

The Physical Activity of Patients Diagnosed with Diabetes Mellitus: A Basis for A Counseling Program

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ABSTRACT

Physical activity is good to exercise every day. It means that people have to know what will they do and when will they do. Some of people had already diagnosed with diabetes mellitus that means they have to know their exercise completely suitable with them. The purpose of this study was to analysis factors that affected assessment physical activity of patients with diabetes mellitus. This study was cross sectional design with descriptive survey approach. There are 72 respondents taken as subjects in this study. Quantitative data in this study used frequency, percentage, mean value, and chi-square test. Rating assessments for physical activity in this study ranged from very high, high, moderate, to low degree. The results showed that there was no significant difference on the participant's physical activity and their age, body mass index, and history of smoking. However, there was a significant difference on the participant's physical activity and their gender, blood sugar levels. Assessment of this physical activity through the Diabetes Mellitus Self-Management Questionnaire (DSMQ) by looking at control of their physical activity, it is considered an effective approach to treat a variety of patients conditions diabetes mellitus through a counselling program. The conclusion on this study that physical activity behaviour of respondents has an influence on blood sugar levels. It recommended that patients with diabetes mellitus control physical activity because it can help patients to control blood sugar within normal limits.

Keywords: Physical Activity, Patients, Diabetes Mellitus, Counseling Program

INTRODUCTION

The latest global estimates from the International Diabetes Federation forecast that by 2040, 642 million people will be living with diabetes (The Lancet, 2017). World Health Organization (2017) stated that the number of people with diabetes has risen from 108 million in 1980 to 422 million in 2014 and the global prevalence of diabetes among adults over 18 years of age has risen from 4.7% in 1980 to 8.5%.

Patients with diabetes has a problem with blood sugar levels who were experiencing hyperglycemia. One way to be able to control blood sugar in patients with diabetes was counseling. This is due to the fact that the patient needs the delivery in controlling patient's own blood sugar. According to the American Counseling Association, counseling is defined as, a professional relationship that empowers diverse individuals, families, and groups to accomplish mental health, wellness, education, and career goals (Austin, 2017).

Based on data from Indonesian Central Bureau of Statistics in 2003, it is estimated that Indonesians aged over 20 years are 133 million. With a DM prevalence of 14.7% in urban areas and 7.2%, in rural areas, it is estimated that in 2003 there were 8.2 million people with diabetes in urban areas and 5.5 million in rural areas (Mayasari, et al., 2014).

South Sulawesi provincial health data showed that patients with diabetes mellitus treated at community health clinic in 2010 were 9.61%, 2011 was 9.32%, increased in 2012 by 12.6%. The data of Makassar City health Office reveals that the diabetes mellitus patients in 2012 as many as 14.067 cases, increased by 14.604 cases in 2013, and in 2014 increased by 21.452 cases (Syatriani, 2017).

The hospital medical records in Labuang Baji Hospital and Pelamonia Hospital Makassar, shows that the data on the number of people with diabetes mellitus is still very much happening. In Labuang Baji Hospital Makassar in 2010 the number of diabetes

mellitus cases was as many as 476 cases, in 2011 was as many as 672 cases, and in 2012 was as many as 682 cases (Mayasari, et al., 2014).

In Addition, data of diabetes mellitus in Pelamonia Hospital Makassar were increasing from about 1.375 people in 2012, about 1.568 people in 2013, and about 1.792 people year 2014 (Usman, 2017).

According to Schmitt et al. (2013), patients with good glycemic control reported significantly more glucose management, dietary control, physical activity, and health-care use than those with poor control.

World Health Organization projects that diabetes will be the seventh causes of the death in 2030. Nevertheless, healthy diet, regular physical activity, maintaining a normal body weight and avoiding tobacco use are ways to prevent or delay the onset of type 2 diabetes (WHO, 2017).

A retrospective cohort study conducted by Franklin (2012) claimed that regularly scheduled lifestyle counseling in real-world settings motivates patients with diabetes to achieve targeted average blood glucose more quickly than scenarios in which patients receive physician advice less frequently. However, one of the factors of a treatment failure is non-adherence to planned therapy, one of the most important attempts to improve patient adherence to therapy is by providing comprehensive, accurate, and structured counseling about the therapy. The existence of this counseling is very important because diabetes is a disease associated with patient lifestyle, distinctive physical activity.

Therefore, the purpose of this study was to analysis factors that affected the assessment of physical activity patients with diabetes mellitus to propose a counseling program.

MATERIAL AND METHOD

In this paper, the researcher used descriptive survey study which described the self-care behaviour distinctive physical activity of patients diagnosed with diabetes mellitus as a basis for the purpose of counselling program.

The participants of the study are those included in the criteria inclusion which was 72 participants. The inclusion criteria as following : hospitalized in Labuang Baji Hospital and Pelamonia Hospital Makassar; participants aged above 18 years old; participants are willing to participate in the study; participants are diagnosed type 1 or type 2 diabetes mellitus; participants have limited information about control of blood sugar; participants disposed to cooperate and willing to fill the instrument which the researcher provided.

Participants who are reluctant to participate in the study are excluded as participants because they are not included in the inclusion criteria in this study.

The primary data in this study was the profile of the participants in terms of age, gender, blood sugar levels, body mass index, and history of smoking. In addition, the questions for diabetes mellitus used Diabetes Self-Management Questionnaire (DSMQ) by Schmitt, et al. (2013) to assessed self-care behaviour participants. In this study will focus on the physical activity.

Furthermore, the primary data of blood sugar levels was from using blood glucose meter ACCU Check. The researcher was using random plasma glucose test which means that if participants who had 200 mg/dl was have high blood sugar levels.

Moreover, the primary data of body mass index was used plat form scale in the hospital to know participants' weight and height. After

that, the researchers grouped body mass index become underweight, normal weight, overweight, and obese which according by American Cancer Society (2016).

In addition, the researcher was used Self-Management Questionnaire (DSMQ) by Schmitt, et al. (2013) to assessed self-care behaviours participants. The rating scale was designed as a four-point Likert scale with response options “applies to me very much” (three points), “applies to me to a considerable degree” (two points), “applies to me to some degree” (one point), and “does not apply to me” (zero point). The responses were converted such that higher scores are indicative of more effective self-care (Schmitt, et al., 2013).

Fatimah (2016) asserted diabetes self-management questionnaire (DSMQ) in Indonesian language which valid and reliable already. The validity and reliability test conducted data retrieval from 30 participants who are people with diabetes mellitus in Posbindu Working Area Puskesmas Pisangan. The validity test results of the DSMQ questionnaire or self-management questionnaire are as follows: test results validity and reliability with degree of freedom $30 - 2 = 28$ (r table 0,312). While the results of reliability test questionnaire is alpha cronbach's r 0,635 so that the questionnaire is declared reliable.

Data gathering procedure, the first step was submitted proposal of this study to Ethics Reviews Committee (ERC). The ERC has reviewed and has approved with minor modification as submitted under Expedited Review. After that, the researcher integrated the recommendations, submitted a revised copy of the proposal and attached compliance from to ERC for compliance checking.

Furthermore, the next step in this study was conducted by seeking permission through

formal letter. After that, the researcher sought informed consent from participants. And then, the researcher gave Diabetes Self-Management Questionnaire (DSMQ) to the respondents.

The data was analysed by using the Statistical Package for the Social Sciences (SPSS 21.0). The following statistical tools and measurements were used to analyse and interpret the data gathered as follows: frequency and percentage distribution (%) were used to present the age, gender, and history of smoking; weighted mean (M) were used to describe the blood sugar level, body mass index and self-care degree; chi-square test was used to determine the significant difference on self-care behaviours of the participants when grouped according to profile variables in general and in terms of physical activity.

RESULT AND DISCUSSION

In this case, it presented about the presented about the presentation and discussion of results on the profile of diabetes mellitus patients. The profile of diabetes mellitus patients includes age, gender, and history of smoking which interpreted frequency and percentage distribution (%). And then, weighted mean (M) will be used to describe the blood sugar level, BMI, and self-care degree.

Below is the interpretation frequency and percentage distribution (%) age of diabetes mellitus patients in Labuang Baji and Pelamonia Hospital as follows:

Table 1. Interpretation Age of Diabetes Mellitus Patients

Age	Frequency	Percentage
Less than equal to 45 years old	28	38.9%
More than 45 years old	44	61.1%

Total 72 100%

Data Source: Primary Data

The result of the research in the table 1 shows the ages of participants in 2 hospitals were found excessively more than 45 years old. There with ages more than 45 years old include 44 participants with a percentage 61.1%. Meanwhile, ages less than or equal to 45 years old are 28 participants with a percentage 38.9%. This indicates that majority of the diabetes mellitus patients are older adults.

Conceptually, DM patients experienced the highest number of cases occurred in the age range of the elderly by age group based on the Ministry of Health Republic of Indonesia (2009) ranging from 46 years to 55 years as many as 22 people respondents (50%) (Depkes RI, 2008). This data is consistent with statements from the American Diabetes Association (ADA), that age above 45 years is one of the risk factors for type 2 diabetes (ADA, 2008).

Below is the interpretation, frequency and percentage distribution (%) gender of diabetes mellitus patients in Labuang Baji and Pelamonia Hospital as follows :

Table 2. Interpretation Gender of Diabetes Mellitus Patients

Gender	Frequency	Percentage
Male	25	34.7%
Female	47	65.3%
Total	72	100%

Data Source: Primary Data

The result in table 2 shows that majority on 65.3% of the participants in 2 hospitals are female. Thus implies that majority of the DM patients are female. Conceptually, results of research conducted by Koja Hospital stated that the prevalence of type 2 diabetes mellitus that occurs in women is 62%, greater than the prevalence in men (Santoso, et al., 2004).

The third is the interpretation of frequency of frequency percentage distribution (%), and

weight mean blood sugar level of diabetes mellitus patients in Labuang Baji and Pelamonia Hospital as follow :

Table 3. Interpretation Blood Sugar Level of Diabetes Mellitus Patients

Blood Sugar Level	Frequency	Percentage	Descriptive Interpretation
Below 200 mg/dl	19	26.4%	Diabetic with High Blood Sugar
200 mg/dl or more	53	73.6%	
Total	72	100%	

Mean Weight = 281.13

Data Source: Primary Data

As shown in the table, majority on 73.6% of the participants have blood sugar levels which are more than 200 mg/dl. This means that the diabetes mellitus have high blood sugar levels. This implies that at through majority of them are diabetic patients, through their implication to medication or interventions, their usual high blood sugar levels when reduced to normal levels.

Conceptually, diabetes is a serious life-long health condition that occurs when the amount of glucose (sugar) in the blood is too high because the body can't use it properly. If left untreated, high blood glucose levels can cause serious health complications (Diabetes UK, 2017).

The fourth is the interpretation of frequency percentage distribution (%), weight mean body mass index of diabetes mellitus patients in Labuang Baji and Pelamonia Hospital as follow:

Table 4. Interpretation Body Mass Index of Diabetes Mellitus Patients

Body Mass Index	Frequency	Percentage	Descriptive Interpretation
Underweight	3	4.2%	Normal
Normal weight	29	40.3%	Weight

Overweight	19	26.4%
Obese	21	29.2%
Total	72	100%
Mean Weight = 26.35		

Data Source: Primary Data

Table shows that 40.3% of the participants have normal BMI, 40 or 55.6% are above normal levels as shown by the specific data for which participants who are 19 or 26.4% are considered overweight, and 21 or 29.2% are obese.

Conceptually, BMI is often used as a screening tool to decide if patient's weight might be putting patient at risk for health problems such as diabetes, heart disease, and cancer (American Cancer Society, 2016).

The fifth is interpretation of frequency and percentage distribution (%) history of smoking diabetes mellitus patients in Labuang Baji and Pelamonia Hospital as follows below:

Table 5. Interpretation History of Smoking Diabetes Mellitus Patients

History of Smoking	Frequency	Percentage
Yes	19	26.4%
No	53	73.6%
Total	72	100%

Data Source: Primary Data

Majority of 73.6% are non-smokers and 9 or 26.4% are smokers. The result implies that smokers for the majority of the participants are not as risk factor for being diabetic patients. The study further found out that smokers are male.

In addition, according to Patja, et al. (2005), smoking is a risk factor for type 2 diabetes independently of BMI and physical activity.

The sixth, in the below is interpretation frequency, percentage distribution (%), and weighted mean physical activity of diabetes mellitus patients in Labuang Baji and Pelamonia Hospital as follows:

Table 6. Interpretation Physical Activity of Diabetes Mellitus Patients

Physical Activity	Frequency	Percentage	Descriptive Interpretation
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Physical Activity	Frequency	Percentage	Descriptive Interpretation
Very high degree	6	8.3%	Low Degree
High degree	14	19.4%	
Moderate degree	12	16.7%	
Low degree	40	55.6%	
Total	72	100%	
Mean Weight = 4.8915			

Data Source: Primary Data

The result of the research in table 6 shows that the physical activity of participants in 2 hospitals is found to be in low degree. Physical Activity is very high degree for 6 or 8.3% of them, high degree for 14 or 19.4%, and moderate degree for 12 or 16.7%. In general, the weighted mean of 4.8915 indicates that the diabetes mellitus patients cover in the study is low degree physical activity. This means that most of majority of them do not in case that allow their calories to burn. Thus, it could possible contribute them to being diabetes mellitus.

Conceptually, physical activity includes all movement that increases energy use, whereas exercise is planned, structured physical activity. Exercise improves blood glucose control in type 2 diabetes, reduces cardiovascular risk factors, contributes to weight loss, and improves well-being (Lin, et al., 2015).

The seventh, below is chi-square analysis of the participant physical activity levels when grouped according to age as follows:

Table 7. Chi-Square Analysis of the Participants Physical Activity Levels when Grouped According to Age

Variable		Physical Activity				Total	Decision Value
		Very High Degree	High Degree	Moderate Degree	Low Degree		
Age	≤ 45 years old	0	5	3	20	28	Accept H0
	> 45 years old	6	9	9	20		
Total		6	14	12	40	72	
X ² Value = 6.929							
P - Value = 0.074							

Data Source: Primary Data

As shown by the computed p-value of 0.074 in the table, the levels of physical activity of participants do not significantly when they are grouped according to age. This means the same physical activity.

This is in line with Mooradian et al (1999) which management strategies for diabetes in older adults are no different from those of diabetes in younger groups.

The eighth, in the below is chi-square analysis of the participant physical activity levels when grouped according to gender as follows:

Table 8. Chi-Square Analysis of the Participants Physical Activity Levels when Grouped According to Gender

Variable	Physical Activity				Total	Decision Value
	Very High Degree	High Degree	Moderate Degree	Low Degree		
Gender						
Male	3	4	9	9	25	Reject H0
Female	3	10	3	31	47	
Total	6	14	12	40	72	

X² Value = 12.077
P – Value = 0.007

Data Source: Primary Data

Table 8 shows that there is a significant difference on the physical activity of male and female participants. This is appropriated by the X² value 12.077 and the p – value of 0.007. As shown in table, the proportion of those with low degree of physical activity is females. Interpretation of the table 8, the participants is housewife for female and the male participants have heavy work. Thus, they have activities but different types of burning blood glucose.

According to Willer et al (2016) claimed diversities in biology, culture, lifestyle, environment, and socioeconomic status impact differences between male and females in predisposition, development, and clinical presentation.

The ninth, in the below is chi-square analysis of the participants physical activity levels when grouped according to blood sugar levels as follows:

Table 9. Chi-Square Analysis of the Participants Physical Activity Levels when Grouped According to Blood Sugar Levels

Variable	Blood Sugar Levels	Physical Activity				Total	Decision Value
		Very High Degree	High Degree	Moderate Degree	Low Degree		
	Below 200 mg/dl	6	9	3	1	19	Reject H0
	200 mg/dl or more	0	5	9	39	53	
Total		6	14	12	40	72	

X² Value = 38.851
P – Value = 0.000

Data Source: Primary Data

The data in table 9 show that there is a significant difference on the physical activity of participants when grouped according to blood sugar levels as supported by the p-value of 0.000. As shown in the table, the highest proportion of those with moderate to low levels of physical activity is there with high blood sugar levels. On the contrary, those with low blood sugar levels have high to very high degree of physical activity.

This is in line with Schmitt et al (2013) stated patients with good glycaemic control reported significantly more physical activity.

The tenth, in the below is chi square analysis of the participant physical activity levels when grouped according to body mass index as follows:

Table 10. Chi-Square Analysis of the Participants Physical Activity Levels when Grouped According to Body Mass Index

Variable	Body Mass Index	Physical Activity				Total	Decision Value
		Under-Weight	Normal Weight	Over-Weight	Obese		
	Under-Weight	0	0	0	3	3	Accept H0
	Normal Weight	5	9	5	10	29	
	Over-Weight	0	4	3	12	19	
	Obese	1	1	4	15	21	
Total			14	12	40	72	

X² Value = 14.977
P – Value = 0.092

Data Source: Primary Data

In the table 10, it shows that there is no significant difference in the physical activity of the participants when grouped according to body mass index of participants has the same degrees of physical activity.

This is in line with theory of Moordian et al (1999) which claimed diet and exercise is often required for optimizing blood glucose control. Target blood glucose ranges should be individualized.

The eleventh, in the below is chi-square analysis of the participants physical activity levels when grouped according to history of smoking as follows:

Table 11. Chi-Square Analysis of the Participants Physical Activity Levels when Grouped According to History of Smoking

Variable		Physical Activity				Total	Decision Value
		Very High Degree	High Degree	Moderate Degree	Low Degree		
History of Smoking	Yes	2	3	6	8	19	Accept H0
	No	4	11	6	32	53	
Total		6	14	12	40	72	
X ² Value = 4.611							
P – Value = 0.203							

Data Source: Primary Data

In the table 11, it shows there is no significant difference in the physical activity of the participants when grouped according to history of smoking with p-value 0.203 through chi-square test. This means that participants who have and who do not have history of smoking have the same degree of physical activity.

In addition, Patja et al (2005) stated smoking is a risk factor for type 2 diabetes independently of physical activity.

CONCLUSION

The summary of finding on this study detailed in the below as following: the profile of the participants that is majority of the participants are above 45 years old; majority of the participants are female; majority of the

participants have high blood sugar levels; the most of the participants are normal weight; majority of the participants are non-smokers.

In addition, the degree of manifestation of the self-care behaviour of the participants in general and in terms of physical activity. In general terms, majority of the participants are diabetes mellitus patients have low degree of physical activity. In specific terms, there is no significant difference on the participant's physical activity and their age, body mass index, and history of smoking. Moreover, there is a significant difference on the participant's physical activity and their gender, blood sugar levels.

Counseling program can be purposed to enhance self-care behaviours, distinctive physical activity.

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