

The Correlation between Blood Glucose Levels, Body Mass Index (BMI), and Age on Prolanis Patients in Baturraden Public Health Care Center II

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ABSTRACT

Health services through the chronic disease management program or Prolanis is a process to determine the health condition of patients with chronic diseases regularly, glucose being one of the parameters of the examination. Glucose levels are influenced by several factors, which are age and body mass index. This study aims to determine the relationship between blood glucose levels with body mass index and age in prolanis patients at Baturraden II Health Center. This type of research is a quantitative study with a cross sectional design using a total sampling technique and the GOD-PAP (Glucose Oxidase Para Amino Peroxidase) examination method on prolanis patients at Baturraden II Health Center. The research was carried out in April 2022 and obtained the results of the examination of blood glucose levels with an average of 133.30 mg/dl, the relationship between age and body mass index respectively to blood glucose levels was p value = 0.701 and p value = 0.211. So it can be concluded that there is no significant relationship between blood glucose levels with body mass index and age in prolanis patients at Baturraden II Health Center.

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1. Introduction

Health management activities are an effort to prevent unwanted things from decreasing a person's health condition. Health management consists of two characteristics, namely preventive and curative. Preventively it can be in the form of a chronic disease prevention program, then curatively it can be in the form of treatment, therapy, and surgery (Indrayani & Ronoatmojo, 2018).

The Chronic Disease Management Program (CDMP) is an international program carried out in every country. Singapore through this program focuses on 20 chronic diseases consisting of Diabetes Mellitus/Pre-diabetes, Hypertension, Hyperlipidemia (Lipid Disorders), Stroke, Asthma, Chronic Obstructive Pulmonary Disease (COPD), Schizophrenia, Severe Depression, Bipolar Disorder, Dementia, Osteoarthritis, Benign Prostatic Hyperplasia, Anxiety, Parkinson's Disease, Chronic Kidney Disease (Nephrosis/Nephritis), Epilepsy, Osteoporosis, Psoriasis, Rheumatoid Arthritis, and Ischemic Heart Disease (Apriadi et al., 2018).

Prolanis (Chronic Disease Management Program) in Indonesia is an activity that focuses on two health services, namely Hypertension and Diabetes Mellitus. Prolanis activities are held every month at the Community Health Center (Puskesmas). Hypertension and Diabetes Mellitus are influenced by several factors, namely gender, age, body mass index, diet, and lifestyle or body activities (Afrizal, 2018).

Blood glucose levels are an indicator in the process of managing diabetes mellitus. Glucose levels can be influenced by gender, age, and physical activity. A person's age is a unit of time that has elapsed since the beginning of birth. The more a person's age, the older they will be, and changes in body condition from young to old will affect blood glucose levels due to a decrease in body metabolism (Rudi & Kwureh, 2017).

Age affects a person's activity patterns so that it affects body weight. A person's weight can be a source of other health problems. Body mass index is a parameter that can be used to monitor a

person's weight for the activities carried out (Ewetumo et al., 2019).

Baturraden II Health Center is an agency located in Baturraden District, Banyumas Regency, prolanis activities at the agency have been running routinely for more than 10 years. Based on the above background, the author is interested in conducting a study on the relationship between blood glucose levels and body mass index and age in Prolanis patients at Baturraden II Health Center. The purpose of this study was to determine whether there was an effect of blood glucose levels with body mass index and age in prolanis patients at Baturraden II Public Health Center.

2. Method

The type of research is analytic observational with a cross sectional design, namely research design by measuring and observing at the same time or at one time which aims to determine blood glucose levels using the GOD-PAP method. This research was conducted from December 2021 – May 2022 at Baturraden II Health Center with a total sampling technique. The sample came from prolanis patients at Baturraden II Health Center, data analysis used the Two Way's Anova test. This research was carried out in accordance with the code of ethics issued by the Health Research Ethics Commission of the University of Muhammadiyah Purwokerto with Registration Number: KEPK/UMP/06/IV/2022.

3. Result and Discussion

Table 1

Results of the Homogeneity of Levene Test Data

Treatment	Levene Test		
	df1	df2	Sig
F	8	18	0.135

Source: Primary Data 2022

Data homogeneity test obtained information that the data to be tested from 2 different populations had similarities (homogeneous) (Solikhin et al., 2015), namely population age and body mass index. The data to be tested has similarities if ($p > 0.05$) and does not have similarities if ($p < 0.05$). Based on table 1, it is shown through the results of the homogeneity test with a value of sig = 0.135 ($p > 0.05$), so it can be concluded that the data is homogeneous and meets the requirements of the Two Way's Anova Test.

Table 2

Two Way's Anova Test Results

Factor Variable	Two Way's Anova	
	df	Sig
Age	27	0.701
Body mass index	27	0.211

Source: Primary Data 2022

The Two Way's Anova test was conducted to determine the relationship between groups that have been divided into two factor variables and the dependent group (Nurhayati, 2019). If the value (p value > 0.05) then there is no relationship between the two groups and the dependent group, and if (p value < 0.05) then there is a relationship between the two groups and the dependent group. Based on table 2, the age factor variable has a sig value = 0.701 ($p > 0.05$) and the body mass index factor variable has a sig = 0.211 ($p > 0.05$) value, so there can be no correlation between blood glucose levels during pregnancy. respondents with factor variables.

a. Discussion

Blood glucose levels can be influenced by several factors, namely a history of diabetes mellitus, age, gender, and physical activity. Physical activity is closely related to a person's age, when a person gets older, the activity will be more limited. This condition causes muscle mass to decrease and will have an impact on body mass index. The strongest factors that can affect a person's blood glucose levels are age and physical activity, this is in line with research conducted by Afrizal, (2018) that the older you get, the more decline in organ function will occur (Afrizal, 2018).

Researchers assume that glucose levels are influenced by physical activity and history of DM. This comes from the data from interviews in table 4.4 section doing sports, respondents with the

largest percentage are in rare and occasional intensity, then all respondents in table 4.5 history section of DM obtained information 100% of respondents have a history of DM. The overall measurement of respondents' glucose levels in table 4.2 obtained an average value of 133.30 mg/dl, in conditions when these levels had high values. Researchers only found similar facts from research conducted by Rudi & Kwureh, (2017) that a history of DM has a significant effect on blood glucose levels with a value of $= 0.025$. Physical activity which is thought to have an effect, it is found that the opposite fact is based on the results of research conducted by Nur, (2016) that the magnitude of the effect of body activity has a value of $= 0.771$ and exercise has a value of $= 0.799$ on blood glucose levels in DM patients (Rudi & Kwureh, 2007). 2017).

The researcher then tested the blood glucose level of the respondent by age and body mass index. The test was carried out using the Two Way's Anova test with factor variables such as age and body mass index. The results of these tests obtained information that the relationship between blood glucose levels with age resulted in a value of $= 0.701$, and the relationship between blood glucose levels and body mass index resulted in a value of $= 0.211$. This is in line with research conducted by Nur, (2016) which showed an insignificant relationship between blood glucose levels in DM patients with age ($= 0.121$) and body mass index ($= 0.232$) (Nur, 2016).

The condition of abnormal BMI or obesity does not necessarily affect the respondent's blood glucose level. The activity of hormones resulting from the secretion of the adrenal glands in the form of adrenaline and corticosteroids can trigger an increase in blood glucose levels because the body's need for glucose is increasing, and corticosteroids can reduce this need again. BMI can be used as a reference in determining a person's risk of contracting metabolic diseases (Sry et al., 2020).

BMI in theory should be able to have an influence on blood glucose levels because in a person with obesity conditions will cause the pancreatic cells to experience hypertrophy, namely an increase in demand due to the burden of glucose metabolism from the body's cells which has increased in number. This condition was not met because the average BMI of respondents in table 4.1 obtained a value of 25.90 ± 4.242 Kg/m² (Carabally et al., 2021).

The age of the respondents based on the results of research conducted by Rudi & Kwureh, (2017) showed a significant effect on current glucose levels with a large value of $= 0.013$. There is a division of age groups into two categories, namely < 45 years and > 45 years, while this study used respondents with a mean age of $62.41 \pm 7,968$ years. The non-variable age resulted in insignificant test results in this study.

Other unstudied factors that can have an influence on blood glucose levels in elderly patients are dietary compliance, drug consumption compliance, fat consumption, knowledge related to DM and family support or motivation (Sry et al., 2020).

Adherence to a person's diet is very influential in maintaining the stability of blood glucose levels. Adherence is also something that can develop a habit for sufferers to adhere to a diet schedule. Non-adherence to dietary therapy results in unstable blood glucose levels. Compliance with drug consumption in the form of anti-diabetic drugs can affect blood glucose levels. Compliance with taking anti-diabetic drugs can be the best choice for patients to control their blood glucose levels (Nanda et al., 2018).

Fat consumption is a factor that can affect blood glucose levels, after consuming fat there will be an increase in fatty acids. Fatty acids are transported to pancreatic cells assisted by fatty acid binding proteins. Fatty acids are converted to Co-A fatty acid derivatives in the cytosol and affect insulin secretion. Impaired insulin secretion will result in an imbalance of insulin levels in the body so that blood glucose levels become out of control (Adwinda & Srimiati, 2019).

Knowledge and family support are the last factors that can make glucose levels unstable. Knowledge gives birth to an objective view of a situation so that people will easily accept opinions without prioritizing a sense of ego. Family support is the main trigger for the birth of good knowledge, so that knowledge and family support are two interrelated factors. Both of these factors will affect the pattern of life both from the food consumed to the activities undertaken by a person (Bertalina & Purnama, 2016).

4. Conclusion

There is no effect between blood glucose levels with body mass index and age in prolanis patients at Baturraden II Health Center as evidenced by the sig value of the body mass index factor variable of 0.211 (p value > 0.05) and the sig value of the age factor variable of 0.701 (p value > 0.05). The suggestion from this study is that researchers should expand the age category of respondents and conduct research in months other than Ramadan.

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