Influential Factors on Preventive Behaviours of Risk Factors for Adults' Metabolic Syndrome in Ponorogo, East Java, Indonesia

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Abstract—In Indonesia, the component prevalence of metabolic syndrome continuously increases. The main risk factors for metabolic syndrome are obesity and inactive lifestyle. This research aimed at finding out influential factors of preventive behaviours of risk factors for adults' metabolic syndrome in Ponorogo using a Health Belief Model (HBM) theory. This cross- sectional research was done in Ponorogo Regency, East Java, Indonesia on October 2019. The dependent variable of this research was the preventive behaviours of risk factors for metabolic syndrome. Then, the independent variables were perceived susceptibility, perceived severity, perceived barriers, perceived benefits, and cues to action. The data was obtained using questionnaires and analysed using chi-square. The findings shows that the HBM construct had an effect on preventive behaviours of risk factors for metabolic syndrome including perceived susceptibility (OR= 2.00; CI 95%=1.06 - 3.77; p= 0.032); perceived severity (OR= 2.05; CI 95%=1.38 - 4.61; p= 0.003); perceived benefits (OR=1.86; CI 95%= 1.01 - 3.34; p= 0.045); perceived barriers (OR= 0.48; CI 95%= 0.25 – 0.90; p= 0.024); cues to action (OR= 3.92; CI 95%= 1.94 - 7.92; p= <0.001).

Keywords—behaviours, preventive, health belief model, metabolic syndrome

I. INTRODUCTION

According to Shahab (2017), metabolic syndrome is a clinical condition on a person with clinical signs of metabolic disorders, including dyslipidemia, insulin resistance, hypertension, and obesity. Metabolic syndrome (MS) is a body function aberration triggered by lifestyle changes, especially low physical activities which are relaxing and lazying, a high carbohydrate diet and a low fiber causing obesity (waist circumference $\geq$ 88 cm in women and $\geq$ 102 cm in men). Unmodifiable risk factors for MS consist of age, sex, and a family history. The changeable risk factors include smoking habits, central obesity, lack of physical acivities, excessive carbohydrate intake, less intake of vegetables and fruits.

The MS prevalence is estimated increasing continuously along with the increasing number of obese individuals. Based on the findings of Framingham Offspring Study, the MS prevalence in the world was 20-25% suffering MS with 29.4 % male respondents (the age of 26 – 82) and 23.1% women. The results of Basic Health Research in Indonesia showed that the MS component prevalence continuously increased including, central obesity 26.6% (2013) raising to be 31.0% (2018), diabetes mellitus 6.9% (2013) raising to be 8.5% (2018), hypertension 25.8% (2013) raising to be 34.1% (2018).

Whereas the obese prevalence in East Java decreased 18.8% from 27.3% (Basic Health Research, 2013), then increased to be 30.38% in 2018 [1]. The important findings of Rosyidi's and friends' research [2] in Ponorogo Regency in 2015 found that there were three higher risk factors for MS than national numbers, namely 74% physical inactivities with 26.1%, 46.9% risk hypertention with 26.6% national number, and 40.6% obesity national with 28.9% national number. Based on the health profile report in East Java, the hypertention prevalence in Ponorogo reached 15.30% in 2016, 13.90% in 2017, and increasing 16.52% in 2018. The obese prevalence reached 0.67% in 2016, 13.99% in 2017, and decreasing 10.57% in 2018. The data shows that MS has already become a serious problem in Ponorogo Regency.

The main risk factors for MS in Ponorogo Regency were behavior and lifestyle, from active to sendetary activities, that caused individual physical inactivities, high smoking habits (above the prevalence of East Java), and lack of vegetable intakes. Based on those risk factors, most of risk factors are caused by unhealthy behaviors or/and lifestyles of individuals. The health campaign has already developed by the government to reduce the number of metabolic syndrome sufferers through activities of integrated development posts such as monitoring weight gain through measuring abdominal circumference, measuring blood pressure, promoting physical activities, campaiging stop-smoking and promoting healthy balanced diets.

Those campaigns has not reduced yet the incident rate of MS. The appropriate intervention strategies of health promotions are by empowering a community at the micro level. At the micro level, the health determinants include behaviours and lifestyles of individuals, such as the choices of smoking, sendatary or active behaviours, healthy or unhealthy diets. Owing to the increasing phenomena on the MS prevalence and the findings of MS as a serious problem in Ponorogo Regency Based on the phenomenon of increasing prevalence of SM and the results of research that describe the metabolic syndrome has become a serious threat in Ponorogo Regency, this research needs to be conducted. The aim of this research is to find out the influential risk

factors of preventive behaviors for MS with adult populations using a Health Belief Model theory in Ponorogo.

II. METHOD

2.1 Study Design

This research applied a cross-sectional approach. The location of this research was in Ponorogo Regency, East Java, Indonesia. The data was collected for 6 months from October 2019 to March 2020.

2.2 Population and Sampel

The source population of this rsearch was all adult patients (the age of 26 – 45) recorded in outpatient register book of all health service facilities in Ponorogo. The research apllied a purposive sampling. The sample was fixed disease sampling (Mutri, 2016) that is the selection of samples based on the disease, namely someone who has a set of at least three clinical signs, namely metabolic disorders, including dyslipidemia (increased triglyceride levels, decreased HDL cholesterol levels), insulin resistance, increased blood pressure (hypertention), and obesity. The total number of samples were 300 respondents; 100 MS respondents dan 200 non-MS respondents.

2.3 Research Variables

The independent variables of this research were a construct of health belief model, including perceived susceptibility, perceived severity, perceived barriers, perceived benefits, and cues to action. On the other hand, the dependent variable was the preventive behaviours of risk factors for MS.

2.3.1 Perceived Susceptibility

Perceived susceptibility was the subject response on the situation or feelings of the risk levels of MC attacks. There were six statements in the questionnaire, containing the statements of individual perceptions getting MS attacks easily. The responses consisted of agree, doubt, disagree. The result of the answer score < mean was categorized as low perceived susceptibility, the answer score > mean was categorized as high perceived susceptibility.

2.3.2 Perceived Severity

Perceived severity was the respondents' levels of confidence on the disease consequences in which the disease would get worse if the individual had not prevented the risk factors for MS. There were six statements in the questionnaire, containing the statements that the disease would get worse without any preventions. The responses consisted of agree, doubt, disagree. The result of the answer score < mean was categorized as low perceived severity, the answer score > mean was categorized as high perceived severity.

2.3.3 Perceived Benefits

Peceived benefits was the individual perception on the value or self-efficacy that doing healthy behaviours was beneficial to reduce the risk of MS. There were eight statements in the questionnaire, as the example stop-smoking was not beneficial for health. The responses consisted of agree, doubt, disagree. The result of the answer score < mean was categorized as low perceived benefits, the answer score > mean was categorized as high perceived benefits.

2.3.4 Peceived Barriers

Perceived barriers referred to the subjective perception consisting barriers to do behavior changes of preventive risk factors for MS. There were six statements in the questionnaire, containing the statements that the disease would get worse without any preventions. The responses consisted of agree, doubt, disagree. The result of the answer score < mean was categorized as low perceived barriers, the answer score > mean was categorized as high perceived barriers.

2.3.5 Cues to action

Cues to action was a needed trigger to stimulate the decicion-making process to occur the preventive behaviours of risk factors for MS. The example was the health worker asked the individual to stop smoking. There were five statements in the questionnaire, containing the statements that the disease would get worse without any preventions. The responses consisted of agree, doubt, disagree. The result of the answer score < mean was categorized as low cues to action, the answer score > mean was categorized as high cues to action.

2.3.6 Preventive Behaviours of Risk Factors for MS

This was an action done by an individual to control risk factors for metabolic syndrome (physical activities, smoking habits, and dietary habits), such as whether or not the individual exercises. There were ten statements in the questionnaire, containing the statements that the disease would get worse without any preventions. The responses consisted of agree, doubt, disagree. The result of the answer score < mean was categorized as not doing, the answer score > mean was categorized asdoing.

2.4 Data Analysis

Univariant data analysis used a descriptive analysis to design a table by entering all data to a computer, then analysed by using a descriptive statistic used to report the result of frequency distribution and percentage (%) of each item. The bivariate data analysis applied to prove the research hypothesis between an independent and dependent variable. Categorical data and nominal statistical tests used Chi-Squaer Test with CI (95%).

III. RESULT

3.1 Sample Characteristics

Table: 1 Sample Characteristics (n=300)

Characteristics	Category	n	%
Age	26-35 years old	67	22.33
	36-45 years old	233	77.66
Sex	Man	105	35
	Women	195	65
Address	Village	110	36.66
	Sub-District	190	63.33
Education	Elementary School	61	20.33
	Junior High School	79	26.33
	Senior High School	129	43
	University	31	10.33
Job	Unemployed	56	18.66
	Famers owing a field	46	15.33
	Traders	63	21
	Government employees	40	13.33
	Laborers	50	16.66
	Indonesian National Army/Police	1	0.33
	Private Employees	36	12
	Village Apparatus	7	2.33
	State-Owned Enterprise Employees	1	0.33

3.2. Bivariate Analysis

The chi-square with 95% confident level was used to analyze the bivariate data. The analysis was to explain the influence of the independent variables (perceived susceptibility,

perceived severity, perceived barriers, perceived benefits, and cues to action) to the dependent variables (the preventive behaviours of risk factors for MS. The result can be seen from the following table.

Table 2. The sample characteristics based on the preventive status of risk factors for Metabolic Syndrome (MS)

Independent Variable	Prevent		Not Prevent		Total		OR	p
	n	%	n	%	n	%		
Perceived susceptibility Low	67	47.52	74	52.48	141	100	2.00	0.032
High	107	67.30	52	32.70	159			
Perceived severity Low	49	37.98	80	62.02	129	100	2.05	0.003
High	125	73.10	46	26.90	171	100		
Perceived benefits Weak	48	39.02	75	60.98	123	100	1.86	0.045
Strong	126	71.19	46	28.81	172			
Perceived barriers Weak	44	28.95	108	71.05	152	100	0.48	0.024
Strong	82	55.41	66	44.59	148	100		
Cues to action Weak	68	49.64	69	50.36	137	100	3.92	<0.001
Strong	58	35.58	105	64.42	163	100		

Table 2. There was a relationship between perceived susceptibility and the preventive behaviours of risk factors for MS. The individual with high perceived susceptibility had a great chance to prevent risk factors for MS with OR value 2.00; p value 0.032. There was a relationship between perceived severity and the preventive behaviours of risk factors for MS. The individual with high perceived severity had a great chance to prevent risk factors for MS with OR value 2.05; p value 0.003.

There was a relationship between perceived benefits and the preventive behaviours of risk factors for MS. The individual with high perceived benefits had a great chance to prevent risk factors for MS with OR value 1.86; p value 0.045. There was a relationship between perceived barriers and the preventive behaviours of risk factors for MS. The individual with weak perceived barriers had a great chance to prevent risk factors for MS with OR value 0.48; p value 0.024.

There was a relationship between cues to action and the preventive behaviours of risk factors for MS. The individual with strong cues to action had a great chance to prevent risk factors for MS with OR value 3.92; p value 0.001.

IV. DISCUSSION

4.1 The effect of perceived susceptibility to the preventive behaviours of risk factors for MS.

A perceived susceptibility is one of strong perceptions for someone to adopt health behaviors. What is felt by adults in Ponorogo about the level of risk for metabolic syndrome, they have a perception of themselves that metabolic syndrome must be prevented by behaving to prevent the risk factors. This finding is in accordance with the research conducted by Ismaeilzadeh et.all [3], on students at Jolfa Iran. The findings of this study indicate the protective role of their high levels of self-control against HIV / AID. They have a high perceived suscwptibility and self-efficacy because they have a history of multiple sex partners and consume amphetamines. Likewise, a study conducted by Fitriyani et.all [4] in the main clinic of Permata Harapan's oncology, Surakarta, revealed that women with high perceived susceptibility would vaccinate 22.81 times more HPV than women who had low perceived susceptibility. Someone who feels he has a risk of disease is more likely to take prevention than who feels he has no risk factors for disease. A high perceived susceptibility and severity encourage a person to take prevention, in this case is to do HPV vaccination. This study is also in line with the research done by Sirait et.al [5] which states that there is a significant relationship between the perception of the risk of contracting HIV and the behavior of using condoms on crew members at the port of Belawan Medan, Indonesia.

4.2 The effect of perceived severity to the preventive behaviours of risk factors for MS.

Adults in Ponorogo district think metabolic syndrome is a severe clinical disorder. This condition is associated with the risk of cardiovascular disease (PKV), stroke, which is one of the leading causes of death in the world and type 2 diabetes mellitus (Shahab, 2017). They believe that if exposed, the consequences are also severe, both medical consequences and socio-economic consequences, which have the potential to cause material loss. The results of this study are in accordance with Simangunsong's research [6]. Pregnant women in Medan have a high perceived threat of HIV / AID transmission to their fetuss. Respondents already know and understand that the transmission of HIV / AIDS from mothe to child can cause dire conditions to death. This research is also in line with the research done by Shahnazi et.al. (2020) which explains that perceived severity is related to the preventive behaviours of COVID 19 in Northern Iran. Meanwhile, people in the five provinces of Northeastern Thailand feel that ostoeporis is a perceived threat, so they take precautions by trying to find out proper nutrition, appropriate physical activity programs, avoiding risky health behaviors that are in line with regional lifestyles, culture, community values which may be beneficial in the prevention and reduction of all aging-related diseases especially osteoporosis [7].

4.3 The effect of perceived benefits to the preventive behaviours of risk factors for MS.

Perceived benefits refer to a person's assessment of the value or efficacy of carrying out healthy behaviors to reduce the risk of experiencing disease [8]. Perceived benefits relate to the benefits that will be felt if you adopt the recommended behavior. This study shows that most adults in Ponorogo district have a strong perceived benefits, they feel that preventing risk factors for metabolic syndrome is beneficial for preventing complications of metabolic syndrome, so they prevent risk factors for metabolic syndrome. The results of this study are in line with research conducted by Louis, PJ [9] which explains that perceived benefits are related to the prediction of the intention of Haitian men to screen for prostate cancer. Qualitative research done by Sripad [10] in Negeria found that pre-eclampsia and eclampsia pregnant women have the perception that early ANC examinations are very useful for dealing with safe childbirth. They feel they have learned about the signs of pre-eclampsia and eclampsia. Another supporting qualitative research was conducted by Ithnain et.all [11] in Negeri Sembilan Malaysia, this study

found that diabetic patients felt the benefits of drinking herbal medicine as a complement to the treatment of their disease.

4.4 The effect of perceived barriers to the preventive behaviours of risk factors for MS.

Perceived barriers refer to subjective assessments which include perceptions of obstacles to changing behavior [8]. The results showed that most adults in Ponorogo district had a perception that preventing risk factors for metabolic syndrome was not difficult, so it was very easy to do it. This is supported by a research done by Yakubu el.all [12], a randomized control trial conducted in high school students in Ghana. The intervention given was comprehensive sex education. The finding was that adolescents' perception of safety in pregnancy prevention increased after the intervention. This research is in line with a quasi-experimental study on the knowledge of people who have three-year- old children against Rickets disease conducted by Alahmadi [13] in Saudi Arabia. Parents have the perception that sunbathing, regular screening and consuming vitamin D are not obstacles to preventing Rickets.

4.5 The effect of cues to action to the preventive behaviours of risk factors for MS.

The results showed that there was an influence between cues to action and preventive behaviour of risk factors for metabolic syndrome. Cues to action are events, people or things that move to change behavior [14]. Adults who have the perception of high acting signals about metabolic syndrome will take precautions against risk factors and vice versa. What moves to do prevention is that they read leaflets or see on television about the benefits of exercise, the benefits of stop-smoking, the benefits of consuming fruits and vegetables which are very useful for preventing metabolic syndrome. The results of this study are in line with Nugrahani's [15] study which states that there is an influence between cues to action and the use of the HPV vaccine for cervical cancer prevention in Kediri. Supporting research is a two-year longitudinal cohort study conducted by Moreno [16] of new students at two US universities regarding alcohol use. Found that alcohol- related attitudes and norms were positively associated with intention to drink in response to pro-alcohol Facebook cues.

WRITERS

Edy Bachrun wrote the research questions, designed the questionnaires, collected the data, and obtained a research permit. Bhisma Murti designed the research, decided the sample collection approach, revised the questionnaires, analyzed the data, and interpreted the results, discussed the findings, and wrote the manuscript. Mahendra Wijaya discussed and revised the data analysis approach. Endang Sutisna Sulaeman discussed the results.

REFERENCES

[1] Kementrian Kesehatan RI. 2018. Riset Kesehatan Dasar Tahun 2018, Badap penelitain dan Pengebangan Kesehatan.www.litbang.kemkes.go.id

[2] Rosjidi H C dan Isro'in L. 2013. Kerentanan perempuan terhadap serangan penyakit jantung dan stroke. Penelitian. Inpress

[3] Ismaeilzadeh S, Allahverdipour H,2, Fathi B & Shirzad S. 2016. Risk Perception of HIV/AIDS and Low Self-Control Trait: Explaining Preventative Behaviors among Iranian University Students. Global Journal of Health Science; 8, (4); 44-52.

[4] Fitryani Y, Mudigdo A, Andriyani BR. 2018. Health Belief Model on the Determinants of Human Papilloma Virus Vaccination in Women of Reproductive Age in Surakarta, Central Java. Journal of Health Promotion and Behavior (2018), 3(1): 16-26.

[5] Sirait LM, Sarumpaet S. 2012. Hubungan Komponen Health Belief Model (HBM) Dengan Penggunaan Kondom Pada Anak Buah Kapal (ABK) Di Pelabuhan Belawan. Retrieved from: https://media.neliti.com/media/publications/159978

[6] Simangunsong D E, Kandace Sianipar K, Purba J,2020. Preventions of HIV/AIDS Transmission from Mother to Child in Pematangsiantar City, Indonesia. Global Journal of Health Science; 12, (11); 83-88.

[7] Aramwiroj M, Chaikoolvatana A, Chaikoolvatana C. 2014. The relations between perceived susceptibility, perceived severity, and preventive behavior to osteoporosis of high- risk persons in five provinces in North-Eastern Thailand. Chula Med J 58(5) 497-510

[8] Murti B. 2016. Prinsip Dan Metode Riset Epidemiologi, Program Studi Ilmu Kesehatan Masyarakat Program Pascasarjana Universitas Sebelas Maret, Surakarta.

[9] Louis PJ. 2016. Examing Constructs of The Health Belief Model as Predictors of Haitian Men's Intention Regarding Prostate Caner Srceening. Journal of Urological Nursing. 39(2):72–82.

[10] Sripad. P, Kirk. K, Adoyi.G, Amy Dempsey. A, Ishaku. S, Warren. C.E. 2019. Exploring survivor perceptions of pre-eclampsia and eclampsia in Nigeria through the health belief model, BMC Pregnancy Childbirth; 19: 431

[11] Ithnain N, Panting A J, Kassim R, Amirudin N, Krishnan M. 2020. Perception of Conventional Medicine and Herbal Medicine Usage amongst Diabetic Patients: A Qualitative Study in Negeri Sembilan, Malaysia. Global Journal of Health Science; 12, (10); 122-132.

[12] Yakubu I, Garmaroudi G,Sadeghi R, Tol A,Yekaninejad S M,Yidana A. 2018. Assessing the impact of an educational intervention program on sexual abstinence based on the health belief model amongst adolescent girls in Northern Ghana, a cluster randomised control trial, Reprod Health; 16: 124; Retrieved from: https://www.ncbi.nlm.nih.gov/pmc/articles/

[13] Alahmadi A, Aljaloud H, Bawazir A, Jradi H, Alhaidari R, Alofi A. 2020. Assessment of Awareness and Knowledge About Rickets in Primary Health Care Centers in Saudi Arabia Based on Health Belief Model and Social Cognitive Theory. Global Journal of Health Science; 12, No. (11); 65-72.

[14] Sulaeman S E. 2016. Model Dan Perlaku Kesehatan Konsep dan Aplikasi. UNS Press.Surakarta.

[15] Nugraheni R R., Budihastuti R U, Pamungakasari P E. 2017. Health Belief Model on the Factors Associated with the Use of HPV Vaccine for the Prevention of Cervical Cancer among Women in Kediri, East Java. Journal of Epidemiology and Public Health, 2(1)): 70-81.

[16] Moreno M A, Mercer L, Young H N, Elizabeth D, Kerr B. 2019. Testing young adults' reactions to Facebook cues and their associations with alcohol use, Subst Use Misuse; 54(9): 1450–1460.