


Long-Suffering of Diabetes Mellitus and Hospital Readmission among Adults with Type 2 Diabetes Mellitus: A Multicenter Study

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Article info	Abstract
<p>Article history: Received: August 16th, 2023 Revised: October 11th, 2023 Accepted: October 20th, 2023</p> <hr/> <p>Correspondent author: Name: Indah Restika Address: Sekolah Tinggi Ilmu Kesehatan Nani Hasanuddin E-mail: indahrestika93@gmail.com</p> <hr/> <p>International Journal of Nursing and Health Services (IJNHS) Volume 6, Issue 5, October 20th, 2023 DOI: 10.35654/ijnhs.v6i5.753 E-ISSN: 2654-6310</p>	<p>Background: Type 2 diabetes mellitus is a chronic metabolic disease with abnormal glucose metabolism, constituting a complex health problem. As a chronic disease, people with diabetes mellitus have a high hospital hospitalization risk. Objective: This study aims to examine the correlation between diabetes mellitus duration and the incidence of hospital readmission in individuals with type 2 diabetes mellitus. Method: This study was a multicenter-based cross-sectional survey. This study was conducted in 5 hospitals in Makassar City, South Sulawesi. The research sample was 291 patients with diabetes mellitus, who were selected using a purposive sampling technique. Result: 207 respondents (71.1%) have had diabetes mellitus for 1-5 years and have been readmitted, while ten respondents (3.4%) have had diabetes mellitus for 6-10 years and have been readmitted. Meanwhile, two respondents (0.7%) who have had diabetes for more than ten years have not been readmitted. The Chi-square test resulted in a score of 0.026 (<0.05). Conclusion: Diabetes mellitus significantly impacts the risk of hospital readmission in Makassar City. Patients who have had diabetes for longer tend to comprehend the disease process and have better self-management. Recommendation: diabetes control should be improved in patients who have had diabetes for a long time to reduce readmissions. Future research should focus on developing approaches to effectively preventing hospital readmission incidents.</p> <p>Keywords: diabetes mellitus, DMT2, hospital readmission</p>
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INTRODUCTION

Diabetes is a severe chronic disease that occurs because the pancreas does not produce enough insulin or the body cannot use the produced insulin effectively (1). Insulin resistance and glucose intolerance lead to hyperglycemia and changes in lipid and protein metabolism (2). Diabetes mellitus (DM), particularly type 2 diabetes, is closely related to metabolic disorders in the body parts, such as the pancreas, muscles, intestines, and fat cells; such a condition can increase lipolysis and decrease lipogenesis (3).

The global prevalence of DM was approximately 463 million people in 2019 (4). The International Diabetes Federation (IDF) estimates that at least 463 million people aged 20-79 years old worldwide had diabetes in 2019. This number is equivalent to the prevalence rate of 9.3% of the total population of the same age (5). Moreover, the IDF reports that the prevalence of DM was 9% in women and 9.65% in men in 2019. The prevalence of DM is predicted to increase to 19.9% or 111.2 million people aged 65-79 years old. The number is expected to continuously increase until reaching 578 million people in 2030 and 700 million people in 2045. Indonesia ranks seventh place worldwide with a prevalence of DM of 10.7 million and third place in Southeast Asia with a total majority of 11.3% (6).

The incidence number of DM in several countries in 2019 are as follows: China with 116.4 million cases, India with 77 million patients, the United States with 31 million cases, Pakistan with 19.4 million cases, Brazil with 16.8 million cases, Mexico with 12.8 million cases, Indonesia with 10.7 million cases, Germany with 9.5 million cases, Egypt with 8.9 million cases, and Bangladesh with 8.4 million cases. The doctor's diagnosis in South Sulawesi shows that the number of patients with DM has reached 0.9% of the total prevalence of DM in Indonesia (7).

DM also leads to economic burdens, including the direct costs of treating diabetes and its complications, costs of lost productivity due to diabetes and its complications, and costs of disability due to diabetes (8). People with diabetes must maintain glucose levels in their bodies to keep healthy. However, the number of hospitalizations of DM patients is still high (9).

Patients with diabetes have a higher risk of hospital readmission than those without diabetes. A study on 4,769 medical patients has reported that diabetes statistically and significantly increases 40% of readmission risks within 90 days (10). Moreover, DM patients are often hospitalized due to complications (11). Complications in DM patients have caused 47% of them to be readmitted after discharge (12).

Hospital readmission refers to the return to the hospital and is used as a standard of high-priority healthcare quality and cost reduction targets (10). There are various factors of hospital readmission. The risk factors for readmission consist of age, sex, patient education, social status, economic status, race, concomitant diseases, failure to convey important information about the outpatient, and other factors that lead to readmission after 30 days of discharge (13).

The duration of DM and its severity measured by types of treatment and diabetes complications can significantly influence the pathophysiology of cognitive function disorders in diabetic subjects (14). In contrast, late-onset diabetes, short-term diabetes, or well-controlled diabetes have a lower impact on impaired cognitive functions (14).

Significant complications that can affect peripheral neuropathy are age, sex, and duration of diabetes. The prone age to complications of diabetes is after age 40 (15). On average, diabetic neuropathy patients have been suffering from DM for ten years. Patients with diabetes for more than ten years have 19 times as high risks as those suffering from diabetes for less than ten years (16).

DM cannot be cured, but blood sugar levels can be controlled. To control diabetes, it is essential to monitor glycemic levels. In addition to controlling blood sugar, people with DM are expected to adhere to the provided treatment because low medication compliance can increase the risk of complications (17). Good blood sugar control aims to reduce diabetes complications (18), and the management of blood sugar control urgently requires blood sugar level monitoring.

In recent years, healthcare systems have focused more on readmission rates to improve the quality and determine the complexity of the patient population. It is estimated that

readmission for DM patients is 14.4-22.7%; these numbers are much higher than the rate of all inpatients of 8.5-13.5% (19). Several previous studies have explored various factors related to the incidence of hospital readmissions; however, investigations on the duration of diabetic suffering associated with the incidence of hospital readmissions have been minimal. Other evidence findings in this matter must be present to support the accuracy of the evidence.

OBJECTIVE

This study aims to examine the correlation between diabetes mellitus duration and the incidence of hospital readmission in individuals with type 2 diabetes mellitus.

METHODS

Design

This was a cross-sectional survey conducted across multiple sites. This study was conducted in several hospitals in Makassar City, South Sulawesi, including the 5 Makassar Regional Public Hospital.

Sample, sample size, and sampling technique

A non-probability sampling strategy was used to select the research samples. Purposive sampling was used to determine 291 diabetic patients as participants. This study used a primary data collection technique, which refers to direct data gathering by providing questionnaires based on the participants' criteria, to collect data. Respondents with diabetes, those aged 18-60, and those willing to participate in this study were all considered for inclusion. Exclusion criteria include respondents who did not participate in the survey.

Data collection process

At a baseline, a battery of demographic items assessed the participants' characteristics, which included age, gender, marital status, and occupation. Data for patients with hospital readmission referred to their medical record data.

Instrument for data collection

Sociodemographic characteristics were collected using self-designed questionnaires.

Data analysis

Non-parametric analysis Kendall's Tau test was applied in this study's bivariate analysis, assuming that the data was not normally distributed, the data groups were paired, and the data type was ordinal.

Ethical consideration

This research has been submitted for permission to the research ethics committee of the Ethics Committee of Nani Hasanuddin Health Institute (Registration Number: 045a/STIKES-NH/KEPK/II/2020)

RESULTS

Characteristics of Respondents in Hospitals in Makassar City

Table 1 describes that most respondents, were 41-50 years old (40.5%). Only 2.1% respondents were >71 years old. 153 respondents (52.6%) are male, and 138 (47.4%) are female. Besides that, the majority of respondents were married (96.6%), worked as entrepreneurs (28.2%), and 273 respondents (93.8%) have suffered from DM for 1-5 years. Meanwhile, 16 respondents (0.7%) have suffered from DM for 6-10 years. Finally, the smallest number of respondents have suffered from DM for >10 years (2 people or 0.7%).

Table 1. Frequency Distribution of Respondents' Social Demographics in Hospitals in Makassar City

Variables	Frequency	%
Age		
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
Genders		
Male	153	52.6
Female	138	47.4
Marital Status		
Married	281	96.6
Unmarried	1	0.3
Single Parent	9	3.1
Occupation		
Unemployment	43	14.8
Civil Servants	23	7.9
Private Employees	13	4.5
Entrepreneurs	82	28.2
Retired	37	12.7

DMT2 Duration		
1-5 years	273	93.8
6-10 years	16	5.5
>10 years	2	0.7

Table 2 describes that 207 respondents (71.1%) suffering from DM for 1-10 years have undergone readmission while 66 respondents (22.7%) suffering from DM for 1-10 years have not undergone readmission. Furthermore, 10 respondents (3.4%) suffering from DM for 11-20 years have experienced readmission, while 6 (2.1%) suffering from DM for 11-20 years have not. Meanwhile, 2 respondents (0.7%) suffering from DM for >21 years have yet to undergo readmission.

The Chi-square test results show a value of $0.026 < 0.05$. This finding indicates that long-DM duration influences hospital readmission in DMT2 patients

Table 2. Non-parametric analysis of Long-Suffering from Diabetes Mellitus on Readmission Incidence of DMT2 Patients

Correlations			
		DMT2 Duration	Hospital Readmission
DMT2 Duration	Correlation Coefficient	1.000	.592**
	Sig. (2-tailed)	-	.028
	N	291	291
Hospital Readmission	Correlation Coefficient	.592**	1.000
	Sig. (2-tailed)	.028	-
	N	291	291

Kendall's tau test

DISCUSSION

Some studies suggest that diabetes is a risk factor for infection. In addition, it is proven that reasonable perioperative glycemic control could reduce readmission and contribute to various factors, such as glycemic control, immunosuppression, and infections (19). Meanwhile, a previous study has discovered that 33.3% of DM patients are readmitted to the

hospital because they do not comply with the recommendations for blood glucose testing (20). DM Patients show higher possibility rates of readmission for 30 days than non-DM patients. DM is an independent risk factor in readmission. The readmission rates are directly correlated with the length of hospitalization of DM and non-DM patients (21).

The readmission process is related to the quality of patient service calculated by the hospital. Some attributes of the diabetic patient dataset affect the quality of treatment, referring to serum glycemic resistance in the body. As a result, the quality of hospital services characterized by a longer serum glycemic level is improved and at a healthy level. However, different attributes associated with DM patients have complicated quality calculations (22). A study of long-suffering from DM conducted in a Polyclinic of Internal Medicine has revealed that most of the respondents have suffered from DM for 5-10 years (43 respondents or 53.1%) because they still cannot apply effective diabetes treatment at home and only rely on medical therapy from health workers; as a result, their disease is not recovered (23).

Furthermore, a previous study investigated 85 patients with DM and revealed that most of them have uncontrollable glycemic; this case is mainly experienced by female elderly patients with low education and longer suffer from DM (24). Several factors increasing the risk of poor glycemic control in patients with Type 2 DM are the length of illness, medication compliance, nutritional status, and coverage of health facilities (25).

A previous study found that blood glucose control is essential to target HbA1c and reduce the risk of postoperative complications and the possibility of readmission (24,25). In addition, poor blood glucose control of patients with higher HbA1c values before or after surgical management leads to a higher risk of readmission within 30 days (26). The four studies mentioned above have proven that DM

patients with and without heart failure have a high risk of readmission. Meanwhile, a study analyzed kidney disease and reported that kidney disease could increase the risk of hospital readmission (27).

Patients with high levels of non-compliance with diabetes treatment will develop hypertension complications. Another study reports that complications and comorbidity are among DM patients' challenges to conducting self-management; consequently, readmission rates increase (28). Another analysis suggests that patients with a longer duration of DM have better self-management because they have more experience and more comprehensively understand disease processes and management (29). The successful process of controlling DM is highly determined by high treatment compliance; thus, all complications caused by DM can be prevented (30).

Meanwhile, previous studies describe that long-suffering from DM is statistically insignificant to patients' quality of life due to their habits in responding to diabetic situations and their ability to control depression levels when suffering from DM (31). As a result, their quality of life gradually improves. Routine medical control compliance refers to the patient's compliance with medical examinations of the suffered disease. Compliant patients tend to gain comprehension and information about effective blood sugar control by taking medication, changing their lifestyle, and concerning their disease progression (32).

However, other studies suggest that a person's long suffering from a chronic disease will affect his experience and knowledge about DM treatment (22). Moreover, the longer duration of suffering from DM will decrease the patients' concern about the disease because they have become bored with undergoing therapy. For example, patients who have suffered from DM for ten years will feel hopeless with their current condition because they have taken the treatment but have not successfully recovered.

In contrast, patients who have suffered from the disease for a year still aspire to take the medicine to heal.

CONCLUSION

Diabetes mellitus significantly impacts the risk of hospital readmission in Makassar City. Patients who have had diabetes for longer tend to comprehend the disease process and have better self-management.

Acknowledgment

Not Applicable

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