International Journal of Multidisciplinary Research and Publications
ISSN (Online): 2581-6187

The Effect of the Health Belief Model (HBM) On Blood Sugar Changes in Type 2 Diabetes Mellitus Patients at Banjar Serasan Health Center, East Pontianak

Lestari Makmuriana[1], Eka Nurvitasari[2], Tri Wahyuni[3]
[1]Lecturer, Department of Medical Surgical Nursing, STIK Muhammadiyah Pontianak, Indonesia
[2]Student, STIK Muhammadiyah Pontianak, Indonesia
[3]Lecturer, Department of Community Health Nursing, STIK Muhammadiyah Pontianak, Indonesia
Email address: lestarimakmuriana@gmail.com

Abstract—*Diabetes mellitus is a lifelong disease that cannot be cured but can be controlled. Efforts to control blood sugar in patients with diabetes mellitus must be appropriate. The accuracy of controlling blood sugar itself is influenced by perception factors. Theory related to perception factors is HBM theory. Health Belief Model (HBM) is a perception of individual confidence in making decisions for healthy behavior that can be used to control blood sugar in Diabetes Mellitus patients. Knowing the effect of the Health Belief Model (HBM) on blood sugar control in patients with Type 2 Diabetes Mellitus in the working area of Banjar Serasan Health Center, East Pontianak. This research uses quantitative methods, with Quasi Experiment research design. The research instrument used was leafleat, demographic sheets, DKQ-24 questionnaire, Health Belief Mode (HBM) questionnaire and Glucometer Tool. The sampling technique used was purposive sampling based on inclusion and exclusion criteria with a sample of 30 respondents. Provision of Health Belief Model theoretical intervention with the results of the intervention pre-test research is an average of 32,967 with the lowest blood sugar level of 104 mg / dl and the lowest sugar level of 332 mg / dl. Intervention post test results with an average of 32,967 with the highest blood sugar levels 83 and the highest blood sugar levels 306 mg/dl. From the results of statistical analysis using Paired T Test with a confidence level of 95% and a significance level (α) of 0.05, the results of the p-value = 0,000 this value indicates the p-value 0,000 <0.05, which is provided as desired the Health Belief Model (HBM) on blood sugar control in Type 2 Diabetes Mellitus patients at the Banjar Serasan Health Center in East Pontianak. There is an influence of the Health Belief Model (HBM) theory on blood sugar control in Type 2 Diabetes Mellitus patients at Banjar Serasan Health Center, East Pontianak.*

Keywords— *Diabetes Mellitus, Theory of Health Belief Model (HBM), Individual Perception.*

I. INTRODUCTION

Non-Communicable Diseases (NCD) has become a major public health problem in Indonesia. This is marked by a shift in the epidemiological pattern of infectious diseases which tend to decrease to non-communicable diseases globally, increase in the world and nationally occupy the top ten diseases that cause death and the most cases, including diabetes mellitus(1). Diabetes mellitus is called the silent killer because this disease can affect all organs of the body and cause various kinds of complaints. Diseases that will be caused include impaired eye vision, cataracts, heart disease, kidney disease, sexual impotence, wounds that are difficult to heal and rot/gangrene, lung infections, blood vessel disorders, stroke and so on. Not infrequently, severe diabetes mellitus sufferers undergo limb amputation due to decay(2). The global prevalence of DM sufferers in 2018 was 451 million (aged 18-99 years) with diabetes worldwide. These numbers are expected to increase to 693 million by 2045. It is estimated that nearly half of all people (49.7%) living with diabetes are undiagnosed. In addition, it is estimated that there are 374 million people with impaired glucose tolerance (IGT) and it is projected that nearly 21.3 million live births of women are affected by some form of hyperglycemia in birth. At the beginning of 2018, about 5 million deaths worldwide were caused by diabetes in the 20-99 year age range. Global health care spending on people with diabetes is estimated at USD 850 billion. Experts say about 79% of people with diabetes live in low- and middle-income countries. The highest age-adjusted prevalence of diabetes in adults (18 – 99 years) was found in the North America and Caribbean Region (NAC) at 10.8% while the lowest was in the African region (AFR) at 4.2%. However, the largest number of people with diabetes is found in the Western Pacific (WP), where there are 168.4 million in the 18-99 year age group, making the Western Pacific region home to 37% of the total global diabetes population(3). The World Health Organization predicts an increase in the number of people with Diabetes Mellitus in Indonesia from 8.4 million in 2000 to around 21.3 million in 2030. This report shows an increase in the number of people with Diabetes Mellitus by 2-3 times in 2035. The national prevalence of Diabetes Mellitus in Indonesia for ages above 15 years is 6.9% of patients with Diabetes Mellitus, 30.4% who have been previously diagnosed and 69.6% who have not previously been diagnosed. Currently, it is estimated that 12.1 million people are diagnosed with Diabetes Mellitus. With this number, Indonesia is ranked 5th in the world, or two ranks compared to previous data which was ranked 7th in the world with 7.6 million people with Diabetes Mellitus(4). It was found that West Kalimantan Province Diabetes Miletus data in 2018 covering all ages was 1.00% and increased to 2.01% while data for age 15 years in 2013 was 0.30% and increased in 2018

Lestari Makmuriana, Eka Nurvitasari, and Tri Wahyuni, "The Effect of the Health Belief Model (HBM) On Blood Sugar Changes in Type 2 Diabetes Mellitus Patients at Banjar Serasan Health Center, East Pontianak," *International Journal of Multidisciplinary Research and Publications (IJMRAP)*, Volume 4, Issue 12, pp. 132-140, 2022.

to 2.70% [5]. Diabetes Mellitus is very influential on the quality of human resources and has an impact on increasing health costs which is quite large. Therefore, all parties, both the community and the government, should actively participate in efforts to control Diabetes Mellitus, especially in efforts to prevent and control blood sugar within normal limits. Diabetes Mellitus will have an impact on the quality of human resources and a large increase in health costs, it is necessary to control a type 2 Diabetes Mellitus program. Type 2 Diabetes Mellitus can be prevented, delayed or eliminated by controlling risk factors[2]. Although successful in improving the lifestyle of diabetics through technology and biomedical science, the management of type 2 diabetes mellitus mostly lies in controlling blood sugar within normal limits in people with diabetes mellitus. This includes healthy behaviors that must be carried out by the patient himself. Healthy behaviors include eating healthy foods, exercising physically, taking medication as prescribed, monitoring blood sugar, regular clinic visits and managing stress[6]. Efforts to control blood sugar aim to prevent complications, improve the patient's quality of life and reduce the patient's blood sugar level. Prevention of complications is done by maintaining the stability of blood sugar with regular treatment for life because Diabetes mellitus is a lifelong disease that cannot be cured permanently[7]. The results of interviewing researchers for 3 days with Diabetes Mellitus patients and also Health Workers at the Banjar Health Center seemed 10% of the total sample said patients came to the puskesmas irregularly, patients came to the puskesmas if the patient felt unwell due to high blood sugar levels. uncontrollable. On average, Diabetes Mellitus patients feel they are healthy and often forget to take Diabetes Mellitus drugs. When asked about how to control blood sugar, several Diabetes mellitus patients said they did not understand and only knew about Diabetes Mellitus through the internet and television and had never received counseling about Diabetes Mellitus. Patients perceive Diabetes Mellitus as a normal and harmless disease. The patient also said that he only took medicine and did not eat sweet food if he felt his blood sugar was high by feeling the symptoms of diabetes appear such as thirst, frequent urination, itching and so on without checking blood sugar levels. The inaccuracy in controlling blood sugar in Diabetes Mellitus patients at the Banjar Serasan Health Center can be influenced by perceptual factors and can be controlled by several theories. One theory that can be used to control blood sugar is the Health Belief Model (HBM) theory. The Health Belief Model (HBM) theory is one of the first models designed to encourage people to take action towards positive health. The main concept of the Health Belief Model (HBM) theory is that healthy behavior is determined by individual beliefs or perceptions about disease and the means available to avoid the occurrence of a disease [8]. The Health Belief Model theory is based on five components, namely Perceived Susceptibility (perceived vulnerability), Perceived Seriousness (perceived seriousness), Perceived Benefits (perceived benefits), Perceived Berriers (perceived barriers) and Cues to Action (cues to act). Perceived Susceptibility is a subjective perception of risk obtained from experienced health conditions such as the perception of the risk of suffering from Diabetes Mellitus where this perception can encourage a person to behave in a healthy manner. Perceived Seriousness (perceived seriousness) of Diabetes Mellitus in patients with Diabetes Mellitus may be felt after complications such as heart disease, hypertension and the patient's knowledge about Diabetes Mellitus as a disease that must take medication continuously and be experienced for life. Perceived Benefits (perceived benefits) are individual beliefs about the benefits of an action such as the benefits of preventing Diabetes Mellitus based on the value of an action in reducing the risk of disease. Perceived Berriers (perceived barriers) are perceptions of negative aspects that psychologically affect individuals to behave in a healthy manner towards Diabetes Mellitus in accordance with recommendations such as pain, costs and unpleasant experiences. Cues to Action (cues for action) are events that can increase a person's motivation to change health behavior in Diabetes Mellitus such as family support, nurses and health workers in health services. The results showed that 53.3% of patients with Type II DM had poor Health Belief. In the perceived susceptibility domain 53.3% of respondents in the bad category of health belief, 54% of respondents in the bad category in the perceived severity domain, in the perceived benefits domain 51.1% of respondents in the bad category, 56.2% of respondents in the good category of perceived barriers and in the cues to action domain 70.8% of respondents are in the good category. From the suggestions presented, researchers still need further research on the Health Belief Model Theory with more samples for further researchers[9]. From the explanation above, the researchers conducted this study to determine the effect of the theory of health belief model (HBM) on changes in blood sugar in Type 2 Diabetes Mellitus patients, looking at the data of Type 2 Diabetes Mellitus patients at the Banjar Serasan Health Center, East Pontianak with the target of Type 2 Diabetes Mellitus patients. so that it is known whether additional health education and follow-up are needed so that complications do not occur for patients.

II. Objective

This research aimed to study the effect of the health belief model (HBM) on blood sugar control in patients with type 2 diabetes mellitus in the working area of Banjar Serasan Health Center, East Pontianak.

III. Methodology

Study Design

This research is a quantitative research. This study uses a quasi-experimental without a control group with the design used is a pretest post test one group design. The research test used Paired T-Test. In this study, the sampling technique used is purposive sampling based on certain inclusion and exclusion criteria that have been determined by the researcher.

Population and Sample

The population of this study was diabetes mellitus patients in the working area of the Banjar Serasan Public Health Center, Pontianak Timur. From 21th April – 16th October 2020. A total of 30 respondents.

Lestari Makmuriana, Eka Nurvitasari, and Tri Wahyuni, "The Effect of the Health Belief Model (HBM) On Blood Sugar Changes in Type 2 Diabetes Mellitus Patients at Banjar Serasan Health Center, East Pontianak," *International Journal of Multidisciplinary Research and Publications (IJMRAP)*, Volume 4, Issue 12, pp. 132-140, 2022.

Instrument

This instrument was developed by researchers after conducting a literature study in journals and books on the theory of health belief model (HBM) about controlling blood sugar in type 2 diabetes mellitus. The data collection tools used in this study were leaflets, informed consent, demographic sheets, DKQ-24 questionnaire, health belief mode (HBM) questionnaire and glucometer tool.

Intervention

The intervention in the study started from April to October 2020. If at that time there were diabetes mellitus patients who met the inclusion criteria, the researchers immediately took these patients as samples.

Data Collection

The data collection tools used in this study were leaflets, informed consent, demographic sheets, DKQ-24 questionnaire, health belief mode (HBM) questionnaire and glucometer tool. After the patient agreed, the researcher asked the patient to sign the informed consent form, after which the researcher conducted the study. This research has passed the ethical test of STIK Muhammadiyah Pontianak with registration number 103/II.I.AU/KET.ETIK/III/2020. Univariate analysis was conducted to describe the characteristics of age, gender, education history, occupation, history of diabetes mellitus, history of health education about diabetes mellitus. Bivariate analysis was conducted on two variables to determine the relationship or correlation, differences. The qualitative independent variables in this study have two categories. Therefore, the test was carried out using the test method for the difference in mean for two paired samples (paired sample t-test).

IV. Results

1. Univariate analysis test

Based on table 1, it shows that the average age of respondents with type 2 diabetes mellitus is 52.10 years old with the youngest age being 23 years old and the oldest being 69 years old in the working area of the Banjar Serasan Public Health Center, East Pontianak.

TABLE 1. Descriptive Statistics of Respondents based on the age of Type 2 Diabetes Mellitus patients in the working area of the Banjar Serasan Health Center April 2020 (n= 30)

Descriptive Statistics							
	N	Range	Minimum	Maximum	Sum	Mean	Std. Deviation
Age	30	46	23	69	1563	52.10	10.937
Valid N (listwise)	30						

TABLE 2. Frequency distribution based on male respondents with Type 2 Diabetes Mellitus in the working area of the Banjar Serasan Health Center April 2020 (n= 30)

Gender	Frequency	Percentage
Male	9	30%
Female	21	70%
Total	30	100%

Based on Table 2, it shows that the most gender in respondents with Type 2 Diabetes Mellitus, namely Female with a total of 21 respondents (70%) and Male with a total of 9 respondents (30%).

TABLE 3. Frequency distribution of respondents based on the education of Type 2 Diabetes Mellitus patients in the working area of the Banjar Serasan Health Center April 2020 (n= 30)

Education	Frequency	Percentage
The elementary school	7	23.3%
Junior high school	1	3.3%
Senior high school	16	53.3%
Bachelor	6	20.1%
Total	30	100%

Based on table 3 the education of the most respondents is senior high school with a total of 16 respondents (53.3%), The elementary school with a total of 7 respondents (23.3%), bachelor with a total of 6 respondents (20.1%) and junior high school with a total of 1 respondent (3.3 %).

TABLE 4. Frequency distribution of respondents based on occupation in patients with Type 2 Diabetes Mellitus in the working area of the Banjar Serasan Public Health Center, East Pontianak District (n= 30)

Work	Frequency	Percentage
Civil servant	3	10%
Private sector	9	30%
Self-employed	3	10%
Housewife	15	50%
Total	30	100%

Based on table 4. shows that not working (housewife) is the type of work of the most respondents with a total of 15 respondents (50%), private sector with a total of 9 respondents (30%), civil servants with a total of 3 respondents (10%) and self-employed with a total of 3 respondents (10%).

TABLE 5. Frequency distribution of respondents based on family history of Diabetes Mellitus Type 2 Diabetes Mellitus patients in the working area of Banjar Serasan Health Center April 2020 (n= 30)

History of Diabetes Mellitus	Frequency	Percentage
Yes	14	46.7%
No	16	53.3%
Total	30	100%

Based on table 5 shows that based on a family history of illness, 16 respondents had no family history of illness (53.7%) and 14 respondents had a family history of illness (46.7%).

TABLE 6. Frequency distribution of respondents based on a history of health education about Diabetes Mellitus Type 2 Diabetes Mellitus patients in the working area of the Banjar Serasan Health Center April 2020 (n= 30)

Health Education History about Diabetes Mellitus	Frequency	Percentage
Ever	18	60%
Never	12	40%
Total	30	100%

Based on table 6, that 18 respondents (60%) had been given health education about Diabetes Mellitus and 12 respondents (40%) had never been given health education about Diabetes Mellitus.

Lestari Makmuriana, Eka Nurvitasari, and Tri Wahyuni, "The Effect of the Health Belief Model (HBM) On Blood Sugar Changes in Type 2 Diabetes Mellitus Patients at Banjar Serasan Health Center, East Pontianak," *International Journal of Multidisciplinary Research and Publications (IJMRAP)*, Volume 4, Issue 12, pp. 132-140, 2022.

TABLE 7. Frequency distribution of respondents based on the patient's level of knowledge about Diabetes Mellitus Type 2 Diabetes Mellitus patients in the working area of the Banjar Serasan Health Center April 2020 (n= 30)

Level of patient knowledge about Diabetes Mellitus	Frequency	Percentage
Low	7	23.3%
Medium	14	46.7%
High	9	30.0%
Total	30	100%

The description of the patient's level of knowledge about Diabetes Mellitus was measured using the Dkq-24 questionnaire (Diabetes Knowledge Questionnaire-24) and was categorized into three, namely low (<16), medium (16-18) and high (>18). Based on table 7 shows that the level of knowledge of respondents about Diabetes Mellitus suffered in the work area of the Banjar Serasan Health Center, Pontianak Timur, belongs to the medium category, namely 14 respondents (46.7%), low category 7 respondents (23.3%) and high category 9 respondents (30.0%).

TABLE 8. Frequency distribution of respondents based on individual perceptions after being given the intervention of the Health Belief Model (HBM) theory in Type 2 Diabetes Mellitus patients in the working area of the Banjar Serasan Health Center April 2020 (n= 30)

	Individual perception after being given the intervention of the Health Belief Model (HBM) theory	Percentage	category
1.	Perceived Susceptibility	79.50%	Good
2.	Perceived Severity	76.77%	Good
3.	Perceived Berriers	75.31%	Good
4.	Perceived Benefits	80.50%	Good
5.	Cues to action	52.86%	enough

Based on table 8 shows that the categories of individual perceptions, namely perceptions of vulnerability are categorized as good (79.50%), threat perceptions are categorized as good (76.77%), perceived barriers are categorized as good (75.31%), and perceived benefits are categorized as good (80.50%). Meanwhile, cues to act are categorized as sufficient (52.86%).

2. Bivariate analysis test (Paired Sample T-Test)

Based on table 9, shows that the results of the intervention pre-test, the mean is 32,967 with the lowest blood sugar level of 104 mg/dl and the highest sugar level of 332 mg/dl. The results of the post-test intervention with a mean of 32,967 with the lowest blood sugar level of 83 and the highest blood sugar level of 306 mg/dl. From the results of statistical analysis using Paired T Test with a 95% confidence level and a significance level (α) of 0.05, the results obtained p-value = 0.000. This number shows that the p-value is 0.000 <0.05, which means that there is a significant relationship. significant so that Ha is accepted (Ho is rejected), it can be concluded that there is an effect of the Health Belief Model (HBM) theory on blood sugar control in Type 2 Diabetes Mellitus patients in the work area of the Banjar Serasan Health Center, East Pontianak.

TABLE 9. The effect of the Health Belief Model (HBM) theory on blood sugar control in type 2 Diabetes Mellitus patients in the working area of the Banjar Serasan Health Center, East Pontianak April 2020 (n=30)

Blood Sugar Level	Mean	Median	Min	Max	Nilai P
Pre Test	32.967	192.50	104	332	0.000
Post Test		158.50	83	306	

V. DISCUSSION

Respondents by Age

The results of the research conducted the average age of the respondents was 52 years. The youngest respondent is 23 years old and the oldest is 69 years old. Based on the age category, the largest diabetes mellitus sufferers are in the age range of 55-64 years and 65-74 years have a 6 times greater risk of developing diabetes mellitus because it is caused by a decrease in pancreatic function [(10)]. The results of this study were supported by the results of another study[(11)]. Where the age of people with diabetes mellitus in 78 respondents was in the age group 51-55 years (36.8%), followed by the age group 46-50 years (28.9%) and the age group 41-45 years (18.4%)[(12)].

The results of the researcher's analysis regarding the relationship between age and the incidence of diabetes mellitus are known to be one of the risk factors where the incidence of diabetes mellitus increases with age, but it is also possible to get older and some do not. affected and still very concerned about maintaining health, because it is not seen from the respondents studied have various ages and the initial diagnosis of diabetes mellitus is also different for each respondent studied. In general, the older and older you are, the more at risk of developing Diabetes Mellitus, which makes age one of the benchmarks that determine a person's level of health.

Respondents by Gender

The results of research conducted by gender, it can be seen that most of the sex respondents are female, as many as 21 respondents. Women have a greater risk of developing type 2 diabetes mellitus than men, related to pregnancy where pregnancy is a risk factor for diabetes mellitus and also other risk factors because physically women have a greater opportunity to increase body mass index[(13)].

The results of the researcher's analysis, gender is one of the risk factors for Diabetes Mellitus patients in the working area of the Banjar Serasan Health Center as seen from the data of the Banjar Serasan Public Health Center, Pontianak Timur, the number of female diabetes mellitus patients is more than male. One of the infectious diseases is diabetes mellitus, where it is known that women are more at risk.

Respondents by Education

The results of the frequency distribution analysis in table 3 based on the last education of the respondents' education are high school with a total of 16 respondents (53.3%), elementary school with a total of 7 respondents (23.3%), bachelor with a total of 6 respondents (20.1%) and junior high school with a total of 1 respondent (3.3%). A low level of education is indeed related to the incidence of Diabetes Mellitus because it is related to low knowledge and the inability of glycemic control[(14)]. Another study said that there was no relationship between education level and the incidence of type 2 diabetes mellitus [(15)]. The same thing was also obtained regarding the risk factors for the incidence of Diabetes Mellitus at the Cengkareng District Health Center, West Jakarta, explaining the results that there was no relationship between education level and the incidence of type 2 diabetes mellitus with p value = 0.503 > 0.05[(16)].

But in another study, the results showed that there was a

Lestari Makmuriana, Eka Nurvitasari, and Tri Wahyuni, "The Effect of the Health Belief Model (HBM) On Blood Sugar Changes in Type 2 Diabetes Mellitus Patients at Banjar Serasan Health Center, East Pontianak," *International Journal of Multidisciplinary Research and Publications (IJMRAP)*, Volume 4, Issue 12, pp. 132-140, 2022.

relationship between the level of education and the incidence of diabetes mellitus, 1.27 times the risk of suffering from diabetes mellitus than people with higher education. People with low levels of education usually have little knowledge. The higher the education, the greater the concern for health[17]. The results of the analysis of researchers that education is not a risk factor seen from the varying levels of education. Logically, it is explained that people with low levels of education usually have little knowledge, the higher the education, the greater the concern for health. However, it is very likely that there are still highly educated people who also ignore health for various reasons that cause Diabetes Mellitus and judging by the development of today's technology where to get health knowledge information that can be accessed easily anytime and anywhere, it is very likely that people with low education can also get access to health information. highly knowledgeable.

Respondents by Work

The results of the frequency distribution analysis in table 4. show that not working (housewives) is the type of work with the most respondents, namely 15 respondents (50%), private sector as many as 9 respondents (30%), civil servants as many as 3 respondents (10%) and self-employed as many as 3 respondents (10%). This study is in line with other studies which found that most of the respondents had no work status and the majority were housewives (IRT) as many as 21 people (61.8%), those who did not work would be at risk of developing Diabetes Mellitus because they tend to lack of physical activity so that the metabolic process or burning calories does not work properly [18]. But there are other studies that are not in line with research conducted which states that due to the high physical activity of housewives, it causes housewives to consume foods that will trigger an increase in sugar levels and can consume these foods whenever they want when they feel bad. tired of his work. Then after eating housewives will immediately rest which results in the metabolic process not going well. Therefore, eating patterns and types of food are a risk for diabetes mellitus in housewives[19].

The results of the researcher's analysis that the type of work is not a risk factor for Diabetes Mellitus but is more influenced by physical activity, people who work as laborers have more physical activity than those who work in the office. Diet and type of food are also risk factors for Diabetes Mellitus, seen from people who do not work, their eating patterns tend to be irregular compared to people who work, where lunch hours have been arranged and adjusted, but people with high levels of activity sometimes eat irregularly. . This is supported by other studies that explain to someone who has a job with a high level of activity so that irregular lifestyle and eating patterns cause health problems. Usually people with busy activities often forget to eat but eat more snacks. With changes in lifestyle and eating habits, consumption of fast food, artificial sugar and high fat with less physical activity, will change the balance by storing energy as fat that accumulates and the risk is 9 times faster to get Diabetes Mellitus. Studies show that a person can prevent type 2 Diabetes Mellitus by exercising regularly, losing weight and eating a healthy diet [6].

Respondents By Family History of Diabetes Mellitus

The results of the analysis of the frequency distribution in table 5 based on a family history of Diabetes Mellitus in the working area of the Banjar Serasan Health Center, East Pontianak, the results of this study indicate that based on a family history of disease, 16 respondents had no family history of disease (53.7%) and 14 respondents had a family history of disease (46.7%). This shows that a family history of diabetes mellitus is a risk factor for developing diabetes mellitus[21]. The results of the researcher's analysis showed that a family history of Diabetes Mellitus was not one of the factors associated with the incidence of Type 2 Diabetes Mellitus. Although heredity has an influence in determining whether a person is at risk of developing Diabetes Mellitus or not, lifestyle also has a major role in the risk of developing Type 2 Diabetes Mellitus. One of the factors associated with the incidence of Type 2 Diabetes Mellitus is physical activity. Therefore, prevention of Diabetes Mellitus for those who are at risk can be done by getting used to a healthy life and exercising regularly[22].

Respondents By History of Health Education About Diabetes Mellitus

The results of the frequency distribution analysis in table 6 in this study are based on a history of health education about Diabetes Mellitus in the working area of the Banjar Serasan Health Center, East Pontianak. The results of this study indicate that 18 respondents (60%) have been given health education about Diabetes Mellitus and 12 respondents (40%) never given health education about Diabetes Mellitus. Health education about Diabetes Mellitus is very important and influential for patients to know the disease and take action to control blood sugar where it is mentioned in the effort to manage Type 2 Diabetes Mellitus there are 4 main pillars, namely: food planning (diet), physical exercise (exercise), drug therapy (insulin) and one of them is health education[4].

In this study, it is explained that education has a very important influence in efforts to increase knowledge in people with diabetes mellitus[23]. This is in line with other studies that the level of knowledge of Diabetes Mellitus patients towards self-monitoring of glucose is still low and there is an increase in knowledge after being given education by means of blood glucose monitoring demonstrations[24].

Respondents By the Level of Knowledge About Diabetes Mellitus

The results of the frequency distribution analysis in table 7. In this study, based on the description of the level of knowledge about Diabetes Mellitus in the working area of the Banjar Serasan Health Center, East Pontianak, the results of this study indicate that the respondent's level of knowledge about Diabetes Mellitus suffered in the work area of the Banjar Serasan Health Center, East Pontianak is included in the medium category is 14 respondents (46.7%), low category 7 respondents (23.3%) and high category 9 respondents (30.0%). From the results of the frequency distribution in table 7, it is found that there are variations in respondents in this study, which means that all respondents have the same characteristics of knowledge, that is, on average they have moderate

Lestari Makmuriana, Eka Nurvitasari, and Tri Wahyuni, "The Effect of the Health Belief Model (HBM) On Blood Sugar Changes in Type 2 Diabetes Mellitus Patients at Banjar Serasan Health Center, East Pontianak," *International Journal of Multidisciplinary Research and Publications (IJMRAP)*, Volume 4, Issue 12, pp. 132-140, 2022.

knowledge.

In this study it was found that the higher a person's education the higher the knowledge about health he has, but this does not apply to the level of education of high school education and below[25]. A good level of health knowledge is owned by someone who has reached the last level of college education. However, in this study, the researcher concluded that education was not a factor in the knowledge of the respondents, seen from the variation in the knowledge of the respondents, on average, with moderate knowledge. Logically, people who are highly educated have a higher chance of knowing the disease they are suffering from. However, it is very likely that there are still highly educated people who also ignore health for various reasons that cause Diabetes Mellitus and judging by the development of today's technology where to get health knowledge information that can be accessed easily anytime and anywhere, it is very likely that people with low education can also get access to health information. highly knowledgeable.

The results in this study also show that there is an effect of the respondent's work on the knowledge possessed by the respondent. This is in line with other studies that describe the results that work is one of the factors that affect the knowledge of people with Diabetes Mellitus. Nirmaya stated that civil servants, private employees and entrepreneurs have better knowledge than housewives. And judging from the respondent's work that not working (housewife) is the most respondent's job in this study, the moderate knowledge possessed by respondents in this study may also be caused by a history of health education factors about Diabetes Mellitus where there are still respondents who have never been given health education. about Diabetes Mellitus. Therefore, it is important for health education to increase knowledge about Diabetes Mellitus experienced so as to increase the respondent's knowledge to become high knowledge and Diabetes Mellitus patients can easily control blood sugar to remain normal. The duration of being diagnosed with Diabetes Mellitus (duration of DM) is also a factor that affects the knowledge of people with Diabetes Mellitus[26].

Respondents By Individual Perception After Giving Intervention Health Belief Model (HBM)

The results of the analysis of the frequency distribution in table 8 in the working area of the Banjar Serasan Public Health Center, Pontianak Timur, the results of this study indicate that the individual perception category, namely the perception of vulnerability is categorized as good (79.50%) and threat perception is categorized as good (76.77%) which means that each respondent is aware of vulnerability. and the dangers of experiencing Diabetes Mellitus.

This study is supported by other studies where research conducted on 242 respondents, it was found that (92.6%) had a positive perception of the perception of vulnerability and seriousness of Diabetes Mellitus where almost all of the respondents had received information related to Diabetes Mellitus and its risk factors. almost all respondents feel they have a high susceptibility to diabetes[27]. In this study, it was also found that a family history of diabetes is one of the risk factors for diabetes mellitus, respondents feel vulnerability and also a high threat. Learn from the experience of family members who have been affected by diabetes mellitus, that this disease is a serious and life-threatening disease if not controlled.

This is in line with this study which states that along with the increasing sense of vulnerability and seriousness, there tends to be an increase in disease prevention and management efforts. The results of this study also show that the perception of barriers is categorized as good (75.31%), which means that respondents in this study perceive that there are no bad barriers in controlling blood sugar. Low perception of barriers can affect individuals in controlling blood sugar, for example if someone feels obstacles in controlling blood sugar, they have to spend money regularly where financial factors are an obstacle factor but this individual also thinks that if he does not control blood sugar regularly this will have an impact. severe it could be that his blood sugar becomes high and will spend more financially than when he controls blood sugar regularly[28].

The results of this study indicate that the perception of benefits is categorized as good (80.50%), which means that respondents in this study are aware of and feel the benefits of controlling blood sugar and will affect their health for the better. This is in line with other studies that respondents who feel there are benefits in carrying out healthy behaviors, indicate they believe that preventive beneficial behavior is the main key to avoid the dangers of Diabetes Mellitus[29].

The results of the study of the four perceptions namely vulnerabilities, threats, barriers and benefits show that all respondents are included in the good but different categories for cues to act are categorized as sufficient (52.86%), which means that even though the perceptions they have are sufficient, this can be changed and improved into good category even very good which is a success in controlling blood sugar against Diabetes Mellitus suffered. The support given by family and friends can be an effort to encourage blood sugar control so that blood sugar is controlled and complications of Diabetes Mellitus do not occur. Not only encouragement from family and closest people, health workers also have a role in encouraging, in an effort to control blood sugar in Type 2 Diabetes Mellitus patients, so there needs to be a more focused health promotion program and the methods used must also be more developed, especially developing the theory of Health Belief Model (HBM) to be easily understood and understood by patients in order to motivate patients in blood sugar control behavior. This signal will later produce a real action if the Diabetes Mellitus patient is sure and really wants to control blood sugar.

Education and knowledge possessed will get a person's health behavior. In addition, it was also found that the interaction and support provided by family and closest people had a positive effect on the cues for controlling Diabetes Mellitus[30].

Based on the results of the research described above, individual perceptions of Diabetes Mellitus patients in the working area of the Banjar Serasan Public Health Center, Pontianak Timur, are all respondents included in a good perception or positive perception. This shows that all respondents with Type 2 Diabetes Mellitus have a perception or view that Diabetes Mellitus is a serious and dangerous disease. All respondents also feel that controlling blood sugar can be

Lestari Makmuriana, Eka Nurvitasari, and Tri Wahyuni, "The Effect of the Health Belief Model (HBM) On Blood Sugar Changes in Type 2 Diabetes Mellitus Patients at Banjar Serasan Health Center, East Pontianak," *International Journal of Multidisciplinary Research and Publications (IJMRAP)*, Volume 4, Issue 12, pp. 132-140, 2022.

beneficial, and feel confident and able to control blood sugar, although there are some obstacles in controlling blood sugar so that it can be controlled and does not cause further complications.

Another study explains that the construct of Perceived Susceptibility (perceived risk) also affects the emergence of healthy behavior. When a person knows that he is at risk of getting a disease, then the belief is formed that he is at risk. Therefore, he will try to do things that he considers to be able to reduce the potential risk that a person believes, the higher the tendency to behave in a healthy manner in the hope of reducing the risk. Unfortunately, this also applies the other way around. When a person feels that he is not at risk of disease, he also tends to behave in a healthy or unhealthy manner. Perceived severity construct is the perception of how serious a disease can be from knowledge or medical information obtained and can come from a person's beliefs about the impact that may arise in his life as a result of the disease. Then the construct of Perceived Benefits, means that the individual behaves in a healthy manner because he believes that something he does will provide benefits, especially in reducing the potential for getting a disease. The Perceived Berrier construct explains that changing behavior, undergoing a new activity in an effort to become, maintain or improve health is not easy because there are obstacles. The obstacle is actually personal evaluation itself. In addition, the Health Belief Model (HBM) is also influenced by Cues to Action where there are incentives that make individuals change their behavior such as encouragement from family members, health advertisements, health services, etc[31].

The Effect of Health Belief Model (HBM) on Blood Sugar Control in Type 2 Diabetes Mellitus Patients

Based on Table 10, it shows that the results of the research in the working area of the Banjar Serasan Health Center, Pontianak Timur, 2 weeks after the intervention of the Health Belief Model theory, with the results of the intervention pre-test research, the mean is 32,967 with the lowest blood sugar level of 104 mg/dl and the highest sugar level of 332 mg. /dl. The results of the post-test intervention with a mean of 32,967 with the lowest blood sugar level of 83 and the highest blood sugar level of 306 mg/dl. From the results of statistical analysis using Paired T Test with a 95% confidence level and a significance level (α) of 0.05, the results obtained p-value = 0.000. This number shows that the p-value is 0.000 <0.05, which means that there is a significant relationship. significant so that Ha is accepted (Ho is rejected), it can be concluded that there is an effect of the Health Belief Model (HBM) theory on blood sugar control in Type 2 Diabetes Mellitus patients in the work area of the Banjar Serasan Health Center, East Pontianak.

This study is supported by other studies with the results of the average value of vulnerability, severity, perceived benefits and barriers, self-efficacy, and average self-care behavior in the low category before the intervention. However, after the intervention, the mean score of each construct of HBM education and self-care behavior increased significantly ($p < 0.001$)[32]. Health education through the Health Belief Model (HBM) theory promotes self-care behavior of patients with Type 2 Diabetes Mellitus. This is in line with this study. The results showed that subjects in the intervention group had significantly better metabolic and glycemic profiles compared to those in the control group. It also shows that knowledge, health beliefs and quality of life increased significantly in the intervention group. The findings show that through self-efficacy education adapted to the Health Belief Model, the quality of life and metabolic profile of Type 2 Diabetes Mellitus patients can be improved[33].

Based on the explanation of several studies above, the researcher concludes that the health education intervention based on the Health Belief Model (HBM) theory carried out in the work area of the Banjar Serasan Public Health Center, Pontianak Timur has an influence in controlling blood sugar, can increase knowledge, skills about self-management, perception of individual trust and The quality of life of Diabetes mellitus patients and this intervention can be used as a method of health education at the Banjar Serasan Health Center, Pontianak Timur and from the results of interviews with respondents after the intervention that respondents feel the benefits (Perceived Benefits) when controlling blood sugar, one example of the benefits is that the eyes become does not blur when blood sugar is controlled. Several components contained in the concept of the Health Belief Model (HBM) theory can foster confidence in Diabetes Mellitus patients. Health education based on the Health Belief Model (HBM) theory can be used and developed as a health education theory where in the Health Belief Model (HBM) theory, Diabetes Mellitus patients can measure individual perceptions and beliefs that individuals have in responding to the disease they are experiencing.

The Health Belief Model (HBM) theory is not only used as an educational method, either directly or indirectly, it can also encourage the participation and cooperation of Diabetes Mellitus patients and their families. Family support is part of Cues to Action (cues to act) where family support is the closest and inseparable part of the patient. With the support provided, it will create a sense of confidence in Diabetes Mellitus patients to control the disease they are suffering from and the patient feels not alone in controlling the Diabetes Mellitus disease experienced so that it does not cause more dangerous disease complications. Cues to Action (signs of action) also includes support for nurses, doctors, other health workers as well as providing support for Diabetes Mellitus patients in terms of providing information about Diabetes Mellitus suffered by patients and the need for the preparation of a questionnaire based on the Health Belief Model (HBM) theory. As seen from several studies, some studies still use self-made questionnaires based on the theoretical framework of the Health Belief Model (HBM) which are then tested for validity and reliability tests, this can cause non-uniformity in terms of the content of the questions in measuring individual perceptions. A questionnaire based on the standard Health Belief Model (HBM) theory can be used by health professionals as a reference to measure individual perceptions and provide knowledge according to individual perceptions and beliefs that individuals have in responding to the illness they are experiencing. This effort is not only in Diabetes Mellitus but can be developed in other diseases as well. Health education efforts based on the Health Belief Model (HBM) theory can be used as a reference for

Lestari Makmuriana, Eka Nurvitasari, and Tri Wahyuni, "The Effect of the Health Belief Model (HBM) On Blood Sugar Changes in Type 2 Diabetes Mellitus Patients at Banjar Serasan Health Center, East Pontianak," *International Journal of Multidisciplinary Research and Publications (IJMRAP)*, Volume 4, Issue 12, pp. 132-140, 2022.

promoting patient self-care behavior as an effort to improve the quality of life of the nation and efforts to prevent further complications in Diabetes Mellitus patients. as well as the world.

VI. Conclusion

Based on the results of research and discussion, it can be concluded that:

1. The characteristics of respondents with Type 2 Diabetes Mellitus in the working area of the Banjar Serasan Health Center, Pontianak Timur include: the average age of the respondents is 52 years, the most gender is female, the most recent education of the respondents is at the high school level, the most dominant occupation of the respondents is housewives , respondents who have a family history of Diabetes Mellitus are 14 respondents, respondents have been given health education as many as 18 respondents
2. The description of the level of patient knowledge about the disease experienced by Type 2 Diabetes Mellitus patients in the working area of the Banjar Serasan Health Center, Pontianak Timur, it was found that there were variations in respondents in this study, which means that all respondents have the same characteristics of knowledge, namely the average respondent has moderate knowledge.
3. Individual perceptions after being given the Health Belief Model (HBM) intervention in Type 2 Diabetes Mellitus patients in the working area of the Banjar Serasan Public Health Center, Pontianak Timur, are included in good perceptions or positive perceptions and indicate that respondents have a perception that Diabetes Mellitus is a serious and dangerous disease. All respondents also feel that controlling blood sugar can be beneficial, and feel confident and able to control blood sugar, although there are some obstacles in controlling blood sugar so that it can be controlled and does not cause further complications.
4. There is an effect of health education intervention based on the Health Belief Model (HBM) theory on blood sugar control in Type 2 Diabetes Mellitus patients in the Banjar Serasan Public Health Center, Pontianak Timur, seen from the results of pre-post intervention blood sugar which changed after the intervention was given.
5. Health education intervention based on the theory of Health Belief Model (HBM) can increase knowledge and skills about self-management, perception of individual beliefs can foster patient confidence to behave in a healthy manner so as to improve the quality of life of Diabetes mellitus patients.

Acknowledgment

The authors thank STIK Muhammadiyah Pontianak to support this study, moral and material.

References

[1] Ministry of Health Republic of Indonesia. (2010). Guidelines for the Control of Diabetes Mellitus and Metabolic Diseases. Jakarta: Ministry of Health Republic of Indonesia.
[2] Ministry of Health Republic of Indonesia. (2015). Health Profile of Indonesia 2015. Jakarta : Ministry of Health RI.
[3] International Diabetes Federation. (2018). IDF 2018 Statistik Programme. Dunia : IDF
[4] Indonesian Endocrinology Society. (2015). Management and Prevention of Type 2 Diabetes Mellitus in Indonesia. Jakarta: Indonesian Endocrinology Society.
[5] West Kalimantan Health Office. (2018). Health Profile of West Kalimantan 2018. Pontianak. West Kalimantan Health Office.
[6] American Diabetes Association. (2018). Standar of Medical Care in Diabetes–2018. Diabetes Care, Vol.42. USA : ADA
[7] D. Pratita, Nurina. (2012). The Relationship of Spouse Support and Health Locus of Control with Compliance in Undergoing the Treatment Process in Patients with Type 2 Diabetes Mellitus. Scientific Journal of University of Surabaya Students. Vol.1, No.5
[8] Hall, K. S. (2012). The Health Belief Model Can Guide Modern Contraceptive Behavior Research and Practice, J Midwifery Women Health, 1(57): 7481
[9] Aulia R, Yuni Dwi Astuti (2017). Overview of Health Belief in Type II Diabetes Mellitus Patients. Journal of the Department of Nursing Vol. Pages 1-8. Semarang : Diponogoro University
[10] InfoDATIN. (2018). (Data and Information Center of the Ministry of Health of the Republic of Indonesia) : Indonesia
[11] Basic Health Research. (2018). Indonesian Ministry of Health Research and Development Agency in 2018.
[12] Rian P, et al. (2017). Relationship of Age with Type Diabetes Mellitus and Erectile Dysfunction. Manado: Faculty of Medicine, Sam Ratulagi University, Manado.
[13] Tandra H. (2013). Healthy Life With Diabetes. Print 1. Yogyakarta : Rapha Publishing
[14] M Use Kikman et al. (2012). Diabetes in Older Adult. Diabetes Care 35 (12) 2650-2664. Doi : 10.2337/dc12-1801
[15] Isabella V, et al. (2014). The Relationship between Education Level and Family History of Suffering from Diabetes Mellitus with Type 2 Diabetes Mellitus Incidence in Outpatients at the Internal Medicine Polyclinic of BLU RSUP Prof. Dr. R.D. Kandou Manado. Manado : Faculty of Public Health, Sam Ratulagi University.
[16] Trisnawati, S & Setyorogo, S. (2013). Risk Factors for the Occurrence of Type II Diabetes Mellitus in the Cengakreng District Health Center, West Jakarta in 2012. Journal of Scientific Health (Online), Vol. 5, No.1
[17] Irawan, Dedi. (2010). Prevalence and Risk Factors for Type 2 Diabetes Mellitus in Indonesian Urban Areas (Secondary Data Analysis of Riskesdas 2007). University of Indonesia Thesis.
[18] Khoirun, Nisa. (2017). The effectiveness of the Health Belief model on knowledge of DM-DISC Diet Management. Riau New Week: Nursing Science Program, Riau University.
[19] Fegi, Yanada. (2014). Risk Factors for Type 2 Diabetes Mellitus in Diabetes Mellitus Patients at Dr. M. Haulussy Ambon. Faculty of Health, Indonesian Christian University, Maluku. Maluku : Ambon.
[20] Wu, Yanlin, *et al*. (2014). Risk Factor Contributing to Type 2 Diabetes and Recent Advances in the Treatment and Prevention. International Journal of Medical Siences. 11 (11). Pg 1185 0 1200.
[21] Adib, M. (2011). Practical Knowledge of Various Deadly Diseases That Most Often Attack Us. Yogyakarta: Blue Book.
[22] Rola O, *et al*. (2017). Effect of Health Education with Self Instructional Module on Knowledge about Diabetes Mellitus. Journal of Enducance: Scientific Study of Health Problems.
[23] Missiriya, S. (2016) Knowledge and Practice of Self Care Management on Diabetes Mellitus among Urban People. Tamilnadu : India. International Journal of Pharmaceutical Sciences Review and Research.
[24] Jasper, Unyme Sunday. (2014). *Determinants of Diabetes Knowladge In a Cohoert of Negeria Diabetik*. Journal of Diabetes & Metabolic. Disorders. 13 : 39 DOI : 10.11.1186/2251-6581-13-39
[25] Nirmaya , Shrestha N (2015). *Diabetes Knowladge and Associated Factor Among Diabetes Patients In Central Nepal*. International Journal of Collaborative Research on international medicine & Public Health. Vol 7 no 5 pg 82-91.
[26] Lestari, R.A., Sari, C.W.M., & Kurniawan, T. (2018). Overview of Student Perceptions of Diabetes Mellitus Prevention Behavior at the Faculty of Nursing, Padjadjaran University. Indonesian Journal of Nursing Education 4 (1), 68-76.
[27] Barati, M., & Vazini, H. (2015). *The Health Belief Model and and Self – Care Behaviors among Type 2 Diabetric Patients. Iranian Jornal of Diabetes and Obesity* Volume 6, hlm. 107 – 113.
[28] Al – Mutairi, R., Bawazir, A.A.,Ahmed, A. E.,& Jradi, H. (2015). *Health Belief Related to Diabetes Mellitus Prevantion among Adolescents in Saudi Arabia*. Sultan Qaboos University Med Journal, hlm. 398-404

[29] Tafti, A. D., Mahmoodadab, S. S., Morowatisharifabad, M. A., Ardakani, M. A., Rezaeipandari, H., & Lofti, M.H. (2015) Determinants od Self-Care in Diabetric Patients Based on Health Belief Model. Global Journal Health Science Vol. 7, hlm. 33 – 42.
[30] Hayden, & Aboyoun, J (2014). *Introduction to Health Behavior Theory*. Burlington : Jones & Bartlett Learning, LCC.
[31] Shabibi, P., Sadegh, M., Zavareh, A., Sayehmiri,K.,Qorbani, M., Rastegarimehr, B., Management, H (2017). Effect of Educational Intervention based on the Health Belief Model on Promoting Self-Care Behavior of Type-2 Diabetes Patients. Electronic Physicirn. 5960-5968.
[32] Mohammadi, S., Karim, N. A., & Talib, R. A (2018). *The Impact of Self-Efficacy Education Based on The Health Belief Model in Iranian Patient With Type 2 Diabetes : a Randomised Controlled Intervention Study*. Asia Pac J Clin Nutr.