

Factors that Related to Type 2 Diabetes Mellitus in Patients Aged 60-69 Years at the Working Area of Puskesmas Kecamatan Taman Sari Jakarta Barat 2019

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Keywords: Type 2 Diabetes Mellitus, Diabetes in Patients Aged 60-69 Years, Family History with DM, Smoke, The History of Hypertension.

Abstract: Diabetes mellitus is a chronic metabolic disorder because the pancreas produces insufficient insulin or the limbs do not use insulin efficiently. This study aims to analyze factors related to Type 2 Diabetes Mellitus in patients aged 60 – 69 years at Taman Sari sub-district health center in 2019. This study used a Cross-Sectional design, with a sample of 97 respondents. The sampling technique uses an Accidental Sampling method. Collection method with questionnaires and interviews with a variable family history with DM, smoking, and history of hypertension. The analysis carried out includes Univariate Analysis and Bivariate Analysis with Chi-Square Test. Based on the results of statistical tests showed that the factors associated with the incidence of Type 2 Diabetes Mellitus in patients aged 60 - 69 years were family history (p-value = 0,000), history of hypertension (p-value = 0,000) and behavior in smoking (p-value = 0.105 and 0.144) not related to the incidence of Type 2 Diabetes Mellitus.

1 PRELIMINARY

Diabetes mellitus is a chronic disease that is still a major problem in the world of health in Indonesia. Diabetes mellitus is a chronic metabolic disorder because the pancreas produces insufficient insulin or members of the body do not use insulin efficiently (Kemenkes RI, 2014). According to WHO (World Health Organization), Diabetes Mellitus is a cause of hyperglycemia. Hyperglycemia is caused by many things, but hyperglycemia is most often caused by diabetes mellitus. In diabetes mellitus, sugar builds up in the blood so it fails to enter the cell. The failure occurs due to insufficient amounts of the hormone insulin or malfunction. The hormone insulin is a hormone that helps the entry of blood sugar (WHO, 2016).

Nearly 80% of people with Diabetes Mellitus are in low and middle-income countries. In 2015, 8.5% of people with diabetes mellitus were adults. The prevalence of diabetes mellitus is estimated in Asia at 153.2%, Europe 59.8%, the Middle East 35.5%, Africa 44.3% and North and South America 29.6% (Ministry of Health RI, 2016). The prevalence of

people with diabetes mellitus in Indonesia according to the International Diabetes Federation in 2017, Indonesia ranks 6 (six) in the world with a total of 10.3 million people and is predicted in 2045 Indonesia will be home to 16.7 million people with diabetes mellitus (IDF, 2017).

While in Indonesia alone data obtained from the results of the Basic Health Research (Riskesdas) in 2018 showed that the prevalence of Diabetes Mellitus by 8.5% increase from the 2013 Riskesdas data which was only 6.9% (Riskesdas, 2018). 2/3 of people with Diabetes Mellitus in Indonesia do not know they have diabetes and have the potential to access health services in a late condition (already with complications) (Ministry of Health Republic of Indonesia, 2014). The percentage of deaths due to diabetes in Indonesia is the second-highest after Sri Lanka (Ministry of Health, Republic of Indonesia, 2014).

Impact or complications of diabetes mellitus both type 1 and type 2 can be divided into two large groups, namely the first acute complications arise suddenly, this condition can be fatal if not treated immediately including hypoglycemia (too low blood

glucose), hyperglycemia (glucose blood is too high), and too much acid in the blood. Second, chronic complications arise slowly, sometimes unknown, but eventually, it becomes increasingly severe and dangerous (Prawirohardjo, 2010).

In the first 3 months starting from January to March 2019 cases of Diabetes Mellitus Type 2 in Puskesmas Kecamatan Taman Sari at the age of 60-69 years as many as 22. Diabetes Mellitus Type 2 is also the 10 biggest diseases each year at Puskesmas Kecamatan Taman Sari.

2 RESEARCH METHODS

This research is in the scope of health which aims to determine the risk factors associated with the incidence of type 2 diabetes mellitus in the working area of Puskesmas Kecamatan Taman Sari, West Jakarta in 2019. Based on the data there are cases of type 2 diabetes mellitus at the age of 60-69 years in Puskesmas Taman Sari District from January to March 2019 were 221 with a prevalence of 7.27%. The targets in this study were patients with type 2 diabetes mellitus in patients aged 60-69 years in the Taman Sari District Health Center in West Jakarta. This research will be conducted in May 2019 until June 2019. This type of research is a cross-sectional study.

3 RESULTS AND DISCUSSION

3.1 Research Result

3.1.1 Univariate Analysis

Description of Incidence of Type 2 Diabetes Mellitus at Patients Aged 60-69 Years in the Working Area of Puskesmas Kecamatan Taman Sari in 2019.

The distribution results show that the analysis results for the incidence of Type 2 DM variables where the proportion is divided into 2 categories, namely Type 2 DM sufferers and not Type 2 DM sufferers, the highest proportion of respondents is Type 2 DM sufferers is 60 respondents (61.9%), while the lowest proportion were respondents who were not sufferers of Type 2 diabetes as many as 37 respondents (38.1%).

Table 1: Distribution of Type 2 DM Events, Family History with DM, Smoking, History of Hypertension in Patients Age 60 - 69 Years at the Working Area of Puskesmas Kecamatan Taman Sari in 2019.

No.	Analysis Type	Number (n)	Percentage (%)
1.	Event DM Type 2	97	100,0
	Patients with type 2 DM	60	61,9
	Not a patient Type 2 DM	37	38,1
2.	Family history with DM	97	100,0
	Yes	69	71,1
	No	28	28,9
3.	Smoking	97	100,0
	Heavy Smoker	15	15,5
	Light Smokers – Moderate	23	23,7
	No Smoking	59	60,8
4.	History of Hypertension	97	100,0
	Yes	60	61,9
	No	37	38,1

Description of Family History in Patients Aged 60-69 Years at the Working Area of Puskesmas Kecamatan Taman Sari in 2019.

The distribution results show that the analysis results for family history variables with DM where the proportion is divided into 2 categories namely having a family history with DM and not having a history with DM. obtained different results, namely the highest proportion of respondents who have a family history with DM as many as 69 respondents (71.1%), while the lowest proportion is respondents who do not have a family history with DM as many as 28 respondents (28.9%).

Description of Smoking in Patients Aged 60-69 Years at The Working Area of Puskesmas Kecamatan Taman Sari in 2019.

The distribution results show that the analysis results for smoking variables where the proportion is divided into 3 categories, namely heavy smokers, light smokers - moderate and not smoking. different results obtained, namely the highest proportion of respondents who did not smoke as many as 59 respondents (60.8%), the proportion of mild smokers - moderate as many as 23 respondents (23.7%), while the lowest proportion were respondents with heavy smokers as many as 15 respondents (15, 5%).

Description of Hypertension History in Patients Aged 60-69 Years at the Working Area of Puskesmas Kecamatan Taman Sari in 2019.

The distribution results show that the analysis results for hypertension history variables where the

proportion is divided into 2 categories, namely having a history of hypertension and not having a history of hypertension. obtained different results namely the highest proportion were respondents who had a history of hypertension as many as 60 respondents (61.9%), while the lowest proportion was respondents who did not have a family history with DM as many as 37 respondents (38.1%).

3.1.2 Bivariate Analysis

The Relationship Between Family History with the Occurrence of Type 2 Diabetes Mellitus in Patients Age 60 - 69 Years at The Working Area of Taman Sari in 2019.

Based on the results of the cross-tabulation shows that the highest proportion of patients who have a family history of DM in patients with Type 2 DM are 51 respondents (73.9%). Similarly, the highest proportion of respondents who do not have a family history of DM in patients who are not sufferers of Type 2 diabetes are 19 respondents (67.9%).

Based on the Chi-Square statistical test, the p-value was 0,000 ($p < 0.05$), so it can be concluded that there is a relationship between family history and DM with DM Type 2. Based on these results the Prevalence Ratio (PR) value in this analysis is 2,300 with 95% CI: 1,139 - 4,010, meaning that respondents who have a family history of DM have 2,300 times the risk of developing type 2 diabetes compared with respondents who do not have a family history of DM.

The Relationship Between Smoking and the Incidence of Type 2 Diabetes Mellitus in Patients Aged 60-69 Years at the Working Area of Puskesmas Kecamatan Taman Sari in 2019.

Based on the results of the cross-tabulation shows that the highest proportion of respondents with heavy smokers who are not sufferers of Type 2 DM as many as 8 people (46.7%), while the highest proportion of respondents smokers mild-moderate with sufferers of Type 2 DM as many as 12 people (52.2 %) and the highest proportion of respondents who did not smoke were 41 people (69.5).

Bivariate analysis statistical test results by making dummy variables obtained the value of P-Value = 0.177 states that there is no significant relationship between smoking and the incidence of Type 2 diabetes in patients aged 60-69 years in the working area of Taman Sari District Health Center in 2019. From this statistical test also known that the value of Prevalence Ratio (PR) = 0.672 ($1 / 0.381 = 2.624$) with 95% CI = 0.381 - 1.184, this shows that patients who do not smoke 2.624 times more at risk of

developing Type 2 diabetes compared with heavy smokers. And also obtained P-Value = 0.224 states that there is no significant relationship between smoking with the incidence of Type 2 DM in patients aged 60-69 years in the Taman Sari District Health Center Work Area in 2019. From this statistical test also known the value of Prevalence Ratio (PR) = 0.751 ($1 / 0.751 = 1.331$) with 95% CI = 0.490 - 1,150, this shows that patients who do not smoke are 1,331 times more at risk of developing Type 2 diabetes compared with heavy smokers.

The Relationship Between Hypertension History and the Incidence of Type 2 Diabetes Mellitus in Patients Aged 60-69 Years at the Working Area of Puskesmas Kecamatan Taman Sari in 2019.

Based on the results of the cross-tabulation shows that the highest proportion of patients who have a history of hypertension in patients with Type 2 diabetes are 48 respondents (80.0%). Similarly, the highest proportion of respondents who did not have a history of hypertension in patients who were not sufferers of Type 2 diabetes were 25 respondents (67.6%).

Based on the Chi-Square statistical test, the p-value was 0,000 ($p < 0.05$), so it can be concluded that there is a relationship between family history and DM with DM Type 2. Based on these results the Prevalence Ratio (PR) value in this analysis was 2,467 with 95% CI: 1,523 - 3,994, meaning that respondents who had a history of hypertension had a risk of 2,467 times developing type 2 diabetes mellitus compared to respondents who had no history of hypertension.

3.2 Discussion

3.2.1 Univariate Analysis

Description of the Incidence of Type 2 Diabetes Mellitus in Patients Aged 60-69 Years at the Working Area of Puskesmas Kecamatan Taman Sari in 2019.

Based on the results of the study the highest proportion of people with type 2 diabetes mellitus were 60 (61.9%) respondents. In this study, the proportion of people with type 2 diabetes mellitus dominates more than the proportion who are not patients with type 2 diabetes mellitus. The results of this study are in line with research conducted by Kistianita et al. (2017) at Kendalkerap Health Center in Malang City, from 88 respondents it was obtained the proportion the highest is in people with type 2 diabetes Mellitus as many as 64 (72.7%).

Table 2: Relationship of Family History with DM, Smoking, and History of Hypertension with the Occurrence of Type 2 DM in Patients Age 60 - 69 Years in the Work Area of Taman Sari District Health Center in 2019.

No.	Variable	Category	Kejadian DM Type 2		P-value	PR (95% CI)
			Penderita DM Tipe 2	Bukan Penderita DM Tipe 2		
1.	Riwayat Keluarga dengan DM	Ya Memiliki Riwayat Keluarga Dengan DM	51 (73,9%)	18 (26,1%)	0,000	2,300 (1,319-4,010)
		Tidak Memiliki Riwayat Keluarga Dengan DM	9 (32,1%)	19 (67,9%)		
2.	Merokok	Perokok Berat	7 (46,7%)	8 (53,3%)	0,177	0,672 (0,381- 1,184)
		Perokok Ringan - Sedang	12 (52,2%)	11 (47,8%)	0,224	0,751 (0,490- 1,150)
		Tidak Merokok	41 (69,5%)	18 (30,5%)	-	1
3.	Riwayat Hipertensi	Ya Memiliki Riwayat Hipertensi	48 (80,0%)	12 (20,0%)	0,000	2,467 (1,523 - 3,994)
		Tidak Memiliki Riwayat Hipertensi	12 (32,4%)	25 (67,6%)		

Based on the results of research conducted at the Taman Sari District Health Center, most of the patients who visited PTM & Elderly Poly were sufferers of type 2 diabetes mellitus and the incidence of type 2 diabetes mellitus was quite high, this was caused by factors that triggered the high incidence of type 2 diabetes mellitus in the working area of the Taman Sari sub-district health center is caused by consuming too many snacks at the wrong time, rarely doing physical activities after eating. Based on the interview results other than these two factors, there are other factors that trigger respondents to contract Type 2 diabetes, which is a factor passed down from parents.

Puskesmas Taman Sari sub-district has conducted an integrated post-training program (Posbindu). Efforts made with the Posbindu program are monitoring and detection, early, Posbindu activities are routine monitoring of DM risk factors, counseling about DM risk factors such as smoking, stress, physical activities, etc. counseling the community to know and understand the risk factors that can cause diabetes mellitus and carry out joint physical activities such as sports. However, people with type 2 diabetes mellitus are still very high in Puskesmas Taman Sari Subdistrict, because according to the results of interviews with Puskesmas staff there is no effort to provide health education related to good eating patterns and regular lifestyles in patients with Type 2 DM patients, therefore researchers recommend that the health center conduct health education about the importance of lifestyle and maintain eating habits of people with Type 2 Diabetes Mellitus.

Description of Family History with DM in Patients Aged 60-69 Years at the Working Area of Puskesmas Kecamatan Taman Sari in 2019.

Based on the results of the study the highest proportion of respondents who have a family history with DM as many as 69 (71.1%) respondents in this study the proportion of family history with DM is more dominant when compared to the proportion who do not have a family history of DM. The results of this study are in line with research conducted by Trisnawati & Setyorogo (2012) at the Cengkareng District Health Center in West Jakarta, from the 50 respondents the highest proportion was obtained among respondents who had a family history of DM with 22 (75.9%).

Based on the results of research conducted at the Taman Sari District Health Center, most respondents have a family history of DM. The number of respondents who have a family history of DM one of them due to lack of parental knowledge so it is not informative enough to inform their offspring and unhealthy eating patterns such as consuming junk food, fast food, it is necessary to have self-awareness to prevent increased risk factors by regulating patterns eating, physical activity and diligently checking blood sugar once a month. We recommend that people who have a family history of DM should be more careful in maintaining the lifestyle and always controlling blood sugar levels.

Description of Smoking in Patients Aged 60-69 Years at the Working Area of Puskesmas Kecamatan Taman Sari in 2019.

Based on the results of the study the highest proportion of smoking variables found in respondents who did not smoke as many as 59 (60.8%). The results of this study are in line with research conducted by Sutriana (2018) of employees at PT Pins Indonesia, of the 112 respondents obtained the highest proportion of respondents who did not smoke as many as 89 (79.5%).

Cigarettes can cause thickening and hardening resulting in narrowing of the arteries. Smokers are those who smoke every day for a minimum period of 6 months during their lifetime still smoking when the survey was conducted (MOH, 2004). Based on the results of interviews with respondents, it is known that the high proportion of respondents who do not smoke is caused by some respondents who have not been diagnosed with Type 2 diabetes or who have stopped smoking after being diagnosed with Type 2 diabetes. In addition, the history of hypertension that some respondents have is one of the factors causing the respondent do not smoke.

Description of Hypertension History in Patients Age 60 - 69 Years at the Working Area of Puskesmas Kecamatan Taman Sari in 2019.

Based on the results of the study the highest proportion of respondents who had a history of hypertension were 60 (61.9%) respondents. In this study, the proportion of respondents who had a history of hypertension was more dominant compared to the proportion who did not have a history of hypertension. The results of this study are in line with research conducted by Kistianita et al., (2017) at the Kendalkerap Health Center in Malang City, from 88 respondents the highest proportion was obtained by respondents who had a history of hypertension of 45 (51.1%).

Based on the results of research conducted at the Taman Sari District Health Center, most respondents have a history of hypertension, some respondents still consume salt for their food needs in large quantities, in addition to consuming salt that does not match the amount of some respondents also experience stress due to economic problems. Efforts to reduce hypertension by reducing salt consumption, taking the medication regularly and managing stress.

The program that has been carried out by the Taman Sari sub-district health center staff is an integrated post-training program (Posbindu), an effort undertaken with the posbindu program that is monitoring and early detection of hypertension, counseling, and providing counseling to the public to know and understand the risk factors can cause hypertension.

3.2.2 Bivariate Analysis

The Relationship Between Family History with DM with the Occurrence of Type 2 Diabetes Mellitus in Patients Age 60 - 69 Years at the Working Area of Puskesmas Kecamatan Taman Sari in 2019.

Statistical test results state that there is a significant relationship between patients who have a family history of DM with the incidence of type 2 diabetes mellitus (p-value = 0,000). Based on research conducted at the Taman Sari District Health Center, most respondents have a family history of DM, many respondents have a family history of DM one of which is due to lack of parental knowledge so it is not informative enough to inform their offspring, who are at risk of having a family history of DM. therefore the researchers suggest respondents do a screening of sugar levels, regulate diet 3 times a day and multiply eating fruits and vegetables, not smoking and routinely doing physical activities doing sports.

The Relationship Between Smoking and The Incidence of Type 2 Diabetes Mellitus in Patients Aged 60-69 Years at the Working Area of Puskesmas Kecamatan Taman Sari in 2019.

Statistical test results state that there is no significant relationship between smoking and the incidence of type 2 diabetes mellitus (p-value = 0.177 & 0.224). According to Action on Smoking and Health (2015), a lot of evidence shows that smoking is a risk factor for type 2 diabetes mellitus. Smoking has been identified as a possible risk factor for insulin resistance. Smoking has also been shown to reduce glucose metabolism which can cause type 2 diabetes mellitus and smoking has also been linked to the risk of chronic pancreatic and pancreatic cancer, indicating that cigarette smoke can be toxic to the pancreas. People who smoke about 20 cigarettes per day have a higher risk of developing diabetes mellitus than nonsmokers.

Based on research conducted at the Taman Sari District Health Center, most respondents do not smoke. This is one of them because some respondents did not smoke from before being diagnosed with Type 2 DM, besides that some respondents had a history of hypertension and stopped smoking after being diagnosed with DM Type 2.

The Relationship Between Hypertension History and the Incidence of Type 2 Diabetes Mellitus in Patients Aged 60-69 Years at the Working Area of Puskesmas Kecamatan Taman Sari in 2019.

Statistical test results state that there is a significant relationship between patients who have a history of hypertension and the incidence of type 2 diabetes mellitus (p -value = 0,000). Based on observations made at the Taman Sari District Health Center, most respondents had a history of hypertension. This may be caused by age at risk, wrong diet, stress or low physical activity so it is expected to maintain a diet by reducing salt consumption, actively moving like sports, managing stress by listening to music and stopping smoking and drinking alcohol, taking drugs hypertension according to doctor's prescription and routinely check blood pressure and pulse.

Taman Sari sub-district health center has an integrated post-training program or POSBINDU where the program is to monitor and detect hypertension early on, counseling, and provide counseling to the public about risk factors that can cause hypertension. Based on the results of the study, researchers advised health workers to do more counseling to the public about risk factors that can cause hypertension.

4 CONCLUSIONS

From the results of data processing research that has been done, it can be concluded that:

1. The description of the incidence of type 2 diabetes mellitus in patients aged 60-69 years in the working area of the Taman Sari subdistrict health center in 2019 is that people with type 2 diabetes mellitus as much as 61.9% while those who are not sufferers of type 2 diabetes mellitus as much as 38.1%.
2. Description of family history with DM in patients aged 60-69 years in the working area of Taman Sari sub-district health center in 2019 with the highest proportion of 71.1% with respondents who have a family history of DM.
3. Description of smoking in patients aged 60- 69 years in the working area of Taman Sari sub-district health center in 2019 with the highest proportion of 60.8% of respondents who do not smoke.
4. The description of the history of hypertension in patients aged 60-69 years in the working area of Taman Sari sub-district health center in 2019 with the highest proportion of 61.9% of respondents who have a history of hypertension.
5. There is a relationship between family history with DM with the incidence of type 2 diabetes mellitus hypertension in patients aged 60-69 years

in the working area of Taman Sari sub-district health center in 2019 that is obtained a P-Value = 0,000.

6. There is no relationship between smoking and the incidence of hypertension type 2 diabetes mellitus in patients aged 60 - 69 years in the working area of Taman Sari sub-district health center in 2019 with P values = 0.177 and 0.224.
7. There is a relationship between the history of hypertension and the incidence of hypertension type 2 diabetes mellitus in patients aged 60-69 years in the working area of Taman Sari sub-district health center in 2019 that is obtained the value of P-Value = 0,000.

5 SUGGESTION

Based on the results of research conducted can be given several suggestions, namely:

1. For the puskesmas organizing health education about the importance of lifestyle and maintaining a diet for people with Type 2 diabetes.
2. The family should do a screening of sugar levels, adjust the diet 3 times a day and multiply eating fruits and vegetables, not smoking and regular physical activity to do sports.
3. For puskesmas (health workers) to educate the public more about risk factors that can cause hypertension.

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