Identification Risk Factor of Diabetes Mellitus Can Be Changed in Older People at Kalirandu, Bangunjiwo Kasihan, Bantul, Yogyakarta

*1st Dinasti Pudang Binoriang
School Of Nursing
Universitas Muhammadiyah Yogyakarta
Yogyakarta, Indonesia
dinasti.binoriang@umy.ac.id

2nd Radiatan Mardiah
School Of Nursing
Universitas Muhammadiyah Universitas Muhammadiyah Yogyakarta
line 4: City, Country
radiatanmardiah456@yahoo.com

Abstract— Diabetes mellitus is a disease that has a high mortality and morbidity, caused by unhealthy life style, like rarely exercise, smoking, obesity, unhealthy diet, or stress. The elderly people are at risk to develop diabetes mellitus caused by the decreased of their physical condition, including the function of β cell which produce insulin as a regulator of blood glucoselevels. The researcher interested to identify risk factor that caused diabetes mellitus in elderly people. Research Purpose: Identifying risk factor that caused diabetes mellitus in elderly people at Kalirandu's Village, Bangunjiwo, Kasihan Bantul Yogyakarta. This is descriptive quantitative non-experimental study with cross sectional approach. Sample used in this study were 80 elderly people. Data analysis used is univariate analysis in the form of frequency distribution. The results showed from 80 respondent, 17 (21,3%) respondents are overweight, 9 (11,2%) are smokers, 58 (72,5%) rarely exercised, 19 (23,8%) have unhealthy diet, and 7 (8,8%) are stressed. Rarely exercising is the highest risk factor that caused diabetes mellitus in elderly people. Further research could describe elderly people's knowledge about exercise or motivation to do exercise at Kalirandu's Village, Bangunjiwo, Kasihan BantulYogyakarta.

Keywords— *Elderly people, Diabetes Mellitus, Risk Factor of Diabetes Mellitus*

I. INTRODUCTION

Non-communicable diseases are diseases caused by heredity, unhealthy lifestyles such lack of exercise, excess body weight and eating foods that with low nutritional value. Non-communicable diseases consist of heart disease, hypertension, cancer, stroke, joint disease, kidney failure, kidney stones, diabetes mellitus, and asthma [1] [2].

Diabetes mellitus is a non-communicable disease that is often found and has a high morbidity and mortality rate. [3]Diabetes and its complications cause 1 death every 8 seconds in the world, which means about 11,000 death occur in a day caused by diabetes. The incidence of diabetes mellitus in USA shows that diabetes mellitus contributes, on average 1 case of stroke every 2 minutes, 1 case of ischemic heart disease every 80 seconds, 1 case of kidney failure every 10 minutes and 1 case of amputation of the lower extremity every 5 minutes, this shows the severity of the consequences caused by diabetes mellitus.

Diabetes mellitus is a disease caused by two factors, namely irreversible risk factors such as family history, age and risk factors that can be changed such as smoking, lack of exercise, obesity, alcohol consumption, unhealthy eating habits and stressed out due to the pressure of life [4]. This condition is supported by the condition of blood vessels in the elderly who experience a decrease in elasticity and strength, so that the elderly are at risk of developing diabetes mellitus [5] [6].

The Special Region of Yogyakarta occupies the third position with a high incidence of diabetes mellitus in Indonesia, with the highest prevalence occurring at age> 55 as much as 6.3% compared with age <55 years of only 3.9% [7]. One of the regencies in the Special Region of Yogyakarta is Bantul Regency with a high incidence of diabetes mellitus and ranks second after hypertension of 20,969 cases[8]. The elderly are individuals age d>60 years and have experienced a decline in both physiological and psychological function, which is characterized by reduced ability of individuals to respond to stressors originating from within and outside [5].

Special Region of Yogyakarta is a province with a high life expectancy with a population of 60-69 years old a total of 127.20 people, 70-74 years old with 92.60 people and >75 years old with 139.60 people [9]. Diabetes mellitus is a chronic disease that is often experienced by the elderly and is supported by an increase in life expectancy of the elderly.

II. RESEARCH METHOD

This research is a non-experimental study with a descriptive survey design using cross-sectional design. Respondents in this study were 80 elderly who have not had diabetes mellitus, data collection using research instruments in the form of question naires that have been tested for validity and reliability, data analysis using univariate analysis and presented in the form of frequency distribution. Research was conducted on 15 February until 10 March 2019. Ethical clereance is confidentiality, justice and

beneficence and ethical approval number: 024/EP-FKIK-UMY/I/2019.

III. RESULT

The result if the survey showed that:

TABLE I.   CHARACTERISTIC OF RESPONDENT

Characteristic	F(x)	%
Gender		
Men	22	27.5%
Women	58	72.5%
Age		
Early Elderly (60-74)	59	73.8%
Late Elderly (75-90)	20	25%
Nonagenarian elderly	1	1.2%
Job		
Housewives	22	27.5%
Labor worker	15	18.8%
Farmer	18	22.5%
Retired Civil servant	7	8.8%
Merchant	5	6.2%
Unemployed	4	5%
Enterpreneur	6	7.5%
Teacher	1	1.2%
(Health Volunteer) Dukun Bayi	2	2.5%
Religion		
Islam	80	100%
Etchnicity		
Java/Jawa	80	100%

TABLE II.   RESULT OF THE DIABETES RISK FACTOR

	Categery of Respondent	F(x)	%
1. Exercise Category:			
	In Risk	58	72.5%
	Not in Risk	22	27.5%
Total		80	100%
2.Obesity Category:			
	In Risk	24	30.4%
	Not in Risk	56	69.6%
Total		80	100%
3.Smoking Habit Category:			
	In Risk	9	11.2%
	Not in Risk	71	88.8%
Total		80	100%
4.UnhealtyDiet Category:			
	In Risk	19	23.8%
	Not In Risk	61	76.2%
Total		80	100
5.Stress Category			
	In Risk	7	8.8%
	Not In Risk	73	91.2%
Total		80	100%

IV. DISCUSSION

A. Characteristic of Respondent

The results showed the respondents were dominated by women with the majority of the age range 60-74 years. This result is supported by the results of [9] which shows that the number of elderly female residents is more than the elderly male, with a percentage of results of 1 percent. The data shows that landlords

in Indonesia are more elderly with age range 60-69 years with a percentage of yield of 5.65 percent from 8.97 percent of all elderly population in Indonesia and the rest are elderly with age> 70 years.

B. Risk Factors

1) Exercise

The results of the study showed that most respondents were at risk of developing diabetes mellitus. This result is supported by the research of [10] showed that individuals with lower levels of physical exercise had a higher risk of developing diabetes mellitus compared to individuals with high levels of physical exercise. Exercising regularly will help maintaining balanced glucose metabolism in the body, adequate exercise will increase the use of glucose by the muscles so that blood glucose leve ldecreased, and on the other hand rarely doing exercise will causes nutrients that were not formed into energy turning into fat and glucose [11].

There commended physical exerciseis 3-4 times a week for approximately 30 minutes for mild exercise such as walking and 20 minutes for exercise with higher intensity like fast walking or jogging. Physical exercise is carried out continuously with rhythmic movements, the movements are arranged and carried out in a series of stages so that it will produce the resilience ofthe body's systems. Physical Exercise will help reduce blood glucose levels and increase insulin sensitivity, this is related to the ability of insulin to transport glucose into the muscles when the muscles contract [12] [13].

2) Obesity

The results of the study showed that some of the respondent shada body weight that exceeded normal limits and were at risk of developing diabetes mellitus. This result is supported by the research of [14] which showed that a person with obesity has a high risk of developing diabetes mellitus, because people with body weight exceeding the normal limit will experience increased levels of cholesterol and triglycerides. The accumulation of fat will inhibit the work of insulin in transporting glucose into cells.

In the results of his study explained that overweight and obesity are closely related to the risk of developing diabetes mellitus by looking at BMI> 25 [10]. The results showed, after being followed up for 11 years, 1136 of 45186 individuals reported having diabetes mellitus, with an age range of 20-65 years. BMI is closely related to the occurrence of diabetes mellitus, where men who are overweight are over three times the risk of normal weight men and obese individuals without physical exercise have a 17-fold risk of developing diabetes mellitus.

3) Smoking Habit

The results of the study showed that some respondents were at risk of developing diabetes mellitus due to smoking behavior in the last 2 weeks. The results of this study were supported by [15] which shows that cigarette consumption causes type 2 diabetes mellitus. Active smokers have a higher risk of diabetes compared to nonsmokers and the risk increase 16% if they consume 10 cigarettes per day. Sigarate smoking causes insulin resistance or inadequate compensation from insulin secretion through various causes such as inflammation, oxidative stress and end othelialdys function.

Cigarettes are one type of object that can have an negative impact on health, one of which is the occurrence of diabetes mellitus. Allah SWT forbids his people to consume things that bring harm, as explained in the word of Allah SWT QS. Al-A'raf verse 157 [16]. First, confirm that you have the correct template for your paper size. This template has been tailored for output on the A4 paper size. If you are using US letter-sized paper, please close this file and download the Microsoft Word, Letter file.

الَّذِينَ يَتَّبِعُونَ الرَّسُولَ النَّبِيَّ الأُمِّيَّ الَّذِي يَجِدُونَهُ مَكْتُوبًا عِندَهُمْ فِي التَّوْرَاةِ وَالإِنجِيلِ يَأْمُرُهُم بِالْمَعْرُوفِ وَيَنْهَاهُمْ عَنِ الْمُنكَرِ وَيُحِلُّ لَهُمُ الطَّيِّبَاتِ وَيُحَرِّمُ عَلَيْهِمُ الْخَبَائِثَ وَيَضَعُ عَنْهُمْ إِصْرَهُمْ وَالأَغْلَالَ الَّتِي كَانَتْ عَلَيْهِمْ فَالَّذِينَ آمَنُوا بِهِ وَعَزَّرُوهُ وَنَصَرُوهُ وَاتَّبَعُوا النُّورَ الَّذِي أُنزِلَ مَعَهُ أُولَئِكَ هُمُ الْمُفْلِحُونَ ﴿١٥٧﴾

Meaning: Those who follow the Messenger, the unlettered prophet, whom they find written in what they have of the Torah and the Gospel, who enjoins upon them what is right and forbids them what is wrong and makes lawful for them the good things and prohibits for them the evil and relieves them of their burden and the shackles which were upon them. So they who have believed in him, honored him, supported him and followed the light which was sent down with him - it is those who will be the successful.

The above verse shows that there is an instigation to do good things and avoid unjust acts and to only do everything that is lawful. Cigarette is an object that is not good for human's life, in which will it result in negative impact from both the Islamic and health view point.

4) Unhealhty Diet

The results of this study indicate that some respondents are at risk of developing diabetes mellitus. This result is supported by the research of [17] showed that there was a significant influence between unhealthy eating patterns and the occurrence of diabetes mellitus in individuals who had not yet experienced type 2 diabetes mellitus at the Wangon I Health Center. Consumption of cholesterol, carbohydrates, sugary foods and junk foods in excess amounts can affect glucose levels in the blood, this is related to the inability of insulin to work due to excess metabolic output of these foods, which supposed enter the cell and be stored in the form of energy but instead accumulate outside the cell.

A good diet will prevent complications of DM due to uncontrolled blood glucose on elderly, conversely with good dietary settings an elderly will be able to maintain his blood glucose levels so that the they will not have limitations in their activities and will result in better quality of life can be achieved[18].[19] explained that puskesmashad an important role in preventing the occurrence of diabetes mellitus through a program that is posyandu(Integrated Health services post) for elderly. The roles of posyanduare to prevent the occurrence of diabetes mellitus in elderly through health education about maintaining diet, counseling, nutrition screening and others.

The nutrition counselling purpose is the management of healthy diet to control the health of the elderly and one of the main topics is how to prevent and control blood glucose levels. Health education media used can be in the form of material leaflets for nutrition consultations. These education media function as media to relay information related to the type of food that should not be consumed, should be reduced or avoided to prevent the occurrence of the disease [17].

5) Stress Risk Factor

The results of this study indicate that some respondents experience stress and are at risk of developing diabetes mellitus. This result is supported by [21] which shows that elderly people who experience stress until depression stage are at high risk of hyperglycemia, the more severe the depression level, the worse the control of blood sugar levels is (fasting glucose level, high 2 hours post-prandial).

Depression is a mood disorder condition that may cause psychological distress in the elderly, this condition causes the activation of receptors that will release proinflammatory cytokines by macrophages in very large amounts (TNF-α, IL-6) that affecting the work of the liver, brain and pancreatic β-cells. These cytokines will disrupt the work of the organs above which can cause insulin resistance. Research by [22] explains that when the acute or chronic stress response activates the HPA axis will produce or secrete corticotopin releasing hormone (CRH) from the hypotalamus which stimulates the anterior pituitary gland to secrete adrenocorticotropic hormone (ACTH) which stimulate the adrenal glands to secrete cortisol. Explain that cortisol is an antagonist of insulin, which will inhibit the work of insulin in regulating blood glucose levels [23].

Explains that not all the elderly experience stress with old age, the affection and motivation provided by the younger family members is a strong factor in helping the elderly make decisions [24]. The phenomenon that is found in the elderly are a decrease in health, cognitive and social function, but it is reported that there is an increase in wellness and positive emotions that occur in the elderly, where the elderly perceive their time is not long so they are motivated to pursue emotional satisfaction rather than being burdened, this condition supported the elderly in avoiding stress.

V. Conclusion

The conclusions that can be drawn from the study titled Identification of Changable Diabetes Mellitus Risk Factors in the Elderly in Kalirandu, Bangunjiwo, Kasihan Bantul, Yogyakarta are as follows: The elderly who participated as respondents in this study as many as 80 persons without diabetesmellitus. The changeable risk factors for diabetes mellitus in the elderly for exercise sub-variables are as many as 58 (72.5%) respondents which were at risk of developing

diabetesmellitus. The changeable risk factors for diabetes mellitus in the elderly for unhealthy diet sub-variables are 19 (23.8%) respondents which were at risk of developing diabetes mellitus. The changeable risk factors for diabetes mellitus in the elderly for sub-obesity variables are 17 (21.3%) which were at risk of developing diabetes mellitus. The changeable risk factors for diabetes mellitus in the elderly for smoking behavior sub-variables are.

REFERENCES

[1] Najmah, Mutahar, R., &Yeni. Pengetahun dan Riwayat Penyakit Tidak Menular pada Ibu Rumah Tangga di Kabupaten Ogan Ilir Tahun 2013. *Jurnal Ilmu Kesehatan Masyarakat,Volume 6*, 6–13. 2015

[2] Rahmayanti, & Hargono. Implementasi Survei lans Faktor Risiko Penyakit Tidak Menular Berbasis POSBINDU Berdasarkan Atribut Survei lans (Studi di Kota Surabaya). *24 Desember 2017*, *5*,276–285. 2017.

[3] Cefalu, W. T. Standards of Medical Care in Diabetes – 2018. *Diabetes Care American Diabetes Association*, 15. 2018.

[4] *American Diabetes Association*. Diagnosis and Classification of Diabetes Mellitus. *Diabetes Care*, *37* (Supplement_1), S81–S90. 2014. https://doi.org/10.2337/dc14-S081.

[5] Padila. *Buku Ajar Keperawatan Gerontik*. 2013. Yogyakarta: NuhaMedika

[6] Shabira, D., Harjono, Y., &Bustamam, N. Hubungan antara Derajat Merokok dan Kadar Gula Darah terhadap Resiko Terjadinya Kaki Diabetik pada Pasien Diabetes MelitusPria di RSUD Ciawi Bogor, 6. 2014.

[7] RISKESDAS. Hasil Utama Riset Kesehatan Dasar. 2018. Jakarta: Kemenkes RI

[8] DinasKesehatanKabupaten Bantul. *Profil Kesehatan Kabupaten Bantul*. 2017. Bantul: Dinkes.

[9] Badan Pusat Statistik. (2017). *Statistik Penduduk Lanjut Usia 2017*.

[10] Hjerkind, K. V., Stenehjem, J. S., & Nilsen, T. I. L. Adiposity, physical activity and risk of diabetes mellitus: prospective data from the population- based HUNT study, Norway. *BMJ Open*, *7*(1), e013142. 2017. https://doi.org/10.1136/bmjopen-2016-013142.

[11] Widyasari,N.Hubungan Karakteristik Responden dengan Risiko Diabetes Melitus dan Dislipidemia Kelurahan Tanah Kali kedinding. *Jurnal Berkala Epidemiologi*, *5*,12. 2017

[12] Putri, E. L. HubunganantaraLatihanJasmanidengan Kadar Glukosa Darah Penderita Diabetes. *Jurnal Berkala Epidemiologi*, *4*(2), 12. 2016

[13] Suyono, *et al*. Panduan Penatalaksanaan Diabetes Melitus bagi Dokter dan Edukator. 2015. Jakarta: Fakultas Kedokteran Universitas Indonesia

[14] Sirait, A. M., Sulistiowati, E., Sihombing, M., Kusuma, A., & Idayani, S. Incident and Risk Factor of Diabetes Mellitus in Adults at Bogor. Prospective Cohort Study Risk Factors Non Comunicable Diseases. *Buletin Penelitian Sistem Kesehatan*, *18*(2). 2015. https://doi.org/10.22435/hsr.v1 8i2.4315.151-160

[15] Akter,S.,Goto,A.,&Mizoue,T. Smoking and the risk of type 2 diabetes in Japan: A systematic review and meta-analysis. *Journal of Epidemiology*, *27*(12), 553–561. 2017 https://doi.org/10.1016/j.je.201 6.12.017

[16] Al-Quran dan Terjemahannya

[17] Isnaini, N., &Ratnasari, R. FaktorRisiko yang Mempengaruhi Kejadian Diabetes Mellitus Tipe Dua. *Jurnal Kebidanan dan Keperawatan Aisyiyah*, *14*(1), 59–68. 2018. https://doi.org/10.31101/jkk.550

[18] Masi, G. N. M. *Hubungan Pola AktivitasFisik Dan Pola Makan Dengan Kadar Gula Darah Pada Pasien Diabetes Melitus Tipe Ii Di Poli Penyakit Dalam Rumah Sakit Pancaran Kasih Gmim Manado*. *5*,8. 2017

[19] Sujana, T., Triandhini, R. L. ., & Sanggaria, O. Peran Puskesmas dalam Identifikasi Dini Penyakit Diabetes Melitus pada Lansia. *Jurnal Kesehatan Bakti Tunas Husada: Jurnal Ilmu IlmuKeperawatan, Analisis Kesehatan dan Farmasi*, *19*, 13. 2019.

[20] Sutarjana, K., &Kuswardhani, R. T.. Depresib erhubungan dengan control glikemik pada kendali diabetes tipe 2 usia lanjut. *Medicina*, *49*(3). 2018. https://doi.org/10.15562/medicina.v49i3.242

[21] Joseph, J. J., & Golden, S. H. Cortisol dysregulation: the bidirectional link between stress, depression, and type 2 diabetes mellitus: Role of cortisol in stress, depression, and diabetes. *Annals of the New York Academy of Sciences*, *1391*(1), 20–34. 2017. https://doi.org/10.1111/nyas.13217

[22] Aktar, R., & Satu, F. Y. Perceived Stress. Coping Strategies, and Phychological Well-Being of People with Diabetes and People Without Diabetes in Bangladesh: a Comparative Study. *Jurnal Psikology Malaysia*, *31*, 11. 2017.

[23] Miller, Carol A. Nursing for Wellness in Older Adults Sixth Edition. 2012. Wolters Kluwer Health: Library of Congress Cataloging in Publication Data