

Factors Associated with Self-Management Behaviour among Type 2 Diabetes Mellitus Patients

Factores asociados con el comportamiento de autogestión entre Pacientes con diabetes mellitus tipo 2

SUMMARY

Objective: This study aims to analyse the **associated factors** with self-management behaviour in type 2 diabetes mellitus (T2DM) patients.

Method: **The study used** a cross-sectional approach with a total sample of 115 T2DM patients in Sidrap Regency, South Sulawesi, selected **through multistage random** sampling. Data were analysed with **Chi-Square s test and logistic regression**.

Results: Respondents with good self-management knowledge were 94 times more likely to manage the disease ($Ex(b) = 94.26$), and those with good self-efficacy were 54 times more likely to practice good self-management behaviour.

Conclusion: Factors greatly affecting self-management are knowledge, self-efficacy, and family support. Self-management can also prevent complications.

Keywords: Type 2 diabetes mellitus, family support, self-efficacy, motivation, knowledge, self-management behaviour

RESUMEN

Objetivo: Este estudio tiene como objetivo analizar los factores asociados con el comportamiento de autocuidado en pacientes con diabetes mellitus tipo 2 (DM2).

Método: El estudio utilizó un enfoque transversal con una muestra total de 115 pacientes con DM2 en Sidrap Regency, South Sulawesi, seleccionados a través de un muestreo aleatorio de etapas múltiples. Los datos fueron analizados la prueba de Chi-Cuadrado y regresión logística.

Resultados: Los encuestados con buen conocimiento de automanejo tenían 94 veces más probabilidades de manejar la enfermedad ($Ex(b) = 94,26$), y aquellos con buena autoeficacia tenían 54 veces más probabilidades de practicar un buen comportamiento de automanejo.

Conclusión: Los factores que afectan en gran medida el automanejo son el conocimiento, la autoeficacia y el apoyo familiar. El autocontrol también puede prevenir complicaciones.

Palabras clave: Diabetes mellitus tipo 2, apoyo familiar, autoeficacia, motivación, conocimiento, comportamiento de automanejo

INTRODUCTION

Diabetes mellitus (DM) is a chronic progressive metabolic disorder involving inappropriately elevated blood glucose levels due dysregulation of insulin hormone (1). DM has several categories, including type 1, type 2, maturity-onset diabetes of the young (MODY), gestational diabetes, neonatal diabetes, and secondary causes due to endocrinopathies, steroid use, etc. The main subtypes of DM are Type 1 diabetes mellitus (T1DM) and Type 2 diabetes mellitus (T2DM), which classically result from defective insulin secretion (T1DM) and/or action (T2DM) (2). T2DM affects approximately 422 million people worldwide (3). Based on the data from the International Diabetes Federation (IDF), in 2021, 537 million people had diabetes worldwide, i.e., approximately one in ten people. That number is estimated to be 643 million in 2030. Indonesia is the fifth-highest country with 19.5 million people with diabetes, and by 2045 is expected to increase by 28.6 million (4).

In addition to the increasing number of cases, DM also causes acute complications, such as diabetic ketoacidosis, nonketotic hyperosmolar, hypoglycaemia, and chronic complications, such as macroangiopathy, microangiopathy, and neuropathy (5). Complications increase the cost of survival and affect the quality of life. A study in Palestine showed that almost 34% of people with diabetes had a poor quality of life (6). In this case, self-management is important in treating diabetes mellitus.

Self-management for type 2 diabetes treatment includes dietary regulation, physical activity/exercise, blood glucose monitoring, medication adherence, and self/foot care (7). Adherence will improve management's achievement, while poor blood sugar regulation can lead to poor glucose control (8). In other words, compliance can prevent complications (9).

A past study involving 123 respondents shows that 62.6% scored low on blood sugar monitoring indicators (10). A study in China shows that 50.4% of diabetes patients' self-management was moderate and 33.6% low (11). These studies indicate that many patients may not understand self-management thoroughly. The success of self-management can be influenced by several factors. Age, sex, education level, duration of suffering, knowledge, self-efficacy, burden of diabetes, family support (12,13).

Previous research has also shown that self-care and self-management educational interventions can improve patients' self-management (14). However, results have not been optimum, and many people are still unable to manage their disease independently. A self-management model based on self-regulation is needed to control emotions and self-concept. Families' knowledge and skills also need to be increased in helping patients overcome their

problems. Therefore, this study aims to analyse the factors associated with self-management behaviour in T2DM patients.

METHOD

The design of this study was a cross-sectional, with data collected from Empagae Health Centre in Sidrap Regency. The dependent variable used in this study was self-management behaviour, and the independent variables were knowledge, motivation, emotional state, family support, and self-efficacy. The sample size was 115 T2DM patients recruited using the technique of multistage random sampling. The criteria were patients with T2DM, undergoing outpatient treatment in community health centers, able to communicate well, aged 35-60, having blood glucose levels between 71-380 mg/dL, and willing to participate. All participants were provided written consent and agreed to follow the study protocol approved by the Health Research Ethics Committee of the Faculty of Health, Mega Buana University, Palopo, Indonesia.

This study reveals the correlation between self-care behaviour and knowledge, motivation, emotional aspects, family support, and self-efficacy of T2DM patients. The research questionnaire was divided into four parts: 1) demographic data, 2) T2DM self-management data using the diabetes self-management questionnaire (DSMQ) (15), 3) family support data using the health social support questionnaire, 4) knowledge about diabetes, emotional aspect assessed using problem areas in diabetic scale (PAIDS), motivation levels measured using the treatment self-regulation questionnaire (TSRQ), and self-efficacy tested using the diabetes self-efficacy scale (DMSES). The factors associated with self-management behaviour were evaluated by using logistic regression analysis.

RESULTS

Table 1. Characteristics of Respondents (n=115)

Characteristics	Mean ±SD	n (%)
Gender, n (%)		
Male	-	43 (37.4)
Female	-	72 (62.6)
Disease complications, n (%)		
No complications	-	63 (54.8)
There are complications	-	52 (45.2)
Age, years (±Up to)	50.5±8.39	-
Length of suffering from DM, years (±up to)	4.6±3.40	-
Blood sugar value, mg/dL (±up to)	253.8±43.86	-

Table 1 shows that most women with T2DM did not have complications such as hypertension and stroke. The average age was pre-elderly, with an average length of T2DM suffering of 4.5 years. The average blood sugar value in the abnormal category was 253.8 mg/dL.

Table 2. Factors Associated with Self-Management Behaviour in T2DM Patients (n=115)

Variable	Self-Management Behaviour				Total		p
	Good		Poor		n=115	%	
	n= 74	%	n=41	%			
Diabetes knowledge							
Have better knowledge	61	53.0	16	13.9	77	67.0	<0.001
Have less knowledge	13	11.3	25	21.7	38	33.0	
Self-efficacy							
Have better self-efficacy	54	47.0	9	7.8	63	54.8	<0.001
Have less self-efficacy	20	17.4	32	27.8	52	45.2	
Family support							
Good	45	39.1	8	7.0	53	46.1	<0.001
Have less	29	25.2	33	28.7	62	53.9	
Motivation							
Good	30	26.1	8	7.0	38	33.0	0.024
Low	44	38.3	33	28.7	77	67.0	
Emotional aspects							
Good	29	25.2	4	3.5	33	28.7	0.001
Low	45	39.1	37	32.2	82	71.3	

Table 2 shows that 61 respondents' knowledge about self-management was good, and 25 were low. The p-value from the **Chi-Square** test was 0.0001, which implies a relationship between knowledge and self-management. Meanwhile, 54 respondents' self-efficacy was good, and 32 were low. The **Chi-Square** shows a p-value of 0.0001, implying a relationship between self-efficacy and self-management. Regarding family support, 45 participants' self-management was good. Meanwhile, 33 respondents with lacked family support showed less optimal self-management. The chi-square test results show a p-value of 0.0001, suggesting a relationship between family support and self-management.

Thirty respondents with high motivation showed good self-management, and 33 with low motivation showed poor self-management. The **Chi-Square** test showed a p-value of 0.024, suggesting a link between motivation and self-management. Likewise, 29 people with good emotional regulation showed good self-management, and 37 others with poor emotional

regulation showed poor self-management. The **Chi-Square** test shows a p-value of 0.001, suggesting a relationship between emotional aspects and self-management.

Table 3. Analysis Factors Associated with Self-Management Behaviour among Type 2 Diabetes Mellitus Patients

Variable	<i>p</i>	OR (Exp B)	95% CI	
			Min	Max
Diabetes knowledge	<0.001	94.26	8.94	752.19
Self-efficacy	<0.001	42.57	3.58	247.25
Family support	0.023	0.153	0.02	0.84

Table 3 indicates that motivation and emotional aspects were not included in multivariate modelling (p-value > 0.25). Meanwhile, knowledge, self-efficacy, and family support factors were included. The findings show that the link between knowledge and T2DM self-management was the most significant (p=0.0001). Exp (B) value was 94.26, meaning someone with good knowledge has 94.3 times the opportunity to conduct T2DM self-management well.

DISCUSSION

Self-management for type 2 diabetes treatment includes dietary regulation, physical activity/exercise, blood glucose monitoring, medication adherence, and self/foot care (7). Patients need to be self-disciplined to carry out this to improve management outcomes. Non-adherence may increase blood sugar levels, which means poor glucose control (8). Compliance is crucial to improving quality of life and preventing complications (9).

Quality of self-management is influenced by factors such as age, gender, level of education, duration of type 2 diabetes, knowledge, self-efficacy, stress, and family support (13,16).

COMMENT: REFENCE 16 IS NOT RELATED WITH THE SUBJECT OF THE MANUSCRIPT

This study shows that self-efficacy is integral (p-value of 0.0001). For example, self-efficacy or the ability to organize and perform specific tasks to obtain expected results (10), can alter a person's way of thinking, feeling, and acting (17). According to the Health Belief Model (HBM), supposing a person has certain knowledge, attitudes, and skills to do something, without high self-efficacy, they may not act on it (18). Walker et al. (2014)

COMMENT: THIS REFERENCE IS MISISNG reported a relationship between self-efficacy and self-care, with a p-value for foot-care of 0.032 **(19) COMMENT: REFERENCE 19 IS NOR COMMENTED AND IS RELATED TO THE EFFECT OF DIABETES SELF-**

MANAGEMENT EDUCATION ON HBAIC AND QUALITY OF LIFE IN AFRICAN-AMERICANS: A SYSTEMATIC REVIEW AND META-ANALYSIS

High self-efficacy also promotes adherence to recommended treatment regimens for chronic diseases to care for oneself. Self-efficacy can also mean high confidence or trust. Someone with high confidence tends to perform DM self-management.

The bivariate analysis also shows a significant relationship between knowledge and self-management with $p=0.0001$ (10). Good self-management depends on willingness, high motivation, and sufficient DM knowledge. For example, dietary knowledge is important for T2DM patients to avoid complications. Pedagogic interventions can be optimised to increase patients' knowledge about the disease, management, treatment, interactions, diets, physical activities, and optimisation of existing health facilities. However, patients are often aware of the dietary recommendations but do not follow them because the foods are not tasty. They eat what they want once no serious symptoms are noticed. In this case, knowledge and awareness are not enough and should be followed by changing behaviour to improve survival and life quality (20). **COMMENT: REFERENCE 20 IS ABOUT STUNING STUNTING CHILDREN !!** Therefore, social support from family is needed.

Previous studies also show that patients did not have sufficient knowledge about self-management. Education on self-care and self-management has not been optimal, and many people cannot manage their disease (14). This study has shown that the factors affecting self-management are knowledge, self-efficacy, and family support. Therefore, educational interventions can focus on these aspects. Family members need to be educated as well to support patients in managing their disease. Additionally, a spiritual approach is needed to help patients improve their emotional regulations and self-concepts.

Lastly, the limitation of this research is that it does not address the spiritual approach. Future research can develop self-management behaviour interventions that integrate spiritual aspects through different theoretical approaches. Future research can also focus on families' knowledge and skills in helping patients overcome their disease problems and improve life quality.

CONCLUSION

This study showed that the factors influencing self-management were knowledge, self-efficacy, and family support. Educational interventions can therefore focus on these aspects. Family members also need to be trained to help patients manage their illness. Additionally, a

spiritual approach is necessary to help patients improve their emotional adjustment and self-concept.

ACKNOWLEDGMENTS

The author is grateful to the Faculty of Health, Mega Buana University, Palopo and Universitas Airlangga, Surabaya, Indonesia for supporting this study.

Funding

The author(s) received financial support for this article's research, authorship, and publication from the institution.

Authors' Contributions

All contributors contributed significantly to this study, and all authors agree with the manuscript's content.

Conflict of Interest

The author(s) declared no potential conflicts of interest concerning this article's research authorship and/or publication.

Availability of Data and Materials

All data generated or analyzed during this study are included in this published article.

Ethical Approval

This article received ethical permission from Faculty of Health, Mega Buana University, Palopo, Indonesia.

REFERENCES

1. Mosleh RSA, Jarrar YB, Zyoud S, Morisky DE. Factors related to diabetes self-care management behaviors among patients with type II diabetes in Palestine. *J Appl Pharm Sci.* 2017;7(12):102–9.
2. Joyce B, Jane H. *Medical Surgical Nursing: Clinical Management for Positive Outcomes*, 8th Ed. St.Louis. Missouri: Saunders Elsevier; 2014
3. Moura NDS, Lopes BB, Teixeira JJD, Oria MOB, Vieira NFC, Guedes MVC. Literacy in health and self-care in people with type 2 diabetes mellitus. *Rev Bras Enferm.* 2019;72(3):700–6.
4. IDF. *IDF Diabetes Atlas Ninth edition 2021*. In International Diabetes Federation. [Internet]. 2021. Available from: <http://www.idf.org/about-diabetes/facts-figures>

5. Papachristoforou E, Lambadiari V, Maratou E, Makrilakis K. Association of Glycemic Indices (Hyperglycemia, Glucose Variability, and Hypoglycemia) with Oxidative Stress and Diabetic Complications. *J Diabetes Res.* 2020;2020:1–17.
6. Tietjen AK, Ghandour R, Mikki N, Jerdén L, Eriksson JW, Norberg M, et al. Quality of life of type 2 diabetes mellitus patients in Ramallah and al-Bireh Governorate–Palestine: a part of the Palestinian diabetes complications and control study (PDCCS). *Qual Life Res.* 2021;30(5):1407–16.
7. Hidayah M. The Relationship between Self-Management Behaviour and Blood Glucose Level in Diabetes Mellitus Type 2 Patient in Pucang Sewu Health Center, Surabaya. *Amerta Nutr.* 2019;3(3):176–82.
8. Hsu HC, Lee YJ, Wang RH. Influencing Pathways to Quality of Life and HbA1c in Patients With Diabetes: A Longitudinal Study That Inform Evidence-Based Practice. *Worldviews Evidence-Based Nurs.* 2018;15(2):104–12.
9. Pereira EV, Tonin FS, Carneiro J, Pontarolo R, Wiens A. Evaluation of the application of the diabetes quality of life questionnaire in patients with diabetes mellitus. *Arch Endocrinol Metab.* 2020;64(1):59–65.
10. Hidayah N, Kristan, Arbiansingih, Supu NM, Latif AI, Amir H. Telehealth Model in Improving Health Service during COVID-19 Pandemic. *Gac Med Caracas.* 2022;130(4):873-878.
11. Qi X, Xu J, Chen G, Liu H, Liu J, Wang J, et al. Self-management behavior and fasting plasma glucose control in patients with type 2 diabetes mellitus over 60 years old: multiple effects of social support on quality of life. *Health Qual Life Outcomes.* 2021;19(1):1–15.
12. Lin K, Park C, Li M, Wang X, Li X, Li W, et al. Effects of depression, diabetes distress, diabetes self-efficacy, and diabetes self-management on glycemic control among Chinese population with type 2 diabetes mellitus. *Diabetes Res Clin Pract.* 2017 Sep;131:179–86.
13. Muchlis N, Amir H, Cahyani DD, Alam RI, Landu N, Mikawati M, et al. The cooperative behavior and intention to stay of nursing personnel in healthcare management. *J Med Life.* 2022;15(10):1311-1317.
14. Hailu FB, Moen A, Hjortdahl P. Diabetes self-management education (DSME) – Effect on knowledge, self-care behavior, and self-efficacy among type 2 diabetes patients in Ethiopia: A controlled clinical trial. *Diabetes, Metab Syndr Obes Targets Ther.* 2019;12:2489–99.
15. Schmitt A, Gahr A, Hermanns N, Kulzer B, Huber J, Haak T. The Diabetes Self-Management Questionnaire (DSMQ): development and evaluation of an instrument to

assess diabetes self-care activities associated with glycaemic control. *J Heal Qual Life Outcomes*. 2013;11(138):1–14.

16. Amir H. Strategies in preventing the transmission of COVID-19 a quarantine, isolation, lockdown, tracing, testing and treatment (3t): Literature review. *Asia Pacific J Health Management*. 2022;17(2):1-7.

COMMENT: REFENCE 16 IS NOT RELATED WITH THE SUBJECT OF THE MANUSCRIPT

17. Umam MH, Solehati T, Purnama D. Overview of the Quality of Life of Patients with Diabetes Melitus. *J Kesehat Kusuma Husada*. 2020;11(1):70–80.
18. Rondhianto, Kusnanto, Melaniani S. The effect of diabetes self-management education, based on the health belief model, on the psychosocial outcome of type 2 diabetic patients in Indonesia. *Indian J Public Heal Res Dev*. 2018;9(11):1718–23.
19. Cunningham AT, Crittendon DR, White N, Mills GD, Diaz V, Lanoue MD. The effect of diabetes self-management education on HbA1c and quality of life in African-Americans: A systematic review and meta-analysis. *BMC Health Serv Res*. 2018;18(1):1–13.
20. Silas L, Rantetampang AL, Tingginehe R, Mallongi A. The Factors Affecting Stunting Child under Five Years in Sub Province Mimika. *Int J Sci Healthc Res*. 2018;3(2):99–108.