



## Related factors with Diabetes Mellitus type II events at posyandu lansia of Puskesmas Pisang Baru Subdistrict Bumi Agung District Way Kanan

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### ABSTRACT

Elderly experience a lot of decline in both physical and mental function, one of the degenerative diseases that become an important problem in elderly is diabetes mellitus (DM) where the type of DM in the elderly is generally DM type II number of elderly as many as 100,390 people and recorded that suffered diabetes mellitus of 1,614 inhabitants (Right Way Health Office, 2017). This study aims to determine the relationship between obesity, physical activity, age with the incidence of type II Diabetes Mellitus in participants in Posyandu elderly working area of PisangBaruPuskesmas, the type of research using quantitative research with cross sectional approach, the population is all elderly in the work area of Pisangmas Baru Bumi Agung District, Way Kanan District in 2018 amounted to 358 people and sampled as many as 189 elderly by accidental sampling. The analysis used chi-square test ( $\alpha = 0,05$ ). The result of the research was obtained: IMT variable p-value = 0,001, physical activity variable p-value = 0,001, age p-value = 0,001, so it was concluded that there was a significant correlation between obesity, physical activity and age with type II diabetes mellitus work Puskesmas Pisang Baru Sub District Bumi Agung District Way Kanan in 2018. Suggestion that writer ask is: to improve quality and performance of health officer in implementation of poyandu elderly with posyandu routine every month, weekly elderly gymnastics once and once monthly, socialization of nutrition menu balance for elderly accompanied with nutrition consultation for patient of diabetes mellitus.

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#### Kata kunci:

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### ABSTRAK

Lansia mengalami banyak penurunan fungsi baik fisik dan mental, salah satu penyakit degeneratif yang menjadi masalah penting pada lansia adalah diabetes mellitus (DM) dimana jenis DM pada lansia umumnya adalah DM tipe II Total Lansia sebanyak 100.390 jiwa dan dicatat yang menderita diabetes mellitus sebesar 1.614 jiwa ( Dinkes Way Kanan, 2017). Penelitian ini bertujuan untuk mengetahui hubungan antara indeks masa tubuh, aktivitas fisik, usia dengan kejadian Diabetes Millitus tipe II pada peserta di posyandu lansia wilayah kerja Puskesmas Pisang Baru, jenis penelitian menggunakan penelitian kuantitatif dengan pendekatan cross sectional, populasinya adalah seluruh lansia dalam wilayah kerja Puskesmas Pisang Baru Kecamatan Bumi Agung Kabupaten Way Kanan tahun 2018 berTotal 358 orang dan diambil sampel sebanyak 189 lansia dengan cara accidental sampling. Analisis penelitian menggunakan uji chi square ( $\alpha=0,05$ ). Hasil penelitian diperoleh: variable IMT p-value= 0,001, variable aktifitas fisik p-value = 0,001, variable usia p-value = 0,001, sehingga disimpulkan ada hubungan yang bermakna antara obesitas, aktivitas fisik, dan usia dengan kejadian diabetes mellitus tipe II wilayah kerja Puskesmas Pisang Baru

Kecamatan Bumi Agung Kabupaten Way Kanan tahun 2018. Saran yang penulis ajukan adalah: meningkatkan mutu dan kinerja petugas kesehatan dalam pelaksanaan poyandu Lansia dengan posyandu rutin setiap bulan, senam lansia 1 minggu sekali dan pemeriksaan rutin 1 bulan sekali, sosialisasi menu gizi seimbang untuk lansia disertai dengan konsultasi gizi untuk penderita diabetes mellitus

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## INTRODUCTION

Increasing Life Expectancy is an indicator of successful development in the health sector. The target of the Ministry of Health's 2010-2014 strategic plan is to increase life expectancy from 70.7 to 72 years. According to the results of the 2000 National Susenas, the number of elderly people was 14.4 million people or 7.18% of the total population, while in 2010 the number of elderly people had reached 19 million people or around 8.5% of the population. This shows an increase in the number of elderly people and is projected to increase so that it is estimated that in 2020 there will be 28.8 million people..

An increase in the number of elderly people will cause various complex problems for the elderly, families and communities including physical, biological, mental aspects that can affect and socio-economic. Along with these problems will affect food intake which can ultimately affect nutritional status. Non-communicable diseases based on RISKESDAS in 2013 the prevalence of Diabetes Mellitus showed an increase from 1.1% (2007) to 2.1% (2013). Lampung Province has an elderly population which continues to increase every year, in 2015 there were 1,812,137 elderly people or 22.3% of the total population of 8,117,268 people. With the number of Diabetes Mellitus sufferers in 2017 amounting to 69,282 people. The increasing elderly population certainly requires attention in the form of health service programs such as the elderly Posyandu.

According to WHO, elderly are those aged more than or equal to 60 years. Some of the problems that are often found in the elderly include: malnutrition, chronic disease, and decreased cognitive function. Way Kanan Regency is one of the regencies in Lampung Province with a population based on BPS data of 432,914 people with the number of elderly aged  $\geq 45$  years of 100,390 people (23%). Based on data from the Profile of the Way Kanan District Health Office in 2017, the coverage of elderly health services aged  $\geq 45$  years in Way Kanan District was 11,902 people with a percentage of 12% of the number of elderly as many as 100,390 people and 1,614 people with Diabetes Mellitus were recorded (Way Kanan Health Office, 2017).

Elderly data at the elderly Posyandu in the working area of the Pisang Baru Health Center in the period January-October 2017 shows that of the total number of elderly registered at the Pisang Baru Health Center, there were 936 with details of pre-elderly aged 45-59 with a total of 442 people with an average the presence of 118 people, elderly aged between 60-69 with a total of 301 people. There were 26 cases of diabetes mellitus at the Pisang Baru Health Center and ranked second in the top 10 most common diseases at the Pisang Baru Health Center UPT. As for what is meant by diabetes mellitus is a chronic disease characterized by blood glucose levels that exceed normal (fasting blood sugar  $\geq 126$  gr/dl and/or blood sugar when above 200 gr/dl). Based on the above data and the high incidence of type II diabetes mellitus at the Pisang Baru Health Center and taking

into account the research variables that might be carried out according to local conditions, the researchers wanted to conduct a study entitled: "Factors associated with the incidence of type II diabetes mellitus in elderly posyandu participants in the working area of the Posyandu Pisang Baru"

## METHODOLOGY

This type of research is quantitative, quantitative research is a method used to investigate objects that can be measured with numbers, so that the symptoms studied can be studied/measured using scales, indices or tables, all of which are more numerous. using exact science. This research was conducted on 10 - 25 February 2018 in the working area of the UPT Pisang Baru Health Center, Bumi Agung District, Way Kanan Regency. The population in this study were all elderly aged  $\geq 45$  years in the working area of the UPT Pisang Baru Health Center, Bumi Agung District, Way Kanan Regency in 2018, totaling 358 elderly people. The sample for this study was taken from an elderly population aged  $\geq 45$  years who were in the working area of the UPT Pisang Baru Health Center and met the inclusion criteria and were selected as the sample. By calculating the sample size from Slovin (in Notoatmodjo, 2010) for populations under 10,000 using the following formula:

$$n = \frac{N}{1 + Ne^2}$$

Keterangan :

- $n$  : Sample Total
- $N$  : Population Total
- $e$  : fault tolerance limit (*error tolerance*)

To use this formula, first determine what the error tolerance limit is. This fault tolerance limit is expressed as a percentage. The smaller the error tolerance, the more accurately the sample represents the population. For example, research with a 5% margin of error means that it has an accuracy rate of 95%. Research with a 2% margin of error has an accuracy rate of 98%. With the same population size, the smaller the error tolerance, the larger the required sample size.

This study uses an error tolerance limit of 5%, with an accuracy rate of 95%, so it is obtained:

$$\begin{aligned} n &= 358 \text{ (posyandu participant )} \\ &= \frac{358}{1 + (358 \times (0.05 \times 0.05))} \\ &= 358 \text{ (elderly)} \\ &= \frac{358}{1 + (0,895)} \\ &= 188,9 = 189 \text{ Sampel} \end{aligned}$$

In this study the sampling technique used accidental random sampling technique. That is, the sample is taken in a way that whoever came first is taken as a sample until the number of samples meets the target. In the working area of the UPT Pisang Baru Health Center, there are 5 villages/villages consisting of 10 posyandu. To obtain a sample from each posyandu in the village, it is carried out based on the distribution of the elderly population as follows:

**Table 1. Sample of elderly working area of UPT Pisang Baru Health Center, Bumi Agung District, Way Kanan Regency**

Nama Kampung	Sample Total	Sample Total	Posyandu Total
Srinumpi	24	14	1
Pisang Baru	122	64	3
Pisang Indah	78	41	2
Sukamaju	50	26	2
Wonoharjo	84	44	2
Total	358	189	10

The sample criteria in this study are as follows:

1. Inclusion Criteria
  - a. Elderly aged  $\geq 45$  years, elderly Posyandu participants.
  - b. Bersedia menjadi responden dan dapat berkomunikasi dengan baik.
  - c. Respondents were in the working area of the puskesmas at the time of the study.
2. Exclusion Criteria
  - a. Respondents who experience mental disorders, senile dementia, hearing loss, and other organ function disorders.
  - b. The respondent was sick and could not be interviewed.
  - c. Respondents did not come to the elderly posyandu

## RESULTS AND DISCUSSION

### a. Univariate analysis

**Table 2. Frequency Distribution of Type II Diabetes Mellitus in Elderly Posyandu Participants in the Working Area of UPT Pisang Baru Health Center, Bumi Agung District, Way Kanan Regency**

Type II DM Incident	Frequency	Percentage
Do not have Type II DM	107	56,6
Have Type II Dm	82	43,3
Total	189	100

**Table 3. Frequency Distribution of Body Mass Index in Elderly Posyandu Participants in the Working Area of UPT Pisang Baru Health Center, Bumi Agung District, Way Kanan Regency**

BMI Status	Frequency	Percentage
Normal	112	59,3
Obese	77	40,7
Total	189	100

**Table 4. Frequency Distribution of Physical Activity for Elderly Posyandu Participants in the Working Area of UPT Pisang Baru Health Center, Bumi Agung District, Way Kanan Regency**

Physical Activity	Frequency	Percentage
No Physical Activity	113	59,8
Do Physical Activity	76	40,2
Total	189	100

**Table 5. Age Frequency Distribution of Elderly Posyandu Participants in the Working Area of UPT Pisang Baru Health Center, Bumi Agung District, Way Kanan Regency**

Usia	Frequency	Percentage
45- 59 years old	107	56,6
> 60 years old	82	43,4
Total	189	100

### b. Bivariate Analysis

**Table 6. The Relationship between Body Mass Index and the Incidence of Type II Diabetes Mellitus in Elderly Posyandu Participants in the Working Area of the UPT Pisang Baru Health Center, Bumi Agung District, Way Kanan Regency**

Variabel	Type II DM Incident				Total	
	No DM Type II		Have DM Tipe II		N	%
BMI	N	%	N	%		
Normal	82	73,2	30	26,8	112	56,6
Obese	25	32,5	52	67,5	77	43,4
Total	107	56,6	82	43,4	189	100
<b>OR 95 % CI</b>				5.685 ( 3.015 – 10.772)		
<b>P Value</b>				0,001		

Based on table 6 above, it is known that there were 73.2% of respondents with a normal body mass index who did not suffer from diabetes mellitus, while as many as 67.5% of the elderly with an obese body mass index (BMI) suffered from diabetes mellitus. The results of the statistical test obtained a p value of 0.001 (smaller than the alpha value = 0.05) which means H0 was rejected so it was concluded that there was a significant relationship between body mass index and the

incidence of type II diabetes mellitus in elderly posyandu participants in the work area of the Pisang Health Center UPT Baru District of Bumi Agung, Way Kanan Regency in 2018. From the results of the analysis, the value of OR = 5.685 was also obtained, which means that the elderly with an obese body mass index have a 5.685 times greater chance of developing type II diabetes mellitus than the elderly with a normal body mass index

**Table 7. The Relationship between Physical Activity and Type II Diabetes Mellitus in Elderly Posyandu Participants in the Working Area of the UPT Pisang Baru Health Center, Bumi Agung District, Way Kanan Regency**

Variable	Type II DM Incident				Total	
	No DM Type II		Have DM Type II		N	%
Physical Activity	N	%	N	%		
Physical Activity	84	74,3	29	25,7	113	59,8
No Physical Activity	23	32,5	53	69,7	76	40,2
Total	107	56,6	82	43,3	189	100
<b>OR 95 % CI</b>				6.675 ( 3.497 – 12.738)		
<b>P Value</b>				0,001		

Based on table 7 above, it is known that there were 74.3% of respondents who did physical activity did not suffer from diabetes mellitus, while as many as 69.7% of respondents who did not carry out physical activity suffered from type II diabetes mellitus. The results of the statistical test obtained a p value of 0.001 (smaller than the alpha value = 0.05) which means H0 was rejected so it was concluded that there was a significant relationship between physical activity and the

incidence of diabetes mellitus in elderly posyandu participants in the working area of the Pisang Baru Health Center, Bumi Agung District Way Kanan Regency in 2018. From the results of the analysis, OR = 6.675 was also obtained. Which means that the elderly who do not carry out daily activities have a 6.675 times greater chance of suffering from type II diabetes mellitus compared to the elderly who do physical activity.

**Table 8. Relationship between Age and Type II Diabetes Mellitus in Elderly Posyandu Participants in the Working Area of UPT Pisang Baru Health Center, Bumi Agung District, Way Kanan Regency**

Variable	Type II DM Incident				Total	
	No DM Type II		Have DM Type II		N	%
Age	N	%	N	%		
45-59 Years Old	76	71,0	31	29,0	107	56,6
> 60 Years Old	31	37,8	47	62,2	82	43,4
Total	107	56,6	43,3	57,1	189	100
<b>OR 95 % CI</b>				4.033 ( 2.189 – 7.433)		
<b>P Value</b>				0,001		

ased on table 8 above, it is known that there were 71.0% of respondents aged 45-59 years who did not suffer from diabetes mellitus and as many as 62.2% of the elderly in the elderly Posyandu aged > 60 years had diabetes mellitus. The results of the statistical test obtained a p value of 0.001 (smaller than the alpha value = 0.05) which means H0 was rejected so it was concluded that there was a significant relationship between age and the incidence of type II diabetes mellitus in elderly posyandu participants in the working area of the Pisang Baru Health Center, Bumi District Agung Way Kanan Regency in 2018. From the results of the analysis, the value of OR = 4,033 was also obtained, which means that the elderly > 60 years have a 4.033 times greater chance of suffering from type II diabetes mellitus compared to the elderly aged 45-59 years..

In the opinion of researchers, the level of body mass index in the elderly at the elderly Posyandu greatly influences blood sugar levels, so it is necessary to socialize diets for DM sufferers, healthy food menus for the elderly to prevent diabetes cases and need routine checks for at least 1 month to control blood sugar in diabetics mellitus.

**2. The relationship between physical activity and the incidence of diabetes mellitus**

From the results of the research above in table 7 shows that there are 76 respondents who do not carry out physical activity, and 53 respondents who suffer from diabetes (69.7%). This decrease in physical activity can be caused because the elderly are no longer working and there is a decrease in physical condition. body due to the aging process such as the process of decreasing musculoskeletal function which can result in immobility in the elderly.

Meanwhile, according to the theory (Bazzano, 2005) DM type II can be controlled or prevented through a healthy lifestyle such as healthy food and regular physical activity. Physical activity is thought to increase the elimination of glucose stimulated by insulin at a set insulin dose. In addition People who are physically trained may experience a smaller increase in plasma insulin concentrations in response to a glucose load than people who lead sedentary lifestyles.

Shara Kurnia Trisnawati's research (2012) states that there is a significant relationship between the incidence of diabetes mellitus and physical activity at the Cengkareng Health Center, West Jakarta, with the result *p-value* = 0.038.

In the opinion of researchers, increasing blood sugar can be prevented by doing physical activity, one of which is light exercise in the elderly. With regular physical activity it is hoped that it can help burn fat in the body so that it can

**c. Study**

**1. The relationship between body mass index (BMI) and the incidence of diabetes mellitus**

The results of the study in table 6 above show that 82 respondents (73.2%) of elderly people with normal BMI do not suffer from diabetes mellitus, while 82 respondents (67.5%) of respondents who are obese suffer from diabetes mellitus.

According to the theory that obesity causes a decrease in the number of insulin receptors that can work inside cells in skeletal muscle and adipose tissue. Obesity can also damage the ability of beta cells to release insulin resulting in an increase in blood glucose levels (Smeltzer et al, 2008). Research by Nelia Fransiska and Neria Sriwandi (2015) states that there is a relationship between body mass index and the incidence of diabetes mellitus (with a p-value = 0.027).

regulate body weight which can overcome fat deposits in the body. As for the activity of doing physical activity with elderly gymnastics regularly and balanced by consuming healthy food and avoiding foods with saturated fat and lots of fruit and vegetable food and drink lots of water at least 8 glasses a day.

### 3. Relationship between age and the incidence of type II diabetes mellitus

Based on the research results in table 8 above, it is known that as many as 62.2% (51 respondents) of the 82 respondents aged > 60 years suffer from diabetes mellitus. According to the theory of Harding et al that the age at risk for type II diabetes mellitus is above 60 years, this is because at that age there are anatomical, physiological and biological changes.

The above results are in line with the results of Shara Kurnia Trisnawati and Soedijono Setyonegoro's study entitled: Risk factors for type II diabetes mellitus at the Cengkareng District Health Center, West Jakarta, which stated that there was a significant relationship between age and the incidence of diabetes mellitus with a p-value = 0.026.

In the opinion of researchers, it is better to adopt a healthy lifestyle from an early age by maintaining a diet and carrying out regular physical activity in order to prevent an increase in blood sugar levels in the elderly which results in anatomical, physiological and biological changes as we get older.

## CONCLUSIONS AND SUGGESTIONS

### Conclusions

Based on research at the Pisang Health Center Elderly Posyandu, the results were:

1. A total of 82 respondents (43.4%) suffered from diabetes from all 189 elderly respondents.
2. As many as 77 respondents (41%) were obese, and those who had normal BMI at the elderly Posyandu were 112 respondents (59%).
3. A total of 113 respondents (59.8%) did physical activity, and those who did not carry out physical activity at the elderly Posyandu were 76 respondents (40.2%).
4. A total of 107 respondents (56.6%) aged 45-59 years, and those aged > 60 years 82 respondents (43.4%).
5. There is a significant relationship between body mass index and the incidence of diabetes mellitus (p value = 0.001).
6. There is a significant relationship between physical activity and the incidence of diabetes mellitus (p value = 0.001).
7. There is a significant relationship between age and the incidence of diabetes mellitus (p value = 0.001).

### Suggestions

1. Officer
  - a. Officers must routinely carry out elderly posyandu according to the posyandu schedule with various supporting activities such as

- a. gymnastics for the elderly once a week and blood sugar checks once a month
- b. Dissemination of healthy food menus and balanced nutrition for the elderly to prevent cases of diabetes mellitus
- c. Collaborate with nutrition officers to carry out nutritional consultations about diet DM
- d. Officers carry out routine blood sugar checks, BB Elderly once a month

### 2. To the next researcher

Advanced researchers should conduct further research by adding research variables and using qualitative methods with different research locations..

### 3. To Puskesmas

As a guide in the implementation of Community Health Efforts, especially the implementation of Non-Communicable Diseases (PTM) activities in an effort to promote the Healthy Living Community Movement (Germas) whose activities take the form of Prolanis Gymnastics which are carried out every week to motivate the elderly to do physical activity.

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