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Research Article

Glycemic Control in Patients with Type 2 Diabetes Mellitus: Descriptive Survey in Makassar City Hospitals

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Abstract

Aims: This study aims to determine the frequency distribution based on the respondent's glycemic control in the hospitals in Makassar City
Methdos: This research is a non-experimental quantitative research using descriptive method. This research was conducted in hospitals in Makassar City, South Sulawesi (RSUD Kota Makassar, Bhayangkara Hospital Makassar, Pelamonia Hospital Makassar, Labuang Baji Hospital, RSUD Haji Makassar, and Ibnu Sina Hospital Makassar). The total of samples in this study amounted to 291 patients with diabetes mellitus using purposive sampling.
Results: Based on the results of the our study, it was found that there were 161 (55.3%) people with diabetes mellitus with less glycemic control and 130 (44.7%) people with diabetes mellitus with good glycemic control.
Conclusions: In the management of diabetes management with monitoring blood sugar levels is very important. Thus, good glycemic control will be declined diabetes complications. Consequently, it is highly recommended for people with diabetes mellitus to reduce the complications of Type 2 DM by complying with glycemic control.

Keywords :
Diabetes mellitus, glycemic control, complications

INTRODUCTION

Type 2 diabetes is the most common form of diabetes and it means that your body doesn't use insulin properly (1). Insulin resistance and glucose intolerance lead to hyperglycemia and changes in lipid and protein metabolism (2). While some people can control their blood sugar levels with healthy eating and exercise, others may need medication or insulin to manage it (1). Type 2 diabetes mellitus is related to metabolic disorders in the body such as the pancreas, muscles, intestines, especially in fat cells which causes increased lipolysis and decreased lipogenesis (3). Optimal glycemic control is fundamental to the management of diabetes (4).

The global prevalence of Diaebets Mellitus (DM) in 2019 is estimated at 463 million people (5). The International Diabetes Federation (IDF) estimates that there are at least 463 million people aged 20-79 years in the world who suffer from diabetes in 2019 or equivalent to a prevalence rate of 9.3% of the total population at the same age.

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Jurnal Keperawatan Komprehensif
Vol. 8 No.1 January 2022

Based on gender, the IDF stated that the prevalence of DM sufferers in 2019 was 9% in women and 9.65% in men. It is estimated that the prevalence of DM will increase as the population ages to 19.9% or 111.2 million people aged 65-79 years. It is predicted to continue to increase to reach 578 million in 2030 and 700 million in 2045. Indonesia is ranked 7th in the world for the prevalence of Diabetes Mellitus of 10.7 million, and Indonesia ranks 3rd with a total prevalence of 11.3 % in Southeast Asia (5). The overall incidence of DM sufferers in 2019 in various countries based on the 10 largest, namely China (116.4 million), India (77 million), United States (31 million), Pakistan (19.4 million), Brazil (16, 8 million), Mexico (12.8 million), Indonesia (10.7 million), Germany (9.5 million), Egypt (8.9 million), and Bangladesh (8.4 million) suffer from DM. In South Sulawesi alone, the number of people with diabetes mellitus based on a doctor's diagnosis reached 0.9% of the total prevalence of diabetes mellitus in Indonesia (7).

According to the International Diabetes Federation (IDF), people with diabetes are at a higher risk of developing a number of disabling and life-threatening health problems than people without diabetes. Consistently high blood glucose levels can lead to serious illnesses that affect the heart and blood vessels, eyes, kidneys and nerves. Patients with diabetes are also at high risk of infection. In almost all high-income countries, DM is the leading cause of cardiovascular disease, blindness, renal failure, and lower extremity amputations. The prevalence of type 2 DM will increase in low and middle income countries if there is no effective management and strategy for its handling (8). Diabetes mellitus cannot be cured, but the patient's blood sugar levels can be controlled. In diabetes control, monitoring glycemic levels is very important. In addition to controlling blood sugar, people with diabetes mellitus are expected to be able to comply with the treatment given, low medication adherence will result in an increased risk of complications (9).

Diabetes mellitus also has an economic burden that includes the direct costs of treating diabetes and its complications, the costs of lost productivity due to diabetes and its complications, and the costs of having diabetes-related disabilities(10); (11). Patients with diabetes are required to maintain the level of glucose in the body in order to remain at a healthy level. Because the level of hospitalization for diabetic patients is high(12). In the management of diabetes mellitus, monitoring blood sugar levels is important. Good glycemic control is to reduce diabetes complications (13).

In fact, glycemic control is very important and monitored because it can help establish the diagnosis, management, and prognosis of type 2 diabetes. Thus, the researcher wanted to know the glycemic control in patients with type 2 diabetes mellitus: a descriptive survey based hospital, especially in Makassar City.

METHODS

Location, Population, Sample, Data Collection

This research is a non-experimental quantitative research using descriptive method. Descriptive research is conducted to describe a symptom, event, and incident that occurs factually, systematically, and accurately. This research was conducted in six hospital in Makassar City, South Sulawesi such as RSUD Kota Makassar, Bhayangkara

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Jurnal Keperawatan Komprehensif
Vol. 8 No.1 January 2022

Hospital Makassar, Pelamonia Hospital Makassar, Labuang Baji Hospital, RSUD Haji Makassar, and Ibnu Sina Hospital Makassar. The total samples in this study amounted to 291 patients with diabetes mellitus using non-probability sampling with purposive sampling. This research data collection uses primary data by providing questionnaires uses a Likert scale according to sample criteria. The questionnaire used was adapted and improved the sentences structure (14) (15).

Sample Criteria

1. Inclusion Criteria

Inclusion criteria are general subjective characteristics of the study target population, affordable to be studied. In determining the inclusion criteria, scientific considerations can be used as a guide:

a. Respondents suffering from diabetes with or without complications
b. Respondents are over 20 years old
c. Respondents who are willing and willing to cooperate in this research.
d. Repondents stay in Makassar and control in hospital

2. Exclusion Criteria

Exclusion criteria is to eliminate/ exclude subjects who meet the inclusion criteria for various reasons:

a. Respondents who were not present when the research was conducted.
b. Respondents who do not have a history of diabetes mellitus.

RESULTS

1. Characteristics of Respondents in Makassar City Hospital

Table 1.
Distribution Based on Hospitals in Makassar City

Hospital	Sample	Percentage (%)
RSUD Kota Makassar	65	22.3
Bhayangkara Hospital Makassar	48	16.5
Pelamonia Hospital Makassar	30	10.3
Labuang Baji Hospital	46	15.8
RSUD Haji Makassar	62	21.3
Ibnu Sina Hospital Makassar	40	13.8
Total	**291**	**100.0**

Based on Table 1, from a total of 291 respondents (100%) the distribution of samples by hospitals in Makassar city shows that sample at RSUD Kota Makassar as much as 65 respondents (22.3%), Bhayangkara Hospital Makassar as much as 48 respondents (16.5%), Pelamonia Hospital Makassar as much as 30 respondents (10.3%), Labuang Baji Hospital as much as 46 respondents (15.8%), RSUD Haji Makassar as much as 62 respondents (21.3%), and Ibnu Sina Hospital Makassar as much as 40 respondents (13.8%).

p-ISSN : 2354 8428 | e-ISSN: 2598 8727

Jurnal Keperawatan Komprehensif
Vol. 8 No.1 January 2022

Table 2.
Frequency Distribution Based on Respondent Age in Makassar City Hospitals

Age	Frequency	Percentage (%)
30-40 Years old	59	20.3
41-50 Years old	118	40.5
61-70 Years old	28	9.6
>71 Years old	6	2.1
Total	**291**	**100.0**

Based on Table 2, the frequency distribution of the respondents' ages shows that most of the respondents aged 30-40 years are 59 people (20.3%), aged 41-50 years are 118 people (40.5%), aged 61-70 years. as many as 28 people (9.6%) and a small proportion of respondents aged >71 years as many as 6 people (2.1%).

Table 3.
Frequency Distribution by Gender of Respondents in Makassar City Hospitals

Gender	Frequency	Percentage (%)
Men	153	52.6
Women	138	47.4
Total	291	100.0

Based on Table 3, the frequency distribution of respondents based on gender was obtained. There were 153 men (52.6%), and 138 women (47.4%).

Table 4.
Frequency Distribution Based on the Marital Status of Respondents in Makassar City Hospitals

Marital Status	Frequency	Percentage (%)
Married	281	96.6
Not married yet	1	0.3
Single Parent	9	3.1
Total	**291**	**100.0**

Based on Table 4, the frequency distribution of respondents based on marital status, obtained respondents who are married as many as 281 people (96.6%), respondents who are not married yet are 1 person (0.3%), and respondents with single parent status are 9 people (3.1%).

p-ISSN : 2354 8428 | e-ISSN: 2598 8727
Jurnal Keperawatan Komprehensif
Vol. 8 No.1 January 2022

Table 5.
Frequency Distribution Based on Respondent's Occupation in Makassar City Hospitals

Profession	Frequency	Percentage (%)
Unemployment	43	14.8
Civil servants	23	7.9
Private employe	13	4.5
Entrepreneur	82	28.2
Pensionary	37	12.7
Other	93	32.0
Total	**291**	**100.0**

Based on table 5, it is found that the highest frequency distribution of respondents' occupations is others (day laborers, and housewives) as many as 93 people (32.0%), civil servants as many as 23 people (7.9%), entrepreneurs 82 people (28.2 %), did not work as many as 43 people (14.8%), and the lowest was private employees as many as 13 people (4.5%).

Table 6.
Frequency Distribution Based on Length of Suffering from Diabetes Mellitus Respondents in Makassar City Hospitals

Length of Suffering	Frequency	Percentage (%)
1-10 Years	273	93.8
11-20 Years	16	5.5
>21 Years	2	0.7
Total	**291**	**100.0**

Based on table 6 the frequency distribution of respondents based on length of suffering from diabetes mellitus, the highest was 1-10 years as many as 273 people (93.8%), 11-20 years as many as 16 people (0.7%), and the lowest was >21 years with 2 respondents (0.7%).

2. Frequency Distribution Based on Respondents Glycemic Control in Makassar City Hospitals

Table 7.
Frequency Distribution of Respondents' Glycemic Control in Makassar City Hospitals

Glycemic Control	Frequency	Percentage (%)
Less	161	55.3
Good	130	44.7
Total	**291**	**100.0**

Based on table 7, the distribution of the frequency of glycemic control is obtained from a total of 291 respondents (100%) respondents, There were 161 patients (55.3%) with less glycemic control and 130 patients with good glycemic control (44.7%).

p-ISSN : 2354 8428 | e-ISSN: 2598 8727

Jurnal Keperawatan Komprehensif
Vol. 8 No.1 January 2022

DISCUSSION

In this study was found that there were 161 people (55.3%) with diabetes mellitus with less glycemic control and 130 people (44.7%) with diabetes mellitus with good glycemic control. Purwitaningtyas et al., (2015) (16)suggest that factors that increase the risk of poor glycemic control in type 2 DM patients include length of illness, medication adherence, nutritional status, and reach of health facilities. The results of other studies conclude that in general there is an effect of glucose management in patients with a medical diagnosis of diabetes mellitus based on blood sugar levels (17).

Glycemic control can be measured using several methods such as fasting blood glucose, intermittent blood glucose, 2 hours post prandial blood glucose, hemoglobin A1c (HbA1C), blood pressure, total cholesterol, Low Density Lipoprotein (LDL) cholesterol, High Density Lipoprotein (HDL) cholesterol, triglycerides, and body mass index (BMI) (18)**.** The best standard for the assessment of long-term glycemic control is glycated hemoglobin (HbA1c) and this should be measured every 3 – 6 months. HbA1C must be used as a major determinant of the success of glycemic control, as well as the need to change therapy if necessary, in a small proportion of diabetes patients, especially those with red blood cell turnover disorders, such as hemoglobinopathies (19).

The results of the previous study (20) suggest that good control of blood sugar levels in diabetes mellitus patients is 6.2%, moderate blood sugar control is 31.2%, and poor blood sugar control is 62.5%. In line with another research (13) that involved of 85 DM patients, most of the glycemic control in patients was not well controlled, which was experienced mostly by women, who had advanced age, and low education and had suffered from DM more long. Meanwhile, another research found the results that there were 53.0% of people with Diabetes Mellitus who had poor glycemic control and 47.0% of respondents had good glycemic control (21).

In line with result study by Kurnianta et al (2021) (22) showed that indicates the failure rate of achieving the glycemic target is quite high, reaching 64.83% of the total involvement of 145 subjects in the early phase of type 2 diabetes. Scientific evidence shows the effect of low achievement of glycemic targets during treatment of type 2 DM in line with risk of chronic complications.

Lee at al., (2017) (23) found that the disease burden of type 2 diabetes mellitus is rising due to suboptimal glycemic control leading to vascular complications. Medication adherence directly influences glycemic control and clinical consequences. Previous studies have stated that low adherence has implications for poor glycemic control, causing complications, morbidity and mortality (24).

Compliance with routine controls to health services is the patient's obedience in carrying out examinations related to the illness. Obedient patients tend to get understanding and information related to good blood sugar control with medication and lifestyle changes as well as information about the development of the disease they are experiencing (25). Adequate glycemic control in type 2 diabetes patients can prevent short-term complications, reduce the risk of long-term complications, and reduce the use and cost of health care resources (26).

p-ISSN : 2354 8428 | e-ISSN: 2598 8727

Jurnal Keperawatan Komprehensif
Vol. 8 No.1 January 2022

CONCLUSIONS

Based on the results of the study, it can be concluded that most of the patients have less glycemic control as many as 161 people (55.3%) and good glycemic control as many as 130 people (44.7%). In the management of blood sugar control, monitoring blood sugar levels is very important, good glycemic control will reduce diabetes complications. So it is highly recommended for people with type 2 diabetes to reduce the complications of type 2 diabetes by complying with glycemic control.

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Vol. 8 No.1 January 2022

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