RELATIONSHIP OF KNOWLEDGE AND ATTITUDE TO THE PREVENTION OF TYPE II DIABETES MELLITUS AMONG STUDENTS OF PUBLIC HEALTH UNDERGRADUATE DEGREE PROGRAM

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ABSTRACT

Introduction: Diabetes mellitus (DM) is a degenerative disease that causes the body's tissues or organs to deteriorate over time. One of the provinces in Indonesia with the highest prevalence of diabetes is the province of East Java. Knowledge related to DM type II should have been instilled since school. When someone has enough knowledge, it will form good attitudes and actions. This study aims to study the relationship between attitudes and knowledge of public health students with actions related to the prevention of DM type II. **Methods:** This type of research is analytic descriptive research with cross-sectional research design. The study population was all S1 Public Health Sciences students, amounting to 870 students. The sampling technique is total sampling / saturated sample. So the size of the study sample is 870 students. This study uses prevalence ratio (PR) analysis to determine the strong relationship between variables and the magnitude of risk. **Result:** The homework between knowledge and action variables shows a value of 1,114 (95% CI = 0.888 – 1.399) and the prevalence ratio value between attitude and action variables shows a value of 0.597 (95% CI = 0.490 - 0.726). **Conclusion:** Suggestions from this researcher are making public service advertisements about student compliance and awareness about healthy lifestyle habits, especially restrictions on foods high in sugar, limiting eating fast food, doing proper and regular exercise, and getting enough sleep.

Keywords: Actions, Attitudes, Diabetes Mellitus, Knowledge

INTRODUCTION

Diabetes Mellitus (DM) may refer to a degenerative disease that causes tissue or organs of the body to worsen over time. DM occurs due to a metabolic disorder, a condition where the pancreas produces a lacking amount of insulin so that the insulin can not work optimally. This condition might increase blood sugar levels (Hyperglycemia) caused by abnormalities in insulin secretion, insulin action, or even both. Hyperglycemia might cause blood sugar to accumulate in the blood resulting in failure to enter the cell. The failure may be triggered by a decrease in the hormone insulin or even a defect in insulin function. Type II diabetes is a DM caused by a decrease in the amount of insulin produced by the body (Susanti, 2019).

Diabetes Mellitus can be categorized into several types, including type I diabetes, type II diabetes, gestational type, and other types of diabetes. However, type II diabetes is considered a widespread type of diabetes. Overall, the type of diabetes that 90% of people suffer from is classified as type II diabetes (Ministry of Health Republic of Indonesia, 2014).

According to the World Health Organization (WHO), the number of people who have diabetes per year in the world reaches 415 million, and more than 80% of them occur in developing countries. Indonesia ranked sixth in the world in 2017 due to the prevalence of diabetes (Department of Health, 2018). East Java is believed to be a province that has had the highest prevalence of DM in Indonesia. Riskesdas reported that the number of people suffering from diabetes

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continuously increased from 2007 to 2013, amounting to 330,512. East Java is also observed to be a province in the top 10 in the highest DM prevalence category. Following the order, East Java is in the sixth rank throughout Indonesia (Ministry of Health Republic of Indonesia, 2014)

In 2012, it was estimated that 25.1% of diabetes cases are from Surabaya, East Java. DM cases also increased in 2013 to 30.12%. Whereas in Sentinel Hospital in East Java, DM disease was ranked 5th out of 49 other infectious diseases (Meidikayanti and Wahyuni, 2017). The increasing of the number of people with DM each year and the decreasing of the age of patients suffering from diabetes mellitus might impact the high costs incurred by the state. Based on the analysis of the World Economic Forum, in the period 2012-2030, Indonesia will be afflicted by 2800 trillion rupiahs or equivalent to twenty times of the Indonesian health budget in 2012 as a whole (Larasati, 2017).

The results of pre-research interviews conducted by the researcher at the Faculty of Public Health, Universitas Airlangga, reveal that most students have a particular lifestyle that might be the trigger of early DM. Students often consume fast food because of its practicality, mainly since the online application comfortably supports it. Besides, they often gather or do assignments in fast-food restaurants, thereby increasing the frequency of consumption of fast food. The frequency of students consuming fast food is reported to reach more than two times a week. Furthermore, they also often consume sugary drinks and soft drinks. Most students also rarely exercise because they are busy with activities outside the campus or lazy. Some students also stated that they have close relatives affected by DM.

Knowledge of Type II DM prevention is critical for adolescents to understand, seeing that they are considered as a high affected age group. The number of adolescents suffering from DM is estimated to be around 12,191,564 people (out of 176,689,366 people) (Ministry of Health Republic of Indonesia, 2014).

Risk factors for type II DM may include permanent factors and modifiable factors. The unalterable factors might refer to factors innate within the individual so that it cannot be modified, for example, sex, race, age, genetic predisposition, history of giving birth to LBW babies, and other invariant factors. On the other hand, the modifiable factors might be related to lifestyles such as hypertension, lack of physical activity, smoking, obesity, and other particular lifestyles. The modifiable risk factors will be managed as prevention efforts (Ministry of Health Republic of Indonesia, 2014). Type II diabetes is often referred to as diabetes lifestyle because it is mostly influenced by genetics, environmental factors (including obesity, age, insulin resistance, physical activity, and food.) and an unhealthy lifestyle. An unhealthy lifestyle may be denoted as the primary determining factor for the occurrence of diabetes mellitus. By monitoring the lifestyle of people with diabetes, it will enhance the chance to regulate blood sugar levels in the body efficiently (Betteng, Pengemanan and Mayulu, 2014).

After understanding the existence of risk factors, prevention must be formed. Prevention is believed to contribute as an effort to maintain a healthy status, improve physical and mental health, and prolong life. There are three stages of prevention to overcome a health problem, namely primary prevention which prioritizes health promotion efforts and various special protections, secondary prevention where efforts are made to of an early diagnosis, immediate treatment, and disability limitation, and tertiary prevention where the last effort that can be done is rehabilitation (Rivai, 2005)

Efforts to prevent DM should be prepared beforehand. Knowledge related to

diabetes mellitus should have been taught in school. When someone has sufficient knowledge, this person would be likely to develop good attitudes and actions. Knowledge might be formed by the experience and the results of sensing or perceiving a particular object to increase insight and produce knowledge output. Attitude is assumed to be the response or reaction that has not yet occurred from the individual to a stimulus or object. Health actions refer to all things related to the activities or actions of individuals in improving and maintaining their health, which is also related to actions to prevent disease (Notoatmodjo, 2003).

Healthy behavior could be applied to reserve diabetes. Behavior is noted as a response arising from oneself due to circumstances around a particular person (Notoatmodjo, 2003). Based on the theory of behavior shift stated by Lawrence Green, a person's behavior is influenced by several factors, which are internal factors and external factors. Three main factors that can influence individual behavior, among others, are predisposing factors, enabling factors, and reinforcing factors (Notoatmodjo, 2010).

Predisposing factors attribute as the first reference as an effort to change behavior. One predisposing factor in this study is the respondent's knowledge and the respondent's attitude toward any diabetes preventive measures. Both of these predisposing factors might be likely to influence an individual's behavior toward DM prevention. Thus, this study aims to analyze the relationship between attitudes and knowledge of public health students with actions toward diabetes prevention. The regular students of the Public Health Program of Universitas Airlangga were selected to be respondents because they had received initial courses related to diabetes mellitus since the early semester. In addition to that, they are also considered as the succeeding health promoters in improving public health.

METHODS

This research applied quantitative research. A cross-sectional approach was chosen and conducted at the Faculty of Public Health, Universitas Airlangga in April to June 2019. Eight hundred and seventy students of the undergraduate Public Health Science Study Program of Universitas Airlangga, consisting of 211 students of Batch 2015, 217 students of Batch 2016, 216 students of Batch 2017, and 226 students of Batch 2018 were selected as the participants of the study. Sampling techniques were employed with a total sampling / saturated sample of 870 students.

The independent variable chosen was the knowledge and attitude of public health students toward the prevention of diabetes mellitus. The dependent variable in this study was the action of public health students on the prevention of diabetes mellitus. The data were collected using an online questionnaire. After that, the data were classified into univariate data and bivariate data. Notwithstanding, the p-value was not examined because a non-probability sampling was used, so the results of the study could not be concluded universally.

Next, the dependent and independent variable data were analyzed using bivariable analysis with cross-tabulation on statistical test equipment. The analysis displayed the frequency results to determine the PR (Prevalence Ratio) and the significance of the risk.

Characteristics of respondents in this study were described based on several criteria, among others, a (1) age of the individual is calculated from the time the individual was born until the time of the study which is divided into individuals aged more than 20 years and individuals less than 20 years old; (2) gender is a characteristic of respondents' sexuality grouped into female and male; (3) the year of education is the length of time that has been taken by the

respondent from the beginning he entered college which is categorized into individuals who have taken less than the same as the second year and individuals who have taken more than the second year; (4) domicile is the area where the respondent lives divided into two groups namely Surabaya domicile and domicile outside Surabaya; (5) ethnic group is an identity of a certain group that contains culture and customs which is divided into two groups, namely Javanese and other than Javanese; (6) Body Mass Index (BMI) is a number that indicates the criteria of the respondent's body is divided into several groups, namely underweight, normal, overweight, or obese; (7) family history of DM is the presence or absence of genetics component of diabetes mellitus divided into two groups: respondents who share genetic factors with family members and respondents who do not share genetic factors with family members; (8) the history of family members suffering from DM includes father, mother, grandfather, grandmother, and siblings. The following is a frequency distribution of respondents' characteristics. Ethical approval for this study protocol was obtained from the Research Ethics Committee of Faculty of Dental Medicine Universitas Airlangga with certificate number 200/HRECC.FODM/V/2019.

RESULTS

The followings are the results of the study based on the analysis that has been conducted:

Overview of Characteristic of Respondents

The respondents of the study selected are 870 students of undergraduate students of Faculty of Public Health, Universitas Airlangga, academic year 2018/2019.

Table 1. Frequency Distribution of Respondent Characteristics

Characteristic	Total	
	n	%
Age		
≥ 20 years old	555	63.8
<20 years old	315	36.2
Total	**870**	**100**
Sex		
Male	105	12.1
Female	765	87.9
Total	**870**	**100**
Duration of Study		
≤ Second Year	439	50.5
>Second Year	431	49.5
Total	**870**	**100**
Domicile		
Surabaya	511	58.7
Other than Surabaya	359	41.3
Total	**870**	**100**
Ethnic Group		
Javanese	760	87.3
Other than Javanese	110	12.7
Total	**870**	**100**
BMI		
Underweight	43	4.9
Normal	578	66.4
Overweight	192	22.1
Obese	57	6.6
Total	**870**	**100**
Shared Genetics Factor		
Yes	357	41.0
No	513	59.0
Total	**870**	**100**
Family Members Suffering from DM		
Father	107	12.0
Mother	77	9.0
Grandfather	59	5.0
Grandmother	111	13.0
Siblings	3	2.0
None	513	59.0
Total	**870**	**100**

Table 1 displays the results of the distribution of respondent characteristics. It

can be seen that 63.8% of respondents are in the age range of more than equal to 20 years. 87.9% of the respondents are female. Moreover, 50.5% of respondents have studied for more than two years and 58.7% of respondents reside in Surabaya. Based on the ethnic group, 87.3% of respondents are Javanese, while according to BMI, 66.4% of respondents have a normal weight. Related to the shared genetics factor, 59.0% of respondents do not have a family history of diabetes mellitus, and 59.0% do not have family members who suffer from diabetes mellitus.

Overview of the Understanding of Diabetes Mellitus

Knowledge or understanding is the output of the perceiving stimulus of an object. Knowledge can be obtained from formal education or non-formal. The following is the frequency distribution of the understanding of diabetes mellitus prevention.

Table 2. Frequency Distribution of Understanding of Diabetes Mellitus Prevention

Knowledge	Total	
	n	%
High	636	73.1
Low	234	26.9
Total	870	100

Table 2 provides the results of the study, showing that 636 respondents (73.1%) possess a high level of diabetes prevention knowledge, and 234 respondents (26.9%) possess a low level of knowledge. The majority of public health students possess a great understanding related to the prevention of diabetes mellitus.

Knowledge can be gained from various sources through both formal and non-formal education. Formal education can be received through schools, while non-formal can be obtained from experiences or stories shared by others.

Overview of Attitude toward Diabetes Mellitus Preventive Measures

Attitude refers to an individual's response to the stimulus they perceive that can affect an individual's actions directly or indirectly. The following is a frequency distribution of diabetes mellitus prevention attitudes.

Table 3. Frequency Distribution of Attitude toward Diabetes Mellitus Preventive Measure

Attitude	Total	
	N	%
Positive	484	55.6
Negative	386	44.4
Total	870	100

Based on Table 3, the results show that the attitudes of 484 respondents (55.6%) are positive, while the attitudes of 386 respondents (44.4%) are negative. The majority of public health students already perform a positive attitude regarding the prevention of diabetes mellitus.

The form of attitude shown by respondents is related to eating patterns, sleep patterns, and physical activities. Respondents also seem to prefer low-sugar foods, eating a maximum of two hours before bedtime, and physical activities on foot.

Overview of Diabetes Mellitus Preventive Measure

The action implies an action accomplished by the individual after receiving various stimuli both internal and external. The following is the frequency distribution of diabetes mellitus preventive measures.

Table 4. Frequency Distribution of Diabetes Mellitus Preventive Measure

Action	Total	
	n	%
Good	592	68.0
Poor	279	32.0
Total	870	100

According to Table 4, it can be inferred that 592 respondents (68.0%) perform good actions while other 279 respondents (32.0%) perform poor actions. The majority of public health students already perform good actions related to the prevention of diabetes mellitus.

Forms of action executed include rare consumption of foods and drinks high in sugar, not smoking, not consuming alcohol, sleeping approximately 7-8 hours per day, and checking blood sugar levels regularly.

Relationship between Knowledge and Diabetes Mellitus Preventive Measures

The following is the result of the analysis of the relationship between knowledge of DM and DM preventive measures on public health students of Universitas Airlangga. Based on Table 5, it is shown that a total of 427 respondents (49.1%) possess high knowledge and good diabetes mellitus preventive measures, while other 165 respondents (19.0%) possess low knowledge and good diabetes mellitus preventive measures. On the other hand, as much as 24.0% or 209 of the total respondents have high knowledge and poor diabetes mellitus preventive measures. In addition, as many as 69 respondents (7.9%) have low knowledge and poor diabetes preventive measures.

Table 5. Relationship between Knowledge and Diabetes Mellitus Preventive Measures

Knowledge	Action				Total	
	Good		Poor			
	n	%	N	%	N	%
High	427	49.1	209	24.0	636	73.1
Low	165	19.0	69	7.9	234	26.9
Total	592	68.0	278	32.0	870	100
PR (*CI* 95%) = 1.114						

According to statistical tests, the prevalence ratio reaches 1.114 (95% CI = 0.888 – 1.399), which implies that respondents with a high level of knowledge have the opportunity to take proper actions by 1,114 times greater than respondents who have profound knowledge. Thus, it can be inferred that respondents who have immense knowledge will perform right actions related to DM prevention.

Relationship between Attitude and Exclusive Diabetes Mellitus Preventive Measures

The following is the result of the analysis of the relationship between attitudes and actions to prevent diabetes mellitus of public health students at Universitas Airlangga.

Table 6. Relationship between Attitude and Exclusive Diabetes Mellitus Preventive Measures

Attitude	Action				Total	
	Good		Poor			
	n	%	n	%	n	%
Positive	365	42.0	119	13.7	484	55.6
Negative	227	26.1	159	18.3	386	44.4
Total	592	68.0	278	32.0	870	100
PR(*CI* 95%) = 0.597						

As shown in Table 6, as many as 365 respondents (42%) have positive attitudes, while the other 227 respondents (26.1%) have negative attitudes. However, these respondents perform good DM preventive measures. On the other hand, 119 respondents (13.7%) possess positive attitudes and poor DM preventive measures, while 159 respondents or as much as 18.3% possess negative attitudes and poor DM preventive measures.

Based on statistical tests, the prevalence ratio value is 0.592 (95% CI = 0.490 - 0.726), which indicates that respondents who possess a positive attitude might have the opportunity to perform good actions 0.597 times greater than those who have a negative attitude. Thus, it can be seen that respondents who have a positive attitude will take the right actions related to DM prevention.

DISCUSSIONS

Relationship between Knowledge and Diabetes Mellitus Preventive Measure

The results of the study indicate that public health students possess high knowledge and positive actions. Based on the analysis, highly educated students tend to have good actions related to the prevention of diabetes mellitus.

This result is supported by research conducted by Amalia and colleagues (2016) that there is a relationship between the level (Amalia, Sutikno and Nugraheni, 2016) of knowledge about DM and the type of DM that become the majority in Wonodadi Health Center, Blitar Regency (P = 0.027). Another research conducted by Khairani (2012) is also in line with the study that there is a relationship between knowledge about understanding DM and diabetes prevention in the elderly (P = 0.001).

However, this study is contrary to that of (Azriful et al., 2018), who found that correlation between the level of knowledge of diabetes risk factors and diabetes status on Civil Servants of UIN Alaudin Makassar (P = 0.121) does not exist.

Knowledge is believed to be an essential role in the formation of actions as a whole because knowledge forms the trust that is used in conveying a reality, creating the basis for individual decisions and developing actions on an object (Notoatmodjo, 2013). This condition then influences the individual in taking action. The newly built action, particularly on adults, is initiated in the cognitive domain, which implies that the subject perceives the stimulus in the form of objects or outside material before new knowledge is developed into actions or attitudes(Priyanto, 2018).

The results also have been able to demonstrate that personal knowledge related to what has been perceived, analyzed interpreted, and influenced by the surroundings might form an attitude that is applied in daily life leading to a particular action. A highly educated person can deeply understand about diabetes preventive measures, which might be able to prevent the

incidence of diabetes early, starting from creating a regular eating schedule, taking into account the intake of calories consumed, paying attention to the types of foods that are appropriate and allowed, and doing appropriate exercises.

Public health students possess a high level of knowledge about diabetes prevention because they have received courses in college. Moreover, public health students are required to be sensitive to the DM issues that are increasingly prevalent among the community. Public health students might be able to be a role model for the community in taking any diabetes preventive measures. Exposure to knowledge about DM prevention will increasingly form positive attitudes in students toward the prevention of diabetes.

Relationship between Attitude and Diabetes Mellitus Preventive Measures

This study confirms that public health students possess positive attitudes and perform good actions. Public health students who have positive attitudes tend to have good actions related to the prevention of DM. A study by Saputra, Rahmatiah and Muhasidah (2017) was of the opinion that 74.4% of students possess a good attitude toward DM prevention efforts, and 25.6% have lower attitude toward diabetes. This result is in line with the research conducted by Shankari et al. (2018). They are of the opinion that the attitude of 48% of students is considered a good attitude, 46% of the students possess fair good attitudes while 6% of students have an unfavorable attitude toward the prevention of diabetes.

The formation of action might be initiated with knowledge or insight related to the stimulus in the form of objects or materials related to diabetes prevention, thus creating a brand new knowledge or insight in a person before generating an innate response in the form of an attitude related to something of which he is aware. Later, a response in the form of action will arise regarding the implementation or nonfulfillment of DM prevention.

Public health students undoubtedly, however, show that they have good knowledge and attitude related to DM prevention. It can also be suggested that public health students might be able to process knowledge and good attitude into have good behavior related to the prevention of DM.

CONCLUSION

The study has identified that the majority of public health students already possess immense knowledge, positive attitudes, and good actions related to DM prevention. The findings clearly indicate that public health students with high levels of knowledge are 1.114 times more likely to implement significant DM preventive measures, and public health students with positive attitudes are 0.597 times more likely to implement large DM preventive measures. Taken together, this research suggests (1) performing early diabetes detection by taking a health screening at the nearest health facility to identify the glycemic condition; (2) implementing the knowledge obtained by performing positive actions to avoid DM in daily life; (3) FKM or the Faculty of Public Health invites students to start implementing healthy lifestyle, such as doing regular exercise, decreasing fast food consumption highly sweetened drinks.

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