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FACTORS ASSOCIATED WITH DIETARY COMPLIANCE WITH TYPE 2 DIABETES MELLITUS IN THE ELDERLY IN SOUTH TANGERANG

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Abstract

Diabetes mellitus is classified as one of the main causes of poor health in the world. One of the populations most at risk and increasing in number is the elderly. To achieve successful control of diabetes mellitus, one of them depends on dietary compliance. Dietary adherence is an important factor to keep blood sugar stable and not cause complications. This study aims to determine the factors associated with dietary compliance with type 2 diabetes mellitus in the elderly in the Pisangan Health Center area. This type of research is observational analytics with a cross sectional approach. The number of samples in this study was 70 respondents taken using purposive sampling techniques. The instruments in this study used demographic questionnaires, influencing factors, and PDAQ (Perceived Dietary Adherence Questionnaire). The results showed that there was a significant relationship between education, knowledge, and self-motivation with DM diet adherence. Meanwhile, there was no significant association between sex, occupation, family support, and the role of health workers with DM dietary adherence. In this study, there were 24 respondents with low diet adherence, and 46 respondents with high diet adherence. Researchers hope that health workers can pay more attention to groups that have not been exposed to information related to DM and DM diet management and can pay attention again to other factors that are less related to dietary compliance in the elderly.

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INTRODUCTION

In Indonesia, non-communicable diseases occupy the top ten diseases that cause the most cases of death[1]. One of the groups or populations most at risk of being affected and increasing in number isthe elderly. In 2018, the percentage of the elderly population in Indonesia increased compared to 2017, around 24.49 million people and reached 9.27%[2]. According to the World Health Organization (WHO), diabetes mellitus is classified as one of the NCDs that is a major cause of poor health in the world. Diabetes mellitus is a set of metabolic barriers characterized by increased blood sugar levels (hyperglycemia), which occurs due to abnormalities in insulin secretion, insulin activity, or both[3]. Data from the International Diabetes Federation (IDF) in 2017 showed that people with diabetes mellitus in the world reached 425 million people, mostly aged 20-79 years, and is expected to increase to 629 million people by 2045. According to the consensus of the Indonesian Endocrine Association (Perkeni) states that the success of the diabetes mellitus control process depends on diet compliance or dietary arrangements in people with diabetes mellitus. Factors that influence dietary compliance are divided into two, namely, internal factors and external factors. Internal factors consist of knowledge and attitudes while external factors consist of family support and health workers[4]. Previous research has shown that dietary adherence in

people with type 2 diabetes mellitus is influenced by various internal and external factors, but there are still differences in results regarding the most dominant factors influencing dietary adherence. Most studies have been conducted on people with diabetes mellitus in general, while research specifically examining dietary adherence in the elderly is still limited, even though the elderly experience physical and psychological changes that can affect adherence behavior. Furthermore, in the Pisangan Community Health Center area, East Ciputat District, there has been no research examining the factors that influence the level of dietary adherence in the elderly with type 2 diabetes mellitus. Therefore, this study was conducted to fill this gap by identifying the factors that most influence dietary adherence in elderly with type 2 diabetes mellitus.

Based on research conducted by Fitriana and Salviana (2021) regarding the analysis of factors affecting dietary compliance in the elderly with type 2 diabetes mellitus, the results of this study found that there was a close relationship between family support, knowledge, income, and nutritional counseling in the level of dietary compliance in the elderly[5]. Furthermore, in a study conducted by Yaslina, et al., (2021) which examines changes in the aging process entitled Physical and psychosocial aspects of functional status in the elderly[6]. The journal explains that there are several changes in the aging process, namely physical changes, psychosocial changes, changes in cognitive aspects, and functional changes. And the results of the study found that there is a relationship between physical, psychosocial aspects and changes in attitudes that occur in the elderly[6].

Therefore, researchers chose to conduct research on elderly subjects because it is in accordance with the urgency obtained by researchers regarding the lack of obedient attitudes of the elderly towards the DM diet and in line with research conducted by Yaslina et, al., (2021) that the elderly experience changes in their attitudes and behavior[6].

METHODS

This type of research uses an observational analytical research design with a cross-sectional approach. This study was conducted from March to June 2023 in the working area of the Pisangan Community Health Center. The population in this study were elderly people with type 2 diabetes mellitus in the working area of the Pisangan Community Health Center. The criteria for patients with type 2 diabetes by medical personnel, aged over 60 years, cognitively and mentally healthy, patients undergoing treatment at the Pisangan Community Health Center. The sampling technique in this study used a purposive sampling technique of 64 samples and a 10% excess to prevent missing data. The research instruments used were a demographic questionnaire, a questionnaire that influences adherence, and a PDAQ (Perceived Dietary Adherence Questionnaire) questionnaire with a validity and reliability test result of Cronbach's alpha of 0.78. In this study, the influencing factors consisted of knowledge, self-motivation, family support, and the role of health workers. These factors have been tested for validity and reliability by Yulia (2015), resulting in a Cronbach's alpha value of 0.70. This research has undergone ethical testing by the Health Ethics Committee of UIN Syarif Hidayatullah Jakarta, etical number Un.01/F.10/KP.01.1/KE.SP/06.08.079/2023[7].

RESULTS AND DISCUSSION

Table I. Characteristics of Respondents with Type 2 Diabetes Mellitus Patients in the Pisangan Health Center Area (n = 70)

Characteristics	Frekuensi (n)	Persentase (%)
Gender		
Male	37	52,9
Female	33	47,1
Last Education		
Not in School/Not Graduated	2	2,9
SD	15	21,4

SLTP	7	10,0
HIGH SCHOOL	32	45,7
Higher Education	14	20,0
Jobs		
Work	16	22,9
Not Working	54	77,1
Knowledge		
Less (≤60%)	17	24,3
Good (≥60%)	53	75,7
Self Motivation		
Less	30	42,9
Good	40	57,1
Family Support		
Negative	36	51,4
Positive	34	48,6
The role of health workers		
Less	32	45,7
Good	38	54,3
DM Dietary Adherence		
Low	24	34,3
High	46	65,7

Based on Table 1, the frequency distribution of characteristics in elderly patients with type 2 diabetes mellitus during May-June 2022 at the Pisangan Health Center obtained the results of the gender variable with 70 respondents, the majority of whom were male, totaling 37 respondents (52.9%). The results obtained from the majority of education variables are high school, totaling 32 respondents (45.7%). The results obtained from the employment variable with 70 respondents, namely the majority did not work, totaling 54 respondents (77.1%). The results of the knowledge variable the majority of respondents had good knowledge of more than 60%, totaling 53 respondents (75.7%). According to Notoatmojo (2014) states that knowledge is very important in shaping a person's behavior and that knowledge is the first step for a person to determine their attitude and behavior. The results of the self-motivation variable the majority of respondents had good self-motivation totaling 40 respondents (57.1%)[8].

The results of the family support variable the majority of respondents had positive family support totaling 34 respondents (48.6%). The results of the health worker role variable were the majority of respondents had a good health worker role totaling 38 respondents (54.3%). Furthermore, dietary adherence in this study was measured based on the level of dietary compliance in elderly patients with type 2 diabetes mellitus during the last 7 days of consuming food. The level of dietary compliance uses the Perceived Diet Adherence Questionnaire measuring instrument. The results of the dietary adherence variable were low dietary adherence totaling 24 respondents (34.3%), and high dietary adherence totaling 46 respondents (65.7%). From the results of the above analysis it can be concluded that high dietary compliance is greater as many as 46 respondents.

Based on the results of this study, it was found that the highest number of respondents in the gender of patients with type 2 diabetes mellitus in the elderly in the Pisangan Health Center area were men as many as 37 respondents (52.9%) while a small proportion of respondents were female as many as 33 respondents (47.1%). The results of this study indicate that both men and women have the same risk of developing diabetes mellitus[9]. And the results of this study are also supported by research in Indonesia conducted by Riskesdas in 2007 that the prevalence does not differ by gender. The results of research conducted by Riskesdas on gender were 1.1%, which means that men and women have the same risk of developing DM[10].

Based on the statistical results in this study, it was found that the highest number of respondents' education in the elderly with type 2 diabetes mellitus was high school, totaling 32 respondents (45.7%). The results of this study are in line with research conducted by Kasumayanti (2019) Most respondents had a high school education level with 34 respondents (39.5%)[11].

Based on the statistical results in this study, it was found that the highest number of respondents was not working, totaling 54 respondents (77.1%). The results of this study are in line with the results of research conducted by Pratiwi (2018) that the highest number of respondents was not working as many as 56 respondents (63.6%). This is because in the study the majority of

respondents did not work because they had reached an advanced age of 60 years and over or had retired.

Table 2. Relationship between Characteristics and Dietary Adherence in Elderly Diabetes Mellitus Type 2 Patients

Varibel	Compliance Level		Total	*p value*	Correlation Coefficient
	Low (%)	High (%)			
Gender					
Male	41,7	58,7	52,9	0,152	0,173
Female	58,3	41,3	47,1		
Education					
Not in School	0	4,3	2,9	0,055	0,230
SD	33,3	15,	21,4		
SLTP	8,3	10,9	10,0		
High School	50,0	43,5	45,7		
Higher Education	8,2	26,1	20,0		
Jobs					
Work	16,7	26,1	22,9	0,532	0,076
Not Working	83,3	73,9	77,1		

Based on the results of table 2 on the variables of gender, education, occupation with dietary complianceand determine the relationship between the two variables. From a total of 70 respondents in the study, it was found that the majority of male gender had a high level of compliance totaling 27 respondents (58.7%) while the level of compliance in female gender had a low level of compliance totaling 14 (58.3%). The results obtained from the education variable from 70 respondents showed that the majority of the compliance level in high school had high compliance, totaling 20 respondents (43.5%). The results obtained from the occupational variables of 70 respondents showed that the majority of the compliance rate on not working had a high level of compliance as many as 34 respondents (73.9%).

In this study, there was no significant relationship between gender and the level of DM diet compliance with *p value* = 0.152, which is >0.05. In the elderly who suffer from diabetes mellitus 2, both women and men do not provide a significant relationship to dietary compliance. This is in line with what was done by Rohani (2018) that there is no correlation between gender and DM diet compliance with a *p value of* 1,000. This shows that gender is not a factor that is directly related to compliance behavior[12].

Reinstock et. al in Lestari (2021) state that gender is not a factor directly related to compliance[13]. Rather, gender is directly related to perceptions and these perceptions are directly related to adherence because gender affects the mental changes of patients to decide to take action to prevent disease or complications from continuing.

The results of the *Spearman rank correlation* test conducted on the education variable and the level of DM diet compliance resulted in a p value of 0.055 where this figure is not more than 0.05, which means that there is a significant relationship between the two variables. Education is an effort to instill an understanding and purpose in order to grow attitudes in individuals to be able to understand and perform positive actions. This study is in line with research conducted by Susanti (2017) testing the correlation between knowledge and DM diet compliance with a *p value of* 0.038.

Based on the results of this study, it was found that 22 respondents out of a total of 70 respondents had low dietary compliance than respondents with higher education. During the field research, respondents with higher education were much more able to understand and accept all DM diet recommendations given by health workers. This led the researcher to assume that the extensive knowledge of the respondents would allow the individual to control himself against the nutrients consumed that could cause an increase in blood sugar and complications in his disease so that the individual would adhere to his diet.

The results of the *Spearmen rank correlation* test conducted on the employment variable and the level of DM diet adherence resulted in a *p value* of 0.532 where the number> 0.05 which means there is no significant relationship between the two variables. In this variable, there is no relationship between employment status and

compliance in dietary management. This study is in line with research conducted by Hestiana (2017) that there is no correlation between employment and DM diet compliance with the results of *p value* 0.7[14].

Quoted from Macgilchrist (2010) that there is a relationship between employment status and DM diet management compliance. because, people with DM who have low income will cause non-compliance in managing the diet compared to people with high income. This is because people who have lower incomes have fewer opportunities to buy foods that are suitable for DM diet management[15].

Table 3. Relationship between Knowledge and Dietary Adherence in Elderly Diabetes Mellitus Type 2 Patients

Knowledge	Compliance Level		Total	*p value*	Correlation Coefficient
	Low (%)	High (%)			
Gender					
Male	33,3	19,6	24,3	0,014	0,293
Female	66,7	80,4	75,7		

Based on the results of table 3 on the variable knowledge with dietary compliance and knowing the relationship between the two variables. Of the total 70 respondents in the study, it was found that 37 respondents (80.4%) had good knowledge and a high level of compliance.

The results of the *Spearmen rank correlation* test conducted on the knowledge variable and the level of DM diet compliance resulted in a *p value* of 0.014 where this figure is <0.05, which means that there is a significant relationship between the two variables. This study is in line with research conducted by Rohani (2018) testing the correlation between knowledge and DM diet compliance with a *p value of* 0.020[13].

In the results of this study, 53 respondents had good knowledge and had a high level of compliance as many as 37 respondents out of a total of 70 respondents. During interviews with respondents, it was found that respondents with high knowledge of DM and DM management proved to be obedient to the diet they were carrying out because the respondents already understood the risks that would be caused and accepted so as to create awareness for individuals and finally individuals would behave according to what individuals knew if they did not comply with their diet.

Table 4. Relationship between self-motivation and dietary adherence in elderly patients with type 2 diabetes mellitus

Self Motivation	Compliance Level		Total	*p value*	Correlation Coefficient
	Low (%)	High (%)			
Less	66,7	30,4	42,9	0,001	0,396
Good	33,3	69,6	57,1		

Based on the results of table 4 on self-motivation variables with dietary adherence and knowing the relationship between the two variables. Of the total 70 respondents in the study, 32 respondents (69.6%) had good self-motivation and a high level of adherence.

The results of the *Spearmen rank correlation* test conducted on the self-motivation variable and the level of DM diet compliance resulted in a *p value* of 0.001 where this figure is <0.05, which means that there is a significant relationship between the two variables. Individual compliance can be influenced by motivation from within the individual to carry out healthy behavior and always maintain their health. This study is in line with research by Nurmala Datuela (2021) testing that there is a correlation between family support and DM diet compliance with a *p value of* 0.000[16].

This shows that good motivation will influence individuals to carry out health behavior according to the recommendations given by health workers. Based on the results of this study, 40 respondents had good self-motivation and showed that the proportion of DM diet compliance was more in respondents who had good self-motivation than respondents who had less motivation.

Table 5. Relationship between Family Support and Dietary Adherence in Elderly Diabetes Mellitus Type 2 Patients

Family Support	Compliance Level		Total	*p value*	Correlation Coefficient
	Low (%)	High (%)			
Negative	58,3	47,8	51,4	0,222	0,148
Positive	41,7	52,2	48,6		

Based on the results of table 5 on family support variables with dietary adherence and knowing the relationship between the two variables. Of the total 70 respondents in the study, 24 respondents (52.2%) had positive family support and a high level of compliance.

The results of the *Spearmen rank correlation* test conducted on the family support variable and the level of DM diet compliance resulted in a *p value* of 0.222 where this figure is> 0.05, which means that there is no significant relationship between the two variables. This study is in line with the results of Febriyanti's research (2021) that there is no correlation between family support and DM diet compliance with a *p value of* 0.137[17]. The results showed that family support did not help patients to increase their confidence to carry out proper dietary management.

In this study, 36 respondents (51.4%) had negative or lack of family support, but even so there were 22 respondents out of 36 respondents who experienced less family support they had high compliance. During interviews with respondents, the average elderly person in the Pisangan Health Center area has separated from their children, only lives with their spouse, or alone. They said that other family members only fulfill their material needs.

Table 6. Relationship between the role of health workers and dietary adherence in elderly patients with type 2 diabetes mellitus

The role of health workers	Compliance Level		Total	*p value*	Correlation Coefficient
	Low (%)	High (%)			
Less	45,8	45,7	45,7	0,891	0,017
Good	54,2	54,3	54,3		

Based on the results of table 6 on the variable role of health workers with dietary compliance and knowing the relationship between the two variables. Of the total 70 respondents in the study, 25 respondents (54.3%) had a good role of health workers and a high level of compliance.

The results of the *Spearmen rank correlation* test conducted on the variable role of health workers and the level of DM diet compliance resulted in a *p value* of 0.891 where this figure is> 0.05, which means that there is no significant relationship between the two variables. This study is in line with research conducted by Febriyanti (2021) testing that there is no correlation between the role of health workers and DM diet compliance with a *p value of* 0.579[17]. This shows that the interaction between health workers and patients does not lead to an understanding of the importance of treatment when consultation is being carried out.

In the results of this study there were 32 respondents (45.7%) who had a lack of role of health workers, but had high dietary compliance as many as 21 respondents. This makes the researcher assume that this is because even though the role of health workers is lacking, there are other important factors that make respondents adhere to their diet such as strong self-motivation and a greater desire to recover.

The level of dietary compliance in this study was measured using the 9-item PDAQ instrument with a total sample of 70 respondents. Based on the statistical results in this study, it shows that there are 2 categories of DM diet adherence levels. low category there are 24 respondents (34.3%), and high category 46 respondents (65.7%). Most of the respondents in this study belonged to the high dietary compliance category. The resulting data arises because there are several influencing factors, especially in self-motivation and the level of individual knowledge.

The results of this study are in line with research conducted by Bangun (2020) that of the 48 respondents

there were 27 respondents (56.3%) compliant with their diet and 21 respondents (43.8%) were not compliant with their diet. This shows that patient compliance in undergoing DM diet management is due to the belief that dietary management can control blood sugar and prevent complications. this is supported by interviews at the time of the study, the respondent said that he had a high desire to recover from his illness by controlling food and the respondent said that when blood sugar levels rise, it causes headaches, weakness throughout the body, and impaired comfort which in turn the respondent maintains his diet.

CONCLUSION

The results of this study show that most respondents with Type 2 Diabetes Mellitus had good knowledge, good self-motivation, and high dietary adherence. The factors of education, knowledge, and self-motivation were found to have a significant relationship with the level of adherence to the Type 2 DM diet, while gender, occupation, family support, and the role of health workers did not show a significant relationship. These findings indicate that internal factors play a more dominant role in influencing dietary adherence than external factors. Therefore, it is recommended that health workers focus on increasing patient knowledge and motivation through education and counseling, while family members are encouraged to provide positive support to patients in maintaining dietary adherence. Further research is suggested to involve a larger number of respondents and explore other variables that may influence dietary adherence, such as psychological and social factors, to obtain a more comprehensive understanding and improve the effectiveness of future interventions.

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