

# Physical Activity Level in Diabetes Mellitus Patients

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**Abstract.** Diabetes mellitus (DM) is a metabolic disorder of carbohydrates, proteins, and fats characterized by hyperglycemia, or increased blood glucose levels, resulting from abnormal insulin secretion or decreased insulin action (Buraerah, 2015). DM management encompasses four main pillars, one of which is physical exercise. Physical exercise is one of the pillars of DM management, serving to improve insulin sensitivity and maintain body health (WHO, 2015). Research This aims to find out the level of picture activity physical exercise in patients with diabetes mellitus. The type of research used was quantitative research using descriptive studies. The number of samples in this study was 55 respondents using a *total sampling technique*. The results of the study showed that physical exercise in patients with diabetes mellitus was mostly big do activities physique light as many as 22 respondents, activities physique currently as many as 26, and activities tall as many as 7 respondents.

**Keywords:** Physical Exercise, Diabetes Mellitus

## INTRODUCTION

Diabetes mellitus (DM) is a metabolic disorder of carbohydrates, proteins, and fats characterized by hyperglycemia, or elevated blood glucose levels, resulting from abnormal insulin secretion or decreased insulin action. Insulin is a hormone that regulates blood glucose levels. This metabolic disorder can lead to high blood sugar levels, known as hyperglycemia (Buraerah, 2015). According to data from the *International Diabetes Federation* (IDF), an estimated 463 million people suffered from diabetes in 2019, with 4.2 million deaths. The global mortality rate for diabetes reached 1.5 million in 2012, and in 2014, the prevalence of diabetes was estimated at 9% of the world's population (WHO, 2015). Indonesia, located in Southeast Asia, ranks third among seven regions worldwide, with a prevalence of 11.3% among people aged 20-79. Indonesia ranks seventh among ten countries, with

10.7 million sufferers. Indonesia is the only Southeast Asian country on the list, thus estimating Indonesia's significant contribution to the prevalence of diabetes in Southeast Asia (Ministry of Health, 2020). Based on the 2018 Central Java Provincial Health Profile, the prevalence of DM was 20.57%, occupying the second largest proportion of non-communicable diseases after hypertension and making it a priority to control non-communicable diseases in Central Java.

As for DM management encompasses four main pillars: diet planning, pharmacological therapy in the form of anti-diabetic drugs or insulin injections, education, and physical exercise. Physical exercise is one of the pillars of DM management, serving to improve insulin sensitivity and also to maintain body health. Glucose will be converted become energy on moment doing activities physique. Exercise physique causes insulin to increase so that blood sugar levels will decrease. In people who rarely exercise, no food substances enter the body burned but buried in the body as fat And sugar. If Insufficient insulin to convert glucose into energy will result in DM (Ministry of Health, 2010). Knowledge about DM, how to take medication, diet, complications, and emergency signs is necessary for sufferers and their families. So knowledge is very important in the process of controlling DM (Perkeni, 2015). Research conducted by Trisnadewi, et al. (2018) showed that as many as ( 77.5% ) families had good knowledge. about exercise physical, (0%) sufficient knowledge, and (22.5%) families who have insufficient knowledge about physical exercise. Based on the background description above, it was found that Still lack of knowledge family about exercise physique on patient diabetes mellitus. By Because That researchers interested do study about knowledge family about exercise physical in patients with diabetes mellitus.

## METHODS

Design study This use method *cross sectional* that measures variables dependent and variable independent in a way simultaneous or in time simultaneously . The sample in this study was 55 respondents using *purposive sampling technique* and data collection using questionnaires. *The International Physical Activity Quotient (IPAQ)* explains that human activity is classified into three levels, namely low, moderate, and high. And tall.

## RESULTS AND DISCUSSION

### A. RESULT

**Table 1.** Frequency Distribution of Respondents Based on Age (n=55)

| Age         | Frequency | Percentage (%) |
|-------------|-----------|----------------|
| 25-35 years | 7         | 12.7           |
| 36-46 years | 10        | 18.2           |
| 47-57 years | 22        | 40.0           |
| 58-70 years | 16        | 29.1           |
| Total       | 55        | 100            |

Based on Table 1 it is known that some of the big respondents be in range age 47-57 years old as many as 22 respondents (40.0%)

**Table 2.** Frequency Distribution of Respondents by Gender (n=55)

| Gender | Frequency | Percentage (%) |
|--------|-----------|----------------|
| Man    | 20        | 36.4           |
| Woman  | 35        | 63.6           |
| Total  | 55        | 100            |

Based on Table 2, it is known that some big respondents most gender 35 respondents (63.6%) were women.

**Table 3.** Frequency Distribution of Respondents Based on Occupation (n=55)

| Work          | Frequency | Percentage (%) |
|---------------|-----------|----------------|
| housewife     | 28        | 50.9           |
| Self-employed | 19        | 34.5           |
| civil servant | 8         | 14.5           |
| Total         | 55        | 100            |

Based on table 3 it is known that some of the big respondents with most jobs are housewives

Households ( housewives ) as many as 28 respondents (50.9%).

**Table 4.** Frequency Distribution of Respondents Based on Education (n=55)

| Education          | Frequency | Percentage (%) |
|--------------------|-----------|----------------|
| Elementary School  | 15        | 27.3           |
| Junior High School | 13        | 23.6           |
| Senior High School | 16        | 29.1           |
| Bachelor           | 11        | 20.0           |
| Total              | 55        | 100            |

Based on table 4 it is known that some of the big respondents 16 respondents (29.1%) were at high school level.

**Table 5.** Frequency Distribution of Respondents Based on Physical Exercise (n=55)

| Physical Exercise          | Frequency | Percentage (%) |
|----------------------------|-----------|----------------|
| High physical exercise     | 7         | 12.7           |
| Moderate physical exercise | 26        | 47.3           |
| Light physical exercise    | 22        | 40.0           |
| Total                      | 55        | 100            |

Based on table 5 it is known that part level of physical exercise of respondents is moderate physical exercise as many as 26 respondents (47.3%).

## B. DISCUSSION

### a. Age

Based on the results of this study, it was found that some big the age of the respondents is in the range 47-57 years old, 22 respondents (40.0%). At the age of 45 years to above , happened decline all function system body among others, the system immune , metabolic , endocrine , sexual and reproductive , gastrointestinal, muscle and nervous . Diseases degenerative start diagnosed , activity and quality life reduce consequence inability Good physique and very disturbed psyche . Research results this , in line with research ( Susanti et al., 2024), where results study show there is significant relationship between age with DM incident . And the majority respondents be in range aged 55-80 years (57.5%).

### b. Gender

Based on the research results , it was found that that Most of the respondents were female, as many as 35 respondents with a percentage of (63.6%). The hormones estrogen and progesterone have ability For improve insulin response in blood . When menopause occurs , then decreased insulin response Due to low estrogen and progesterone levels , diabetes is more common in women than in men. Women are at a significantly higher risk of developing diabetes. In terms of risk factors, women are at a higher risk of developing diabetes because, physically, they have a greater chance of increasing their body mass index (BMI). Monthly cycle syndrome ( *premenstrual syndrome* ) and post-menopause make the distribution of body fat easy to accumulate ( Kautzky -Willer et al., 2016 ).

## c. Work

Based on the research results, it was found that the highest level of employment was housewives, with 28 respondents (50.9%). This is in line with research conducted by Nurayati et al. (2017) where the majority of respondents not working after being diagnosed with DM so he does more activities at home such as sitting and watching television. Respondents who work as housewives whose daily work includes sweeping, cooking, cleaning the house and washing are included in moderate physical activity. Doing a physical activity as housewives, including doing physical activities, which can indirectly control Blood glucose levels. If someone's work does not involve enough physical activity, this will cause an increase in fat deposits and excess body weight, which can influence the occurrence of type 2 diabetes (Sumangkut, 2013).

## d. Education

Based on the research results, it was found that the highest level of education for respondents was high school, with 16 respondents (29.1%). High school level was included . category education middle class which is generally has give ability read, understand, and access information health with more Good compared to education basic. Ability the potential improve knowledge about factor risk of diabetes mellitus. Although Thus, the incidence of diabetes mellitus is not only influenced by the level education, but also by factors other like age, history family, obesity, activity physical, pattern eating, and metabolic conditions. Therefore that, although respondents own level relatively good education, diabetes mellitus remains can happen if factor risk other No can controlled. In line with Green and Kreuter's theory (2005) where education including in predisposition influencing factors, no only on knowledge only, but also influences attitudes, beliefs and behavior health somebody.

## e. Physical Exercise

The results of the study showed that the level of physical exercise of most respondents was big is moderate physical exercise as many as 26 respondents (47.3%). In line with research conducted by Permatasari, Rakhman, & Jannah (2025) showed that the majority of respondents did moderate physical exercise, as many as 31 respondents. (77.5%). Activity physique being done by the respondent like do work home and walking fast. Activity physique explained as movement body that comes from from muscle framework and utilize energy body. Activities physical activity performed covers all movement moment time leisure, transportation move to something places and activities work. Activities physique own function important in diabetes management, because with activity regular physical can help in management disease No infectious such as diabetes mellitus. Activity physical activity performed in a way regular will influential to level high blood sugar control (Kaunang et al, 2018).

Research result show as many as 22 respondents (40.0%) did activity light. Different with results research conducted by Alza, et al (2020), where part big respondents, as many as 66.7% of respondents do activity physique light. Respondent with activity light physique many have blood sugar levels fast No controlled, while those who are active physique currently own blood sugar levels controlled fasting. Activity physique light work done respondents like road relax and do work House stairs. Activities light physique tend show level glucose blood high fasting activity physical deficiencies risky in a way independent to disease chronic such as diabetes mellitus. Activity physical deficiencies impact on increasing level glucose blood. Activity physical deficiencies cause muscle No Work optimally so that excess energy within body will changed becomes visceral fat. When

activity physique occurs , muscles will influence controlled blood sugar levels . Muscles will use stored glucose in form glycogen so that glucose stored blood will decreased . DM sufferers who do not do activity physique will be optimal saved in the body in form sugar and fat. Sugar buildup will Keep going increase if insulin does not sufficient change glucose become energy.

Research results also show as many as 7 respondents (12.7%) did training high activity . Activity physique heavy is movement body that causes expenditure energy in amount big. The more heavy activity physical activity performed every day by someone , then the more low sugar levels in blood . Activities activity physical activity performed in a way routine namely 2-4 times a week in 30 minutes will improve glucose control in blood become good . Activity heavy physical will influence improvement use glucose in body by muscles so that synthesized endogenous glucose will increased to increase blood sugar levels blood still balance and body will compensate need high glucose . However activity heavy physical exertion in DM sufferers can cause risk significant blood sugar fluctuations. Research previously , that activity physique with intensity heavy more A little lower glucose than intensity moderate. This is caused by because occurrence improvement higher amounts of catecholamine and growth hormone hormones big than activity physique intensity heavy so that can increase blood sugar levels . DM sufferers who have too much insulin A little in circulation will releases excess counterinsulin hormone during activity physique heavy . This can increase level glucose and ketone bodies that have been high and deep long term trigger ketoacidosis diabetic . On the other hand , if high insulin levels Because administration of exogenous insulin , activity physique heavy can weaken or prevent improvement mobilization glucose or substrate other . Impact ongoing events that occur that is hypoglycemia.

## CONCLUSION

Based on the results of research on the description of physical exercise in diabetes mellitus patients using primary data obtained through questionnaires with a sample of 55 respondents, the following conclusions can be drawn: Based on the characteristics of the research results from 55 samples obtained, most were aged 47-57 years as many as 22 respondents (40.0%), the most gender was female as many as 35 respondents (63.6%), the most occupation was housewife as many as 28 respondents (50.9%), the most education was high school as many as 16 respondents (29.1%), the most physical exercise was moderate physical exercise as many as 26 respondents (47.3%).

## REFERENCES

- Alza , Y., Arsil , Y., Marlina , Y., Novita, L., Agustin, ND (2020). Activity Physical , Duration Diseases and Blood Sugar Levels in Type 2 Diabetes Mellitus (DM) Patients . <https://garuda.kemdiktisaintek.go.id/documents/detail/1821849>
- Buraerah, Hakim. (2015). Analysis of Type 2 Diabetes Mellitus Risk Factors at Tanrutedong Community Health Center, Sidenreg Rappan. National Scientific Journal Vol.1, No.5: 17-25.
- Fitriyani. Risk Factors for Type 2 Diabetes Mellitus at the Citangkil District Health Center and the Pulo Merak District Health Center, Cilegon City. Jakarta: Fkm UI; 2012.
- Green, L. W., & Kreuter, M. W. (2005). Health Program Planning: An Educational and Ecological Approach (4th ed.). McGraw-Hill.
- Kaunang, P, J, W., L, C., & Langi, LFG, F. (2018). The Relationship Between Physical Activity and the Incidence of Diabetes Mellitus in Outpatients at the Bitung City Regional General Hospital. Jurnal Kesmas, 7(5).
- Kautzky-Willer, A., Harreiter, J., & Pacini. 2016. Sex and gender differences in risk, pathophysiology and complications of type 2 diabetes mellitus. Endocrine reviews, 37(3), 278-316
- Ministry of Health of the Republic of Indonesia. (2020). Stay Productive, Prevent, and Treat Diabetes Mellitus. Infodatin, 1–6. <https://pusdatin.kemkes.go.id/folder/view/01/structurepublikasi-pusdatin-info-datin.html>
- Nurayati, L., & Adriani, M. (2017). The Relationship between Physical Activity and Fasting Blood Sugar Levels in Type 2 Diabetes Mellitus Patients, pp. 80–87: Faculty of Public Health, Airlangga University.

- Nursalam. (2017). *Nursing Science Research Methodology* (4th ed.). Jakarta: Salemba Medika.
- Permatasari, ED, Rakhman, A., Jannah, L. (2025) Activities Physical Examination in Type II Diabetes Mellitus Patients. <https://jurnal.stikespantiwaluya.ac.id/index.php/JPW/article/view/330/206>
- Petersmann, A., Nauck, M., Müller-Wieland, D., Kerner, W., Müller, U.A., Landgraf, R., Freckmann, G., & Heinemann, L. (2018). Definition, classification and diagnostics of diabetes mellitus. *Journal of Laboratory Medicine*, 42 (3), 73–79. <https://doi.org/10.1515/labmed-2018-0016>
- Previarsi, R., Nurhasanah, L., & Widiastuti, F. (2020). Overview of the Level of Knowledge About Diabetes Mellitus (DM) in Outpatients at West Cikarang Hospital. *Jurnal Ilmiah Kesehatan Medika Drg. Suherman*, 2 (1), 88–93. <https://jurnal.medikasuherman.ac.id/imds/index.php/JIKMDS/article/view/146>
- Riskesdas, K. (2020). Main Results of Basic Health Research (RISKESDAS) (file:///Users/serenaonasis/Downloads/infodatin-penglihatan.pdf, 2019)
- Ristanti, Atika. 2013. "The Relationship between Private Tutoring and Learning Outcomes" Siti, R. (2021). The Relationship Between Physical Activity and Blood Sugar Levels in Diabetes Mellitus Patients at the Karangmulya Community Health Center in 2021. 2020–2021.
- Sumangkut, Sartika, et al. The Relationship between Diet and the Incidence of Type-2 Diabetes Mellitus in the Internal Medicine Clinic of Prof. Dr. RD Kandou Manado Hospital. *Nursing Journal*. 2013;1(1):1–6.
- Susanti, N., Raniah, S., Agustin, AM, & Sari, NC (2024). The relationship between age and gender with the incidence of diabetes mellitus at the Stabat Community Health Center (UPT). *PREPOTIF: Journal of Public Health*, 8 (3), 6355–6361. <https://doi.org/10.31004/prepotif.v8i3.30437>
- Trisnawati. 2013. Risk Factors for Type 2 Diabetes Mellitus Incidence at the Cengkareng District Health Center, West Jakarta, *Scientific Journal of Health* Vol.5, No.1, [http://lp3m.thamrin.ac.id/upload/artikel%202.%20vol%205%20no%201\\_shara.pdf](http://lp3m.thamrin.ac.id/upload/artikel%202.%20vol%205%20no%201_shara.pdf), accessed June 21, 2014.
- WHO Global Report On Diabetes. France: World Health Organization; 2015.