

## LEVEL OF KNOWLEDGE AND PHYSICAL ACTIVITY WITH BLOOD SUGAR LEVELS IN DIABETES MELLITUS SUFFERERS AT THE PRACTICE OF INDEPENDENT DOCTOR EKA MARLIANA

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### Abstract

**Background:** Diabetes mellitus is a health condition characterized by metabolic disorders due to lack of production and function of the hormone insulin, which causes an increase in blood sugar levels in the urine (Syamsiah, 2017). The World Health Organization (WHO, 2015) notes that around 10 million people worldwide suffer from diabetes mellitus. Indonesia is ranked fourth with the highest number of sufferers after India, China and the United States. According to the Indonesian Ministry of Health's Basic Health Research Data (Riskesmas) (2013), the number of Diabetes Mellitus sufferers in Indonesia reached 9.1 million people, with 90% of them suffering from type 2 diabetes (Soegondo, 2012). The Indonesian Statistics Agency recorded that the prevalence of type 2 diabetes mellitus in urban areas was 14.7%, while in rural areas it was 7.2%. Banten Province is one of the provinces in Indonesia with a high prevalence rate of Diabetes Mellitus. Knowledge is defined as facts, truth, or information obtained through experience or learning (Arisma et al., 2017). Meanwhile, physical activity is body movement that involves skeletal muscles, requires energy, and can provide health benefits (Anggraeni & Alfarisi, 2018). **Research Objective:** This aims to analyze the relationship between the level of knowledge and physical activity and blood sugar levels in patients diabetes mellitus at the Independent Doctor's Practice. **Research Method:** This research design is analytical descriptive, focusing on the relationship between independent and dependent variables. **Research Results:** The results of statistical tests using questionnaire sheets filled in by respondents (diabetes mellitus patients) showed P values of 0.048 and 0.000. Thus, it can be concluded that there is a significant relationship between the level of knowledge and physical activity and blood sugar levels in diabetes mellitus patients at the Eka Marlina Independent Doctor's Practice.

**Keywords:** BLOOD SUGAR, Diabetes mellitus, World Health Organization

### Introduction

Diabetes mellitus is a disease condition characterized by metabolic abnormalities caused by suboptimal production and function of the insulin hormone, resulting in increased blood sugar levels in the urine. On an ongoing basis, high blood sugar levels can cause damage to various body systems, including the cardiovascular system, kidneys, nerve damage (stroke), and can even lead to the risk of death (Syamsiah, 2017).

Knowledge is a series of facts, truths, or information obtained through personal experience or through a learning process. As a form of information, knowledge can be accessed or realized by individuals. Another definition states that knowledge is the result of observation and understanding obtained by humans through their minds (Arisma et al., 2017).

Knowledge plays a crucial role in diabetes management. In this context, the understanding that diabetics have about their condition has great significance. This is because knowledge can help them evaluate their attitudes, thoughts, and avoid the risk of related diseases (Rosita, 2019).

The results of research by Perdana et al., (2013) suggest that patient knowledge about diabetes mellitus is a tool that can help sufferers carry out diabetes management so that more and better patients suffering from diabetes mellitus know about diabetes mellitus and can change their behavior, control the condition of the disease. so you can live longer with a good quality of life.

Physical activity is a body movement produced by skeletal muscles and requires energy (Anggraeni & Alfarisi, 2018).

The effects of physical activity or exercise are directly related to increased muscle glucose recovery, that is, the extent to which muscle glucose is absorbed from the bloodstream. During exercise, muscles use the glucose stored in them, and when the blood flow supplies glucose in the muscles, the muscles will fill the deficiency by absorbing glucose from the blood. In this context, it can result in a decrease in blood glucose levels and improvement in blood glucose control (Anggraeni & Alfarisi, 2018).

According to the World Health Organization (WHO) in 2015, around 10 million people worldwide suffered from diabetes mellitus. Indonesia is ranked fourth with the highest number of diabetes mellitus sufferers after India, China and the United States. Based on data from the Indonesian Ministry of Health's Basic Health Research (Riskesdas) in 2013, the number of diabetes mellitus sufferers reached 9.1 million people, with 90% of them suffering from type 2 diabetes (Soegondo, 2012). The Indonesian Statistics Agency reports that the prevalence of type 2 diabetes mellitus in urban areas reached 14.7%, while in rural areas it was 7.2%. Banten Province is one of the provinces in Indonesia with a high prevalence rate of diabetes mellitus.

Data relevant to this situation shows that in the Banten region, the prevalence of diabetes mellitus reached 104,962, while in Tangerang City the diagnosis rate reached 23.5% (Ministry of Health of the Republic of Indonesia, 2013). In 2019, the Tangerang District Health Service estimated that the number of diabetes mellitus sufferers reached two percent of the total population of 3.47 million people. The Head of the Disease Control and Prevention (P2P) Division of the Tangerang District Health Office stated that it is estimated that there are around 69,500 diabetes mellitus sufferers spread across 29 sub-districts in Tangerang, with the Independent Doctor's Practice Eka Marliana recording 1,135 cases from January to September 2023.

Based on a preliminary study of five type 2 diabetes mellitus patients who underwent outpatient treatment at Poli Eka Marliana on 16 October 2023, it was found that 55% of them had increased blood glucose levels during the previous examination, even though they had followed the doctor's medication prescription. An increase in blood glucose levels at the last examination indicates that blood glucose levels are not well controlled, and one possible cause is a lack of physical activity in daily life.

The aim of this research is to determine and analyze "**The Relationship between Knowledge Level and Physical Activity with Blood Sugar Levels in Diabetes Mellitus Sufferers at the Independent Doctor's Practice Eka Marliana**".

## **Data Collection**

This research design involves selecting methods, data collection techniques, and analysis strategies that are appropriate to the research objectives. In this context, the research uses a cross-sectional approach which is a correlative analytical research. Cross-sectional research focuses on measuring or observing independent and dependent variable data only once at a time. All variables are evaluated simultaneously at one point in time, without any follow-up (Nutsalam, 2016). The population in this study were 70 patients who visited and were diagnosed with diabetes mellitus at

the Eka Marlina independent doctor's practice, Serang district in the period November 2023. In this study, it was calculated based on the Slovin formula, where the sample is for a small population or less than 10,000 as quoted from Notoatmodjo (2010). Based on the results of these calculations, the sample size was 59 respondents.

## Result

### 1. Univariate Analysis

**Table 1. Distribution of Respondents Based on Demographic Data for Diabetes Mellitus Patients at the Independent Doctor's Practice Eka Marlina in 2023 (n = 59)**

| No        | Variable                         | Frequency | Percentage % |
|-----------|----------------------------------|-----------|--------------|
| <b>1.</b> | <b>Age</b>                       |           |              |
|           | 26-35 years<br>(Early adulthood) | 10        | 16.9 %       |
|           | 36-45 years (Late adulthood)     | 16        | 27.1 %       |
|           | 46-55 years (Early elderly)      | 14        | 23.7 %       |
|           | 56-65 years (Early elderly)      | 19        | 32.3 %       |
|           | Total                            | 59        | 100 %        |
| <b>2.</b> | <b>Gender</b>                    |           |              |
|           | Man                              | 16        | 27.1 %       |
|           | Woman                            | 43        | 72.9 %       |
|           | Total                            | 59        | 100 %        |
| <b>3.</b> | <b>Last Education</b>            |           |              |
|           | No School                        | 0         | 0.0%         |
|           | SD                               | 18        | 30.5 %       |
|           | SMP/MTS                          | 15        | 25.4 %       |
|           | SMA/MA/SMK                       | 26        | 44.1 %       |
|           | Diploma/Bachelor                 | 0         | 0.0%         |
|           | Total                            | 59        | 100 %        |
| <b>4.</b> | <b>Work</b>                      |           |              |
|           | PNS                              | 0         | 0.0%         |
|           | TNI/Polri                        | 0         | 0.0%         |
|           | Trader                           | 0         | 0.0%         |
|           | Farmers/Ranchers/<br>Fishermen   | 12        | 20.4 %       |
|           | Private                          | 20        | 33.9 %       |
|           | Other (IRT)                      | 27        | 45.7%        |
|           | Total                            | 59        | 100 %        |

Based on Table 1 above regarding the demographic characteristics of respondents, it shows that the majority of respondents aged 56-65 years were 19 respondents (32.3%), female, 43 respondents (72.9%) and based on data above the upper secondary education level, more respondents had as many as 26 respondents (44.1%), the majority of respondents' occupations include housewives (IRT), namely 27 respondents (45.7%).

**Table 2. Frequency Distribution of Levels of Knowledge and Physical Activity in Diabetes Mellitus Patients at the Independent Doctor's Practice Eka Marlina in 2023**  
(n = 59)

| No | Variable          | Frequency | %      |
|----|-------------------|-----------|--------|
| 1. | Knowledge level   |           |        |
|    | Bad               | 46        | 78.0 % |
|    | Good              | 13        | 22.0 % |
|    | Total             | 59        | 100 %  |
| 2. | Physical Activity |           |        |
|    | Low               | 32        | 54.2 % |
|    | Currently         | 16        | 27.1 % |
|    | Tall              | 11        | 18.6 % |
|    | Total             | 59        | 100 %  |

Based on table 5.2 for the level of knowledge, the results show that out of 59 respondents, the number of respondents who had a poor level of knowledge was 46 respondents (78.0%) and those who had a good level of knowledge were 13 respondents (22.0%).

Meanwhile, regarding physical activity, the results showed that out of 59 respondents, the number of respondents who had low physical activity was 32 respondents (54.2%), 16 respondents had moderate activity (27.1%) and 11 respondents (18.6%) had high activity.

**Tabel 3. Frequency Distribution of Blood Sugar Levels in Diabetes Mellitus Patients in Eka Marlian Independent Doctor Practice in 2023 (n = 59)**

| No | Blood Sugar Levels | Respondent Frequency | %    |
|----|--------------------|----------------------|------|
| 1. | Low                | 35                   | 59.3 |
| 2. | Normal             | 17                   | 28.8 |
| 3. | Tall               | 7                    | 11.9 |
|    | Total              | 59                   | 100  |

Based on table 5.3 for blood sugar levels, the results show that out of 59 respondents, the number of respondents who had low blood sugar levels was 35 respondents (59.3%), 17 respondents (28.8%) had normal blood sugar levels and 7 respondents (11.9%) had normal blood sugar levels. high as many as 7 respondents (11.9%).

## 2. Bivariate Analysis

**Table 4. The Relationship Between The Level Of Knowledge And Blood Sugar Levels In Diabetes Mellitus Patients At Eka Marlina's Independent Doctor's Practice In 2023 (n = 59)**

| Knowledge Level | Blood sugar levels |      |        |      |      |      |       |      | OR     | 95 % CI  | P-Value |
|-----------------|--------------------|------|--------|------|------|------|-------|------|--------|----------|---------|
|                 | Low                |      | Normal |      | Tall |      | Total |      |        |          |         |
|                 | N                  | %    | N      | %    | n    | %    | n     | %    |        |          |         |
| Bad             | 31                 | 52.5 | 14     | 23.7 | 1    | 1.6  | 46    | 77.9 | 46.500 | 4.394    | 0.048   |
| Good            | 4                  | 6.7  | 3      | 5.8  | 6    | 10.1 | 13    | 22.1 |        | -        |         |
| Total           | 35                 | 59.2 | 17     | 28.7 | 7    | 11.7 | 59    | 100  |        | 492.1234 |         |

From table 4 above, it shows that there is a relationship between the level of knowledge and blood sugar levels in diabetes mellitus patients at the Eka Marlina Independent Doctor's Practice with the following results:

- 1) Poor level of knowledge regarding blood sugar levels from 46 respondents (78.0%), low blood sugar levels amounted to 31 respondents (52.5%), for normal blood sugar levels there were 14 respondents (23.7) while high blood sugar levels amounted to 1 respondent (1.6%).

- 2) Good level of knowledge regarding blood sugar levels from 13 respondents (22.1%), low blood sugar levels amounted to 4 respondents (6.7%), for normal blood sugar levels there were 3 respondents (5.8%) while high blood sugar levels totaling 6 respondents (10.1%).
- 3) The Odd Ratio (OR) value obtained is 46.500 with the lower limit being 4.394 while the upper limit is 492.1234, meaning that a good level of knowledge has 46 times the chance of a poor level of knowledge regarding blood sugar levels in patients. diabetes mellitus.
- 4) The statistical test results obtained a P value of 0.048, meaning  $< \alpha$  (0.05), so it can be concluded that there is a significant relationship between knowledge and blood sugar levels in diabetes mellitus patients at the Eka Marliana Independent Doctor's Practice.

**Table 5. The Relationship Between Physical Activity and Blood Sugar Levels in Diabetes Mellitus Patients at the Independent Doctor's Practice, Eka Marliana, 2023 (n = 59)**

| Physical Activity | Blood Sugar Levels |      |        |      |      |      |       |      | OR     | 95 % CI | P-Value |
|-------------------|--------------------|------|--------|------|------|------|-------|------|--------|---------|---------|
|                   | Low                |      | Normal |      | Tall |      | Total |      |        |         |         |
|                   | N                  | %    | n      | %    | n    | %    | N     | %    |        |         |         |
| Low               | 23                 | 38.9 | 2      | 3.3  | 7    | 11.8 | 32    | 54.2 | 20.100 | 3.024   | 0.001   |
| Currently         | 5                  | 8.4  | 7      | 11.8 | 4    | 6.7  | 16    | 27.1 |        | -       |         |
| Tall              | 4                  | 6.7  | 7      | 11.8 | 0    | 0.0  | 11    | 18.6 |        | 134.094 |         |
| Total             | 32                 | 54.0 | 16     | 26.9 | 11   | 18.5 | 59    | 100  |        |         |         |

From table 5.5 above, it shows that there is a relationship between physical activity and blood sugar levels in diabetes mellitus patients at the Eka Marliana Independent Doctor's Practice with the following results::

- 1) Low physical activity affected blood sugar levels from 32 respondents (54.2%), low blood sugar levels amounted to 23 respondents (38.9%), normal blood sugar levels amounted to 2 respondents (3.3%) while high blood sugar levels amounted to 7 respondents (11.8%).
- 2) Moderate physical activity affected blood sugar levels from 16 respondents (27.1%), low blood sugar levels amounted to 5 respondents (8.4%), normal blood sugar levels amounted to 7 respondents (11.8%) while high blood sugar levels amounted to 4 respondents (6.7%).
- 3) High physical activity affected the blood sugar levels of 11 respondents (18.6%), low blood sugar levels were 4 respondents (6.7%), normal blood sugar levels were 7 respondents (11.8%) while high blood sugar levels were 0 respondents (0.0%).
- 4) The Odd Ratio (OR) value obtained is 20,100 with the lower limit being 3,024 while the upper limit is 134,094, meaning that high physical activity has 20 times the chance of low physical activity affecting blood sugar levels in diabetes mellitus patients. .
- 5) The results of the statistical test showed that the p value = 0.001, meaning  $< \alpha$  (0.05), which shows that there is a relationship between physical activity and blood sugar levels in diabetes mellitus patients at the Eka Marliana Independent Doctor's Practice.

## Discussion

Based on the results of bivariate test analysis between the level of knowledge and blood sugar levels in diabetes mellitus patients, it was found that the level of knowledge regarding blood sugar levels was poor from 46 respondents (77.9%), low blood sugar levels were 31 respondents (52.5%), for blood sugar levels. Normal blood amounted to 14 respondents (23.7%) while high blood sugar levels amounted to 1 respondent (1.6%). A good level of knowledge regarding blood sugar levels was 13 respondents (22.1%), low blood sugar levels were 4 respondents (6.7%), normal blood sugar levels were 3 respondents (5.8%) while high blood sugar levels were 6 respondents (10.1%).

From the results of the bivariate Chi-Square test to see whether there is a relationship between the level of knowledge and blood sugar levels, it was found that the p value was Asym. Sig (2-sided) =  $0.048 < \alpha$  (0.05), then the hypothesis  $H_0$  is rejected and  $H_a$  is accepted. The conclusion is that there is a relationship between the level of knowledge and the blood sugar levels of diabetes mellitus patients at the Eka Marliana Independent Doctor's Practice. Based on the results of bivariate tests between physical activity and blood sugar levels in diabetes mellitus patients, it was found that low physical activity affected blood sugar levels for 32 respondents (54.2%), low blood sugar levels for 23 respondents (38.9%), for high blood sugar levels. Normal amounted to 2 respondents (3.3%) while high blood sugar levels amounted to 7 respondents (11.8%). Moderate physical activity affected blood sugar levels from 16 respondents (27.1%), low blood sugar levels amounted to 5 respondents (8.4%), normal blood sugar levels amounted to 7 respondents (11.8%) while high blood sugar levels amounted to 4 respondents (6.7%). High physical activity affected the blood sugar levels of 11 respondents (18.6%), low blood sugar levels were 4 respondents (6.7%), normal blood sugar levels were 7 respondents (11.8%) while high blood sugar levels were 0 respondents (0.0%).

From the results of the bivariate Chi-Square test to see whether there is a relationship between the level of knowledge and blood sugar levels, it was found that the p value was Asym. Sig (2-sided) =  $0.001 < \alpha$  (0.05), then the hypothesis  $H_0$  is rejected and  $H_a$  is accepted. The conclusion is that there is a relationship between the level of knowledge and the blood sugar levels of diabetes mellitus patients at the Eka Marliana Independent Doctor's Practice.

The results of this research are in accordance with Kosasih's theory, Yana Setiawan, with the title "The relationship between levels of knowledge and physical activity with blood sugar levels in type 2 diabetes mellitus patients in Karang Jaya village, Pebayuran sub-district, Bekasi district." Based on the results of research conducted in Karang Jaya village, Pebayuran subdistrict, Bekasi district in 2022 using the Chi Square test, there is a relationship between the level of knowledge and blood sugar in type 2 diabetes mellitus patients with a p-value of 0.000, meaning  $\leq \alpha$  (0.05) and there is a relationship between physical activity and blood sugar in type 2 diabetes mellitus patients with a p-value of 0.001, meaning  $\leq \alpha$  (0.05). The results of this research are in accordance with human research based on Ade Asrianti's research, with the title "The relationship between eating patterns, level of knowledge and physical activity with blood sugar levels in type 2 DM sufferers in the work area of the Popalia Health Center, Wakatobi Regency in 2021". It can be concluded that there is a relationship between the level of knowledge and blood sugar levels in type II DM patients, using the OR (Odds Ratio) method it can be obtained with a value of  $OR = 3.5$ , which means that the level of knowledge is a risk factor for the occurrence of Type II DM in Popalia health centers and there is The relationship between physical activity and blood sugar levels in type II DM patients using the OR (Odds Ratio) method can be obtained with an OR value of 3.3, which means that 50% of physical activity is a risk factor for Type II DM at the Popalia Community Health Center.

Researchers hope that the level of knowledge and physical activity in these patients can further increase and improve, so that diabetes mellitus patients will be more enthusiastic and motivated to maintain their health and be willing to carry out physical activity every day

independently.

## Conclusion

Based on research carried out at the Independent Doctor's Practice, Eka Marlina Kp. Pasir Sembung Rt/Rw.015/005 Gembor, Binuang Serang - Banten, can be concluded as follows:

- a. Based on table 2 for the level of knowledge, the results show that out of 59 respondents, the number of respondents who had a poor level of knowledge was 46 respondents (78.0%) and those who had a good level of knowledge were 13 respondents (22.0%).
- b. Based on table 3 for blood sugar levels, the results showed that of the 59 respondents, the number of respondents who had low blood sugar levels was 35 respondents (59.3%), 17 respondents had normal blood sugar levels (28.8%) and those who had high blood sugar levels. high as many as 7 respondents (11.9%).
- c. The Odds Ratio (OR) value obtained is 46,500 with the lower limit being 4,394 while the upper limit is 492.1234, meaning that a good level of knowledge has 46 times the chance of a poor level of knowledge regarding blood sugar levels in diabetes mellitus patients. The statistical test results obtained a P value of 0.048, meaning  $< \alpha$  (0.05), so it can be concluded that there is a significant relationship between knowledge and blood sugar levels in diabetes mellitus patients at the Eka Marlina Independent Doctor's Practice.
- d. Meanwhile, based on table 2 on physical activity, the results showed that of the 59 respondents, the number of respondents who had low physical activity was 32 respondents (54.2%), who had moderate activity was 16 respondents (27.1%) and who had high activity was 11 respondents (18.6%).
- e. Based on table 3 for blood sugar levels, the results showed that of the 59 respondents, the number of respondents who had low blood sugar levels was 35 respondents (59.3%), 17 respondents had normal blood sugar levels (28.8%) and those who had high blood sugar levels. high as many as 7 respondents (11.9%).
- f. The Odds Ratio (OR) value obtained is 20,100 with the lower limit being 3,024 while the upper limit is 134,094, meaning that high physical activity has 20 times the chance of low physical activity affecting blood sugar levels in diabetes mellitus patients. . The results of the statistical test showed that the p value = 0.001, meaning  $< \alpha$  (0.05), which shows that there is a relationship between physical activity and blood sugar levels in diabetes mellitus patients at the Eka Marlina Independent Doctor's Practice.

## Suggestion

It is hoped that health workers, especially nurses, can provide a level of knowledge by providing education to the patient's family about diabetes mellitus, the importance of the level of knowledge so that patients know about the disease they suffer from and to carry out physical activity every day so that serious complications cannot occur.

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