



# Relationship Between Health Literacy Related to Physical Activity and Blood Sugar Control in Patients With Type 2 Diabetes Mellitus in The UPTD (Community Health Center) Lemito Area

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## ABSTRACT

The incidence of chronic diseases has increased in all countries as a result of demographic and epidemiological transformation. One of them is diabetes mellitus (DM) which not only causes premature death worldwide but this disease is one of the chronic diseases that causes many other complications. The World Health Organization (WHO) estimates that the death rate associated with DM will double by 2030. This study uses a quantitative research type with a Cross-Sectional research design. The population in this study were patients suffering from type 2 Diabetes Mellitus in the UPTD Lemito Health Center Area with a population of 39 respondents from January to August 2024 and the sample in this study used the total Sampling technique with a total of 39 samples. The instrument in this study used a questionnaire. The data analysis technique used the Fisher exact test, which obtained a p-value = 0.000, which means that there is a relationship between health literacy related to physical activity and blood sugar control in patients with type 2 diabetes mellitus in the UPTD Lemito Health Center Work Area, Pohuwato Regency

## 1. INTRODUCTION

The incidence of chronic diseases has increased in all countries as a result of demographic and epidemiological transformations. One of them is diabetes mellitus (DM) which not only causes premature death worldwide but this disease is one of the chronic diseases that causes many other complications. The World Health Organization (WHO) estimates that the death rate associated with DM will double by 2030. Specifically, the most common type of DM in Indonesia is type 2 diabetes mellitus (T2DM). The high number of people with diabetes mellitus is caused by changes in people's lifestyles lack of physical activity, and incorrect dietary patterns. (Murtiningsih et al., 2021) According to the International Diabetes Federation (IDF) in 2019, there were 463 million people in the world with DM in the age range of 20-79 years, 136 million of whom were over 65 years old. The prevalence of DM sufferers in Indonesia reached 10.7 million. In Gorontalo Province, there has been an increase over the past 3 years, namely in 2017 by 3.5%, in 2018 by 5.1% and in 2019 by 7.4%. The latest data released in Gorontalo Province in 2022 the number of DM sufferers was 18,074 people spread across several regencies/cities. (Ministry of Health of the Republic of Indonesia, 2020).

Data obtained from the Pohuwato Regency Health Office in 2022 and 2023 showed that there were several sub-districts with DM sufferers who increased from 2022 to 2023. One of them is Lemito District. The Lemito Health Center showed that there were 18 DM sufferers in 2022, and this increased to 33 people, sufferers in 2023 with a diagnosis of T2 DM. (DINKES Pohuwato, 2022). Health center level recording and reporting system (SP2TP, 2024), UPTD Lemito Health Center in 2024, DM is ranked third out of ten diseases with the most sufferers, data from January: 8 cases, February: 11 cases, March 13 cases, April: 15 cases, May: 20 cases, June: 23 cases, July: 30

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cases and August 39 cases, the prevalence of DM at UPTD Lemito Health Center increased in January, namely 8 cases, to 39 cases in August.

As the number of DM sufferers continues to increase, it is feared that this condition if not treated properly and correctly will result in complications of various other diseases, and decreased body, social, and psychological functions. A good understanding is needed for DM sufferers to be able to maintain their health, which is usually hampered by a lack of knowledge related to the disease they suffer from, which can lead to worsening health conditions (Wahyudin et al., 2023).

Low understanding of health is caused by the low level of health literacy in individuals in understanding, utilizing, and applying existing information to maintain good health. The increasingly sophisticated development of technology today makes it easier for someone to access various information such as health, but the increasingly rapid and uncontrolled development of information makes people confused about choosing good and correct information. Health literacy in everyone is very important to know, especially for DM patients, because they require continuous care consisting of several complexes, namely the level of health education, physical exercise, diet, and medication. (Selviana Daud, 2023). Health literacy is the knowledge of competence in each person in understanding, assessing, and applying health information in making decisions about health maintenance, preventing disease, and carrying out health promotion that is useful in maintaining and improving quality of life during the life journey, and it can be well established that low levels of health will lead to worse health outcomes because diabetes treatment requires patients to seek information related to treatment, make health decisions, and understand medical instructions, health literacy is very relevant for the treatment of diabetes mellitus. (Abdul et al, 2020).

The Indonesian Endocrinology Association (PARKENI) said that there are 5 pillars in the management of diabetes mellitus, namely education related to diabetes, nutritional therapy, physical exercise (physical activity), pharmacological therapy, and routine examinations. Diabetes sufferers who do physical activity make blood glucose burn into energy, so that energy cells will be more sensitive to insulin, and good blood circulation and the risk of type 2 DM decreases by 50%. Physical activity that is carried out routinely can improve blood fat profiles, lower cholesterol and control blood sugar. DM cannot be cured but blood glucose can be controlled through 5 pillars of DM management, one of which is physical activity. Physical activity is an initial effort in preventing, controlling, and overcoming DM. (N. Sari & Purnama, 2019).

## 2. METHOD

Based on this study, the research design used is cross-sectional. The population in this study were patients suffering from type 2 Diabetes Mellitus in the UPTD Lemito Health Center Area with a population of 39 respondents from January to August 2024. The sampling technique used was the total sampling technique. The sample in this study was all type 2 Diabetes Mellitus patients recorded in the UPTD Lemito Health Center Work Area from January to August 2024, with criteria by the inclusion criteria: Patients with Type 2 Diabetes Mellitus, willing to be respondents and exclusion: have chronic diseases.

## 3. RESULT AND DISCUSSION

**Table 1.** Distribution of Respondent Characteristics Age

Age	(n)	Persentase (%)
26-35 Years	1	2,6
36-45 Years	6	15,4
46-55 Years	23	59
56-65 Years	6	15,4
>65 Years	3	7,6
<b>Total</b>	<b>39</b>	<b>100</b>

Source: Primary Data, 2024

Based on table 1, the distribution of respondents by age is known that from 39 respondents, the largest age group is 46-55 years with a total of 23 respondents (59%).

**Table 2.** Respondent Characteristics by Gender

Gender	(n)	Persentase (%)
Male	4	10,3
Female	35	89,7
Total	39	100

Source: Primary Data, 2024

Based on table 2, the distribution of respondents based on gender is known that of the 39 respondents, the largest gender is female with a total of 35 respondents (89.7%).

**Table 3.** Respondent Characteristics Based on Education

Education	(n)	Persentase (%)
SD	8	20,5
SMP	10	25,6
SMA	14	35,9
DIPLOMA	1	2,6
BACHELOR	6	15,4
Total	39	100

Source: Primary Data, 2024

Based on table 3, the distribution of respondents based on education is known that of the 39 respondents, the most jobs were high school with a total of 14 respondents (35.9%).

### **Relationship of Health Literacy Related to Physical Activity with Blood Sugar Control in Type 2 Diabetes Mellitus Patients in the Working Area of UPTD Lemito Health Center, Pohuwato Regency.**

Bivariate analysis was conducted to determine the relationship of Health Literacy Related to Physical Activity with Blood Sugar Control in Type 2 Diabetes Mellitus Patients in the Working Area of UPTD Lemito Health Center, Pohuwato Regency.

**Table 4.** Relationship of Health Literacy Related to Physical Activity with Blood Sugar Control in Type 2 Diabetes Mellitus Patients in the Working Area of UPTD Lemito Health Center, Pohuwato Regency

Health Literacy Related to Physical Activity	GDS				n	%	P value
	Normal		High				
	n	%	n	%			
Adequate	5	12,8	2	5,1	7	17,9	0,000*
Inadequate	0	0	32	82,1	32	82,1	
Total	5	12,8	34	87,2	39	100	

Based on table 4 shows the relationship between health literacy related to physical activity with blood sugar control in patients with type 2 diabetes mellitus in the Working Area of UPTD Lemito Health Center, Pohuwato Regency, the results of the alternative fisher exact test were obtained by considering the data analyzed in the form of categorical data in a 2x2 contingency table with a small number of samples. And (because there are 2 cells with an expect count <5) 0.000 (<0.05) which means that there is a relationship between health literacy related to physical activity with blood sugar control in patients with type 2 diabetes mellitus in the Working Area of UPTD Lemito Health Center, Pohuwato Regency.

## **Health Literacy Level Related to Physical Activity in Type 2 Diabetes Mellitus Patients in the Working Area of UPTD Lemito Health Center, Pohuwato Regency**

From the results of the study based on health literacy related to physical activity, it is known that out of 39 respondents, the majority of respondents had inadequate literacy with a total of 32 respondents (82.1%). This is supported by the results of the questionnaire where most respondents stated that they did not agree that diabetes mellitus is a disease that experiences an increase in blood sugar levels. Based on the results of interviews with respondents, respondents stated that if they did not have signs and symptoms of diabetes mellitus, respondents stated that they did not agree that if blood sugar levels increased, they suffered from diabetes mellitus.

Health Literacy is the ability to read, understand, and act on health information. Including tasks such as reading and understanding prescription drug labels. Health Literacy for each individual is important to know because it is related to the ability to obtain information in an effort to improve health, in general, health literacy can improve health and help to make the right decisions regarding their health (Jones, 2011). According to research by Sabil et al. (2019) stated that health literacy is one of the drivers in carrying out good self-care management, where low Health Literacy is an obstacle to improving health outcomes in people with chronic diseases. According to several theories, one of the factors that influence Health Literacy is education, someone with a high level of education has high Health Literacy, and where with a low level of education have low Health Literacy.

## **Blood Sugar Control in Type 2 Diabetes Mellitus Patients in the Work Area of the Lemito Health Center UPTD, Pohuwato Regency**

From the results of the study based on the GDS examination, it was found that out of 39 respondents, there were 34 respondents with high GDS (87.2%). This is evidenced by the results on the observation sheet. Measuring blood sugar levels using Random Blood Sugar measurements, also known as random blood sugar levels, is a way to check random blood sugar levels that can be done at any time without prior fasting preparation. According to (Ardiyan, 2018) blood sugar levels are used to establish a diagnosis of Diabetes Mellitus. This is in line with what was stated by (Septa Setyawan, 2015) that the method of examining random blood glucose can provide a rapid picture of changes in blood glucose whether in a state of hyperglycemia, hypoglycemia, or controlled.

The results of the study showed that most respondents had high blood sugar levels. Many diabetes mellitus patients who have high blood sugar levels indicate that respondents lack self-awareness where a diabetes mellitus patient must know how important it is to carry out blood sugar control properly and correctly because it must be understood that a diabetes mellitus sufferer who does not carry out blood sugar control properly and correctly has a high risk of increasing blood sugar levels compared to patients who do not suffer from diabetes mellitus. With high blood sugar levels, complications will occur in diabetes mellitus patients so efforts are needed to reduce the occurrence of complications, one of which is vascular and neuropathic by controlling blood sugar levels (Y. B. Bataha, 2017). Most respondents in this study were over 45 years old.

This is by the results of research conducted by (Trisnawati & Setyorogo, 2013) that most respondents in the DM case group were in the age range of 35-65 years. This is because people at this age are less active, gain weight, decrease muscle mass and due to the aging process which results in progressive shrinkage of beta cells. Age is one of the factors that can affect a person's health-related to cells and organs of the body that have experienced decreased function along with increasing age. Blood circulation, oxygen delivery to wounds, clotting, inflammatory response and phagocytosis in the elderly are easily damaged and the risk of infection is greater which has an impact on the wound-healing process (Perkeni, 2015).

## Relationship of Health Literacy Related to Physical Activity with Blood Sugar Control in Type 2 Diabetes Mellitus Patients in the Working Area of UPTD Lemito Health Center, Pohuwato Regency

Based on the results of the study, show a relationship between health literacy related to physical activity with blood sugar control in type 2 diabetes mellitus patients in the Working Area of UPTD Lemito Health Center, Pohuwato Regency, the results of the alternative Fisher exact test (because there are 2 cells with an expected count  $<5$ ) are 0.000 ( $<0.05$ ), which means that there is a relationship between health literacy related to physical activity with blood sugar control in type 2 diabetes mellitus patients in the Working Area of UPTD Lemito Health Center, Pohuwato Regency.

This is supported by data in Table 4.6 showing that patients with inadequate health literacy levels related to physical activity and high blood sugar control were 32 respondents (82.1%) and adequate health literacy levels but high blood sugar levels were 2 respondents (5.1%) and adequate health literacy levels related to physical activity and normal blood sugar levels were 5 respondents (12.8%). Low understanding of health is caused by the low level of health literacy in individuals in understanding, utilizing, and applying existing information to maintain good health. The development of increasingly sophisticated technology today makes it easier for someone to access various information such as health, but the increasingly rapid and uncontrolled development of information makes people confused about choosing good and correct information (Selviana Daud, 2023). (Zainuddin et al., 2024)

In respondents who have adequate health literacy levels and normal blood sugar levels, there are 5 respondents (12.8%). This is influenced by the respondent's education factor where someone with a high level of education has a good level of health literacy and a low level of education has a low level of health literacy in respondents, in addition to having an impact on the level of health knowledge, education also forms a person's expertise in understanding health, such as the ability to read and search for various sources of health information and the ability to use the internet. Someone who is sick will try to find information related to their health and look for sources of various treatments to prevent more severe complications, and the tendency of people who know they are sick to ask a lot of questions to health services to prevent more serious diseases. Based on the results of the study, 2 respondents (5.1%) were also found with adequate literacy levels but high blood sugar levels. Someone who has good health literacy related to physical activity does not necessarily have the motivation or willingness to make efforts to care for and comply with matters related to their illness. When viewed from the results of the interview, most respondents were unable to control their food and do sports activities regularly. Lack of attention and motivation from the respondent's family and the respondent himself towards self-care, thus aggravating the occurrence of diabetes mellitus so that blood sugar levels are high. According to research conducted by Sabil & Anisa (2021) which states that the better the health literacy, support, and motivation from the family, the better it is in carrying out physical activities to be able to control blood sugar properly and correctly.

For the level of health literacy related to inadequate physical activity and high blood sugar levels due to the age factor of respondents, most of whom are over 45 years old where some of the respondents have experienced decreased vision and hearing so that it is difficult to receive health information from health workers, this is due to the influence of declining physical and mental health, as well as an increased risk of cognitive decline, with age can affect the patient's ability to access, understand, use information and be unable to decide about their health. Sabil *et al.* (2018) stated that the age factor is related to health literacy, this is due to the influence of declining physical and mental health, as well as an increased risk of cognitive decline at age which can affect the patient's ability to access, understand, use information and be able to make decisions about their health care.

According to Gaffari et al. (2020), Adequate health literacy related to physical activity will result in good self-care management, and vice versa, someone who has inadequate health literacy related to physical activity will result in poor self-care management. Where someone who has

good knowledge about their illness will have the ability to do things to maintain their illness so that complications do not occur.

#### 4. CONCLUSION

1. Health Literacy Level Related to Physical Activity in Type 2 Diabetes Mellitus Patients in the Working Area of UPTD Lemito Health Center, Pohuwato Regency, it is known that out of 39 respondents, the highest literacy is inadequate literacy with a total of 32 respondents (82.1%).
2. Blood Sugar Control in Type 2 Diabetes Mellitus Patients in the Working Area of UPTD Lemito Health Center, Pohuwato Regency, GDS is known that out of 39 respondents, the highest GDS is high with a total of 34 respondents (87.2%).
3. Based on the results of the study, it shows the relationship between health literacy related to physical activity and blood sugar control in patients with type 2 diabetes mellitus in the Working Area of UPTD Lemito Health Center, Pohuwato Regency, the results of the alternative fisher exact test (because there are 2 cells with an expect count  $<5$ ) 0.000 ( $<0.05$ ) which means that there is a relationship between health literacy related to physical activity and blood sugar control in patients with type 2 diabetes mellitus in the Working Area of UPTD Lemito Health Center, Pohuwato Regency.
4. The results of this study indicate the importance of health literacy, especially related to physical activity, in helping Type 2 Diabetes Mellitus patients control their blood sugar levels. Therefore, interventions at the health center and primary care levels should include health literacy education as part of the diabetes management program.

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