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The knowledge, attitudes and behaviors of family influence diabetic mellitus diet's compliance among elderly

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Abstract.
Context: The prevalence of Diabetes Mellitus is increasing worldwide, and most of them are suffered by elderly. Knowledge, attitudes, and behaviors of family have important role toward compliance of Diabetes Mellitus diet. Diabetes Mellitus diet is one of main pillar diabetes mellitus management by observing food consumption in terms of quantity, quality and mealtime (3J). **Aims**: The purpose of this study is to analyze the relationship of family behavior (knowledge, attitudes, and actions) towards compliance to the application of a Diabetes Mellitus diet for the elderly. **Settings and Design**: A cross sectional study with 55 elderly were involved in this quantitative research. **Methods and Material**: Subject was interviewed by training enumerator using structured questionnaire. **Statistical analysis used**: Chi square test was used to analyze the data. **Results**: There was significant association between the knowledge, attitudes and behaviors of family with compliance of diabetes mellitus diet among elderly ($p < 0.05$). **Conclusions**: Family have important role to maintain compliance of Diabetes Mellitus Diet among Elderly who suffered Diabetes Mellitus. The better knowledge, attitude and behaviors of family, they provide elderly well education and action of Diabetes Mellitus Diet.

Keywords: Characteristic of elderly, food consumption, nutritional fulfillment

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Introduction

Health problems can be influenced by lifestyle, diet, work environment factors, exercise and stress. Lifestyle changes, especially in big cities, cause an increase in the prevalence of degenerative diseases, one of them is Diabetes Mellitus (DM)[1]. People with DM increase with increasing age. The increase in Interrupted Glucose Tolerance (TGT) and Fasting Blood Sugar (GDP) shows the occurrence of DM. The highest proportion of TGT in the 65 yr to 74 yr age group is 29.9 %. The highest proportion of GDP in the 55 yr to 64 yr age group is 36.6 %. The prevalence of DM in East Java that had been diagnosed with DM by doctors is 2.1 % with an absolute number of 605.974 people[2].The data shows that the age of the elderly is the highest prevalence of DM patients, because an elderly person tends to experience a decrease in his health condition[3].

Families have an important role in family health, including during the DM diet. The application of dietary management to the elderly needs special attention, namely the attention of the family to socialize physiological conditions, nutritional needs (macro and micro), consumption level and nutritional status in the elderly so that the elderly health status remains in good condition[3]. Families can influence the health status of family members, including the elderly in the family. Health status is influenced by behavior. Behavior is divided into three domains, namely cognitive, affective, and psychomotor, which are then measured in terms of knowledge, attitudes, and actions[4].

Solutions that can be done for elderly people with DM (people with diabetes) by taking the DM diet. DM diet is one of the main pillars of DM management by taking into account the consumption of food both in number, type and schedule. The amount of food can be known by balanced consumption in terms of carbohydrates, protein and fat. The type of food is high in fiber and has a low glycemic index. The food schedule includes consistent meal times and feeding distance every 3 h to 4 h[5]. With good management it is believed that optimal patient quality of life will be maintained and avoid the chronic complications of Diabetes Mellitus.

The number of people with DM in Indonesia is increasing. Based on the 2013 Riskesdas – *Riset Kesehatan Dasar* (Basic Health Research), the proportion of DM patients aged > 15 yr in Indonesia increased by 1.1 %, namely 5.7 % (2007) to 6.9 % (2013). Whereas the proportion of urban population increased 4.5 %, namely 5.70 % (2007) to 10.20 % (2013)[6].

Based on data from Public Health Office Jember Regency, Indonesia, DM is one of the three biggest diseases suffered by the elderly. The number of cases of DM has increased in the last 2 yr, amounting to 50.2 % from 1 360 cases (2015) to 2 043 cases (2016). It does not rule out the possibility that low family behavior (knowledge, attitudes, behaviors) and the presence of other risk factors that affect, for example, unhealthy diets that cause obesity and lack of physical activity are the causes of the large incidence of DM in the Puger district. The purpose of this study

is to analyze the relationship of family behavior (knowledge, attitudes, and actions) towards compliance to the application of a DM diet for the elderly.

Materials and Methods

This study, using quantitative research methods with cross sectional design. The population in this study is elderly (> 60 yr old) whose suffering Diabetes Mellitus in *Puskesmas Puger* (Public Health Center of Puger) working area. Determination of samples in this study using purposive sampling technique. The sample for this research are 55 respondents. Data was analyzed using SPSS Version 20.0. Categorized data was analyzed using Chi Square Test. Significance level in this study if $p < 0.05$.

Statistic analysis

This study using chi square test was used to analyze the data.

Result

Distribution of sample characteristics can be seen in Table 1.

Table 1. Elderly characteristic and family distribution

Elderly Characteristics	**n**	**%**
Age		
Elderly	51	92.7 %
High risk elderly	4	7.3 %
Education level		
Basic	36	65.5 %
Secondary	17	30.9 %
High	2	3.6 %
Working status		
Entrepreneur	4	7.3 %
Farmer	4	7.3 %
Not working	47	85.5 %
Family education level		
Basic	16	29.1 %
Secondary	35	63.6 %
High	4	7.3 %
Family income		
< Regional minimum wage	20	36.4 %
≥ Regonal minimum wage	35	63.6 %

Family here were people in the family who have the most role in providing or determining elderly food. Table 1 shows the results of age characteristics, the amount of people whose the age of the elderly were 51 respondents (92.7 %), the education characteristics the amount of people whose at the based level were 36 respondents (65.5 %), meanwhile for the job characteristics, the amount of people who categorized as not working respondent were 47 respondents (85.5 %),

education family with secondary education category were 35 respondents (63.6 %). Family distribution based on family income showed that family whose categorized into ≥ regional minimum wage were 35 respondents (63.6 %).

Application of the DM diet

Application of the DM Diet among elderly showed that there were 51 respondents (92.7 %) respondent who did not fill energy consumption requirement. The type of dietary food consumed by the elderly which was already fill the standard were 45 respondents (81.8 %). The meal schedule for the elderly did not fill the standard were 45 respondents (81.8 %).

Elderly compliance with the DM diet

Elderly people with DM who had comply to diet were four respondents (7.3 %), while those who had not comply to the DM diet were 51 respondents (92.7 %). Table 2 showed, there were 30 respondents (54.5 %) who had moderate knowledge of family toward DM. Family attitudes toward the DM diet in the moderate category were 36 respondents (65.5 %). The family who had not implemented a DM diet for DM elderly were 41 respondents (74.5 %). The results of the chi square test obtained a p–value (0.026) < α (0.05) so that H_0 wasn't accepted. This means that there the relationship between family knowledge about the DM diet with DM dietary compliance in the *Puskesmas Puger* (Public Health Center of Puger) working area.

Table 2. Family knowledge, attitudes, and behaviors on compliance with the elderly dm diet

Variable	n	%
Knowledge status		
High	23	41.8 %
Moderate	30	54.5 %
Low	2	3.6 %
Attitude category		
High	19	34.5 %
Moderate	36	65.5 %
Low	-	-
Behavior		
Already implemented	41	74.5 %
Not yet implemented	14	25.5 %

The results of cross tabulation in Table 3 showed that the elderly who came from well educated families who had compliance to run a DM diet were 0 % and those who did not comply with the DM diet were 58.2 %. While the elderly who came

from high–knowledge families had compliance to do the DM diet were 7.3 % and the elderly who did not comply with the DM diet were 34.5 %.

Table 3. Relationship between knowledge, attitudes, and family behaviors with compliance with diet for DM elderly

Compliance	Knowledge				Amount		p–value
	Moderate		High				
	n	%	n	%	n	%	
Comply	0	0 %	4	7.3 %	4	7.3 %	
Not comply	32	58.2 %	19	34.5 %	51	92.7 %	0.026
Amount	32	58.5 %	23	41.8 %	55	100 %	

	Attitude				Amount		p–value
	Moderate		High				
	n	%	n	%	n	%	
Comply	0	0 %	4	7.3 %	4	7.3 %	
Not comply	36	65.5 %	15	27.3 %	51	92.7 %	0.011
Amount	36	65.5 %	19	34.5 %	55	100 %	

	Behavior				Amount		P–value
	Not yet implement cd		Already				
	n	%	n	%	n	%	
Comply	0	0 %	4	7.3 %	4	7.3 %	
Not comply	41	74.5 %	10	18.2 %	51	92.7 %	0.003
Amount	41	74.5 %	14	25.5 %	55	100 %	

Chi Square test results obtained a p–value (0.011) < α (0.05) so that H0 was not accepted. This means that there was a relationship between family attitudes about the DM diet with DM dietary compliance in the *Puskesmas Puger* (Public Health Center of Puger) working area. The results of cross tabulation in Table 3 show that the elderly who came from families that had a moderate attitude had compliance to run a DM diet were 0 % and the elderly who did not comply with the DM diet were 65.5 %. While the elderly who came from families with high attitudes had compliance to run a DM diet were 7.3 % and those who did not comply with the DM diet were 27.3 %.

Chi Square test results obtained a p–value (0.011) < α (0.05) so that H0 was not accepted. This means that there was a relationship between family behavior on the DM diet with DM dietary compliance in the *Puskesmas Puger* (Public Health Center of Puger) working area. The results of cross tabulation in table 3 showed that the elderly who came from families who their behaviors did not implemented and had compliance to run a DM diet are 0 % and those who did not comply with the DM diet were 74.5 %. Elderly people from families who their behaviors

implemented and had compliance to run a DM diet were 7.3 % and elderly who did not comply with the DM diet were 18.2 %.

Discussion

The relationship between family knowledge and compliance with the elderly DM diet

Family knowledge affects family nutrition behavior. Nutritional behavior will affect the nutritional fulfillment of family members because the consumption of individuals with each other in one family usually will not be much different. The family as the closest people for elderly have the duty to care for the elderly who generally have experienced changes in their body, such as decrease in biological, psychological, and physiological functions. Therefore the elderly need a family role in order to survive with the changes. Families have an important role in the lives of the elderly. This is because the elderly who are not able to carry out their activities as strong as when they were young anymore due to changes in various organ functions. Therefore family knowledge, especially those who care for the elderly, is very influential on the condition of the elderly[7].

The results of this study are in accordance with existing theories. Family knowledge have relationship with diet compliance of DM elderly in the *Puskesmas Puger* (Public Health Center of Puger) working area. This study is also in line with research that states a significant relationship significant statistical with p–value ($0.001 < \alpha$ (0.05) between the level of knowledge with DM dietary compliance in DM patients in Gonilan village[7].

The relationship between family attitudes and compliance with the elderly DM diet

A person's attitude not only affects their health but also the people around them. The attitude of the family who have role as an elderly cook will determine the health condition of the elderly. Families can be very influential in determining individual health beliefs and values and can also determine acceptable health programs. Families also support and make decisions about the care of sick family members[8].

The results of this study are in line with the research that shows a significant relationship between attitudes and compliance to the DM diet with a value of p–value = 0.018 probability p–value $< \alpha$ (0.05) in DM patients in RSUD AM Parikesit East Kalimantan[9]. Another study also stated a relationship ($p = 0.001$) between attitudes and DM dietary compliance in DM patients in Gonilan village[7]. The prevention attitude of DM are such as regulating diet, consumption level as needed, applying the right diet and physical activity in order to reduce blood sugar or keep blood sugar in normal.

The relationship between family behavior with compliance with elderly DM diet

Action or behavior is a response to stimulate that are active, and can be observed. An attitude has not automatically materialized in an action. Attitudes as the real difference are needed supporting factors or a tradition that allows, among other things, facilities. In addition to facility factors, a factor of support from other parties is also needed[4]. The behavior of families who care about people with DM is very necessary to deal with patients who need attention. Families provide preventive measures and jointly care for family members who are sick because the family is the smallest unit of society that is most closely related to the patients. With the presence of family support can improve patient compliance in carrying out a diet[10]. This research is also in line with research that states positive practices have an influence with controlling blood sugar in people with DM, which is equal to 77.8 %[11].

Conclusion

The DM diet which is carried out by elderly people with diabetes mellitus in the Community of *Puskesmas Puger* (Public Health Center of Puger) working area is mostly the amount of energy consumed daily is not in accordance with the standard, the type of food is not according to standards because food is still consumed and eating schedules are not in accordance with 3J diet guidelines. Family knowledge about the DM diet in the working area of the *Puskesmas Puger* (Public Health Center of Puger) is mostly in the moderate category. The attitude of the family about the DM diet in the working area of the Puger Health Center is mostly classified as the medium category. The majority of DM elderly families in the *Puskesmas Puger* (Public Health Center of Puger) working area have not yet applied DM dietary measures. There is a relationship between family knowledge and compliance to the elderly DM diet. There is a relationship between family attitudes and compliance to diabetic DM diet. There is a relationship between family action and compliance to diabetic DM diet.

Suggestions for elderly people should make dietary arrangements by paying attention to food intake to maintain health in order to stay healthy and fit, for example doing based on the 3Js DM diet. Which is stated that, the energy consumed daily must contain protein, fat and carbohydrates. Do not consume any type of food that is should be avoided by DM patients (limiting sugar consumption, not consuming fruits containing high sugar content such as sapodilla, mangoes, oranges, rambutans, durians, grapes, not consuming soft drinks, ice cream. Doing eating schedules according to the 3Js DM diet guideline which is three large meals between large meals in the range of 23 h consuming fruit intervals, the elderly DM should consume fruit or vegetables every day because consumption of fruits and vegetables every day can maintain blood sugar levels to stay stable.

Families should be more active in asking doctors or paramedics about DM diets in elderly people with DM, so that they can provide education to DM elderly. The family should follow the development of blood sugar levels after conducting an

examination at the Health Center so that it is easier to control the blood sugar levels of the elderly so that they can be controlled properly. For the Health Office and Puger Health Center, it is necessary to optimize activities that focus more on the importance of the 3Js DM diet. For example, hold an elderly posyandu for counseling on the 3Js DM diet for families with elderly families who have DM.

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