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Social Support-Based Family Empowerment Model for Diabetes Mellitus Patients in Blood Sugar Control Routines, Diet, and Sports Activities in Pekanbaru

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ABSTRACT

Diabetes Mellitus (DM) is a non-communicable disease that continues to increase, especially in developing countries. In Indonesia, the prevalence of DM among adults reached 11.3% or approximately 20.4 million cases in 2023, and the WHO estimates that this figure will increase by 80% by 2025. Managing DM requires not only medication but also blood sugar control, dietary compliance, and regular physical activity. To support this, a family empowerment model based on social support is needed.This study aims to analyze the effect of the family empowerment model on blood sugar control routines, diet compliance, and exercise activities of DM patients in Pekanbaru. The study uses a quantitative approach with a quasi-experimental one-group pre-post test design on 70 respondents with DM. The research instrument is a questionnaire that measures social support, blood sugar control, diet compliance, and physical activity. Data analysis used SPSS 25 and SmartPLS to test validity, reliability, and the relationship between variables.The results showed that all constructs were valid and reliable with Cronbach's Alpha and Composite Reliability values > 0.90. The path coefficient test showed a significant effect of family empowerment on diet compliance (T = 12.538; p = 0.000), exercise activity (T = 9.012; p = 0.000), and blood sugar control (T = 6.085; p = 0.000) in the pre-test, as well as an increase in the relationship in the post-test, particularly blood sugar control (T = 8.002; p = 0.000).These findings indicate that the social support-based family empowerment model is effective in improving dietary compliance, physical activity, and the ability of patients to control blood sugar levels.

KEYWORDS: Diabetes Mellitus, family empowerment, social support, diet, physical activity, blood sugar control.

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INTRODUCTION

Diabetes mellitus (DM) is a chronic disease characterized by elevated blood glucose levels due to impaired insulin secretion or function. According to reports from the WHO and the International Diabetes Federation (IDF), the global prevalence of DM is increasing significantly each year, especially in developing countries. In Indonesia, the prevalence of DM in adults reached 11.3% or around 20.4 million cases in 2023, and the WHO estimates an increase of up to 80% by 2025. This condition shows that DM is a major challenge for the national health system. Controlling DM requires more than just pharmacological therapy; it must also be accompanied by lifestyle changes such as regular blood sugar control, adherence to a healthy diet, and increased physical activity. However, many DM patients find it difficult to maintain adherence to these self-management programs. One factor that can help is social support, especially from family.Families play an important role as a source of emotional, motivational, and instrumental support in helping patients carry out their DM control routines. A family empowerment model based on social support is expected to improve patients' ability to control blood sugar, adhere to diets, and exercise regularly.Based on this, this study was conducted to analyze the effect of a family empowerment model based on social support on blood sugar control routines, diet adherence, and physical activity among DM patients in Pekanbaru.

METHODS

This study uses a quantitative approach with a quasi-experimental one-group pre-test–post-test design. This design aims to measure changes before and after the implementation of the family empowerment model on the variables studied in the same group. The study was conducted in the working areas of several community health centers in the city of Pekanbaru in 2025. The population consists of all type 2 diabetes mellitus patients who undergo routine check-ups at the Pekanbaru Community Health Centers. The research sample consisted of 70 respondents, selected using purposive sampling with the following criteria: all DM patients who were willing to be respondents and had a minimum adequate Family APGAR score (6-7). The research instrument was a structured questionnaire with four main constructs: social support-based family empowerment, diet compliance, and family activities. Data analysis used SPSS 25 for descriptive analysis of respondent distribution and data normality testing. The validity and reliability of the instrument constructs used in this study were analyzed using SmartPLS 4.0, while the relationship between variables (path coefficient) was also analyzed using SmartPLS 4.0.

RESULTS AND DISCUSSION

1. **Respondent Characteristics**

Respondent characteristics in this study include frequency distribution information such as age, gender, education, occupation, duration of illness, information obtained, and sources of information.

Table 1. Frequency Distribution of Respondent Characteristics

Variable	Catagory	Frequency (N)	Persentase (%)
Usia	26 - 35 years	2	2,9%
	36 - 45 years	1	1,4%
	46 – 55 years	38	54,7%
	56 – 65 years	27	38,6%
	> 65 years	2	2,9%
Gender	Male	32	45,7%
	Female	38	54.3%
Level of Education	Elementary School	4	5.7%
	Junior High School	12	17.1%
	High School	37	52,9%
	Diploma/University	17	24,3%
Type of Job	Civil Servant	13	18,6%
	Self High School	21	30.0%
	Housewife	20	28,6%
	Employee	2	2,9%
	Unemployee	14	20,0%
Long Suffering	<1 years	27	38,6%
	1-2 years	31	44,3%
	3-6 years	11	15,7%
	>10 years	1	1,4%
Receive Infortmation	Already	70	100,0%
	Not yet	0	0,0%
Source of Information	Online Media	16	22,9%
	Social Media	23	32,9%
	Family	11	15,7%
	Health Workers	20	28,6%

Source: SPSS 25 (2025)

Table 1 shows that there were 70 respondents in this study. The characteristics of the respondents include the following frequency distribution: characteristics based on age: the majority of respondents were in the early elderly group aged 46-55 years, totaling 38 respondents (54.3%), followed by the early elderly group aged 56-65 years, totaling 27 respondents (38.6%), followed by the early adult group aged 26-35 years with 2 respondents (2.9%) and the elderly group aged > 65 years with 2 respondents, and the late adult group aged 36-45 years with 1 respondent (1.4%). This shows that the majority of DM patients are in the early elderly group aged 46-55 years. The gender of the respondents was female for 38 respondents (54.3%) and male for 32 respondents (45.7%). This shows that the majority were female. The respondents' education levels were high school for 37 respondents (52.9%), diploma/university for 17 respondents (24.3%), junior high school for 12 respondents (17.1%), and elementary school for 4 respondents (5.7%). The respondents' occupations were 21 respondents (30.0%) who were entrepreneurs, 20 respondents (28.6%) who were housewives/homemakers, Unemployed/retired 14 respondents (20.0%), Civil Servants 13 respondents (18.6%), and Private Employees 2 respondents (2.9%). The duration of DM was 1-2 years for 31 respondents (44.3%), < 1 year for 27 respondents (38.6%), 3-6 years for 11 respondents (15.7%), and > 10 years for 1 respondent (1.4%). All 70 respondents (100.0%) had received information about DM. The sources of information were social media (23 respondents, 32.9%), health workers (20 respondents, 28.6%), online media (16 respondents, 22.9%), and family (11 respondents, 15.7%).

DESCRIPTIVE ANALYSIS OF VALIDITY AND RELIABILITY

Table 2. Descriptive Analysis of Validity and Reliability

	Cronbach's alpha	Composite reliability (rho_a)	Composite reliability (rho_c)	Average Variance Extracted (AVE)
Kepatuhan Diet	0.934	0.938	0.944	0.627
Model Pemberdayaan Keluarga	0.927	0.929	0.939	0.605
Aktivitas olahraga	0.940	0.944	0.949	0.650
Rutinitas Kontrol Kadar Gula Darah	0.936	0.948	0.945	0.634

Source: SmartPLS 4.0 (2025)

Validity and reliability were tested using SmartPLS 4.0, resulting in Cronbach's Alpha and Composite Reliability values > 0.90, and AVE > 0.5. This indicates excellent internal consistency.

DESCRIPTIVE ANALYSIS OF PATH COEFFICIENTS PRE-POST TEST

Table 3. Descriptive Analysis of Path Coefficients Pre-Post Test

efficiests	tatistic test	test	alue test	test	erangan
nily Empowerment → Diet Compliance	538	00	00	000	nifikan
Family Empowerment → Sports Activities	12	0	00	000	nifikan
Family Empowerment → Blood Sugar Control Routine	85	2	00	000	nifikan

Source: SmartPLS 4.0 (2025)

The path analysis results show a significant influence between the variables in the model both before and after the intervention. In the pre-test, the effect of the family empowerment model on diet compliance (T = 12.538; p = 0.000), exercise activity (T = 9.012; p = 0.000), and blood sugar control (T = 6.085; p = 0.000) were all significant. After the intervention, these values remained significant but showed an increase in the strength of the relationship, especially in blood sugar control (T = 8.002; p = 0.000). This indicates that the social support-based family empowerment program not only improves diet compliance and exercise activity but also strengthens the ability of patients to control their blood sugar levels. This effect can be explained by the increase in knowledge, motivation, and emotional support from the family after participating in the intervention program, so that patients are more consistent in implementing a healthy lifestyle.

CONCLUSION

The social support-based family empowerment model has been proven effective in improving dietary compliance, physical activity, and the ability of DM patients to control their blood sugar levels. Family social support is a key component in strengthening patient motivation and discipline in managing their disease. This model can be integrated into Puskesmas or clinic education programs as a form of non-pharmacological intervention. Families need to be actively empowered to become supporting agents in DM management. Further research is recommended using an experimental design with a control group to strengthen the evidence of the model's effectiveness.

CONFLICTS OF INTEREST

The authors declare no conflict of interest.

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