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RISK OF TYPE 2 DIABETES MELLITUS AMONG HEALTHY INDIVIDUALS IN TIGO BALEH AND RASIMAH AHMAD AREA IN BUKITTINGGI IN 2017

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ABSTRACT

The negative impact of Diabetes Mellitus (DM) are shortening the life expectancy, increasing morbidity rates and worsening the quality of life. These impacts are rising due to the growth of number of patients, particularly among unidentified sufferer. International Diabetes Federation estimates that by 2035 there will be 592 million people suffering from DM at least more than 85% of them will have type 2 DM. According to health ministry of RI, in west Sumatera, there were around 44000 DM Sufferers in 2014 and 40% of population group was known as undiagnosed DM with high risk level. Meanwhile, in Bukittinggi the highest DM sufferer is on public health Center Tigo Baleh followed by Public Health Center Rasimah Ahmad. However, there was not a single data released about DM risk. This research aimed to identify type 2 DM prevalency risk through screening of healthy individualsin 2017. The method of this research was quantitative survey in Tigo Baleh and rasimah Ahmad Areas. Data was collected from 500 respondents by using FINDRISC instrument. The result revealed 5 levels of DM risk, there were Low risk 25%, Slightly Elevated Risk 32%, Moderate Risk 21.2%, High Risk 19.2%, and Very High Risk 2.6%, respectively.

Keywords: Type 2DM risk, findrisc, Bukittinggi

INTRODUCTION

The estimate from the International Diabetes Federation for 2035 predicts thatthe number of Diabetes Mellitus (DM) patients in the world will reach 592 millionand 90% of DM patients will be affected by DM type 2. The number DM patients were 382 million people and 50% of them were at risk of DM / undiagnosedin 2013. *Data Riset Kesehatan dasar* (Rikesdas) 2013 informs that DM patients were about 12 million people and about 60% of them were at risk DM /undiagnosed in Indonesia. Besides, it is recorded that about 44 thousand DM patients, 40% of them have not previously been diagnosed with DM in the province of West Sumatra, (Kemenkes, 2014).

Prevalence of prediabetic in West Sumatera is about 17 thousand people. These undiagnosed individuals have a high risk of progressive disease complications that are unnoticed and the lack of early preventive measures can be directly threatening to the lives of the sufferers (Kemenkes, 2014). This issue was closely related to the declining in life expectancy, increased morbidity and bad life style of DM Patient (World Health Organization, 2006). Therefore, it is very necessary to

give special attention and serious care for this case.

The prevention of DM disease can be obtained by conducting DM preventive programs in populations at risk for the increase of DM disease which in this case is also called pre-diabetic patients. Individuals with pre-diabetes have blood levels exceeding normal levels but have not met the criteria to be diagnosed as patients with DM. Uncontrolled pre-diabetes will amend into type 2 diabetes within 5-10 years. However, early prevention programs in pre-diabetes patients are able to delay or prevent the increase of the disease into type 2 diabetes (Centers for Disease Control and Prevention, 2014). In other words, it is not all pre-diabetes that can turn into Diabetes.

The existence of alteration of lifestyle risk factors in individuals at risk of DM may help in delaying or preventing DM disease especially type 2 DM (Centers for Disease Control and Prevention, 2014). This is closely related to the nurse's function as a nursing service provider to patients with DM. Nurses as part of the health worker also have a responsibility to overcome the problems that arise in patients with DM. The DM risk factors include age, gender, waist

circumference, activity, consumption of fruits and vegetables, history of hypertension and consumption of hypertensive drug, and genetics.

As a preliminary effort in preventing of DM disease, it is important to have information about the healthy community that has not previously been diagnosed with DM, but has the risk to develop into DM disease without pervention effort. This effort can be implemented through community screening with the help of the instrument FINDRISC. This instrument has several advantages such as;user friendly, economic and no need invasive procedures (Linstrom & Tuomilehto, 2003).This study will use an instrument also called FINDRISC (The Finnish Diabetes Risk Score). Linstrom & Tuomilehto (2003) developed FINDRISC as an instrument to identify a person against the risk of developing DM disease with no laboratory tests. In FINDRISC, some data required from respondents will relate to age, body mass index, waist circumference, history of hypertension drug consumption, history of blood sugar measurement, physical activity and fruits consumption, and the degree of vegetables consumption per day.

FINDRISC is the best indicator in determining the prevalence of undiagnosed DM. All the variables tested have a strong association with insulin resistance and also have a higher relation strength to insulin secretion. This was obtained based on analysis of research data through logistic regression to more than 7 thousand respondents in Finland (Wang *et al*., 2010).

In Bukittinggi, the most populated of DM patients is in area of Public Health Canter of Rasimah Ahmadand Tigo Baleh, but there is still no detail data related to healthy individuals who are prediabetics. Therefore, related to one function of the nurse as a researcher, the researcher took this opportunity to get involved in the prevention effort of DM disease through research. The researcher was interested in getting data related to healthy society at risk of DM disease (pre-diabetes) on the community within the scope of Rasimah Ahmad and Tigo Baleh Public Health Center in Bukittinggi 2017.

RESEARCH METHODOLOGY

The research method was cross-sectional Study with survey. The research was conducted in the working area of Rasimah Ahmad and Tigo Baleh Public Health Centers in April-September 2017. The basic consideration of this study was the selection of the research sites because of all health centers in Bukittinggi, the highest incidence of DM disease was at Rasimah Ahmad and Tigo Baleh Public Health Center in Bukittinggi.

The population in the study was healthy individuals who had never been diagnosed with DM and those who stays in the area of Rasimah Ahmad and Tigo Baleh Public Health Center in Bukittinggi. Sampling technique of the study was purposive sampling where the samplewas taken in accordance with the criteria desired by the researcher. The sample of this study were about 500 respondents. The inclusion criteria in this study were healthy individuals who have never been diagnosed with DM previously.

The data were collected by directly takingthem from DM research location. Researcher obtained data from the respondents during interviews and screening. This study used instruments such as FINDRISC and checklist related demographic data.

The validation of FINDRISC against undiagnosed type 2 DM, dysglycemia and metabolic disorders havebeen done by Makrilakis *et al*., (2010) in Greece. This study was conducted on 869 respondents who were willing to undergo a type 2 diabetes prevention skeleton. The results suggest that the FINDRISC questionnaire was a good instrument for cross-sectional skringing to detect undiagnosed diabetes, dysglycemia (prediabetes) against poplation in Greece. .

RESULTS AND DISCUSSION

Total of 500 healthy individuals have returned the questionnaires of FINDRISC with 100% response rate. The demographic characteristics of the respondents were listed in table 1. A total of 500 respondents were sampled with more than half of respondents were female (64%) with age 45 years. All of the respondents have traditional ethnicity in West Sumatera (minang).

Table 1: Demographic Characteristic of Respondent in the Working Area of Rasimah Ahmad and Tigo Baleh Public Health Center in Bukittinggi (N=500) in 2017

	Frequency	Percentage
Age		
<45	255	51.0
45-54	120	24.0
55-64	82	16.4
>64	43	8.6
gender		
Male	181	36
Female	319	64
ethnichity		
Minang	500	100

Based on table 1, respondents come from the adult age has higher number which were around 457 participants comparing with the old ones. The age is considered as a risk factor for diabetes type 2. Broadly, there is the decline condition of insulin function at old age but it will be influenced by lifestyle whether tends to do preventive against DM or vice versa at a young age (Bhalerao *et al*., 2014). The older the age of a person the higher risk of type 2 DM will increase. This is in accordance with the research result conducted in Jeddah where the risk of DM was increased both in men and women over the age of 50 years (Bahijri *et al*., 2016). Other studies also suggest that the highest prevalence of type 2 DM is present at age 59-60 years and will increase by age (Majgi *et al*., 2012). However, there is only 8.6 people aged over 64 years in this study.

Table 2: Frequency distribution of Type 2 DM Risk In Healthy Individuals in the Working Area of Rasimah Ahmad and Tigo Baleh Public Health Center in Bukittingg in 2017. N (500)

Risk OF DM type 2	Frequency	Percentage
Low	125	25.0
Slight	160	32.0
Moderate	106	21.2
High	96	19.2
Very high	13	2.6
Total	500	100

Table 2 shows the risk of type 2 diabetes in healthy individuals in the working area of Rasimah Ahmad and

Tigo Baleh Public Health Center with with the highest percentage was achieved by slightly Elevated risk of DM which was about 32% from total respondents of 500 people. In contrary, very High Risk Achieved by far the lowest persentage which was about 2.6%.

As for the other factor, a resemblance illustrations can be seen on the following finding:

Table 3: Frequency distribution of BMI Risk In Healthy Individuals in the Working Area of Rasimah Ahmad and Tigo Baleh Public Health Center in Bukittingg in 2017. N (500)

BMI	Frequency	Percent
<25	239	47.8
25-30	166	33.2
>30	95	19.0
Total	500	100.0

Based on table 3, the description of Body Mass Index of participants was more higher in the range of Under Weight to normal. In other words, most participants have low risk factors associated with BMI. There was only 19% of respondents had BMI with Over weight. The result of this study suggests that there was only a low percentage of participants have BMI risk factors with overweight or obese categories. Relevant study found that Risk Factors Obesity will cause adipose tissue to release some substances such as fatty acids, glycerol, hormones, proinflamatory cytokines and other factors that can increase the occurrence of insulin resistance (Majgi *et al*., 2012).

Table 4: Frequency distribution of Hypertension Factor Riskin Healthy Individuals in the Working Area of Rasimah Ahmad and Tigo Baleh Public Health Center in Bukittingg in 2017. N (500)

Hipertensi	Frequency	Percent
No	350	70.0
Yes	150	30.0
Total	500	100.0

From table 4, it was known that 70% of respondents do not suffer from hypertension and there was only 30% of respondents suffer from hypertension as a risk factor for diabetes type 2. The incidence of hypertension as a risk factor from type 2 diabetes is still unclear but there

were some hypotheses that can be argued. As an example, high blood pressure can cause microvascular dysfunction that plays a role in the increase of DM type2 disease. In addition, endothelial dysfunction is closely related to the occurrence of insulin resistance (Lima *et al*., 2014; Nguyen *et al.,* 2008; Meigs *et al*., 2004).

Table 5: Frequency distribution of Consumption of Hypertension DrugsIn Healthy Individuals in the Working Area of Rasimah Ahmad and Tigo Baleh Public Health Center in Bukittingg in 2017. N (500)

Hipertensi	Frequency	Percent
Yes	433	86.6
No	67	13.4
Total	500	100.0

From table 5, it is known that only about 13% of participants didn't take hypertension drugs. In this study, it is found that most respondents control their blood pressure by taking hypertension drugs.

Table 6: Frequency distribution of heredity factors In Healthy Individuals in the Working Area of Rasimah Ahmad and Tigo Baleh Public Health Center in Bukittingg in 2017. N (500)

Hipertensi	Frequency	Percent
No	206	41.2
Relative	179	35.8
Sibling	115	23.0
Total	500	100.0

Table 6 Shows that it was found the result 41% of the respondents have no DM offspring. Besides, 23% of respondents have a history of biological parents *(sibling)* and relative who also suffer from DM. Moreover, about 35% of the respondents have a history of having DM is not from family such as uncle and aunt. although the presence of a family history inflicted diabetes type 2 may be a risk factor for DM type 2 but environmental factors may also cause a person to suffer from DM such as stress, socioeconomic, life style and physical activity (Wu *et al*., 2014; Wagner *et al*., 2013).

Table 7: Frequency distribution of smoking factor Risk In Healthy Individuals in the Working Area of Rasimah Ahmad and

Hipertensi	Frequency	Percentage
No	400	80.0
Yes	100	20.0
Total	500	100.0

Table 10 shows that 80% of respondents are not smokers. There were only about 100 people mentioned as active smokers. From the results of this study, it was known that less than ¼ of the participants as active smokers where cigarettes can contribute to the occurrence of resistance to insulin (Oba *et al*., 2012).

CONCLUSION

From the results of this study itcan be concluded that: there are 5 categories of healthy individuals who are at risk of type2 Diabetes Mellitus, there are low risk, slight risk, moderate risk, high risk, and very high risk. The highest percentage for the risk of type 2 diabetes in healthy individuals in the area of "Rasimah Ahmad and Tigo Baleh Public Health Center" was achieved by slightly Elevated risk of DM (32%) Which is estimated 1 in 25 will develop to DM.Suggestion for further research is recommended to create a suitable method as a self-management controlling the blood glucose for those individuals whose have the risk of type 2 DM.

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