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# EFFECT OF ERGONOMIC EXERCISE ON CHANGES IN BLOOD SUGAR LEVELS IN DIABETES MELLITUS PATIENTS IN THE IN PATIENT ROOM OF DR. ABDUL RIVAI BERAU DISTRICT

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**Abstract:** Physical activity utilizes and processes the body's calories in metabolism can help lower blood sugar levels. Ergonomic gymnastics is a well-tolerated physical activity in diabetes mellitus patients. Ergonomic exercise contributes to the utilization of body calories through physical activity to control blood sugar levels in the body. This study aims to determine the effect of ergonomic exercise on changes in blood sugar levels of Diabetes Mellitus patients in the Inpatient Room of RSUD dr. Abdul Rivai Berau District. This research is a type of correlational quantitative research by design *quasy-experiment* with approach *pre-post-test without control group design*. 20 research samples were taken randomly *quota sampling* in the inpatient room of dr. Abdul Rivai Berau District. Data analysis is done by *Independent t-test* with a significance level of 0.05. Research results found sufferer Diabetes Mellitus at dr. Abdul Rivai was dominated by men (60.0%), aged 35 to 45 years (100.0%), and graduated from high school (50.0). The patient's blood sugar level before the intervention averaged 347.00 mg/dL (st. Dev = 44.73) and after the intervention averaged 271.00 mg/dL (st. Dev = 59.46). There is a significant effect of ergonomic exercise on changes in blood sugar levels in diabetic patients (sig 0.001; correlation coefficient 0.896) so that ergonomic exercise interventions can make a very strong contribution to changes in blood sugar levels in patients with diabetes mellitus in the inpatient room of RSUD dr. Abdul Rivai.

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**Keywords:** Diabetes Mellitus Type II, Blood Sugar Levels, Ergonomics

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## 1. Introduction

Diabetes Mellitus is a non-communicable disease with a prevalence that continues to increase globally due to the health condition of the body being unable to control and control blood sugar levels resulting in prolonged or chronic hyperglycemia (PERKENI, 2015). In fact, diabetes mellitus is a global and national public health problem. This disease is caused by impaired insulin function, problems balancing blood sugar levels, abnormal pancreatic function, and accumulation of blood sugar levels in the liver (IDF, 2019). Diabetes Mellitus is a non-communicable disease which is one of the four priority health problems globally (Pusdatin Kemenkes RI, 2018).

Efforts to control Diabetes Mellitus consist of 5 pillars including: 1) health counseling, 2) diet management, 3) physical activity or exercise, 4) medication, and 5) routine health checks. However, until now, more people with Diabetes Mellitus have focused on fulfilling their diet and taking medication, even though physical activity is also an important factor for controlling blood sugar levels (Dian, 2020). This refers to the concept that physical activity utilizes and processes the body's calories in metabolism can help lower blood sugar levels. So that it is appropriate that

physical activity is not ignored by people with diabetes mellitus so that the balance of blood sugar levels in the body can be maintained in a balanced manner according to their needs.

The strategy for preventing and controlling non-communicable diseases such as diabetes mellitus is carried out by prioritizing promotive and preventive efforts at the community level (Ministry of Health RI, 2016). This is motivated by the increase in the number of people with Diabetes Mellitus which is more often caused by unhealthy lifestyles such as lack of activity and the habit of consuming fatty foods. In particular, the consumption of fatty foods is the main source of calorie accumulation which has the potential to cause obesity as a risk factor for diabetes mellitus. In addition, physical activity is also an important factor that should not be ruled out in controlling the body's blood sugar levels which can naturally burn the body's calories to prevent the accumulation of blood sugar levels (PERKENI, 2015).

Based on Dian's research (2020) it results that ergonomic exercise can potentially reduce blood sugar levels so it is suggested that nursing interventions through physical activity with ergonomic exercises can be carried out in patients with diabetes mellitus to control blood sugar levels in the body. However, this research was carried out without regard to bias or variable factors *confounding* such as treatment programs, dietary patterns, counseling and unhealthy lifestyles. Even though the bias due to health education interventions, diet management, and treatment programs can affect blood sugar levels in patients (Ariani, Nuraeni, & Supriyono, 2015).

Through ergonomic exercises, it is hoped that all the muscles of the body will move optimally so that blood sugar metabolism can occur during the process of burning calories. Physical exercise through ergonomic exercises can prevent and treat various diseases. Ergonomic exercise can also help improve blood circulation, so the risk of complications due to lack of blood circulation can be prevented through physical activity (Ariani et al., 2015).

Diabetes Mellitus patients in hospital care rooms still have to carry out daily activities during treatment (*activity daily living*) which can be done independently, with assistance, or in person *total care*. *Activity Daily Living* during treatment generally includes self-care activities consisting of the need to eat and drink, *toileting* and bathing, decorating and dressing, using communication tools, writing, managing economic/financial needs and so on. Apart from that, there are also mobility activities including sitting and getting up, changing positions, shifting or changing places, and so on (Ainur Rofik Islami, 2019). This activity is also a physical activity that can be done even within limitations so that you can maintain blood sugar levels within the normal value range and as needed.

Currently, Indonesia is ranked seventh in the country with the highest number of people with diabetes mellitus globally. Based on his estimates, it is estimated that in the age range of 20 to 79 years, 9.3% of the total global population or 463 million people currently experience Diabetes Mellitus. This figure is predicted to continue to increase in 2030 reaching 578 million people (10.2%) to 700 million people (10.9%) in 2045. Likewise with Indonesia, which until 2019 the number of cases of Diabetes Mellitus reached 10.7 million people (IDF, 2019).

Based on basic health research from the Balitbangkes (2018), an increase in the prevalence of Diabetes Mellitus from 2013 to 2018 was found in almost all provinces in Indonesia.

The prevalence of diabetes mellitus in 2013 was 1.5% and increased to 2.0% in 2018 where East Kalimantan Province was ranked 3rd for Diabetes Mellitus nationally with a prevalence of 3.1% (Balitbangkes, 2018). This data means that Diabetes Mellitus is a non-communicable disease that has become a trend among the public and has become a national and global health problem.

Data Profile of the District Health Office. Berau (2019) recorded the number of people with Diabetes Mellitus as many as 3,740 people during 2019. Visit data at the inpatient room of RSUD dr. Abdul Rivai during the last 6 months from June to November 2019 there were 59 cases of Diabetes Mellitus with 16 cases of Diabetes Mellitus as the main diagnosis and 43 cases as a secondary diagnosis. From these data, the diagnosis of Diabetes Mellitus is the second highest number of cases of care in the ICU, reaching a total of 31 cases of treatment during 2020. In general, the majority of nursing interventions for patients with Diabetes Mellitus are in the form of observation and health education while being treated in the treatment room. Based on the literature study, there was no ergonomic exercise intervention as one of the interventions applied to Diabetes Mellitus patients in the treatment room.

As *basic Evidence Based Practice* in the inpatient ward of dr. Abdul Rivai, studies on physical activity during the treatment period as one of the nursing interventions for people with Diabetes Mellitus have not been optimally carried out. Though some *literature review* provide suggestions that ergonomic exercise can be a solution in nursing interventions to maintain the balance of blood sugar levels in people with diabetes mellitus. In addition, the importance of further research related to ergonomic exercises in patients with diabetes mellitus needs to be carried out because the majority of people with diabetes mellitus often ignore the importance of tolerable physical activity so that there is a balance between consumption and glucose needs in the body. The expected impact is that through ergonomic exercises, it is possible to control blood sugar levels properly and independently as well as adaptive utilization of body glucose.

As the background has been described and based on the importance of further research on tolerated physical activity through ergonomic exercises in diabetes mellitus patients, the researcher is interested in conducting research on "Effect of Ergonomic Gymnastics on Changes in Blood Sugar Levels in Diabetes Mellitus Patients in the Inpatient Room of RSUD dr. Abdul Rivai, Berau Regency" as one of the *evidence-based practice* in nursing science and further research developments.

## **2. Materials and Methods**

This research was carried out for 2 (two) months, from April to May 2021, in the inpatient room of dr. Abdul Rivai Berau District. This research is planned using design *pre-experiment research* with approach *pre-post-test without control group design* because the research subjects could not be controlled for variables *confounding* or bully. The patient population in this study were patients who were hospitalized during the study period taken based on the average number of visits in one month, namely as many as 59 patients with diabetes mellitus with a primary diagnosis and Diabetes Mellitus as a secondary diagnosis and a sample of 20 were taken randomly. *quota sampling* in the inpatient room of dr. Abdul Rivai Berau District. Data collection

was carried out using an observation sheet by collecting data on blood sugar levels before and after treatment. Data analysis in this study was preceded by a data normality test with a test *Shapiro Wilk* because the sample data for this study amounted to <50 samples (20 respondents), then a test was carried out with *Independent t-test* with a significance level of 0.05.

### 3. Results and Discussion

#### 3.1 Results

##### 3.1.1 Demographic Characteristics of Diabetes Mellitus Patients in the Inpatient Room of RSUD dr. Abdul Rivai Berau District

Table 1. Demographic Characteristics of Diabetes Mellitus Patients in Inpatient Rooms RSUD dr. Abdul Rivai Berau District (n=20)

Variable	Amount	Presen
Gender		
- Man	12	60,0 %
- Woman	8	40,0 %
Age		
- 35 to 45 years	20	100,0 %
Last education		
- SD	2	10,0 %
- JUNIOR HIGH SCHOOL	3	15,0 %
- SMA	10	50,0 %
- Diploma/Masters	4	20,0 %
- Postgraduate	1	5,0 %
Work		
- Private	5	25,0 %
- TNI/POLRI/ASN	5	25,0 %
- Self-employed	5	25,0 %
- Others	5	25,0 %

Based on table 1 about the demographic characteristics of Diabetes Mellitus patients in the inpatient room of dr. Abdul Rivai, Berau Regency, it is known that the respondents in this study were dominated by male respondents (60.0%), all respondents were in the age range of 35 to 45 years (100.0%), their last education was dominated by high school (50.0 %), and all respondents were balanced on work history as a private sector, TNI/POLRI/ASN, self-employed, and others (25.0% each).

**3.1.2 Blood Sugar Levels of Patients with Diabetes Mellitus in Hospital Inpatient Room. dr. Abdul Rivai Berau District Before Ergonomic Exercise Intervention.**

**Table 2.** Blood Sugar Levels in Patients with Diabetes Mellitus in Hospital Inpatient Rooms. dr. Abdul Rivai Berau District Before Ergonomic Exercise Intervention (n=20)

<b>Variable</b>	<b>Min – Max</b>	<b>Mean</b>	<b>St. Dev</b>
Blood Sugar Pre Intervention Ergonomic Exercise	281,00 – 438,00	347,55	44,73

Based on table 2 regarding blood sugar levels of Diabetes Mellitus patients in the hospital ward. dr. Abdul Rivai, Berau Regency, before the ergonomic exercise intervention was carried out, was in the range of 281.00 mg/dL to 438.00 mg/dL. At this value, the average blood sugar level was 347.00 mg/dL (st.Dev = 44.73).

**3.1.3 Blood Sugar Levels in Patients with Diabetes Mellitus in the Inpatient Room of Dr. Abdul Rivai Hospital, Berau Regency After Ergonomic Exercise Intervention.**

**Table 3.** Blood Sugar Levels in Patients with Diabetes Mellitus in the Inpatient Room of RSUD dr. Abdul Rivai Berau District After Ergonomic Exercise Intervention (n=20)

<b>Variable</b>	<b>Min - Max</b>	<b>Mean</b>	<b>St. Dev</b>
Blood Sugar Post Ergonomic Exercise Intervention	176,00 – 400,00	271,05	59,46

Based on table 3 regarding blood sugar levels of Diabetes Mellitus patients in the inpatient room of RSUD dr. Abdul Rivai, Berau Regency, after the intervention of ergonomic exercises was in the range of 176.00 mg/dL to 400.00 mg/dL. At this value, the average blood sugar level was 271.00 mg/dL (st. Dev = 59.46).

**3.1.4 The Effect of Ergonomic Exercise on Changes in Blood Sugar Levels in Diabetes Mellitus Patients in the Inpatient Room of RSUD dr. Abdul Rivai Berau District**

**Table 4.** Test the normality of research sample data with *Sapphire-Wilk* (n=20)

<b>Variable</b>	<b>Statistics</b>	<b>df</b>	<b>Say</b>	<b>The knot</b>
GD For Test	0,964	20	0,630	Normally distributed
GD Post Test	0,928	20	0,143	Normally distributed

Based on table 4 as written, it is known that the significance value of the Pre Test Blood Sugar variable is 0.630 (p-value > 0.05; normal distribution) and the Post Test Blood Sugar variable is 0.143 (p-value > 0.05; normally distributed) . Based on this, the bivariate analysis was tested *paired sampel t-test* because all of the research variables are normally distributed.

**3.1.5 Bivariate test results in research using *testpaired sampel t-test* with the following results:**

**Table 5.** The Effect of Ergonomic Exercise on Changes in Blood Sugar Levels in Diabetes Mellitus Patients in the Inpatient Room of RSUD dr. Abdul Rivai Berau District (n=20)

<b>Data Group</b>	<b>Mean</b>	<b>Difference Means</b>	<b>Correlation coefficient</b>	<b>Sig. (Paired Sample)</b>
Pre Intervention Blood Sugar Levels	347,55			
Post Intervention Blood Sugar Levels	271,05	76,50	0,896	0,001

Based on table 5 regarding the results of bivariate analysis on the effect of ergonomic exercise on changes in blood sugar levels of Diabetes Mellitus patients in the inpatient room of dr. Abdul Rivai, Berau Regency, it is known that there was a change in the average value of blood sugar levels when from 347.55 mg/dL to 271.05 mg/dL. This change is a decrease in the average amount of 76.50 mg/dL. The bivariate test showed that the significance value obtained was 0.001 (p-value <0.05). This means that  $H_a$  in this study failed to be rejected, namely that there was a significant effect of ergonomic exercise on changes in blood sugar levels in patients with diabetes mellitus in the inpatient room of RSUD dr. Abdul Rivai.

**3.2 Discussion**

**3.2.1 Demographic Characteristics of Diabetes Mellitus Patients in the Inpatient Room of RSUD dr. Abdul Rivai Berau District**

The demographic characteristics of Diabetes Mellitus patients in the inpatient room of Dr. Abdul Rivai Hospital, Berau Regency, it is known that the respondents in this study were dominated by male sex (60.0%), all respondents were in the age range of 35 to 45 years (100.0%), last education was dominated by high school (50.0%), and all respondents were balanced in work history as private sector, TNI/POLRI/ASN, self-employed, and others (respectively each 25.0 %).

Based on estimated sufferers, it is estimated that in the age range of 20 to 79 years, of the total global population, there are 9.3% or a total of 463 million people currently experiencing Diabetes Mellitus. This figure is predictable will continue to increase in 2030 reaching 578 million people (10.2%) to 700 million people (10.9%) in 2045. Likewise with Indonesia, which until 2019 then the incidence of Diabetes Mellitus cases reached 10.7 million people (IDF, 2019). Based on basic health research from the Balitbangkes (2018), an increase in the prevalence of Diabetes Mellitus from 2013 to 2018 was found in almost all provinces in Indonesia. The prevalence of diabetes mellitus in 2013 was 1.5% and increasing to 2.0% in 2018 where East Kalimantan Province is ranked 3rd for Diabetes Mellitus nationally with a prevalence of 3.1% (Balitbangkes,

2018). These data mean that Diabetes Mellitus is a non-communicable disease *trend* in society and has become a health problem nationally and globally

Based on the results of this study, sufferers of Diabetes Mellitus are dominated by the male gender. This is contrary to the results of basic health research which states that the prevalence of women dominates by 1.8% compared to men which is only 1.2%. In addition, the age range of people with Diabetes Mellitus begins to increase between the ages of 35 to 44 years (Balitbangkes, 2018). This is in line with the results of this study, where all respondents in this study had an age range of 35 to 45 years (100.0%).

Patients with diabetes mellitus have a prevalence of 1.6% with a history of high school education and the highest is 2.8% with a history of tertiary education. Data Basic health research from the Balitbangkes (2018) also explains that PNS/TNI/POLRI have the highest prevalence of 4.2% suffering from Diabetes Mellitus.

In accordance with the results of data analysis on the demographic characteristics of Diabetes Mellitus patients in the inpatient room of dr. Abdul Rivai, Berau District, in this study is relevant to the results of basic health research by Balitbangkes (2018), even though the gender in this study is more dominated by male sex. In this study it was only carried out over a period of 2 months, namely during March and April 2020, where the number of patients used was the condition of visits to the inpatient unit which could not represent the gender distribution of diabetes mellitus sufferers at the Berau district level to the national level. So this is reasonable, even though the male sex dominates, it cannot represent the results regionally or nationally.

Diabetes Mellitus patients in this study were all in the age range of 35 to 45 years, which at this age is the initial range for the increase in the incidence of Diabetes Mellitus nationally with a prevalence of 1.1% (Balitbangkes, 2018). In addition, PERKENI (2015) also stated that 10.9% of the population aged  $\geq 15$  years suffered from Diabetes Mellitus based on blood tests. This pattern of occurrence can be attempted by controlling it through dietary adjustments (80.2%), exercise or physical activity (48.1%), and herbal alternatives (35.7%) (Balitbangkes, 2018).

### **3.2.2 Blood Sugar Levels of Patients with Diabetes Mellitus in Hospital Inpatient Room. dr. Abdul Rivai Berau District Before Ergonomic Exercise Intervention.**

The results of research on blood sugar levels in Diabetes Mellitus patients in the hospital ward. dr. Abdul Rivai, Berau Regency, before the ergonomic exercise intervention was carried out, it was in the range of 281.00 mg/dL to 438.00 mg/dL. At this value, the average blood sugar level was 347.00 mg/dL (st. Dev = 44.73). Data on blood sugar levels in this study were samples of blood sugar levels while belonging to the criteria for hyperglycemia and fulfilling the diagnostic requirements for Diabetes Mellitus because the blood sugar level values during blood sugar levels were  $\geq 200$  mg/dL.

The research was carried out for 2 months, where the average blood sugar level before the ergonomic exercise intervention was taken no later than 2 days since the patient first entered the inpatient room. The blood sugar level figure is the initial assessment of the value that will be used

as an initial reference to indicate whether there is a change or not when compared to the measurement results after the ergonomic exercise intervention.

Blood sugar sampling for all patients was carried out in a single technique using a blood sugar stick which was carried out directly and independently by the researcher. The act of sampling is preceded by *informed consent* as evidence of responsibility and accountability for the procedure to the patient. In addition, during the initial examination, it was also explained about the research procedure as a condition for the patient's willingness to agree or not agree to be a research respondent.

The strategy for preventing and controlling the non-communicable disease diabetes mellitus is carried out by prioritizing promotive and preventive efforts at the community level (Ministry of Health RI, 2016). This is motivated by the increase in the number of people with Diabetes Mellitus which is more often caused by unhealthy lifestyles such as lack of activity. Physical activity is also an important factor that should not be ruled out in controlling the body's blood sugar levels which can naturally burn calories body to prevent the accumulation of blood sugar levels (PERKENI, 2015)

Diabetes Mellitus patient in the inpatient room of RSUD dr. Abdul Rivai, Berau Regency basically still has to carry out daily activities during treatment (*activity daily living*). These activities can be carried out independently, with the help of nurses, or independently *total care* facilitated by nurses according to their needs and abilities. In general, the patient's activity during the period care consists of self-care including eating and drinking, *toileting* and bathing, decorating and dressing, using communication tools, writing, managing economic/financial needs and so on.

As with the univariate analysis on the results of this study, patients had not received interventions in the form of ergonomic exercises, so in general gymnastic activities or activities regulated through activities to maintain energy utilization had also not been carried out as a form of nursing intervention. If you look at the average value of blood sugar levels which is 347.00 mg/dL (> 200 mg/dL), then in general these blood sugar levels greatly exceed normal limits and need to be reduced through several nursing interventions that can be tolerated by patients.

### **3.2.3 Blood Sugar Levels of Patients with Diabetes Mellitus in Hospital Inpatient Room. dr. Abdul Rivai, Berau District After Ergonomic Exercise Intervention.**

Univariate analysis as the third objective of this study was the analysis of blood sugar levels in Diabetes Mellitus patients in the hospital ward. dr. Abdul Rivai, Berau District, after the intervention of ergonomic exercise. The results showed that the blood sugar levels of Diabetes Mellitus patients after the ergonomic exercise intervention ranged from 176.00 mg/dL to 400.00 mg/dL. At this value, the average blood sugar level was 271.00 mg/dL (st. Dev = 59.46).

Movements performed during ergonomic exercises function to increase the effectiveness of heart function, muscle strength, increase organ function, cure spinal diseases, increase immunity, cure asthma and sinusitis, reduce blood sugar levels and reduce blood pressure (Dian, 2020). The implementation of ergonomic exercises is carried out in a combination of breathing and muscle movement which has a relaxing effect on the patient who does it.



Ergonomic exercise intervention in this study was carried out after the patient agreed and was willing to be a research respondent followed by measuring initial blood sugar levels which was carried out a maximum of 2 days after the patient entered the hospital or entered the inpatient room. Researchers assisted the implementation of ergonomic exercises for patients which were carried out 3 times consecutively during the treatment period.

The implementation of ergonomic exercises is carried out sequentially during the patient's treatment period in the inpatient room. For example on H1 the implementation of the first ergonomic exercise intervention, then the next intervention will be carried out on H2 and continued with the third intervention on H3. On the 3rd day (D3), after 2 hours after the last ergonomic exercise intervention, the researcher measured blood sugar levels again, which is called Post Intervention blood sugar levels. This value of blood sugar levels is the subject of discussion in this discussion.

Sampling of post-intervention blood sugar levels was carried out using the same procedure as pre-intervention blood sugar levels. The procedure is still carried out independently by the researcher using the same operational standards and tools so that the accuracy of pre- and post-intervention measurements can be considered to have the same standard. In general, the average value of blood sugar levels in Diabetes Mellitus patients in the hospital ward. dr. Abdul Rivai after the ergonomic exercise intervention was still relatively high, which was 271.00 mg/dL. This criterion is still classified as hyperglycemia and fulfills the requirements in establishing the diagnosis of Diabetes Mellitus (PERKENI, 2015).

During the procedure for carrying out ergonomic exercises, the researcher provides monitoring to the patient so that he does not force it and puts more emphasis on adjusting his abilities and relaxation during the implementation process. However, basically all patients during the ergonomic exercise period can utilize their energy well, even all patients sweat but not in large volumes.

The implementation of ergonomic exercises is carried out in accordance with the SOP in the patient's inpatient setting while maintaining the patient's privacy. The activity was carried out as a nursing intervention and documentation was carried out in the nursing care process for patients while being treated in the inpatient room of dr. Abdul Rivai. Although in general the average blood sugar level is still in the criteria of hyperglycemia, the resulting average value has a lower difference than the average blood sugar level before the ergonomic exercise intervention.

#### **3.2.4 The Effect of Ergonomic Exercise on Changes in Patient's Blood Sugar Levels**

The results of the bivariate analysis in this study resulted in a change in the average value of blood sugar levels at any time from 347.55 mg/dL to 271.05 mg/dL. This change means a decrease of an average of 76.50 mg/dL. This analysis strengthens the results of the univariate test in the previous discussion, where in fact in this bivariate analysis it was proven that there was a decrease in the average blood sugar level after the ergonomic exercise intervention.

Identifying further, the results of the bivariate test showed that the significance value obtained was 0.001 (p-value <0.05), which means that there was a significant effect of ergonomic

exercise on changes in blood sugar levels in diabetes mellitus patients in the inpatient room of RSUD dr. Abdul Rivai. This significance value reinforces that a decrease in the average value of blood sugar levels of 76.50 mg/dL is a good effect of the ergonomic exercise intervention performed on Diabetes Mellitus patients.

The results of this study are in line with and relevant to previous research conducted by Ariani et al. (2015); Jerau and Arif (2016) stated that ergonomic exercise interventions function to reduce blood sugar levels. In fact, in their research, Jerau and Arif (2016) stated that ergonomic exercise has better effectiveness than the intervention of diabetic foot exercise. However, in both studies it was explained that confounding factors such as diet, therapy, gender, and other physical activity can also manifest in the decrease in blood sugar levels that occur.

This study uses a ratio data scale so that it has a better level of analysis than when using an ordinal or nominal variable measuring scale. The resulting data according to the results of this study are values *real* blood sugar levels in units of mg/dL using the same test equipment used for measurements prior to the ergonomic exercise intervention. Value *usereal* This is a good step compared to categorizing ordinal values on several blood sugar levels. The reason is that the difference of even one point in the value of blood sugar levels before and after the ergonomic exercise intervention has a significant value.

Basically, adaptive physical activity functions to help reduce insulin retention so that insulin levels are utilized by the body in good condition. In addition, through physical activity can also utilize carbohydrates so that fat burning occurs and reduce the risk of obesity. Through physical activity as described, it can potentially reduce the risk of diabetes mellitus (RI Ministry of Health, 2019). Easily through physical activity, excess blood sugar levels in the body are utilized in the form of energy breakdown through muscle activity so that it has the potential to reduce the accumulation of excess levels and return to numbers close to normal even to normal.

Even though this concept is theoretically the correct rationalization, the physical ability factor of Diabetes Mellitus patients needs to be given special attention so that things that are cold do not happen during the treatment period with physical activity interventions. In this case what is meant by physical activity is ergonomic gymnastics with the principle of paying attention to the patient's physical abilities and seeking more relaxation so that the patient feels comfortable during the treatment period.

Identifying in more depth regarding the magnitude of the correlation coefficient value which is the value of the effectiveness of ergonomic exercise interventions also needs to be discussed in this study. The correlation coefficient value illustrates the effectiveness of the effect of ergonomic exercise on changes in the value of blood sugar levels before and after the ergonomic exercise intervention is 0.896. Referring to Sutopo and Slamet (2017), this value has a very strong influence (in the range of 0.80 to 1.00). This means that the intervention of ergonomic exercise makes a very strong contribution to changes in blood sugar levels in patients with diabetes mellitus in the inpatient room of dr. Abdul Rivai.

Ergonomics exercises are carried out with a duration of about 20 minutes for 2 to 3 times a week with perfect body movements. Ergonomic exercises can be done by anyone with

movements resembling prayer movements that can be tolerated even into old age. The implementation of this exercise is carried out with a combination of breathing movements and muscle movements so that it also has the potential to have a positive impact in the form of relaxation (Andri et al., 2019).

Ergonomics exercise begins with a warm-up, followed by stretching, core exercises, and ends with a cool-down and re-stretching. Before, during and after the implementation of gymnastics it is advisable to drink so that it can provide a fluid supply for the family due to gymnastic activities. An important aspect to consider in ergonomics is the chemical and mechanical response due to skeletal muscle contraction. The occurrence of a mechanical response in ergonomic exercise takes place when the muscles contract and relax which results in optimal blood circulation and increases body oxygenation (Andri et al., 2019).

According to Wratsongko (2010) as a pioneer of ergonomic exercise, the benefits of ergonomic exercise are balancing and stretching the body so that it returns to a relaxed state. In principle, ergonomic exercises have benefits for: 1) improving circulation and blood circulation in the body, 2) reducing tense muscles or providing relaxation, 3) reducing anxiety, fatigue, and stress, 4) providing improvements in mental alertness, 5) reducing risk of injury to the body, and 6) providing freshness or refreshment to the body.

Based on the results of this study, the contribution of ergonomic gymnastics has an impact on significant changes in blood sugar levels, so nursing interventions for physical activity through ergonomic gymnastics need to be implemented. The principles that need to be considered are the patient's physical abilities and the principle of relaxation so that in addition to utilizing positive energy, ergonomic exercise as a nursing intervention can also provide comfort and reduce stressors during the treatment period.

#### **4. Conclusion**

The development of nursing through promotive and preventive efforts without neglecting curative and rehabilitative efforts at the individual to community level needs to be improved. This is in accordance with the government's strategy in dealing with non-communicable diseases, especially Diabetes Mellitus

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