables on endogenous variables. The test criteria stated that if *p value* ≤ *level of significance* (*alpha* = 5%), it means that there is a significant influence of exogenous variables on endogenous variables. The results of testing the hypothesis can be known through the **Table 2.** It can be seen that all of variable is significant in affecting health behavior except health information access with a path coefficient of -0.059. But, the effects of health information access on health literacy and health empowerment showed significant influence with a path coefficient of 0.093 and 0.382. Moreover, The effect of the level of health literacy on health behavior produces a path coefficient of 0.321 with CR 4.51*. It can be said that there is a significant influence on the level of health literacy on health behavior. The

effect of health empowerment on health behavior produces a path coefficient of 0.221 with CR 6.9*. It means that there is a significant influence of health empowerment on health behavior. (**Table 2)**

Table 2. Hipothesis Test and Conversion of Path Diagrams into Structural Models

Exogenous	Endogenous	Path Coefficient	SE	Critical Ratio
Health information access	Health Literacy	0.093	0.044	2.11*
Health information access	Health Empowerment	0.382	0.131	2.9*
Health information access	Health behavior	-0.059	0.057	1.04
Health Literacy	Health Behavior	0.321	0.071	4.51*
Health Empowerment	Health Behavior	0.221	0.032	6.9*

b. Mediation Test

The mediation test is used to examine the effect of mediation variables on the influence of exogenous variables directly on endogenous variables. **Table 3** showed that health literacy is a variable that connects access to health information and health behavior. The path coefficient of the indirect effect of access to health information on health behavior through health literacy is 0.0298 (**Table 3**). The positive coefficient indicates that the higher the Access to Information (X1), the higher the Behavior (Y3) through the improvement of the Health Literacy (Y2) pathway. On the other hand, the effect of access to health information on health behavior is not significant, so that health literacy is complete mediation. Complete mediation means that the Information Access Variable (X1) does not explain the diversity of Health Behavior Variables (Y3), but the Health Literacy Variable (Y2) which explains the variability of Health Behavior Variables (Y3) in the relationship between Access to Information (X1) and Health Behavior (Y3)

Table 3. The Mediation Test

Exogenous	Endogenous	Path Coefficient
Health information access * Health literacy	Health Behavior	0,0298
Health information access * Health empowerment	Health Behavior	0,084

Meanwhile, the effect of access to health information on health behavior through health empowerment produces a path coefficient of 0.084. The positive coefficient indicates that the higher the Access to Information (X1), the higher the Health Behavior (Y3) through the improvement of the health Empowerment pathway (Y2). The Health Empowerment Variable (Y1) is a perfect/ complete mediating variable on the relationship between Access to Information (X1) and Health Behavior (Y3), because the two direct influences that make up the indirect effect are equally significant while the direct influence between Access to Information (X1) on Health Behavior (Y3) is not significant.

IV. DISCUSSION

To date, health literacy is still a problem in many countries. Programs and training are needed to improve the health literacy level. Some previous research stated that Low health literacy will have an impact on decisions making mistakes related to health, for example errors in understanding the therapy given, non-compliance with the treatment undertaken, misunderstanding the rules of drug use, and other actions taken that can increase the risk of complications and worsening the illness.[11,12, 13]

This research showed that the better the health literacy, the better the health behavior. Literacy indicators used are functional health literacy, communicative health literacy and critical health literacy.[14] Functional health literacy is related to one's capability to read, write and appreciate primary health information.[15] Furthermore, some previous research stated that by having good functional health literacy, it will be easier for people to find information from various sources, such as TV, internet, brochures and other media.[16,17] So, it can improve and support self-care management.[15,17,18]

According to Inoue et al.[17] Communicative health literacy is the capability to collect health information from various sources and use it in self-care management. In communicative health literacy, social interaction and communication play a major role. As Katz et al research results, which stated that patients who actively ask about the condition and treatment of pregnancy will get more pregnancy health information, and has a positive effect on self-care management and choices related to their health.[19] Meanwhile, critical health literacy is a particular construct, which includes personal and social abilities, knowledge, health decision making and effective interactions between service providers and users.[20] Critical health literacy requires critical thinking

skills. Education level is one of factors that determines the level of critical health literacy.[14,21] It can be understood because critical health literacy requires one's ability to extract and analyze information before it is used as a basis for making health decisions.

The research showed that health literacy level and health empowerment affected health behavior. The higher level of health literacy can be seen from the higher functional health literacy, communicative health literacy and critical health literacy will affect the higher level of health behavior reflected on the health maintenance, health seeking behavior and environmental health behavior. The results reinforced the study held by Cho, Young Ik et al.[22] in their research entitled "Effects Of Health Literacy On Health Status And Health Service Utilization Amongst The Elderly". The study aims at exploring four prospect mediating factors namely disease knowledge, health behavior, prevention of care, and adherence to medicine for connecting health literacy on health status and health service utilization. Health literacy has a positive relationship with knowledge of disease and prevention of care. Moreover, health behavior is the only variable found to be significantly correlated with health status.[22]

The Medical Library Association defines health literacy as the ability to recognize the need for health information, to find out how and where to find information about health, and how to evaluate and use this information in daily life to make good health decisions.[23] Health literacy is the degree of a person's ability to obtain, process and understand basic health information and services needed to make appropriate health related decisions. Health literacy in every individual is important to know because it is related to the ability to obtain health information, improve health knowledge and assist individuals/communities in making appropriate decisions about their health in an effort to improve and maintain health.[24, 25]

Low health literacy can also lead to poor self-management abilities which can result in non-compliance with treatment, poor health outcome, and greater medical costs. [26] People who have low health literacy (health literacy) also often show low healthy behaviors, such as the results of research conducted by Weiss. He stated that people who have limited health literacy exhibit unhealthy behaviors such as smoking more, including during pregnancy, more did not breastfeed, and more did not come regularly to child health services.[27]

Furthermore, it was found that the higher health empowerment affected the level of health behavior through authority, competence, trust, opportunity, responsibility and support indicator. The result also found significance effect was found between the level of health literacy (X1) on health behavior (Y1) through implementation of health empowerment (M1). The basis of empowerment is related to the so-called ascending ascent to health promotion**,** where decision-making begins at the individual or group level and these ideas are joined for approval and implementation**. ..** "Becaus**e** it is a concern for a group or an individual and an increase in health or fitness is considered an important outcome for health**.**" [28]

The results were appropriate with the findings of Zoe Heritage dan Mark Dooris entitled "Community participation and empowerment in Healthy Cities" stated that Community participation and empowerment is a core principle that underlies the Healthy Cities movement.[29] Community participation in healthy city development is an important part of the local governance process. Empowerment must be in the corridor of effective health promotion and as an integral part of long-term strategic development in realizing sustainable healthy city. The results of study were also in line with the research of Josephine Ocloo and Rachel Matthews, entitled "From tokenism to empowerment: progressing patient and public involvement in healthcare improvement. They stated that The involvement of patients and the wider community in the majority of health care stages can provide a number of benefits.[30] The use of a more democratic model is important to do to overcome the power imbalance between patients, the public and professionals and health organizations. According to Martensson & Hensing, health literacy have a significant effect on empowerment.[31] Furthermore, Nutbeam stated that empowerment is the highest aim of health literacy.[15] It was a little different by Schulz and Nakamoto that health literacy and empowerment are two different concept but they have connection through knowledge and skill.[32]

Several health efforts have been carried out by the Blitar City Government for gaining the Public health degree. There are Community Based Total Sanitation Activities and Community Based Health Efforts. Community Based Total Sanitation consists of five pillars, namely: Improved latrine access, Hand washing program, Household scale drinking water and food processing, Household scale waste treatment and Household scale waste processing.

Meanwhile, Community Based Health Effort consits of three forms. In order to empower and provide facilities in obtaining basic health services, The effort is managed and organized by community itself. It consists of :

a. Integrated Healthcare Center (*Posyandu*)

   Posyandu is the integrated Healthcare Center where the community is the implementer as well as obtaining services health. In addition, It can be used as a means to exchange information, opinions, and experiences, as well as deliberate to solve various problems faced by either family problems or community problems itself related to health. In 2019, the number of *Posyandu* in Blitar City was 167 and as many as 155 (92.81%) were active.

b. Village Health Post (*Poskesdes*). Poskesdes is one of Community Based Health Effort established in villages in an effort to bring basic health services closer to village communities. *Poskesdes* is managed by 1 midwife and at least 2 cadres who

is the coordinator of the existing Community Based Health Effort. In 2019, all urban villages in Blitar City had *Poskesdes*, as many as 21.

c. Alert Village

Alert Village is a village whose inhabitants have the readiness of the resources and the ability to independently prevent and overcome health problems, disasters and health emergencies. Moreover, an active alert village is a village that has a Village Health Center (*Poskesdes*) or other Community Based Health Effort which is open every day and functions as a provider of basic health services, disaster management and emergency, community-based surveillance which includes monitoring growth (nutrition), disease , environment, and health behavior.

This study showed that health empowerment and health literacy were the core of elements in order to improve public health behavior. It also was supported by health information access. Adequacy of access to health information will facilitate changes in public health behavior. The study resulted that health literacy and health empowerment is the mediation variable between health information access and health behavior.

V. CONCLUSION

Along with advances in technology and science, health is becoming very important and a major concern for everyone. The community is now trying to improve their health, prevent disease, and cure their disease through health information. Health information can be obtained from many sources. For getting correct health information, it is needed capability that called health literacy. Health literacy is the capability of individuals to access, understand, evaluate health information and use it in making their health decisions. The research tried to explore the factors influencing health behavior from health information access, health literacy and health empowerment variables. According to Lawrence Green, the health behavior is established by the beliefs, knowledge, attitudes of the person or community concerned. Furthermore, it also influenced by availability of facilities and attitudes or behavior of health workers.[3] Based on the results and discussion above, it can be culminated that the health literacy and health empowerment affected the health behavior significantly. The better the health literacy, the more likely it is to improve health behavior. Health empowerment process is dominant influence on health behavior. This means that more effective health empowerment process tends to improve health behavior.

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