



Basic Conditioning Factors (BCFs) and Selfcare Agency Clients T2DM

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Abstract. Diabetes Mellitus (DM) is a chronic disease that will last a lifetime. The problems are very complex, from hyperglycemia to macrovascular and microvascular complications. This research aimed to analyze basic conditioning factors (BCFs), which consisted of 3 elements, namely lifestyle, family system, and health status, towards the self-care agency of T2DM clients. The research method used an analytical design with a cross-sectional approach. The population were all T2DM patients in 4 health center areas in Surabaya, and the monthly average was 440 patients. The sample size was a portion of the population of T2DM clients calculated based on Isaac and Michael's table with a 5% error rate of 195 people. Sampling was carried out using Cluster Sampling, and then, at each Community Health Center, sampling was conducted proportionally using a random sample. Data analysis was carried out using univariate and bivariate analysis through statistical testing of the T-test, based on analysis of variance-based structural equation models (SEM) or component-based SEM. The research results showed that almost all of the lifestyle patterns of T2DM clients were good (93.8%), nearly all family systems were good (94.4%), and the health status of all respondents was healthy. Self-care agencies for T2DM clients, 82% were in the low category, while the analysis showed that three factors were significant with a p-value <0.05. It can be concluded that a good lifestyle can improve self-care. The family system consisting of family type, family culture, and resources owned by the individual or family can enhance the self-care of T2DM clients. In contrast, the health status of T2DM clients depends on whether positive or negative perceptions can influence self-care.

Keywords: Basic Conditioning Factors, Self-care Agency, T2DM

1 Introduction

Diabetes Mellitus (DM) is a chronic, progressive disease characterized by the body's inability to metabolize carbohydrates, fats, and proteins. The problems are complex, from hyperglycemia to macrovascular and microvascular complications [1]. Diabetes in Indonesia is the main cause of death and morbidity and the sixth largest healthcare problem in the world, with increasing numbers. It impacts costs, burdening individuals, families, and even the country.

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T. Triwiyanto et al. (eds.), *Proceedings of the 6th International Conference of Health Polytechnic Surabaya (ICoHPS 2023)*, Advances in Health Sciences Research 72,

https://doi.org/10.2991/978-94-6463-324-5_13

Characteristics showed that the prevalence of diabetes mellitus in the Indonesian adult population was 6.9% in 2013 and 8.5% in 2018 [2]. The prevalence of DM based on a doctor's diagnosis at ages ≥ 15 years, East Java is in 5th place at 2.6%. The majority of DM at all ages in Indonesia, based on Riskesdas 2018, East Java province, was slightly lower than that of DM at ages ≥ 15 years, namely 2.4%.

Diabetes treatment is complicated and calls for ongoing attention and assistance. Diabetes mellitus patients frequently experience diminished motivation, pessimism, lower capacity to manage diabetes, and difficulties breaking old habits or routines since people living with diabetes have their challenges in managing themselves by making the appropriate decisions every day [3]. DM is a chronic disease that will last a lifetime. Management of this disease requires the participation of doctors, nurses, nutritionists, and other health workers. Clients and families also have an essential role, so they need to receive education to provide an understanding of the course of the disease, prevention, complications, and management of DM. Healthcare providers believe that DM is a disease that requires self-care management, where clients must be skilled, reliable, and responsible enough to increase self-care agency [4]. Basic conditioning factors (BCFs) influencing a person's self-care are age, gender, developmental stage, health status, social culture, health care system, family system, lifestyle, environment, and resources [5].

Personal, social, and environmental aspects help nurses in assessing and planning individual care in Self-Care Deficit Nursing Theory. BCFs include age, family system factors, health care system factors, sociocultural elements, and lifestyle. BCFs are founded on the idea that people belong to sociocultural groups and live in a world that changes their life conditions [5]. The BCF assists the nurse in determining the individual's internal and external factors that affect the care required, the person's ability to engage in treatment, and available health care resources. The BCF analysis indicated similarities between the factors/dimensions listed in that both can have a favorable or negative impact on health and both involve situations that modify nursing actions [6].

The study results stated a relationship between basic conditioning factors and self-care agency of the hospitalized elderly patients with cancer in nursing care department p-value 0.049 [7]. The results of other studies stated that although men's self-care agency scores were higher, there was no statistically significant difference. The characteristics of diabetes mellitus patients are very diverse, so it is necessary to conduct a study to determine the BCFs of self-care agency in type 2 diabetes mellitus patients [8].

2 Materials and Method

The type of research used is analytical with a cross-sectional approach. The study was conducted at three Community Health Centers in the Surabaya area, Kalijudan Community Health Center, Tambak Rejo, and Pacar Keling Surabaya. The population is all Type 2 Diabetes Mellitus (T2DM) patients in the health center area, and the monthly average is 440. The sample size is a portion of the population of T2DM clients calculated based on Isaac and Michael's table at a 5% error rate of 195 people.

Inclusion criteria are clients diagnosed with T2DM, aged over 30 years, receiving insulin or oral anti-diabetic treatment, without visual or hearing problems, and willing to be a respondent by signing an informed consent. Exclusion criteria were T2DM with cognitive/mental disorders and speech disorders.

Sampling was conducted using Cluster Sampling; then, at each Community Health Center, sampling was done proportionally using random sample. The data collection tool used in this research was a questionnaire developed by researchers from research variables based on literature. The self-care conditioning factor instrument uses a Likert scale of strongly agree (4), agree (3), disagree (2) and strongly disagree (1). Measuring self-care agency uses the SDCA instrument, calculating the mean of each item (diet, exercise, blood sugar levels, foot care, and medication) obtained from the sum of the scoring results divided by the number of samples. Then, the calculation results are entered as mean \pm SD (standard deviation). The values obtained to determine self-care agency are \geq mean \pm SD = high self-care agency and $<$ mean \pm SD = low self-care agency.

This research instrument's validity and reliability test used thirty respondents from the sample. Validity is tested using Pearson's Product Moment Correlation formula, and reliability is measured using Cronbach's alpha technique. Basic conditioning factors instrument. The results of validity testing show that all indicators of all variables have correlation values with a significance level of less than 0.05. The results of the instrument reliability tests in this study were all reliable, with values $>$ 0.60.

This research was carried out after obtaining proper ethics from the Surabaya Ministry of Health Polytechnic No. EA/1081/KEPK-Poltekkes_Sby/V/2022. Data collection methods include interviews using a questionnaire consisting of demographic data, basic conditioning factors data, and self-care agency data. Data analysis was carried out using univariate and bivariate analysis through statistical testing of the T-test, based on analysis of variance-based structural equation models (SEM) or component-based SEM.

3 Results

3.1 Demographics of Respondents

The demographic characteristics of T2DM respondents in Table 1 show that almost all female respondents (79%), in terms of religion, nearly one hundred percent (90.3%) are Muslim. Almost half of them (41%) are high school graduates, nearly half of them (40%) are nuclear families, and most of the respondents said they have complications (61.5%).

Table 1. Demographic data for T2DM respondents in 2022

Characteristics	Category	Frequency	Percentage (%)
Gender	Male	41	21
	Female	154	79
	Total	195	100

Characteristics	Category	Frequency	Percentage (%)
Religion	Islam	176	90.3
	Catholic	3	1.5
	Christian	16	8.2
	Total	195	100
Education	University Diploma	25	12.9
	Elementary School	52	26.6
	Secondary Education	80	41
	Primary Education	38	19.5
	Total	195	100
Family Type	Big family	34	17.4
	Main family	78	40
	Elderly family	28	14.4
	Live with children	55	28.2
	Total	195	100
Complications	Yes	120	61.5
	No	75	38.5
	Total	195	100

The results of the numerical analysis showed that the age of the youngest respondent was 30 years and the oldest was 85 years, the average age was 58.9 years, the median was 60 years, and the standard deviation was 9.253 years. Respondents' average duration of illness was 30 years, and the lowest was 1 year. The average duration of disease was 6.5 years, the median was 5 years, and the standard deviation was 5.686 years. Based on the last blood sugar test value, the lowest result was 90 mg/dl, and the highest was 510 mm/dl. The average blood sugar value was 203.18, and the median was 200.0, with a standard deviation of 78.168. It can be seen in Table 2.

Table 2. Characteristics of Age, Length of Illness, and Last Blood Sugar Check Based on Numerical Data of T2DM Clients in 2022 (n=195).

Demographic characteristics	Mean	SD	Min-max
	Median		
Age	58.90	9.253	30-85
	60.00		
Long time of illness	6.50	5.686	1-30
	5.00		
Last blood sugar check (random)	203.18	78.168	90-510
	200.00		

3.2 Basic conditioning factors for T2DM clients

The analysis results of basic conditioning factors and lifestyle patterns stated that they were good (93.8%), and almost all family systems indicated that they were good (94.4 %). The health status of all respondents indicated that they were healthy. All data is described in Table 3.

Table 3. Basic conditioning factor variables for T2DM clients in 2022 (n=195)

Variable	Category	Frequency	Percentage (%)
Lifestyle	Low	0	0
	Fair	12	6.2
	Good	183	93.8
	Total	195	100
Family Systems	Low	0	0
	Fair	11	5.6
	Good	184	94.4
	Total	195	100
Health Status	Healthy	195	100
	Unwell	0	0
	Total	195	100

3.3 Self-care agency of T2DM clients

Based on the results, it was known that the self-care agency of T2DM respondents were almost entirely in the low category (82.1%), which can be seen in Table 4.

Table 4. Self Care Agency frequency distribution in 2022

Variable	Category	Amount	Percentage (%)
Self-Care Agency	Low	160	82.1
	Fair	0	0
	Good	35	17.9
	Total	195	100

3.4 Testing the relationship between variables

Testing was carried out using the statistical t-test. The relationship or influence between variables is declared to have a significant effect if it has a p-value <0.05 . The calculation results showed that there are three relationships between variables that have a considerable influence, namely lifestyle on self-care agency, family system on self-care agency, where the three variables have positive coefficient values, which means that the more the lifestyle increases, and the family system, the more self-care agency increases. Health status toward self-care agency has a negative coefficient value, which means that as health status increases, self-care agency decreases. The test results can be depicted in Table 5.

Table 5. Results of testing the relationship between variables

Variable	Original Sample (O)	Sample Mean (M)	Standard Deviation (STDEV)	T Statistics (O/ST DEV)	P Values	Exp Significance
Lifestyle -> Self Care Agency	0.216	0.216	0.095	2.271	0.024	Significance
Family System -> Self-Care Agency	0.222	0.229	0.098	2.265	0.024	Significance
Health Status -> Self-Care Agency	-0.246	-0.242	0.067	3.675	0.000	Significance

4 Discussion

The research results showed that lifestyle, family system, and health status influence self-care agency. The lifestyle of T2DM clients were in a good category, and only a few were in the fair category. Lifestyle for people with diabetes is defined as the lifestyle while the client is carrying out treatment and management of diabetes mellitus. People with diabetes already have a good lifestyle pattern. This condition shows that people with diabetes can apply their knowledge and skills to carry out self-care.

Diabetes self-care has been defined as an evolutionary process of developing knowledge or awareness by learning to cope with the complex nature of diabetes in a social context [8]. While most of the daily care of diabetes is carried out by the client and family, there is an important need for reliable and valid measures for diabetes self-management.

Diabetes self-care skills are behaviors carried out by people with diabetes to manage their disease successfully. These include diet, medication, exercise, stress management, monitoring blood sugar, eyes, kidneys, and foot care. Apart from that, it was observed that a healthy lifestyle is also related to the habits of people with diabetes in implementing clean and healthy living behavior. Diabetes self-care requires diabetes clients to make many dietary and lifestyle modifications, clean and healthy living, medication, exercise, stress management, monitoring blood sugar, eyes, kidneys, and foot care [9].

The lifestyle patterns of people with diabetes also have good lifestyle patterns [10]. Implementing a healthy lifestyle in daily life is very important and must be made a habit by every individual with diabetes. A healthy lifestyle covers three main health aspects: physical, mental, and social. The main components of this healthy lifestyle concept are increasing knowledge and habits of hand washing, increasing knowledge and food intake patterns, increasing anti-smoking knowledge and attitudes, and increasing knowledge and exercise habits [11].

Based on the family system, this research showed that almost all families supported clients so that they could carry out self-care. The role or relationship of family members and other people is very important for diabetes clients. The family system also includes the type of family, the culture that influences the family, and the individual or family's care resources within the family. This family contains large families or families with few family members. This affects the family's economic needs, which will later affect the cost of care. A larger number of family members allows for greater needs, so it is possible that care for family members who are sick with diabetes mellitus is not a priority [12].

Family is the main support system for a client [13]. This family support can take the form of information support by providing individuals with direct or indirect advice and feedback. Instrumental support provides the diabetic client's dietary needs and appreciation support that can be given to the family, namely providing reinforcement or praise if the client can carry out good self-care so that the sufferer feels appreciated, confident, and valuable. Emotional support is a form of support from expressions such as attention, empathy, and concern for someone. This support will cause the support recipient to feel comfortable and at ease again, to feel owned and loved when experiencing stress, and to provide assistance in the form of encouragement, personal warmth, and love.

Family support, diet, and exercise among older Mexican-American men with type-2 diabetes may improve adherence to diet and increase activity [14]. However, other research shows that although family support leads to expanded self-care programs in diabetes clients, commitment to self-care programs does not automatically decrease blood sugar [15]. Research on 98 type 2 diabetes patients showed that optimal glycosylated hemoglobin levels were related to the social support received from the family [16]. This study shows that family support reduces and controls blood sugar.

Perceived social support has a positive and significant correlation with client self-care, which predicts 9.1% of changes in self-care [16, 17]. Another study showed a significant inverse relationship between family support and HbA1c [18]. This family support can have an impact on improving the client's blood sugar control. It can be interpreted that the supportive role of the family will maintain a higher level of self-confidence, leading to self-care abilities and successful behavior change.

Research on gender views shows differences between men and women regarding family support. Men acknowledged family support regarding diet, whereas women generally thought that not having help at home and pressure from the family interfered with their ability to care for diabetes. Diabetes clients also need meetings with other diabetes clients where clients change experiences and receive support to improve coping with disease problems [19, 20]. If diabetes clients encounter social obstacles consisting of group pressure, lack of family support, lack of public awareness of diabetes, an unsupportive macro environment and various difficulties in the social system, lack of appropriate programs in the media, and lack of standard resources to educate the public. In that case, there is a lack of self-care ability.

Health status influences self-care agency. Health Status in this study was related to the diabetes client's perception of their level of health or illness. The health status of diabetes clients can be known through medical diagnosis, description of current health conditions, complications, and treatments carried out, as well as perceptions about each

individual's health. The high negative perception of diabetes clients regarding the assessment of diabetes is a psychologically disturbing thing caused by the experiences felt during the illness. The current findings have implications for the involvement of psychologists in the delivery of diabetes care, as patients' cognitive and emotional representation of the disease may pose significant challenges to their involvement in diabetes self-care practices, especially in diet and exercise [21].

Illness perception and diabetes knowledge significantly predicted overall diabetes self-care practices. Analysis of specific self-care rules showed that clients' diet and exercise were significantly expected by disease perception and diabetes knowledge. The client's exercise or ability to perform self-care was significantly predicted only by disease perception. At the same time, blood sugar testing and diabetic foot care were significantly predicted by knowledge about diabetes [22, 23]. Client perceptions about diabetes also significantly poor client compliance with medication, diet, and exercise. Diabetes clients with positive perceptions have good knowledge and good diabetes care management [24, 25]. This happens because diabetes clients view their illness as a serious matter, prioritizing treatment and independent care for their recovery.

5 Conclusion

Basic conditioning factor variables (lifestyle, family system, and health status) influenced self-care agency. Factors within the family and self of T2DM clients require adequate support to change habits or lifestyles in self-care. Diabetes clients needed meetings with other diabetes clients to exchange experiences and receive support to improve coping with disease problems. Health workers can facilitate this meeting in the form of activities of the Chronic Disease Management Program or Posyandu for the Elderly as a development program from the Community Health Center.

Acknowledgment

Thanks are expressed to the Surabaya Ministry of Health Polytechnic institution, which has provided research costs under the PDUPT scheme based on work contract number HK.03.01/I/1725/2022.

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