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DESCRIPTIVE STUDY OF DIETARY PATTERNS AND PHYSICAL ACTIVITIES AMONG PATIENTS WITH TYPE 2 DIABETES MELLITUS IN COMMUNITY HEALTH CENTER OF KESUNEAN, CIREBON

Hanif Haidaryafi, Muhammad Edial Sanif, Ignatius Hapsoro Wirandoko

Faculty of Medicine, Universitas Swadaya Gunung Jati

*Corresponding author's email: Hanifhaidaryafi@gmail.com

ABSTRACT

***Background**: The prevalence of Diabetes Mellitus (DM) remains high in Indonesia. The Basic Health Research of Indonesia in 2018 revealed that 2% of 250 million population were diagnosed of DM. Unbalanced dietary patterns and lack of physical activities contributed as the risk factors of DM type 2. Particularly, this study wants to find out the description of dietary patterns and physical activities among patients in the community health center of Kesunean, Cirebon.*

***Methodology**: This descriptive study used 89 people with DM type 2 aged 45-65 years as the respondents. Consecutive sampling was used as the sampling technique, while recall questionnaire of 24-hour food consumption and food frequency for diet and Baecke questionnaire for physical activity were used as data collection techniques.*

***Results**: The results of frequency distribution analysis showed that 64 (71.9%) respondents had unbalanced diets, while 25 (28.1%) of them had balanced diets. Regarding physical activities, 51 (57.3%) respondents had low intensity of physical activities and 38 (42.7%) patients had moderate intensity of physical activities.*

***Conclusion**: Most of the respondents with DM type 2 had unbalanced diets and low intensity of physical activities. Community Health Center of Kesunean should provide communication, information and communication about the importance of balanced diets and physical activities in order to prevent the incidence of DM type 2.*

***Keywords**: Physical activity, diet, type 2 diabetes mellitus*

INTRODUCTION

Diabetes mellitus is a metabolic disorder with a multifactorial etiology. It is characterized with chronic hyperglycemia and able to affect the metabolism of carbohydrates, proteins and fats. Diabetes mellitus has various symptoms, such as polyuria (lots of urination), polydipsia (lots of drinking), and polyphagia (lots of eating) with weight loss. Hyperglycemia can cause damage to blood vessels before the disease is detected [1,2].

The International of Diabetic Federation (IDF, 2017) states the global prevalence rate of Diabetes Mellitus patients in 2017 is 425 million and is predicted to continue to reach 629 million by 2045. Indonesia is a country with more than 10 million people with diabetes mellitus. [3] Indonesia basic health research data (2018) shows that the cases of diabetes mellitus (DM) have increased from 1.5% in 2013 to 2.0% in 2018 from a total population of 250 million. (1.4).

Furthermore, it is also found that unbalanced dietary patterns and lack of physical activities were the most influential risk factors compared to other risk factors in the increasing cases of type 2 diabetes mellitus in Indonesia with a 53% percentage for unbalanced diets and 26.1% for the lack of physical activity. It occurred due to lack of physical activity and imbalance of dietary patterns can affect the buildup of blood sugar levels. In addition, the data also shows that the largest population of people with type 2 diabetes mellitus in Indonesia is in the age group of 45-70 years; thus, the age group of 45-65 years is chosen in this study. Based on the annual reporting data of non-communicable diseases programs in the Health Office of Cirebon City and the elderly program at the Community Health Center of Kesunean, it was found that type 2 diabetes mellitus was ranked second as the non-communicable disease with 125 patients consisting of 31 male patients and 94 female patients. It is estimated that there are still some patients who have not been recorded because of a lack of awareness and knowledge about the importance of applying a balanced diet and good physical activity and a lack of enthusiasm for routine health checks. Whereas, there are several work programs in community health center such as the elderly courtesy program and integrated coaching program that can be used by the community as a means to increase knowledge about diabetes mellitus and other non-communicable diseases and to conduct routine health checks. Therefore, the researchers feel the need to look at an overview of dietary pattern and physical activity of people with type 2 diabetes mellitus in Community Health Center of Kesunean. [4.5.6]

METHOD

This research is a descriptive study involving 89 patients with type 2 diabetes mellitus aged 45-65 years from Community Health Center of Kesunean, Cirebon, West Java, Indonesia. Samples are determined with consecutive sampling and sample size is determined using Isac Michael Tables. The inclusion criteria for the study subjects are patients with type 2 diabetes mellitus aged 45-65 years enrolled in Community Health Center of Kesunean. The exclusion criteria for this study are patients with mental disorders and patients with type 2 diabetes mellitus who had complications causing difficulties in their daily activities.

Diabetes mellitus is diagnosed by a doctor in charge at the Community Health Center after physical and supporting examinations. The cases of diabetes mellitus in the Community Health Center of Kesunean are determined based on data from the elderly program and non-communicable disease programs for the past 4 years.

The subjects of the dietary pattern are determined from two questionnaires, the food recall questionnaire which is to describe how many calories consumed by the subject in a day and the Food Frequency questionnaire which is to find out how often the subjects have meals in a day and what type of food contained in one menu. As a result, the respondents' dietary patterns will be divided into 2 categories, i.e. balanced and unbalanced. A balanced diet is a diet with meals 3 times a day and intermittent meals 2 times a day with materials that contain building and regulating substances in which the calories for men: 2470 kcal and women: 1740 kcal. Meanwhile, an unbalanced diet is a diet with meals less than 3 times a day with or without interlude and with or without building and regulating substances in which the number of calories does not meet the predetermined standards.

Subject physical activity status is obtained after calculating the physical activity index of the Baecke questionnaire with 22 questions about their daily activities, such as physical activity during work time, exercise time, and free time. This questionnaire is chosen because it is often used by several previous studies discussing physical activity, has detailed questions and an easy calculation method but still has fairly accurate results. The calculation of the results from the Baecke questionnaire is as follows:

Table 1. Baecke Questionnaire Formula

Index	Formula
Index of work time	((6- (point for seating)) + SUM (point for other 7 parameters))/8
Index of exercise time	(SUM (point for all 4 parameters))/4
Index of free time	((6-(point for watching TV) + SUM (point for other 3 items)) / 4
Index of physical activities	Index of work time + index of exercise time + index of free time

Index score ≤ 6.5 is considered activity with low intensity, 6.5 – 9.5 is considered activity with moderate intensity, and ≥ 9.5 is considered activity with high intensity. Data analysis in this study uses frequency distribution.

RESULT

Distribution of physical activity, dietary patterns and diabetes cases of respondents in this study are illustrated in the following table:

Table 2. Distribution of all variables

Physical activities	F	P (%)
Low	51	57.3
Moderate	38	42.7
High	0	0
Total	89	100
Dietary pattern		
Balanced	64	71.9
Unbalanced	25	28.1
Total	89	100
Type 2 Diabetes Mellitus at age group of 45 – 65 years	89	100

From Table 2, respondents who had low intensity of physical activity were 51 respondents or 57.3% while respondents who had moderate intensity of physical activity were 38 respondents or 42.7%, and respondents who had high intensity of physical activity were 0 respondents or 0%. These results indicate that respondents with low intensity of physical activity or having physical activity index ≤ 65 are higher than respondents with moderate intensity of physical activity or with physical activity index 6.5-9.5; however, there are no respondents with high intensity of physical activity or activity index ≥ 9.5. Respondents who had an unbalanced diet were 64 respondents or 71.9%, while respondents with a balanced diet were 25 respondents or 28.1%. These results indicate that there are a lot of respondents who had an unbalanced diet such as eating more than three times a day consuming foods that have high glucose levels and with caloric intake that exceeds predetermined standards.

In the table above, there are 89 respondents who suffer from type 2 diabetes mellitus at the age of 45-65.

DISCUSSION

This study shows that respondents who have low, moderate and high intensity of physical activity are 57.3% (51 patients), 42.7% (38 patients) and 0% (0 patients), respectively. It indicates that most respondents had low intensity of activities physical. It is also found that respondents who had a balanced and unbalanced diet were 28.1% (25 patients) and 71.9% (64 patients), respectively. It indicates that the majority of respondents had an unbalanced diet such as eating more than three times a day by consuming foods with high levels of glucose and calories.

Physical activity carried out by most patients was not in accordance with physical activity recommended for people with diabetes mellitus. The intensity of physical activity carried out by patients determines

blood sugar levels and insulin levels used to absorb glucose in the tissues while physical activity with low intensity cannot significantly reduce blood sugar levels. It is in line with the previous research by Fuad (2014) who says that low intensity of physical activity in patients with type 2 diabetes mellitus could not significantly reduce glucose levels compared to moderate intensity of physical activity. [8] It occurs because the absorption of glucose by the body's tissues at rest requires insulin; meanwhile, in active muscle conditions, absorption of glucose by tissue is not accompanied with an increase in insulin levels despite increased glucose requirements which can reduce insulin resistance in blood. Therefore, someone with more intense physical activity has a lower risk of suffering from diabetes mellitus, while someone with a low intensity of physical activity has a higher risk of suffering from type 2 diabetes mellitus [8,9,12].

Physical activities recommended for patients with type 2 diabetes mellitus include physical exercise, i.e. aerobic with moderate intensity (50-70% maximum heart rate) such as brisk walking, cycling, jogging, and swimming. Maximum heart rate is calculated by reducing the number 220 with the patient's age. Daily physical activity and physical exercise are carried out regularly 3-5 times a week for about 30-45 minutes, with a total of 150 minutes per week and pause between exercises no more than 2 consecutive days. It is recommended to do a blood glucose check before physical exercise. For blood glucose level of 250 mg/dL, it is recommended to delay physical exercise. In patients with DM without contraindications (for examples: osteoarthritis, uncontrolled hypertension, retinopathy, nephropathy), it is recommended to also carry out resistance training 2-3 times/week in accordance with the doctor's instructions. Physical exercise should be adjusted to the age and physical fitness status. The intensity of physical exercise in people with DM who are relatively healthy can be increased, while those with DM with complications, the exercise intensity need to be reduced and adjusted to each patient. [15]

The dietary pattern applied by most patients is not in accordance with the recommended diet for patients with type 2 diabetes mellitus. An unbalanced diet can increase patients' blood sugar levels to be increasingly uncontrolled and increase the risk of complications such as nerve disorders, eyes, ulcer and kidney. It is in line with Arora et al. (2005) stating that carbohydrate/glucose levels in the diets of diabetic patients can affect patients' blood sugar levels. The lower the level of carbohydrates in the diet of patients dietary, the more controlled the patients' blood sugar levels [12.13.14]. As for the recommended dietary pattern for patients with diabetes mellitus includes recommended carbohydrates at 45-65% of total energy intake, especially high-fiber carbohydrates, total carbohydrate restrictions, recommended fat intake is 20-25% of caloric needs, not exceeding 30% of total energy intake. In addition, the foods that need to be restricted are those that contain lots of saturated fat and trans-fat including fatty meat and full cream milk; not to mention, the recommended cholesterol consumption is <200 mg/day and protein requirements are 10-20% of total energy intake. In patients with diabetic nephropathy, it is necessary to decrease protein intake to 0.8 g/kg BW per day or 10% of energy needs, with 65% of them having high biological value, except for DM patients who have undergoing hemodialysis protein intake to 1-1.2 g/kg BW per day. [15]

The unbalanced dietary pattern and bad physical activity found in the work area of Community Health Center of Kesunean was because most people do not understand what and how to implement a balanced diet and good physical activity and there are still many people who often have fast food/instant food with high glucose and calorie levels and have no good physical activity. In fact, the Community Health Center of Kesunean has conducted several activities to provide education about non-communicable diseases and to collect data on people with non-communicable diseases such as elderly people, integrated coaching program, non-communicable diseases programs (PPTM), etc. It happens because there are a lot of people who do not want to take a medical test for fear of being diagnosed with the disease. Even though, the fact is that the sooner someone is diagnosed with an illness, the faster the treatment will be given and can increase the chances of recovery [6.7]. The Community Health Center of Kesunean is expected to provide counseling about balanced diet and good physical activity referring to the provisions set by the ministry of health to the community both those who have not suffered from

type 2 diabetes mellitus and those who have suffered from type 2 diabetes mellitus to optimize prevention of new cases as well as complications of type 2 diabetes mellitus.

CONCLUSION

This study shows that the majority of type 2 diabetes mellitus patients in the work area of Community Health Center of Kesunean have poor habits of physical activity and unbalanced dietary patterns. Future studies are expected to be able to analyze more broadly the other risk factors of type 2 diabetes mellitus. It is also expected that community health center of Kesunean can provide counseling on balanced diet and good physical activity referring to the provisions set by the Ministry of Health to the community who have not been affected by type 2 diabetes mellitus and those who have had type 2 diabetes mellitus to optimize the prevention of new events and complications.

CONFLICT OF INTEREST

The author declares that there is no conflict of interest.

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