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BEHAVIORAL STUDY OF DIABETES MELLITUS PATIENTS IN BLOOD GLUCOSE CONTROL: A PHENOMENOLOGICAL STUDY

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ABSTRACT
The disease pattern in Indonesia is currently shifting from infectious diseases to degenerative diseases. This pattern is accompanied by the problem of a double burden of disease. The incidence of degenerative diseases is increasing along with changes in lifestyle and environmental behavior. One of the threats of degenerative diseases to public health is diabetes mellitus. The prevalence of diabetes in people aged over 15 years increased from 10.9% in 2018 to 11.7% in 2023. This shows that this disease is not only a problem for the elderly but also affects the productive age group. The main causes include unhealthy diet, lack of physical activity, and obesity. This study aims to observe and explore the behavior of people with diabetes in controlling blood glucose while suffering from diabetes. The research method used in this study is qualitative research with a phenomenological approach, with the informant selection technique using the snowball technique of 25 people. The main instrument of qualitative research is the researcher herself. The researcher is a nurse with a Masters in Nursing. The researcher as a facilitator also uses the tools used in the study as data collection instruments, namely the Digital Voice Recorder in this case the researcher's cellphone (Oppo A92) and interview guidelines and field notes and the researcher conducted in-depth interviews for approximately 3 weeks, data processing and data analysis using the Colaizzi method which consists of seven stages. Based on the results of in-depth interviews with 25 informants, 16 themes of the phenomenon of factors causing uncontrolled blood glucose were obtained, including incorrect knowledge about diabetes, the assumption that diabetes is a harmless disease, boredom factors in managing diet, poor behavior in daily eating habits, taking medication not according to the given dose, rarely or not doing sports activities, having an attitude that ignores the rules in following a diet while suffering from diabetes, information obtained from health workers and family is minimal, information from various media such as the internet is not utilized, limited health workers in providing education, feelings of hopelessness while suffering from diabetes mellitus, feeling that they do not get support from family or health workers in treating diabetes while suffering from diabetes mellitus, alternatives to drugs from the hospital are taking herbal medicines. The phenomenon of the dominant factors causing uncontrolled blood glucose is incorrect knowledge about diabetes, as well as the assumption that diabetes is a harmless disease, as well as boredom factors in regulating diet, and poor behavior in daily eating habits, as well as rarely or never doing sports activities, and having attitudes and behaviors that ignore the rules in undergoing treatment while suffering from diabetes.

Keywords: behavior; blood glucose control; diabetes mellitus

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INTRODUCTION

The prevalence of diabetes mellitus (DM), particularly type 2 DM, has been significantly increasing across various countries, including both developed and developing nations. Alarmingly, it is being diagnosed more frequently among adolescents and young adults.

According to the International Diabetes Federation (IDF) and the World Health Organization (WHO), and American Diabetes Association (ADA) (2020) more than 500 million people worldwide are estimated to be living with diabetes. This number is predicted to triple by 2030, potentially reaching 16.7 million cases by 2045. The prevalence of diabetes in people aged over 15 years increased from 10.9% in 2018 to 11.7% in 2023. This shows that this disease is not only a problem for the elderly but also affects the productive age group. The main causes include unhealthy diet, lack of physical activity, and obesity (Association Diabetes American (ADA) (2020). ((IDF), 2010), (World Health Organization (WHO), tahun 2020)Indonesia faces a similar situation, with high prevalence rates contributing to substantial healthcare costs. Early diagnosis and comprehensive management of diabetes are critical in reducing morbidity and mortality rates. Between 2013 and 2018, the number of people with diabetes in Indonesia increased by more than 20%. Diagnosed cases account for approximately 2% of the total population, while about 70% remain undiagnosed. Most cases occur in the productive age group and urban areas, making diabetes the third leading cause of death in Indonesia. Alarmingly, only one-quarter of those with diabetes are aware of their condition, leaving three-quarters with uncontrolled diabetes (Kementerian Kesehatan RI Badan Penelitian dan Pengembangan.,2018), (Kementerian Kesehatan RI Badan Penelitian dan Pengembangan, 2013).

In West Sumatra, the total diabetes prevalence was 1.6% of the population in 2018, placing the province 21st out of 34 provinces in Indonesia (Dinas Kesehatan Provinsi Sumatera Barat, 2018). According to the West Sumatra Provincial Health Office, there were 44,280 diabetes cases in 2018, rising to 59,024 cases in 2019, with the highest concentration in Padang City (Dinas Kesehatan Provinsi Sumatera Barat, 2019).According to the results of research by (Yosmar R, Almasdy D, 2019), it was found that 57.7% of the people of Padang City had a high risk of diabetes mellitus, related to indicators including gender, age, excessive BMI, waist circumference, a history of high blood glucose, and Having a previous positive family history of diabetes, this also goes hand in hand with uncontrolled high glucose levels for diabetes sufferers.Diabetes can lead to acute and chronic complications affecting various body systems. Fifty percent of diabetes-related deaths are due to coronary heart disease, and 30% are caused by kidney failure. Additionally, diabetes contributes significantly to disability, with 30% of patients experiencing blindness due to retinopathy and 10% undergoing limb amputation (Mashudi., 2011). (Witasari, U., Rahmawaty, S. and Zulaekah, S., 2009) reported that approximately 2.5 million people, or 1.3% of Indonesia's population, die annually due to diabetes complications.

Controlling blood glucose levels is a crucial step in preventing complications. Effective management of blood glucose among diabetes patients is as important as managing any other chronic disease. A study by (Nurfadilla dkk, 2023)emphasized the importance of global and national interventions supported by integrated family and cultural frameworks combined with health education. These interventions aim to sustain self-management behaviors among diabetes patients and improve the health status of those with type 2 diabetes. Effective diabetes management is more achievable when patients have sufficient knowledge and skills to control their blood glucose levels. Therefore, the objective of this study is to examine the strategies and actions undertaken by individuals living with diabetes (Nurfadilla dkk, 2023).According to Kemenkes RI in 2020, in controlling diabetes which is included in the category of Non-Communicable Diseases (PTM), the role of Community Health Centers and First Level Health Facilities (FKTP) is at the forefront in providing public health service efforts. Efforts to control PTM in Community Health Centers are carried out by establishing PTM Integrated Health Center.

One effort to avoid diabetes complications is by controlling blood glucose in diabetes sufferers. Controlling blood glucose in diabetes sufferers is very important, as with other chronic diseases, diabetes is a burden for patients and families, and the medical costs of diabetes sufferers are two to three times higher compared to non-diabetics. In addition to increasing medical costs, long- and short-term complications cause serious problems not only for people with diabetes, but also for their families. To avoid diabetes complications and reduce the risk of diabetes-related death, patients require long-term blood glucose control (Cheragi et al., 2015).The results of (Sianipar Connie Melva, 2019) regarding the factors that influence diabetes sufferers not to comply with blood glucose control, the most dominant is the factor of understanding instructions from health workers, where 58.3% of respondents did not understand the recommended instructions, and another factor, namely the quality of interaction between respondents and families with the results of 55.6% of diabetes sufferers with families in the category of lack of interaction.

The disease pattern in Indonesia is currently shifting from infectious diseases to degenerative diseases. This pattern is accompanied by the problem of a double burden of disease. The incidence of degenerative diseases is increasing along with changes in lifestyle and environmental behavior. One of the threats of degenerative diseases to public health is diabetes mellitus.Diabetes management is very necessary for diabetes sufferers regarding knowledge in implementing a healthy lifestyle (medical nutrition therapy and physical activity) along with pharmacological intervention or medication administration. Knowledge about self-monitoring, signs and symptoms of hypoglycemia and how to deal with it must be provided to patients. Education for diabetes patients is very important, with the aim of promoting healthy living, it needs to always be carried out as part of prevention efforts and is a very important part of holistic diabetes management (Depkes. RI, 2020).In this study, behavioral research was conducted on the non-compliance of diabetes mellitus sufferers in controlling blood glucose while suffering from diabetes using a qualitative research approach, with the aim of the research to see the behavior of diabetes mellitus sufferers while suffering from diabetes.

METHOD

The research method used in this research is a qualitative study with a phenomenological approach, with the technique of selecting informants using the snowball technique, namely using information from previous informants to get the next informant or with the help of key informants with a total of 25 informants consisting of 15 people with diabetes. 7 families of diabetes sufferers and 3 people responsible for diabetes at the Andalas, Mabacang Kuranji and Lubuk Buaya Community Health Centers. The main instrument of qualitative research is the researcher himself. The researcher is a nurse with a Master's degree in Nursing. The researcher as a facilitator also uses the tools used in the research as a data collection instrument, namely a Digital Voice Recorder, in this case the researcher's cellphone (Oppo A92) and an interview guide as well as field notes or field notes and the researcher conducts in-depth interviews more or less. for 3 weeks, data processing and data analysis using the Colaizzi method which consists of seven stages consisting of: making data transcripts, reducing data extraction, determining subthemes/themes, organizing the collection of meanings formed into groups themes, writing complete and in-depth descriptions and validating the results of data analysis directly to informants as well as presenting data matrices.This research has received ethical approval with ethical test number 34/UN.162/KEP-FK/2023.

RESULT

Based on the results of in-depth interviews with informants from several questions including: the meaning of diabetes for informants, efforts made in controlling blood sugar so far, supporting information facilities and infrastructure so far, the psychological condition of informants during diabetes, the perceived meaning of family and health worker support, the use of alternative therapies in treating diabetes, access to health facilities and informants' expectations for diabetes mellitus, the results of the themes and subthemes obtained include:

Table 1.
Construction of in-depth interview results related to the meaning of diabetes mellitus

Keywords	Category	Theme	Conclusion
Lack of understanding	Knowledge needs	Misunderstood knowledge about diabetes	Need for information related to diabetes
Meaning of diabetes	Perception of diabetes	Diabetes is a harmless disease	Need for information related to diabetes
Eating habits	Perception in regulating diet	Boredom in regulating diet	Feeling of boredom

Table 2.
Construction of interview results regarding efforts that have been made by informants so far

Keywords	Category	Theme	Conclusion
Diet	Daily eating habits	Bad behavior in daily eating habits	Incorrect or irregular diet
Taking medication	Medication rules	Taking medication not according to the prescribed dosage	Use of wrong dosage of medication
Physical activity	Sports activities	Rarely or even not doing sports activities	Irregular exercise
Attitude	Forms of informant attitudes in everyday life	Having an attitude that ignores the rules in following a diet while suffering from diabetes	Indifferent attitude

Table 3.
Construction of interview results regarding information facilities and infrastructure related to information that supports blood glucose mellitus control

Keywords	Category	Theme	Conclusion
Information sources	Sources of information obtained	Information obtained from health workers and families is minimal	Limited sources of information
Information facilities	Information facilities and infrastructure	Information from various media such as the internet is not utilized	Limitations in accessing information
Education providers	Sources of education providers	Limited human resources in providing education	Limitations in human resources

Table 4.
Construction of interview results regarding the psychological condition of informants during diabetes

Keywords	Category	Theme	Conclusion
Feelings	Feelings felt	Hopelessness during diabetes mellitus	Hopelessness

Table 5.
Construction of interview results regarding family and health worker support

Keywords	Category	Theme	Conclusion
Support provided	The meaning of support from health workers and from family	Feeling of not getting support from family or health workers in treating diabetes while suffering from diabetes mellitus	No support from officers and family

Table 6.
Construction of interview results regarding the use of alternative therapies and diabetes treatment

Keywords	Category	Theme	Conclusion
Herbal Medicine	Herbal medicinal drinks	Alternatives to replace medicine from the hospital taking herbal medicine	Often taking herbal medicine compared to medicine from the hospital

Table 7.
Construction of interview results regarding the types of financing used so far

Keywords	Category	Theme	Conclusion
Type of financing	Financing in treatment	Cost of diabetes treatment so far with health insurance or BPJS	Cost of treatment using BPJS

Table 8.
Construction of interview results regarding access to health facilities

Keywords	Category	Theme	Conclusion
Access to health facilities	Access to health facilities	Access to health facilities is easily accessible	Access to health facilities during diabetes treatment is easily accessible

Table 9.
Construction of interview results regarding informants' expectations regarding their illness

Keywords	Category	Theme	Conclusion
Hope for diabetes	Hope for the future	Hope that blood sugar can remain stable and there are no other complications	Hope that blood sugar is controlled and there are no other complications

DISCUSSION

Based on the results of in-depth interviews, 16 categories or themes from various aspects were obtained, including: Misunderstood knowledge about diabetes, the assumption that diabetes is a harmless disease, boredom factors in managing diet, poor behavior in daily eating habits, taking medication not according to the given dose, rarely or not doing sports activities, having an attitude that ignores the rules in following a diet while suffering from diabetes, information obtained from health workers and family is minimal, information from various media such as the internet is not utilized, limited human resources in providing education, hopelessness while suffering from diabetes mellitus, feeling that they do not get support from family or health workers in treating diabetes while suffering from diabetes mellitus, alternatives to drugs from hospitals taking herbal medicine, the cost of diabetes treatment so far with health insurance or BPJS, Access to health facilities is easy to reach, hope that blood sugar can remain stable and there are no other complications.

Diabetes is one of the chronic diseases that is widely known by the public, but often the information circulating about it is inaccurate. Misunderstandings can affect how a person prevents or manages diabetes. The impact of misunderstandings results in incorrect diabetes management, such as stopping taking medication, or sufferers may avoid medical treatment and choose alternative treatments without scientific evidence, which can worsen their condition, delaying diagnosis and treatment because they feel their symptoms are not diabetes or are not too dangerous, increasing the risk of serious complications, such as kidney, heart, eye, and nerve damage. Not only does it have a physical impact but it also has a psychological impact, such as misunderstandings can create stigma, such as the assumption that people with diabetes cannot live a normal life. This can reduce self-confidence and affect the mental health of sufferers, some even give up hope (Association Diabetes Amaricans/ADA. 2020).

In accordance with the results of research on (Artini, 2016) on the relationship between anxiety levels and blood glucose levels in type 2 diabetes patients in the Gedong Air Village Health Center Work Area, Bandar Lampung, it was found that the strength of the Spearman correlation between anxiety levels measured using the HARS questionnaire and blood glucose levels was 0.426, which means that the strength of the correlation between the two variables is moderate with a p value <0.05 (0.012), which means that there is a significant correlation between anxiety levels and blood glucose levels. Also supported by research by (Ludiana dkk, 2022) on the relationship between psychological factors of stress and depression with blood sugar levels in type 2 diabetes mellitus patients, it was found that stress and depression levels have a significant relationship with blood sugar levels in diabetes mellitus patients. The relationship between stress and blood sugar is included in the strong category and depression is included in the sufficient category. The direction of the correlation shows a positive direction, meaning that the higher the levels of stress and depression, the higher the blood sugar levels of diabetes mellitus patients will increase.

Informant knowledge is important, because with an understanding of this knowledge, respondents can determine steps to prevent diabetes and prevent complications from diabetes mellitus. Low levels of knowledge and education are one of the causes of high cases of a disease, including type 2 Diabetes Mellitus. Knowledge is important to shape behavior. Likewise in preventing diabetes mellitus which requires knowledge in the form of understanding, signs and symptoms, risk factors, and ways to prevent diabetes mellitus itself. One source of knowledge can be obtained through health promotion. Knowledge is the basis for action. Before an individual acts, it is usually preceded by knowing, after that having the initiative to take action. The existence of a knowledge base on certain behaviors makes the behavior last longer. Knowledge is needed to be able to change society more easily towards the better (Paulus Wahana, 2016).

Behavior is based on three factors, namely predisposing, supporting, and driving factors. Predisposing factors consist of knowledge, beliefs, attitudes, demographic factors, and so on. Supporting factors include the availability of resources or community potential such as the physical environment and health facilities (Susanto, 2019). Driving factors include the attitudes and behavior of others such as health workers, community leaders. Behavior to prevent diabetes is influenced by several factors. First, predisposing factors. This factor consists of the knowledge possessed by individuals regarding diabetes and the risks if they have contracted diabetes (Paulus Wahana, 2016). Beliefs also influence individuals to take preventive measures. Individuals' beliefs about the dangers that can occur to them if they contract the disease certainly influence individuals to take preventive measures. Second, supporting factors. This factor is based on the presence or absence of facilities that can support individuals to take preventive measures against diabetes mellitus. The existence of sports facilities such as Sports Halls (GOR), the availability of jogging areas, and other public areas for exercise. Another supporting factor is the existence of health facilities such as clinics, doctor's practices, health centers and hospitals.

The existence of these supporting factors will certainly make it easier for individuals to prevent diabetes mellitus. Third, driving factors. The driving factor is influenced by the attitudes and behavior of others around the individual. Individuals who live in areas where the majority of people do regular exercise tend to behave the same way. This condition is because the individual is influenced by the behavior of others. Motivation from health workers and family can also be a motivator for individuals to make health efforts. For example, health workers and family provide motivation for routine health checks such as routine blood sugar

checks for diabetes sufferers. The formation of a new behavior begins with knowledge (cognitive), meaning that someone knows the material first, then that knowledge will shape attitudes and actions. Knowledge and understanding of diabetes mellitus will shape what behavior or actions will be taken to prevent diabetes mellitus (Effendi and Makhfudli, 2009).

The results of this study found that almost all diabetes sufferers assume that diabetes is not a dangerous disease, because they do not feel severe complaints, besides that they have the perception that diabetes will not cause other disorders, examined in daily eating patterns, informants also said that, the food consumed every day does not need to be regulated according to the recommendations of health workers, because they feel, whether regulated or not, their eating patterns do not feel any significant changes. According to (Limsah Silalahi, 2019) there is a significant relationship between knowledge about type 2 Diabetes Mellitus and preventive measures for type 2 diabetes mellitus, he explained that of the 70 respondents, more than half had insufficient knowledge, also supported by the results of (Waode Azfari Azis, Laode Yusman Muriman, 2020) on the relationship between the level of knowledge of diabetes mellitus and the lifestyle of diabetes mellitus sufferers, the results showed that the level of knowledge of diabetes mellitus sufferers was mostly lacking, while the lifestyle of diabetes mellitus sufferers was mostly unhealthy, and there was a relationship between the level of knowledge and lifestyle of diabetes mellitus sufferers with a p value <0.005. And also supported by research on the relationship between knowledge and attitudes with tuberculosis prevention efforts which states that the results of the study were analyzed univariately using the Spearman Rank test. Based on the research, it was obtained from 30 respondents that knowledge had a correlation coefficient of 0.73 from 30 respondents that attitudes had a correlation coefficient of 0.45. It was concluded that there was a relationship between knowledge and efforts to prevent pulmonary tuberculosis in Legok Village, Jambi City. There is a relationship between attitudes and prevention of pulmonary tuberculosis in Legok Village, Jambi City (Khairunnisa, dkk. 2023).

According to (Nursihhah, 2021) regarding the relationship between dietary compliance, physical activity, and taking medication on controlling blood sugar levels in patients with diabetes mellitus, there is a significant relationship between dietary compliance and the value (p = 0.000). Therefore, Nursihah suggests the importance of family support and health workers to increase the knowledge of diabetes mellitus patients in controlling blood sugar levels by providing information on the management of diabetes mellitus so that they can change the attitudes and behavior of diabetes sufferers. Similar to (Indirawaty, 2021) research on the relationship between knowledge and family support with routines in controlling blood sugar in patients with type 2 diabetes mellitus. with the results based on the results of statistical tests using risk, it was found that there was a relationship between knowledge in controlling blood sugar levels with a p-value of 0.002 and there was a relationship between family support in controlling blood sugar levels with a ρ-value of 0.001, a p value of <0.05 was obtained. Conclusion: There is a significant relationship between knowledge and family support with routines in controlling blood sugar in patients with type 2 diabetes mellitus in the Mangasa Health Center Work Area, Makassar City.

Family support greatly influences the attitude of diabetes sufferers as well as in controlling their blood glucose, based on the results of (Nanda Tia Adila, 2020) with the title of the relationship between family support and sufferers' attitudes with efforts to control blood sugar levels of type 2 diabetes mellitus at the Banyuanyar Surakarta Health Center, the results of the relationship between family support and efforts to control blood sugar levels obtained a p-value of 0.015 and the relationship between sufferers' attitudes and efforts to control blood

sugar levels obtained a p-value of 0.003. It can be concluded that there is a relationship between family support and sufferers' attitudes with efforts to control blood sugar levels in type 2 diabetes mellitus at the Banyuanyar Surakarta Health Center, namely the higher the family support and sufferers' attitudes, the more efforts to control their blood sugar levels increase.

Family support in the role of blood glucose control is very high, because what is meant by family support according to Family support is a form of interpersonal relationship that protects someone from the bad effects of stress (Kaplan & Sadock., 2002). Family support according to (Friedman, 2010) is the attitude, action of family acceptance of family members, in the form of informational support, assessment support, instrumental support and emotional support. So family support is a form of interpersonal relationship that includes attitudes, actions and acceptance of family members, so that family members feel that someone cares about them. So family social support refers to social supports that are viewed by family members as something that can be accessed or held for families who are always ready to provide help and assistance if needed.

Not only family support and health worker support, other factors that influence compliance in managing diet or regulating eating patterns in diabetes mellitus patients are also caused by factors from the sufferer themselves, according to the results of (Hestiana Dita Wahyu, 2017) on Factors related to compliance in managing type 2 DM diet. The results showed a relationship between age (p <0.01), gender (p <0.01), and family role (p: <0.01) with compliance in managing type 2 DM diet. There was no relationship between education (p: 0.44), occupation (p: 0.7), knowledge (p: 0.42), and the role of health workers (p: 0.7), so it can be concluded that the factors related to compliance in managing type 2 DM diet from oneself are age and gender.

CONCLUSION

Based on the results of in-depth interviews with 25 informants, 16 themes of the phenomenon of factors causing uncontrolled blood glucose were obtained, including incorrect knowledge about diabetes, the assumption that diabetes is a harmless disease, boredom factors in managing diet, poor behavior in daily eating habits, taking medication not according to the given dose, rarely or not doing sports activities, having an attitude that ignores the rules in following a diet while suffering from diabetes, information obtained from health workers and family is minimal, information from various media such as the internet is not utilized, limited health workers in providing education, feelings of hopelessness while suffering from diabetes mellitus, feeling that they do not get support from family or health workers in treating diabetes while suffering from diabetes mellitus, alternatives to drugs from the hospital are taking herbal medicines.

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