

# The relationships among self-efficacy, health literacy, self-care and glycemic control in older people with type 2 diabetes mellitus

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## Abstract

**Purpose** – This study aims to identify the relationships among self-efficacy, health literacy, self-care and glycemic control in older people with type 2 Diabetes Mellitus (DM).

**Design/methodology/approach** – This study was a descriptive analytics correlational study with a cross-sectional design. The sampling method was purposive sampling involving 68 older people with type 2 DM.

**Findings** – The results showed that self-efficacy, health literacy and self-care correlated with glycemic control at significant levels of  $p = 0.020$ ,  $p = 0.002$  and  $p = 0.022$ , respectively.

**Practical implications** – Nurses should help older people with type 2 DM in maintaining their self-efficacy and self-care and increasing their health literacy to ensure their glycemic control is in normal state.

**Originality/value** – This study showed that self-care, self-efficacy and health literacy had a significant correlation with glycemic control in older people with type 2 DM. It indicates that the better self-care, self-efficacy and health literacy of patients, the more likely the patients' blood HbA1C level to be in the normal range.

**Keywords** Type 2 DM, Health literacy, Glycemic control, HbA1C, Older people

**Paper type** Research paper

## Introduction

Diabetes Mellitus (DM) is one of the noncommunicable diseases that attracts much attention nowadays. It is also one of the chronic degenerative diseases that has become a serious issue both in developed and developing countries with an increased number of cases every year (Soegondo *et al.*, 2013).

The prevalence of DM among adults and older people has increased significantly (Rahimi-Madiseh *et al.*, 2016), and it is estimated to increase from 425 million to 629 million people globally (IDF, 2017). In Southeast Asian countries, including Indonesia, the prevalence of DM has also increased (World Health Organization, 2016). According to data from the Health Office in Takalar Regency, one of the regencies in South Sulawesi Province, Indonesia, the prevalence of type 2 DM is second place after hypertension among noncommunicable diseases.

The success of the management of DM cannot be separated from the ability of individuals to access, understand and use information and health services to make decisions about their health care, or known as health literacy (Berkman *et al.*, 2010). According to Jones *et al.* (2011), it is important to know about health literacy in each individual, as it is associated with the ability to access health information to improve and maintain their health. According to Javadzade *et al.* (2012), low health literacy is a barrier to improve health outcomes in patients with DM and can lead to delayed diagnosis and low self-care skills.

Those findings are in line with a study by [Massoompour et al. \(2017\)](#) that found a significant positive correlation between health literacy and self-care behavior, indicated by the higher health literacy in patients with DM, the more improved their self-care and glycemic control. Moreover, according to [Marques et al. \(2013\)](#), one of the main aspects of diabetes care is self-care, as it can improve patient health and reduce treatment costs and complications. Furthermore, according to [Gao et al. \(2013\)](#), the success of DM therapy depends on the ability and success of patients in effective self-management behaviors, including adherence to medication, diet, physical activity, blood glucose monitoring, adaptive coping mechanisms and self-efficacy. Nurses have a critical role in helping older people to maintain their self-care ([Irwan and Balabagno, 2014](#)). Therefore, measuring patient's self-care among DM patients is required as the baseline to design appropriate nursing intervention.

Self-efficacy is an important aspect in the management of DM to identify adherence to self-care and one of the main steps in developing interventions that are individually designed to create behavioral changes to reduce complications in older people with DM ([Mishali et al., 2010](#)). Among older people with hypertension, [Irwan et al. \(2016\)](#) had found that self-efficacy correlated significantly with self-care. Besides, the success of a chronic disease management program cannot be separated from the individuals' ability to access, understand and use health information and services to make decisions about their health care or known as health literacy ([Berkman et al., 2010](#)). Based on the above phenomenon, this study aimed to identify the relationships among self-efficacy, health literacy, self-care and glycemic control in patients with type 2 DM.

## Methods

This study was a descriptive analytic correlational study with a cross-sectional design, conducted at rural area in South Sulawesi, Indonesia, from November to December 2018. A total of 459 patients with type 2 DM visited the hospital; 213 of them were older people. After calculating the sample using the Slovin formula, it required 68 people to be recruited for this study. The sampling method was nonprobability sampling with a purposive sampling technique. The inclusion criteria were people diagnosed with type 2 DM, aged  $\geq 60$  years old and willing to be respondents.

This study has received ethical permission from the medical ethics committee of Hasanuddin University. Data collection were done using three questionnaires and one laboratory test. The questionnaires were as follows:

- Diabetes Management Self-Efficacy Scale, consisting of 20 statement items with a Likert scale of 1–3 for self-efficacy;
- the Functional Critical and Communicative Health Literacy, consisting of 14 questions using Likert scale 1–4 for health literacy; and
- the Summary of Diabetes Self-Care Activities, consisting of 14 questions for self-care.

The laboratory test was for glycemic control by measuring blood HbA1C levels after, and data were analyzed using the logistic regression analysis.

## Results

According to [Table 1](#), the average age of respondents was 66 years (SD = 5.55) old; time since diagnosed was 5.5 years (SD = 4.5); more than half of them were female (60.3%); a third of them completed up to junior high school education (32.4%); almost half of them were unemployed (45.6%); and most of them have no wound (75%).

[Table 2](#) shows that self-care correlates with HbA1C ( $p = 0.002$ ), in which patients with high self-care tend to have normal blood HbA1C levels. It also shows that self-efficacy correlates with HbA1C glycemic control ( $p = 0.022$ ), in which patients with high self-efficacy tend to

have normal blood HbA1C levels. In addition, it shows that health literacy correlates with blood HbA1C levels ( $p = 0.020$ ), in which patients with high health literacy tend to have normal blood HbA1C levels.

In [Table 3](#), the logistic regression analysis results at the final stage (step 2) show that there is a correlation between high self-care and normal blood HbA1C level ( $p = 0.012$ ). It also shows that respondents with high self-care have 0.242 times more normal HbA1C levels than those with low self-care.

**Table 1** Distribution of the characteristics of respondents ( $n = 68$ )

Characteristics of respondents	N	Total	
		n	(%)
Age (mean [SD])	(65.7 (5.6))		–
Time (year) since diagnosed (mean [SD])	(5.5 (4.5))		–
<i>Gender</i>			
Male	27		39.7
Female	41		60.3
<i>Education level</i>			
No formal schooling	14		20.6
Primary school	16		23.5
Junior high school	22		32.4
Senior high school	14		20.6
College	2		2.9
<i>Occupation</i>			
Unemployed	31		45.6
Farmer	21		30.9
Entrepreneur	4		5.9
Others	12		17.6
<i>Having wound</i>			
Yes	17		25.0
No	51		75.0

**Table 2** Correlation among self-efficacy, health literacy, self-care and glycemic control

Study variables	N	HbA1C		Total		P-value	
		Normal (%)	High (%)	n	(%)		
<i>Self-care</i>							
High	24	61.5	15	38.5	39	100	0.002
Low	7	4.1	22	75.9	29	100	
Total	31	45.6	37	54.4	68	100	
<i>Self-efficacy</i>							
High	22	57.9	16	42.1	38	100	0.022
Low	9	30.0	21	70.0	30	100	
Total	31	45.6	37	54.4	68	100	
<i>Health literacy</i>							
High	27	54.0	23	46.0	50	100	0.020
Low	4	22.2	14	77.8	18	100	
Total	31	45.6	37	54.4	68	100	

**Table 3** Multivariate analysis using logistic regression of self-efficacy, health literacy and glycemc control

Variable	B	SE	P	Exp.(B)	95% C.I for Exp (B)	
					Lower	Upper
<i>Step 1a</i>						
Self-efficacy	-0.765	0.563	0.174	0.465	0.154	1.403
Health literacy	-1.008	0.683	0.140	0.365	0.096	1.391
Self-care	-1.252	0.577	0.030	0.286	0.092	0.887
Constant	2.145	0.719	0.003	8.538	-	-
<i>Step 2a</i>						
Health literacy	-1.073	0.671	0.110	0.342	0.092	1.274
Self-care	-1.418	0.562	0.012	0.242	0.081	0.728
Constant	1.847	0.657	0.005	6.342	-	-

Note: \*Logistic regression

## Discussion

The results showed that, in general, self-care had a significant correlation with glycemc control ( $p = 0.002$ ), indicating that the better the self-care of respondents, the more likely their HbA1C to be normal. Self-care in type 2 DM patients is very necessary. Self-care can reduce the risk or slow the progression of type 2 DM complications (Mohebi *et al.*, 2013). Besides, Shrivastava and RamBihariLal (2013) explains that to prevent diabetes-related morbidity and mortality, self-care behaviors in many domains including diet choice, physical activity, proper drug intake and blood glucose monitoring are very important and should be emphasized and require an integrated approach to promote self-care practice and prevent long-term complications among patients with DM.

The statistical analysis results showed that there was a correlation between self-efficacy and glycemc control in which respondents with high self-efficacy tend to have good glycemc control. This finding is in line with a study by Walker *et al.* (2014) that self-efficacy influences glycemc control. According to Park *et al.* (2019), self-efficacy is a factor influencing adherence to medication in patients with DM ( $p < 0.05$ ), and individuals with a higher level of self-efficacy can manage their diabetes care (Nuari *et al.*, 2018). The important part of the self-efficacy theory is that the stronger the individual believes in his ability to perform a series of actions, the more likely he will begin and maintain the given activities (Cinar and Schou, 2014).

Studies on health literacy have shown that, in general, health literacy has a significant relationship with HbA1C, which means the better the health literacy of patients with DM, the more likely the HbA1C to be in the normal range. Health literacy is an individual's ability to obtain, process and understand information and basic health services so that they can make informed decisions for their health (Hernandez and Landi, 2011).

Lee *et al.* (2015) have stated that the perception of empowerment and health literacy could relatively influence self-efficacy and self-care behaviors. Self-efficacy and self-care are relatively able to affect glycemc control in patients with type 2 DM. Radwan *et al.* (2018) and Irnawan (2020) also have found that glycemc control is related to medication adherence, better health literacy, knowledge and availability of coaching factors that can help patients in targeting interventions to improve glycemc control and prevent complications.

The results of logistic regression analysis showed that there was a correlation among self-care, self-efficacy, health literacy and glycemc control. Respondents with high self-care had 0.242 times more normal HbA1C than those with low self-care; respondents with high health literacy had 0.342 times normal HbA1C; and respondents with high self-efficacy had 0.465 times normal HbA1C.

## Conclusion

This study showed that self-care, self-efficacy and health literacy had a significant correlation with glycemic control in older people with type 2 DM. It indicates that the better self-care, self-efficacy and health literacy of patients, the more likely the patients' blood HbA1C level to be in the normal range.

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