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Research

Application of Social Cognitive Theory on the Tertiary Preventive Behavior in Patients with Type II Diabetes Mellitus in Ponorogo Hospital

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ABSTRACT

Background: Diabetes Mellitus (DM) is a non-communicable disease that becomes a serious threat to global health. This disease is a serious chronic disease because it cannot be cured. An increasing number of cases of non-communicable diseases that are associated with risk factors are in line with lifestyle changes that increasingly modern. This study aimed to analyze the effect of the variables in Social Cognitive Theory on tertiary prevention behavior in patients with type 2 Diabetes Mellitus.
Subjects and Method: This was a cross-sectional study design. This study was conducted on patients with type 2 DM in the hospital in Ponorogo Regency, East Java, from January to February 2020. There were 200 patients with type 2 DM as the sample of the study. The sample was taken by random sampling. The dependent variable was Tertiary prevention behavior of type 2 DM. The independent variables were observational learning, role model, vicarious experience, imitation, attitude, outcome expectations, knowledge, reinforcement, self-efficacy, and self-management. The data were collected through a set of questionnaires. The data were analyzed based on Path Analysis using stata 13 application.
Results: Tertiary prevention behavior of type 2 DM was directly increased by strong imitation (b= 1.40; 95% CI= 0.51 to 2.28; p= 0.002), good knowledge (b= 1.36; 95% CI= 0.48 to 2.25; p= 0.002), positive attitude (b= 1.32; 95% CI= 0.44 to 2.19; p= 0.003), strong self-efficacy (b= 1.07; 95% CI= 0.18 to 1.96; p= 0.018), and good self-management (b= 2.26; 95% CI= 1.31 to 3.22; p <0.001). Tertiary prevention behavior of type 2 DM was indirectly affected by observational learning, role model, vicarious experience, outcome expectation, and reinforcement.
Conclusion: Tertiary prevention behavior of type 2 DM is directly increased by strong imitation, good knowledge, positive attitude, strong self-efficacy, and good self-management. Tertiary prevention behavior of type 2 DM is indirectly affected by observational learning, role model, vicarious experience, outcome expectation, and reinforcement.

Keywords: social cognitive theory, type 2 Diabetes Mellitus.

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BACKGROUND

Diabetes Mellitus (DM) is the highest cause of death in the world's adult population of 5 million deaths, compared to HIV/AIDS (1.5 million people), tuberculosis (1.5 million people), and malaria (0.6 million people) (IDF, 2015). More than 60% of men and 40% of women died before 70 years of age in the Southeast Asia region (WHO, 2016).

Indonesia ranked seventh in the world in 2015 for the highest prevalence of DM sufferers along with China, India, the United

States, Brazil, Russia, and Mexico with an estimated number of people with diabetes of 10 million (IDF, 2015). East Java Province ranked fifth in Indonesia for DM cases after DKI, East Kalimantan, DIY, and North Sulawesi. The prevalence of DM increased from 2.1% in 2013 to 2.6% in 2018 (Basic Health Research, 2018). The health problems associated with degenerative diseases that biologically lead to symptoms of cell damage that occur within a certain period of time were type 2 DM (Shamizadeh et al. 2019).

An effective approach related to controlling blood sugar levels can be conducted to prevent the complications and premature death that may occur due to all types of DM. DM is a complex chronic disease. It requires ongoing medical care with a multi-factorial risk reduction strategy beyond glycemic control. Patient support and self-management were very important to prevent acute complications and reduce long-term complications (IDF, 2017).

One theory of behavior change that can be implemented in tertiary prevention behavior in patients with type 2 DM is Social Cognitive Theory (SCT). In the SCT, there were three ways, namely the dynamic reciprocal determinants among personal factors, the environmental effects, and behaviors that continuously interact. Therefore, SCT might be used as a framework in the planning of changes in health behavior (Taylor et al. 2016).

Based on the explanation above, the incidence of DM in some regions of Indonesia has increased significantly over time. It is expected that Social Cognitive theory approach would increase preventive efforts in the management of patients with type 2 DM. This study aimed to analyze the factors that affected the tertiary prevention behavior of type 2 DM by using Social Cognitive Theory.

SUBJECTS AND METHOD

1. Study Design

This was an observational analytical study with a cross-sectional design. This study was conducted on patients with type 2 DM at Ponorogo Regency Hospital, East Java, from January to February 2020.

2. Population and Sample

The population of this study was patients with type 2 DM in Ponorogo Regency Hospital. The sample of the study was 200 patients that were taken using random sampling technique.

3. Study Variables

The dependent variable was tertiary prevention behavior of type 2 DM. The independent variables were observational learning, role model, vicarious experience, imitation, attitude, outcome expectation, knowledge, reinforcement, self-efficacy, and self-management.

4. Operational Definition of Variables

Tertiary Prevention Behavior was a healthy behavior, a prevention of complication by controlling blood sugar levels, doing control routinely, and taking the medication regularly. The data were collected by a questionnaire. The measurement scale was continous and transformed into dichotomous, coded 0=poor and 1=good.

Observational Learning was someone's observation of the behavior of others. The individual imitated the behavior and repeated the behavior. The data were collected by a questionnaire. The measurement scale was continous and transformed into dichotomous, coded 0=weak 1= strong.

Role Model was the process of imitating every behavior conducted by someone from paying attention to the behavior of people around them, such as friends, family, or the environment. The data were collected by a questionnaire. The measurement scale was continous and transformed into dichotomous, coded 0=weak 1= strong.

Vicarious experience was someone's observation of other's behavior indirectly through television, media, news, advertisements. In addition, the individual imitated the behavior. The data were collected by a questionnaire. The measurement scale was continous and transformed into dichotomous, coded 0=weak and 1= strong.

Imitation was how far an individual imitated other's behavior with the consequences of positive or negative responses. The data were collected by a questionnaire. The measurement scale was continous and transformed into dichotomous, coded 0=weak 1= strong.

Attitude was the tendency to respond to someone in the form of behavior towards an event both in the form of beliefs, feelings, or behavior towards an event. The data were collected by a questionnaire. The measurement scale was continous and transformed into dichotomous, coded 0=negative and 1= positive.

Outcome Expectation was the result of a behavior in the form of consequences if the behavior would be conducted independently. The data were collected by a questionnaire. The measurement scale was continous and transformed into dichotomous, coded 0= poor and 1= good.

Knowledge was the result of one's knowledge through the senses, thus causing a person to imitate or follow the behavior. The data were collected by a questionnaire. The measurement scale was continous and transformed into dichotomous, coded 0= poor and 1= good.

Reinforcement was a stimulus or response from outside that would increase the possibility of repetition of behavior. The data were collected by a questionnaire. The measurement scale was continous and transformed into dichotomous, coded 0= weak and 1= strong.

Self-efficacy was the positive beliefs and abilities of the respondents to control tertiary prevention behavior through daily habits. The data were collected by a questionnaire. The measurement scale was continous and transformed into dichotomous, coded 0= weak and 1= strong.

Self-management was the ability to maintain a commitment to a health goal, related to the prevention of tertiary in patients with type 2 DM. The data were collected by a questionnaire. The measurement scale was continous and transformed into dichotomous, coded 0= weak and 1= strong.

5. Data Analysis

a. Univariate Analysis

The univariate analysis was conducted on each study variable. The categorical data were described in n and %. The continuous data were described in n, mean, SD, minimum, and maximum.

b. Bivariate Analysis

The bivariate analysis in this study used the Chi-square test. This test aimed to find out the relationship between variables X and Y.

c. Multivariate Analysis

The multivariate analysis aimed to find out the effects of various variables learned using Path Analysis using the stata 13 application.

6. Research Ethic

This study was conducted based on the study ethics which consisted of an informed consent form, anonymity, confidentiality, and ethical clearance. The ethical clearance was obtained from the Health Research Ethics Committee of Dr. Hardjono Hospital, Ponorogo, Indonesia, No: 3502021K1211420-20-011700004/KEPK/I/2020.

RESULTS

1. Sample Characteristics

Table 1 shows the characteristic of the sample (continuous data). The categorical data is described in Table 2.

2. Univariate analysis

Table 2 shows that the study subjects who had good tertiary prevention (76.0%) were higher than those who had poor tertiary prevention (24%). The study subjects who had strong observational learning (64.5%) were bigger than those who had weak observational learning (35.5%).

Table 1. The Characteristic of the Sample (Continuous Data)

Variable	N	Mean	SD	Min.	Max.
Tertiary prevention	200	9	1.27	6	10
Observational learning	200	8.72	1.74	5	10
Role model	200	3.86	2.41	0	6
Vicarious experience	200	1.91	1.33	0	3
Imitation	200	1.82	1.44	0	3
Attitude towards behavior	200	3.74	1.47	0	5
Outcome expectation	200	4	1.18	1	5
Knowledge	200	4.02	1.20	1	5
Reinforcement	200	8.13	2.66	2	10
Self-efficacy	200	3.76	1.59	0	5
Self-management	200	4.44	1.10	1	5

Table 2. The Characteristic of the Sample (Categorical Data)

Characteristic	N	Percentage (%)
Tertiary prevention		
Poor	48	24.0
Good	152	76.0
Observational learning		
Weak	71	35.5
Strong	129	64.5
Role model		
Weak	79	39.5
Strong	121	60.5
Vicarious experience		
Weak	83	41.5
Strong	117	58.5
Imitation		
Weak	79	39.5
Strong	121	60.5
Attitude		
Negative	82	41.0
Positive	118	59.0
Outcome expectation		
Poor	85	42.5
Good	115	57.5
Knowledge		
Poor	79	39.5
Good	121	60.5
Reinforcement		
Weak	57	28.5
Strong	143	71.5
Self-efficacy		
Weak	79	39.5
Strong	121	60.5
Self-management		
Poor	43	21.5

Good			157			78.5		

Table 3. The bivariate analysis of the Application of Social Cognitive Theory: Tertiary Prevention Behavior in Patients with Type 2 Diabetes Mellitus

Independent Variable	Tertiary prevention				OR	CI 95%		p
	Poor		Good			Lower Limit	Upper Limit	
	N	%	N	%				
Observational learning								
Weak	29	40.85	42	59.15	3.99	1.92	8.36	<0.001
Strong	19	14.73	110	85.27				
Role model								
Weak	34	43.04	45	56.96	5.77	2.68	12.71	<0.001
Strong	14	11.57	107	88.43				
Vicarious experience								
Weak	32	38.55	51	61.45	3.96	1.89	8.44	<0.001
Strong	16	13.68	101	86.32				
Imitation								
Weak	31	39.24	48	60.76	3.95	1.89	8.34	<0.001
Strong	17	14.05	104	85.95				
Attitude								
Negative	33	40.24	49	59.76	4.62	2.18	9.99	<0.001
Positive	15	12.71	103	87.29				
Outcome expectation								
Poor	33	38.82	52	61.18	4.23	2.00	9.12	<0.001
Good	15	13.04	100	86.96				
Knowledge								
Poor	32	40.51	47	59.49	4.46	2.12	9.55	<0.001
Good	16	13.22	105	86.78				
Reinforcement								
Weak	31	54.39	26	45.61	8.83	4.02	19.54	<0.001
Strong	17	11.89	126	88.11				
Self-efficacy								
Weak	32	40.51	47	59.49	4.46	2.12	9.55	<0.001
Strong	16	13.22	105	86.78				
Self-management								
Poor	28	65.12	15	34.88	12.78	5.45	30.23	<0.001
Good	20	12.74	137	87.36				

In the role model, the study subjects who had strong role model (60.5%) was higher than those with weak role model (39.5%). In the vicarious experience, the study subject with strong vicarious experience (58.5%) was higher than those with weak vicarious experience (41.5%). The study subjects who were strong imitation (60.5%) were higher than those with weak imitation (39.5%). The study subjects who had positive attitude (59%) were higher than those with negative attitude (41%). The study subject who had good outcome expectation (57.5%) was higher than those with poor outcome expectation (42.5%). Most of the study subjects had good knowledge of 60.5% and poor knowledge of 39.5%.

Two-third of the study subjects had strong reinforcement (71.5%). The study subjects with strong self-efficacy (60.5%) were higher than those with weak self-efficacy (39.5%). The study subjects with good self-management (78.5%) were higher than those with poor self-management (21.5%).

3. Bivariate analysis

Table 3 shows the results of the Chi-square test. The tertiary prevention behavior in type 2 DM increased with strong observational

learning (OR= 3.99; 95% CI= 1.92 to 8.36; p <0.001), strong role model (OR= 5.77; 95% CI= 2.68 to 12.71; p<0.001), strong vicarious experience (OR= 3.96; 95% CI= 1.89 to 8.44; p <0.001), strong imitation (OR= 3.95; 95% CI= 1.89 to 8.44; p<0.001), positive attitude (OR= 4.62; 95% CI= 2.18 to 9.99; p<0.001), high outcome expectation (OR= 4.23; 95% CI= 2.00 to 9.12; p<0.001), good knowledge (OR= 4.46; 95% CI= 2.12 to 9.55; p<0.001), strong reinforcement (OR= 8.83; 95% CI= 4.02 to 19.54; p<0.001), strong self-efficacy (OR= 4.46; 95% CI= 2.12 to 9.55; p<0.001), and good self-management (OR= 12.78; 95% CI= 5.45 to 30.23; p<0.001).

4. Path Analysis

Multivariate analysis was used to determine the effect of more than one independent variable. This study used Path analysis with Stata 13**.**

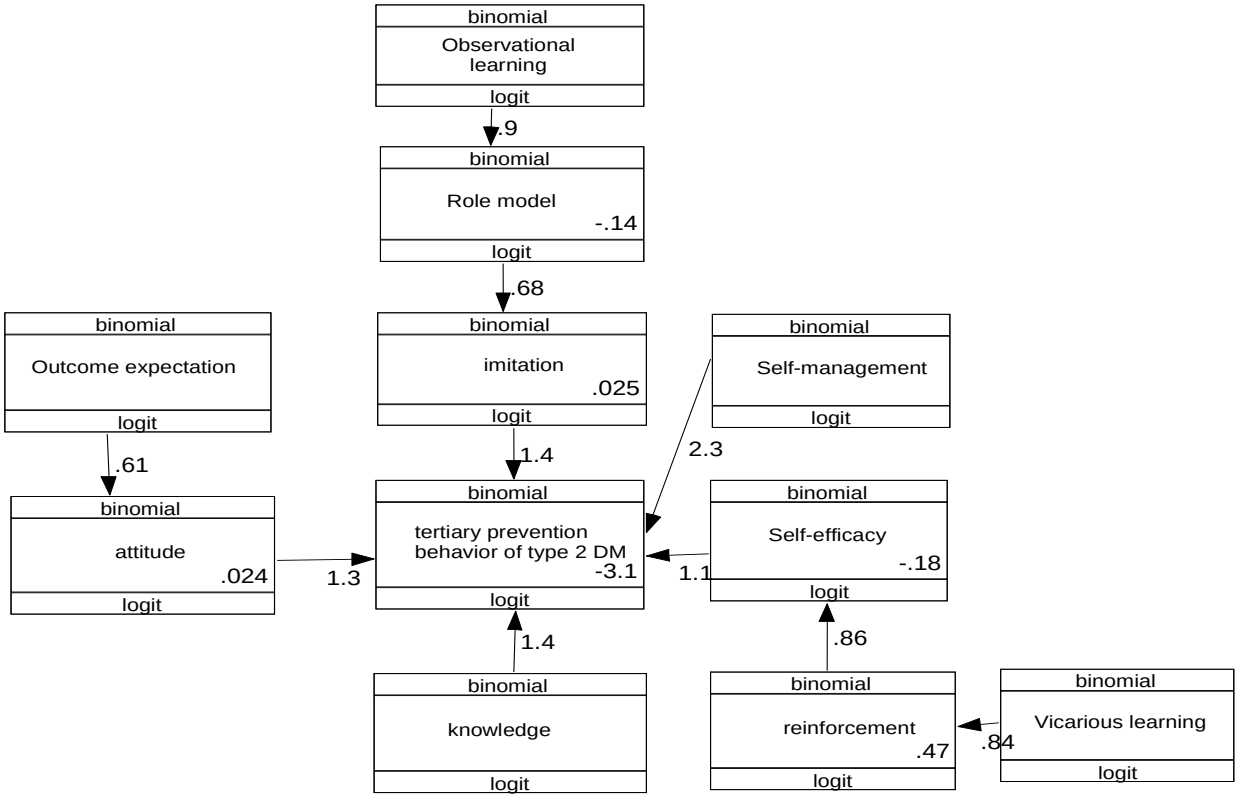

Figure 1. The Structural Model of the Path Analysis

Figure 1 depicted path analysis model on the tertiary prevention behavior in patients with type 2 diabetes mellitus using social cognitive theory. Figure 1 showed that tertiary prevention behaviour in type 2 DM patients were affected direct and indirectly by several factors.

Table 4 shows that there was a direct effect on imitation, knowledge, attitude, self-efficacy, and self-management on tertiary prevention behavior of type 2 DM.

Strong imitations directly increased logodd (possibility) of tertiary prevention in patient with type 2 DM 1.40 units than weak imitation (b=1.40; 95% CI= 0.51 to 2.28; p= 0.002).

Good knowledge directly increased logodd (possibility) of tertiary prevention in patient with type 2 DM 1.36 times than poor

knowledge (b= 1.36; 95% CI= 0.48 to 2.25; p= 0.002).

Positive attitude directly increased logodd (possibility) of tertiary prevention in patient with type 2 DM 1.32 times than negative attitude (b= 1.32; 95% CI= 0.44 to 2.19; p=0.003).

Strong self-efficacy directly increased logodd (possibility) of tertiary prevention in patient with type 2 DM 1.07 times than weak self-efficacy (b= 1.07; 95% CI= 0.18 to 1.96; p= 0.018).

Good self-management directly increased logodd (possibility) of tertiary prevention in patient with type 2 DM 2.26 times than poor self-management (b= 2.26; 95% CI= 1.31 to 3.22; p<0.001).

Tertiary prevention in patient with type 2 DM was indirectly affected by observational learning, role model, outcome expectation, reinforcement, and vicarious experience.

Strong role model increased with strong observational learning (b= 0.90; 95% CI= 0.30 to 1.50; p= 0.003).

Imitation increased with strong role model (b= 0.68; 95% CI= 0.98 to 1.26; p= 0.022).

Positive attitude increased with good outcome expectation (b= 0.60; 95% CI= 0.03 to 1.17; p= 0.038).

Strong self-efficacy increased with strong reinforcement (b= 0.83; 95% CI= 0.21 to 1.46; p= 0.007).

Reinforcement increased with strong vicarious experience (b= 0.83; 95% CI= 0.21 to 1.46; p= 0.009).

Table 4. The Application of Social Cognitive Theory: Tertiary Prevention Behavior in Patients with Type 2 Diabetes Mellitus

Dependent Variable		Independent Variable	Path Coeff. (b)	CI95%		p
				Lower Limit	Upper Limit	
Direct Effect						
Tertiary prevention behavior in type 2 DM patients	←	Imitation (strong)	1.40	0.51	2.28	0.002
	←	Knowledge	1.36	0.48	2.25	0.002
	←	Attitude (positive)	1.32	0.44	2.19	0.003
	←	Self-efficacy (strong)	1.07	0.18	1.96	0.018
	←	Self-management (good)	2.26	1.31	3.22	<0.001
Indirect Effect						
Role model	←	Observational learning	0.90	0.30	1.50	0.003
Imitation	←	Role model	0.68	0.98	1.26	0.022
Attitude	←	Outcome expectation (good)	0.60	0.03	1.17	0.038
Self-efficacy	←	Reinforcement (strong)	0.83	0.21	1.46	0.007
Reinforcement	←	Vicarious experience (strong)	0.83	0.21	1.46	0.009
N Observation= 200						
Log likelihood= -708.06						
AIC= 1448.11 BIC= 1500.88						

DISCUSSION

1. The effect of observational learning on tertiary prevention behavior

Based on the result of the study, observational learning had an effect on tertiary prevention behavior of type 2 DM. Someone with strong observational learning increased the likelihood of having tertiary prevention behavior of type 2 DM 0.90 units higher than those with weak observational learning.

Observational learning explained that individuals learned through observation of a behavior carried out by someone else. In addition, the individual would repeat the behavior. If the behavior could be done well others, the individual would try to repeat the behavior well too (Murti, 2018).

The result of the study is supported by Ghoreishi et al. (2019) that observational learning, based on social cognitive theory, affected educational intervention in health promotion in the self-care of patients with diabetes.

2. The effect of role model on tertiary prevention behavior

Based on the result of this study, role model had an effect on tertiary prevention behavior of type 2 DM. Someone with strong role model increased the likelihood of having tertiary prevention behavior of type 2 DM 0.68 units higher than someone with weak role model.

The result of the study is in accordance with a study conducted by Luo et al. (2019) that someone with a certain lifestyle might be able to affect others. Therefore, in developing a preventive policy, the social effect must be considered.

In principle, someone with high motivation would try to realize what he wants. For example, a patient with DM who was required to carry out DM diet adherence, with high motivation would affect the mind to carry it out and implement it with an action (Risti, 2017).

3. The effect of vicarious experience on tertiary prevention behavior

The result of this study indicated that vicarious experience had an effect on tertiary prevention behavior of type 2 DM. Someone with strong vicarious experience increased the likelihood of having tertiary prevention behavior of type 2 DM 0.83 units higher than someone with weak vicarious experience.

Information sources significantly affected knowledge and self-management. With this information, it was expected that someone would be easier to obtain health information, thus leading to a better behavior change in tertiary prevention behavior of type 2 DM (Javalkar, 2016).

4. The effect of imitation on tertiary prevention behavior

The result of this study showed that imitation had an effect on tertiary prevention behavior of type 2 DM. Someone with strong imitation increased the likelihood of having tertiary prevention behavior of type 2 DM 1.40 units higher than someone with weak imitation.

The result of the study is in line with a study conducted by Aweko et al. (2018) that the implementation of diet was one of the main components in the success of DM management. However, it often became an obstacle in DM services because it required adherence and motivation from the patients.

Giving health information by families to patients with type 2 DM allowed patients to understand their illnesses, thus having a desire to take good care and treatment (Nuryanto, 2019).

5. The effect of attitude on tertiary prevention behavior

Based on the result of this study, attitude had an effect on tertiary prevention behavior of type 2 DM. Someone with positive attitude increased the likelihood of having tertiary prevention behavior of type 2 DM 1.32 units higher than someone with negative attitude.

The result of the study is in accordance with a study conducted by Ponzo et al. (2017) that someone with good attitude would be

easy to obey the diet, thus giving a positive effect on her/his health. It occurred because attitude towards the diet was very closely related to the individual characteristics. This study is also supported by Kueh et al. (2016) that the attitude as the variable had a significant predictor of knowledge in glucose and foot care monitoring in type 2 DM patient.

6. The effect of outcome expectation on tertiary prevention behavior

Based on the result of this study, outcome expectation had an effect on tertiary prevention behavior of type 2 DM. Someone with good outcome expectation increased the likelihood of having tertiary prevention behavior of type 2 DM 0.60 units higher than someone with poor outcome expectation.

This study is supported by Suyanto et al. (2016) that someone with good outcome expectation would make a change in behavior, thus giving a positive impact on his/her health. This is in line with a study conducted by Shamizahed et al. (2019) that outcome expectation was a belief related to a certain behavior that led to certain results. These findings indicated that the implementation of SCT. based on the intervention in DM population at risk, had the potential to give benefit to these populations.

7. The effect of knowledge on tertiary prevention behavior

Based on the result of this study, knowledge had an effect on tertiary prevention behavior of type 2 DM. Someone with good knowledge increased the likelihood of having tertiary prevention behavior of type 2 DM 1.36 units higher than someone with poor knowledge.

The result of the study is in line with Herawati et al. (2018) that someone with good knowledge about health would minimize or avoid the occurrence of a disease. A behavior that was implemented based on knowledge would last longer than behavior that was not implemented with good knowledge.

The better one's knowledge of DM, the better someone is on a DM diet. Besides, the changes in a person's behavior could also control the condition of the disease, so that he/she could survive longer with a good quality of life (Chai, 2018).

8. The effect of reinforcement on tertiary prevention behavior

Based on the result of this study, reinforcement had an effect on tertiary prevention behavior of type 2 DM. Someone with strong reinforcement increased the likelihood of having tertiary prevention behavior of type 2 DM 0.83 units higher than those with weak reinforcement.

Someone with strong reinforcement would be easier to repeat positive behaviors related to tertiary prevention behavior of type 2 DM because reinforcement could affect one's behavior (Murti, 2018).

The result of the study is in accordance with Ramkisson et al. (2017) that reinforcement, related to social support, was very important to help patients with DM to overcome their health problems while increasing adherence to treatment.

A good appreciation for people with type 2 DM would make the government feel recognized or valued. Fear of not being appreciated by the peer or social environment could be minimized. Therefore, the sufferers were able to actualize themselves in their environment according to their abilities (Nuryanto, 2019).

9. The effect of self-efficacy on tertiary prevention behavior

Based on the result of this study, self-efficacy had an effect on tertiary prevention behavior of type 2 DM. Someone with strong self-efficacy increased the likelihood of having tertiary prevention behavior of type 2 DM 1.07 units higher than someone with weak self-efficacy.

Someone with strong self-efficacy would be easier to control a behavior he/she wanted relating tertiary prevention behavior of type 2 DM (Murti, 2018).

The result of the study is in accordance with Sharoni et al. (2018) that self-efficacy could improve self-care of foot injury in people with DM. Some respondents with foot injuries had recovery due to strong self-efficacy. Therefore, it could affect one's behavior in the treatment of foot injuries.

10. The effect of self-management on tertiary prevention behavior

Based on the result of this study, self-management had an effect on tertiary prevention behavior of type 2 DM. Someone with good self-management increased the likelihood of having tertiary prevention behavior of type 2 DM 2.26 units higher than someone with weak poor self-management.

The result of the study is in accordance with a study conducted by Goreshi et al. (2019). From the several variables used in the study, self-management had the greatest impact on DM self-care. People with good self-management, would tend to behave well by carrying out a healthy lifestyle.

Foot care needed to be conducted by people with DM because it could minimize the risk of injury to the foot that could develop into foot ulcers (Hidayah, 2019).

AUTHOR CONTRIBUTION

Nur Aida Yuliana was the main researcher who played a role in collecting the data, formulating the articles, and processing the data. Pawito played a role in the background formulation. Bhisma Murti formulated a theoretical framework for learning and discussion.

CONFLICT OF INTEREST

We declare that there was no conflict of interest.

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