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## **DETERMINANTS OF SELF-CARE MANAGEMENT IN PATIENTS WITH TYPE 2 DIABETES MELLITUS**

**Eva Rahayu, Ridlwan Kamaluddin, Eti Dwi Hapsari**

Universitas Jenderal Soedirman, Purwokerto, Indonesia

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### **ABSTRACT**

Patients with type 2 diabetes need to do self-care practices to minimize possibility of complications and to improve quality of life. Several factors are assumed to influence self-care practices of patients with type 2 diabetes. The purpose of this research was to determine factors related to self care practice in type 2 diabetes patients in Banyumas Regency. This research used cross sectional design. Population was all patients with type 2 diabetes mellitus in Banyumas Regency. This study used cluster sampling technique with sample size of 532 patients in 22 community health centers in the district. Data analysis used Spearman correlation test and multiple linear regression. Result indicated that p value for each variable affecting diabetes self-care practices were 0,043 (gender), 0.18 (age), 0.11 (duration of diabetes), 0.000 (knowledge), 0.01 (motivation), and 0.000 (family support). Ten point four percent variation in diabetes self-care practices can be explained by knowledge variable ( $\beta = 0.32$ ). It can be concluded that gender, knowledge, motivation and family support determine self-care management in patients with type 2 diabetes mellitus. Knowledge variable was the most dominant factor related to diabetes self-care.

Keyword : Determinants, diabetes mellitus, diabetes self-care

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### **ABSTRAK**

Penderita diabetes tipe 2 perlu menerapkan perawatan mandiri dalam rangka meminimalisir berbagai komplikasi dan penurunan kualitas hidup. Beberapa faktor diduga memiliki pengaruh terhadap penerapan perawatan mandiri diabetes oleh penderita diabetes tipe 2 di Kabupaten Banyumas. Tujuan penelitian ini adalah untuk mengetahui faktor determinan yang memengaruhi penerapan perawatan mandiri diabetes tipe 2 di Wilayah Kabupaten Banyumas. Penelitian ini menggunakan desain *cross sectional*. Populasi adalah seluruh penderita diabetes melitus tipe 2 se-Kabupaten Banyumas. Metode penarikan sample dengan teknik *cluster sampling* dengan besar sampel 532 orang yang tersebar di 22 puskesmas se-Kabupaten Banyumas. Analisis data menggunakan uji korelasi Spearman dan regresi linier ganda. Hasil penelitian menunjukkan nilai p pada masing-masing variabel yang dihubungkan dengan perawatan mandiri diabetes adalah 0,043 (jenis kelamin), 0,18 (usia), 0,11 (lama menderita diabetes), 0,000 (pengetahuan), 0,01 (motivasi), serta 0,000 (dukungan keluarga). Sebesar 10,4 % variasi perawatan mandiri diabetes dapat dijelaskan oleh variabel pengetahuan dengan koefisien  $\beta = 0,32$ . Kesimpulan penelitian ini adalah faktor yang mempengaruhi perawatan mandiri diabetes antara lain jenis kelamin, pengetahuan, motivasi dan dukungan keluarga. Variabel pengetahuan menjadi faktor yang paling dominan berpengaruh terhadap perawatan mandiri diabetes.

Kata Kunci : Determinan, diabetes melitus, perawatan mandiri diabetes

## BACKGROUND

Diabetes mellitus is a group of metabolic diseases characterized by hyperglycemia due to abnormalities of insulin secretion or insulin action, or both of them (American Diabetes Association [ADA], 2010). Type 2 diabetes mellitus is the most common type of diabetes in the world, with approximately 90% of diabetic patients suffer from this type of diabetes (Quittenbaum, 2007). Diabetes mellitus is a lifelong disease affecting quality of human resources and increasing health cost. One of strategies to minimize possibility of complications and to improve quality of life of diabetic patients is self-care management. Diabetes self-care practices should be performed throughout life and become patient's responsibility (Bai, Chiou, & Chang, 2009). The practices include taking regular medication, dieting, performing physical exercise, monitoring blood sugar continuously and performing regular foot care (Xu Yin, Savage & Whitmer, 2008). Self-care becomes the basis for diabetes control and for preventing complications. Increasing the practices thus will improve patient's health status.

Diabetes self-care has shown many benefits for patients. However, many patients in Banyumas Regency still have not practiced it adequately. Implementation of diabetes self-care practices is affected by many factors. Several factors identified from previous researches included age and gender (Sousa & Zauszniewski, 2005), socioeconomic (Bai et al., 2009), duration of diabetes (Bai et al., 2009), motivation (Shigaki, Kruse, Mehr, Sheldon & Moore, 2010), knowledge of diabetes (Sigurdartottir, 2005; Xu Yin et al., 2008), family support (Xu Yin et al., 2008; Bai et al., 2009), confidence in the effectiveness of diabetes management (Xu Yin et al., 2008) and communication of health workers (Heisler, Bouknight, Hayward, Smith, & Ker, 2007). However, a comprehensive study to include all these factors and determine the most dominant factor contributing to diabetes self-care practice in type 2 diabetes in Banyumas cultural context is unavailable. Health

workers need to understand various factors affecting diabetes self-care behaviors, so they can develop suitable interventions to improve the health status of the patients. This research aimed to identify factors related to implementation of self-care in type 2 diabetes patients in Banyumas Regency.

## METHOD

This research used cross sectional design. Population was type 2 diabetes patients in Banyumas Regency with the total of 2,214 patients from 39 community health centers. Number of sample was calculated based on hypothesis test of correlation coefficient with  $r$  value of 0.246. Overall, 532 respondents were enrolled in this study. Sampling technique used in this research was cluster sampling. Sampling frame consist of 39 community health centers. The number of community health center entering into sampling cluster was determined by dividing number of sample by the average sample from each community health centers. A total of 22 community health centers were entered into sampling cluster.

Data were collected using questionnaires. Researcher provided explanation to the respondent about the purpose and benefits of the research, then asked the willingness and consent of respondents to participate in the research by signing informed consent. Diabetes self-care was measured using the Summary of Diabetes Self-Care Activities (SDSCA) developed by Toobert et al (2000) which has been modified and tested for its validity and reliability by Kusniawati (2011). The items validity was between 0.2-0.74 and Alpha Cronbach's value was 0.8. This instrument consisted of 14 questions related to self-care activities in patients with type 2 diabetes, including dietary regulation, physical exercise, blood sugar monitoring, medication, and foot care. This instrument consists of 8 alternative answers that is 0 to 7 days. The higher score indicated better self-care practice. Instrument for assessing knowledge of diabetes was developed by Anderson & Christison

(2008) which has been tested for its validity and re-reliability by Gultom (2012). The items validity was between 0.41-0.95 and Alpha Cronbach's value was 0.95. The instrument consists of 21 questions regarding diet, DM drugs, physical exercise and sugar monitoring and 3 alternative answers. The higher score indicates the better knowledge. Motivation was measured by using a modified instrument of Treatment Self Regulation Questionnaire (TRSQ) developed by Ryan and Deci (2000). This instrument consisted of 9 statements related to reasons to do self-care activities. The higher score indicates the better motivation. Questionnaire on family support was adopted from the Hensarling Diabetes Family Support Scale (HDFSS) developed by Hensarling (2009). This instrument has been tested for validity and re-reliability by Yusra (2011). The item validity was 0.5 and Alpha Cronbach's value was 0.96. The instrument consists of 29 items with 4 alternative answers (never, sometimes, often and always). The higher score indicates the better family support. Bivariate data analysis in this study used Spearman correlation test, while multivariate data analysis used Multiple Linear Regression test. Hypothesis will be accepted if p value is less than 0.05.

**RESULT**

A total of 532 respondents were involved in the study. From table 1, it can be seen that median age of respondents was 60 years (min-max: 38-85 years) and more than half of respondents were female (61.8%). Median value for duration of diabetes was 5.19 years with a minimum duration of 0.2 years and a maximum duration of 31 years. Median diabetes self-care was 3.7 days (0.8-4).

The result also indicated median values for knowledge, motivation and family support variables were 0.95 (0.45-2.7), 2 (0.1-3) and 1.8 (0-4) respectively.

**Table 1. Values for determinant factors and diabetes self-care**

Variable	Median	Min-Max
Age*	60	38-85
Duration of diabetes*	5.19	0.2-31
Knowledge*	0.95	0.45-2.7
Motivation*	2	0.1-3
Family support*	1.8	0-3
Gender		
Male, n(%)	203	38.2%
Female, n(%)	329	61.8%
Diabetes self-care	3.7	0.8-4

*Possible score range of diabetes self-care, knowledge, motivation, and family support are 0-7, 0-4, 0-3 and 0-3 respectively.*

*\*Data is not normally distributed*

**Table 2. Bivariate and multivariate analysis of determinant factors**

	Diabetes self-care		Total R <sup>2</sup> , %	β (p)
	r	p		
Age	-0.58	0.18		
Duration of Diabetes	-0.06	0.11		
Knowledge	0.33	0.00	10.4	0.322 (0.000)
Motivation	0.11	0.01		
Family support	0.15	0.00		
Gender	0.08	0.04		

Table 2 describes result of bivariate and multivariate analysis. Factors significantly related to diabetes self-care included gender, knowledge, motivation, and family support (p <0.05). While age and duration of diabetes did not have significant relationship to diabetes self-care (p > 0.05).

The last modeling on multivariate test of Multiple Linear Regression generated one significant variable as the determinant. Ten point four percent

variation of diabetes self-care can be explained by knowledge (β = 0.322; P <0.001). This finding indicated that knowledge was the best predictor/determinant affecting diabetes self-care in patients with type 2 diabetes. However, there are still other factors that are not examined in this research which influencing diabetes self-care among patients in Banyumas Regency.

## DISCUSSION

The median age of respondents in the present study was 60 years (38-85). Bivariate analysis showed that there was no significant relationship between age and diabetes self-care. This result was in accordance with Vivienne et al. (2007) and Kurnia, Karuncharernpanit and Amatayakul (2015) that found age did not contribute to diabetes self-care. Median score of diabetes self-care was 3.7 (> 50% of the total score of diabetes self-care). Younger and older age groups have been practicing diabetes self-care, but it was not optimal. Younger age group is encouraged to live productively, while older age group is to achieve successful ageing. This may be the reasons why age did not have relationship with diabetes self-care behaviors.

Duration of diabetes did not have relationship to diabetes self-care. The result of this research was not in accordance with Vivienne et al. (2007) and Bai et al. (2009) that found duration of diabetes influenced diabetes self-care. Longer duration of diabetes will make patient to get used to the disease and treatment process, especially self-care. Enthusiasm and responsibility for newly diagnosed patients to minimize complications or to do diabetes self-care might be different with those who have been diagnosed for years. This is why the present finding was in contrast to previous studies.

The present study indicated that gender had a relationship to self-care behaviors of patients with type 2 diabetes in Banyumas Regency. This result is supported by previous research that demonstrated a relationship between gender and management of diabetes self-care in patients with type 2 diabetes in Jordan (Albikawi & Abuadas, 2015). Univariate result indicated that female patients tended to show better diabetes self-care practices than male patients. Female patients' characteristic that likely to care more about their health than male patients might explain why gender had relationship to self-care.

Knowledge variable also had significant effect on self-care behavior of

patients with diabetes ( $p < 0.01$ ). In addition, multivariate test indicated that knowledge was the only predictor of diabetes self-care behaviors ( $\beta = 0.322$ ). This result was in line with Kurnia et al. (2015). The study reported that knowledge was one of the factors that had a significant effect on the management of diabetes self-care in Malang City, Indonesia. In addition, Rahayu (2014) also found that knowledge factor was the strongest predictor of diabetes self-care in Indonesia. The result of Huang, Liu, Zhang, Yao (2013) also supported these findings. The study indicated that knowledge factor had an effect on diabetes management in patients with type 2 diabetes in China.

Median value for diabetes self-care behaviors in the present study was 3.7. This finding indicated that achievement of self-care was only 52% of the ideal treatment. In addition, univariate analysis showed that median value of knowledge was 0.95. That was 31.7% of the ideal achievement of knowledge or in other word it was in the low category. These help explain why knowledge had positive correlation and becomes main predictor of diabetes self-management. Low knowledge leads to low achievement of diabetes self-care behaviors. Notoatmojo (2010) defines knowledge as the result of human sensing through the senses. Knowledge can make people to have awareness so they will behave according to the knowledge. The higher the knowledge, the higher the ability of individual in performing assessment of material or object. This assessment is basis for person to act.

The present study demonstrated a significant relationship between motivation and diabetes self-care ( $p=0.01$ ) with positive correlation. An individual who has high motivation will improve diabetes self-care. This was in line with Shigaki et al (2010) that found a significant influence of motivation on diabetes self-care. Motivation is an important factor for patients with diabetes because motivation become strong stimulus to perform diabetes self-care behaviors so optimal blood sugar control can be achieved and

occurrence of complications can be minimized.

Result indicated that family support had an effect on diabetes self-care behaviors ( $p=0.001$ ). Previous researches demonstrated the similar result that positive support provided by the family improved diabetes self management/care behaviors (Xu Yin et al., 2008; Bai et al., 2009; Gunggu, Thon & Lian, 2016). Family support is the attitude, action and family acceptance to the patient (Friedman, Bowden, & Jones, 2012). Support from the family will increase patients' knowledge and management of diabetes, which then lead them to perform better diabetes self-care behaviors. Mayberry & Osborn (2012) found that patients who had better knowledge of diabetes came from families who provide good support to them. In addition, strong family will increase confidence of patients in seeking self-care and control on the disease (Xu Yin et al 2008). There are other factors that have not been explored in this study, which may influence diabetes self-care, such as self-efficacy and support from health care providers. This becomes limitation of this study.

#### CONCLUSION AND SUGGESTION

In conclusion, factors that had a significant effect on diabetes self-care were gender, knowledge, motivation and family support. Knowledge was the most dominant factor affecting diabetes self-care of patients with type 2 diabetes in Banyumas Regency. The present study suggested to the importance to improve health education by using appropriate methods and media to improve knowledge and motivation of patients to implement diabetes self-care based on gender. In addition, health education is also needed to increase family support for patients with diabetes.

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