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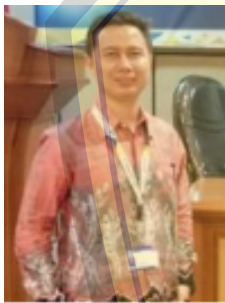
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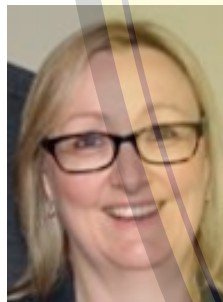iD 0000-0003-2602-7730   Scopus : 57202394177   GKWdb-UAAAAJ   6692437

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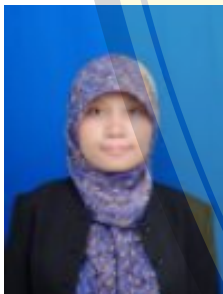
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ORIGINAL ARTICLE

ANALYSIS OF PSYCHOSOCIAL FACTORS AFFECTING DIETARY BEHAVIOR AMONG PEOPLE WITH TYPE 2 DIABETES MELLITUS IN INDONESIA

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ABSTRACT

Dietary behavior is essential to diabetes self-management in people with type 2 diabetes mellitus. Understanding factors influencing diabetes self-management will help in designing appropriate intervention. The study aims to determine the effect of psychosocial on dietary behavior. This study was an analytical observational with a cross-sectional design. The sample size was 138 respondents recruited with multistage random sampling. Psychosocial factors were identified using; 1) Spoken Knowledge in Low Literacy patients with Diabetes Scale, 2) The Coping Scale, 3) Diabetes Distress Scale, 4) Hensarling Diabetes Family Support Scale, 5) Perceived nurse support questionnaire, while dietery behaviour was measured by Self-Management Dietary Behaviors Questionnaire. Data analysis used multiple linear regression. Among five psychosocial factors only two factors influenced dietary behaviour, such as; distress and perceived family support (p=0.004; p=0.001 < α=0.05). Meanwhile, knowledge, coping, and perceived nurse support did not affect diabetes diet (p=0.133; p=0.527; p=0.535 > α=0.05) with R^2 = 0.275 (F=11.148; p=0.001 <α=0.05). Distress and perceived family support are two psychosocial factors that can affect dietary behavior. Preventing the occurrence of distress and increasing family support are important to improve dietary behavior adherence in people with type 2 diabetes mellitus.

Keywords: *Dietary behavior; psychosocial factors; type 2 diabetes mellitus*

INTRODUCTION

Type 2 diabetes mellitus (T2DM) is a health problem that is a priority for treatment worldwide. The number of people with DMT2 worldwide has continued to increase in the last decade, including in Indonesia. In 2019, the number of people with T2DM in Indonesia was 10.7 million, and in 2021 it increased to 19.5 million (International Diabetes Federation, 2021). East Java Province is one of the provinces with the highest number of people with T2DM in Indonesia. The prevalence of people with T2DM in East Java was 2.6% compared to 2013, which was only 2.1%. Specifically, in Jember Regency, it was a 2% increase compared to 2013, which was only 1.1% (Indonesian Ministry of Health, 2019).

Diabetes is a chronic disease that relies heavily on disease management and changes in behavior and lifestyle, especially setting a healthy and balanced diet (Neuenschwander et al., 2019). Meal planning involves

determining the amount, type, and schedule of daily meals (Nurjannah & Asthiningsih, 2023). However, diet programs for people with diabetes mellitus often fail, characterized by diet patterns that do not follow health workers' recommendations and increased blood glucose levels (American Diabetes Association, 2021; International Diabetes Federation, 2021). Previous studies showed that 21.02% of people with T2DM do not adhere to a diabetes diet (Fitriana & Salvina, 2021). Even the results of another study stated that only 6.06% of people with T2DM followed a diabetes diet (Messina et al., 2018). The results of previous studies also showed that 38.7% of people with T2DM had insufficient knowledge, 33.33% had a perception of less family support (Fitriana & Salvina, 2021), Only 9.52% received social support in the high category, and only 29.37% who have adaptive coping (Albai et al., 2017). Another study showed that most people with T2DM (51.2%) had diabetes distress (Messina et al., 2018).

Psychosocial factors can affect self-management compliance among people with T2DM, such as eating patterns. Based on the literature review, psychosocial factors that can affect the diabetes diet are knowledge (Babikr et al., 2017; Morris et al., 2020; Mphasha et al., 2021; Nurkamilah et al., 2018), coping (Fidan et al., 2020; Onyishi et al., 2021), distress (Kokoszka et al., 2022; Jannoo et al., 2017), perceived family support (Demilew et al., 2018; Gupta et al., 2019), and perceived nurse support (Alshammari et al., 2021; Morris et al., 2020; Rondhianto et al., 2020). Dietary knowledge plays an essential role in regulating diet. Inadequate dietary understanding leads to poor diabetes conditions, complications, comorbidities, decreased quality of life, and death (Ang et al., 2019; Babikr et al., 2017).

People with T2DM who have passive coping mechanisms will experience health concerns, an increase in diabetes fatalism (perception of hopelessness and helplessness), and a decrease in self-care behaviors such as diet or eating patterns (Polhuis et al., 2020; Chew *et al.*, 2017). The family's support and level of knowledge can affect the adherence of people with T2DM to running a diabetic diet. The higher the family support, the more people with T2DM will be more obedient to the diet program. In addition, people with T2DM, especially those with severe symptoms, will seek information about diet and recommendations from health workers, such as nurses (Morris *et al.*, 2020; Ligita *et al.*, 2019).

One of the primary forms of dietary self-management, in order to control diabetes, is dietary behavior. Until now, no or very few studies have analyzed the effect of psychosocial factors such as knowledge, coping, distress, perception of family support, and perception of nurse support on diabetes behavior simultaneously. Based on the aforementioned studies, Jember regency is experiencing an ever-increasing number of diabetes mellitus patients, coupled with scant studies exploring the relationship between psychosocial factors and dietary behavior. Therefore, the current study aims to determine what psychosocial factors influence the dietary behavior of people with T2DM in the Jember Regency.

METHOD
Study design
The study was an analytical observational with a cross-sectional design.

Sample
The study was conducted in Jember Regency, East Java, Indonesia, from May to June 2022. The sample study was people with T2DM with inclusion criteria: (1) 40-65 years old; (2) have diabetes for more than one year; (3) not currently undergoing treatment at a hospital or other health institution; and (4) does not have barriers to communication such as deaf, blind, and speech impaired. The sample size was 138 respondents calculated using G Power ($f2 = 0.15$; $α = 0.05$, and power $(1-β) = 0.95$). The sampling technique used is multistage random sampling. We divide the Jember Regency into five regions (east, west, north, south, and middle). We then selected two community health centers from each region randomly. We randomly selected five villages from each community health center and 2 - 3 people with T2DM from each village.

Instruments
The instruments used in this study were:
1. Spoken Knowledge in Low Literacy patients with Diabetes Scale (SKILLD) (Rothman et al., 2005). This instrument was validated in Indonesian language by Rondhianto (2021). The results of the validity and reliability tests were $r = 0.371 – 0.709$, Cronbach's alpha $= 0.812$. It has 2 dimensions, firstlly disease sign and symptoms, secondly disease management which are measured in likert format ranging from 1 to 16. Knowledge was categorized into low (< 5.33), medium (5.33 – 10.65), and high (≥ 10.66). SKILLD was used to measure the knowledge of people with DMT2.;
2. The Coping Scale (Hamby et al., 2015). This questionnaire was used to measure the coping skills of people with DMT2 in the management of diabetes. This instrument was validated in Indonesian language by Rondhianto (2021). The results of the validity and reliability tests were $r = 0.363 – 0.855$, Cronbach's alpha $= 0.727$. The scoring is ranging from 11 to 44. Coping was categorized into low (< 22), moderate (22 – 32.99), and high (≥ 33);
3. Diabetes Distress Scale (DDS) (Polonsky et al., 2005). DDS was used to measure the diabetic distress experienced by people with T2DM. This instrument was validated in Indonesian language by Ahmad (2018). The results of the validity and reliability test are $r = 0.595 – 0.755$, Cronbach's alpha $= 0.931$. The measurements are ranging from 1 to 17. Distress was categorized into low (< 2.68), moderate (2.68 – 4.32), and high (≥ 4.33);
4. Hensarling Diabetes Family Support Scale (HDFSS) (Hensarling, 2009). HDFSS was used to measure people's perception of T2DM on family support in managing T2DM. The Indonesian HDFSS instrument was validated by Rondhianto (2021). The results of the validity and reliability test are $r = 0.499 – 0.866$, Cronbach's alpha $= 0.966$). It has range from 24 to 96. Perceived family support was categorized into low (< 48), moderate (48 – 71.99), and high (≥ 72);
5. Perceived nurse support questionnaire (Rondhianto et al., 2020). The questionnaire was used to measure the perceived support for T2DM patients with the support provided by nurses in managing T2DM. The results of the validity and reliability tests were $r = 0.381 – 0.886$, Cronbach's alpha $= 0.948$). The scoring is ranging from 24 to 96. Perceived nurse support was categorized into low (< 48), moderate (48 – 71.99), and high (≥ 72);
6. Self Management Dietary Behaviors Questionnaire (SMDBQ) (Primanda et al., 2011). SMDBQ was used to measure dietary behavior in patients with T2DM. The SMDBQ's dimensions are 1) selection of healthy food, 2) attitude towards calory needs, 3) diet arrangement, 4) eating schedule. The results of the validity and reliability tests were $r = 0.405 – 0.818$, Cronbach's alpha $= 0.903$. Dietary behavior was categorized into low (< 32), moderate (32 – 47.99), and high (≥ 48).

Data collection
Researchers collected data with the help of five assistants or enumerators by conducting direct interviews with respondents. Researchers obtained list of prospective respondents from selected Public Health Centers. Then, randomization was done using Microsoft excel $^{(R)}$ series 16. The enumerators then approached selected participants at their respective addresses. Before collecting the researcher explained the objectives, benefits, possible hazards, procedures, and research techniques to prospective respondents (informed). After the prospective respondent understands it, the prospective respondent is asked to sign an informed consent. The data collection took 4 weeks.

Data analysis
Data were analyzed using multiple regression analysis ($α = 0.05$). The classical assumption test is carried out for each variabels first as a prerequisite for multiple regression tests:

(1) normality test, knowledge (*p: 0,200*), coping (*p: 0,200*), distress (*p: 0,097*), perception of family support (*p: 0,200*) and perception of nursing support (*p:0,073*), which mean all variables has normal data distribution; (2) multicollinearity test knowledge (*tolerance: 0,842*), coping (*tolerance: 0,852*), distress (*tolerance: 0,739*), perception of family support (*tolerance: 0,678*) and perception of nursing support (*tolerance:0,888*), which mean there are no multicollinearity occured; (3) heteroscedasticity test knowledge (*p: 0,280*), coping (*p: 0,060*), distress (*p: 0,771*), perception of family support (*p: 0,583*) and perception of nursing support (*p:0,413*), which mean all variables have no heteroscedaticity; and (4) linearity test knowledge (*p: 0,777*), coping (*p: 0,475*), distress (*p: 0,361*), perception of family support (*p: 0,901*) and perception of nursing support (*p: 0,897*), which mean all variables have linearity. The data were analyzed descriptively using descriptive statistics (frequency distribution and central tendency).

Ethical consideration
Health Research Ethics Committee, Faculty of Nursing, Universitas Jember, approved the study with a numbered certificate is 072/UN25.1.14/KEPK/2022.

RESULTS
The respondents' characteristics were collected to portray demographical situation. Researchers collected age, gender, education and income data as seen in Table 1.

Table 1. Characteristics of Respondents Based on Age, Gender, Education, and Income in Jember Regency in May-June 2022 (n=138)

Demographic Characteristics	n	%
Age		
40-45	17	12,3
46-55	54	39,1
56-65	67	48,5
Gender		
Male	49	35,5
Female	89	64,4
Education		
No school	17	12,3
Basic Education	54	39,1
Middle Education	53	38,4
College	14	10,1
Income		
> regional minimum wage	55	39,8
< regional minimum wage	83	60,1

Most respondents were 56-65 years old (48.5%), female (64.4%), had primary education (39.1%), and low income (60.1%) (Table 1).

There are 5 psychosocial factors that researchers gather in this study as presented in Table 2.

Table 2. Psychosocial Factors of People with T2DM in Jember Regency in May-June 2022 (n=138)

Variable	Mean ± SD	Category	n	%
Knowledge	9,76 ± 2,96	Low	15	10,8
		Medium	63	45,6
		High	60	43,4
Coping	29,31 ± 5,74	Low	13	9,4
		Medium	93	67,3
		High	32	23,1
Distress	2,94 ± 0,95	Low	44	31,8
		Medium	42	30,4
		High	52	37,6
Perceived family support	63,97 ± 15,95	Low	22	15,9
		Medium	74	53,6
		High	42	30,4
Perceived nurse support	60,84 ± 15,67	Low	24	17,3
		Medium	88	63,7
		High	26	18,8

Most respondents had a moderate category in knowledge (45.6%), coping (67.3%), perceived family support (53.6%), and perceived nurse support (63.7%). Most respondents had distress in a high category (37.6%) (Table 2).

Table 3 shows that most respondents had a moderate category in dietary behavior (61.5%). Table 4 shows a simultaneous influence of psychosocial factors on dietary behavior (p= 0.001).

Table 3. Diet Behavior of People With T2DM in Jember Regency in May-June 2022 (n=138)

Variable	*Mean* ± SD	Category	n	%
Diet behavior	42,95 ± 8,61	Low	14	10,1
		Medium	85	61,5
		High	39	28,2

Partially, there were no influence between knowledge, coping, and perceived nurse support on dietary behavior (p= 0.133; p= 0.527; p= 0.535). There were an influence of distress and perceived family support on dietary behavior (p = 0.044; p =0.001). The value of the Adjusted R Square was 0.275. It means that psychosocial factors can explain 27.5% of the variation in diabetic dietary behavior. At the same time, 72.5% explained other factors outside of psychosocial factors (Table 4).

Table 4. Effect of Psychosocial Factors on Diet Behavior of People With T2DM Jember Regency in May-June 2022 (n=138)

Fisher Test			t Test				R Square
F	Sig	Model		B	t	Sig	
11,418	0,001	Fit	(Constant)	30,259	5,258	0,000	0,275
			Knowledge	0,347	1,511	0,133	
			Coping	0,075	0,634	0,527	
			Distress	-1,555	-2,037	0,044	
			Perceived family support	0,208	4,355	0,000	
			Perceived nurse support	-0,028	-0,620	0,535	

DISCUSSION

This study showed that most people with T2DM were aged 56-65. It is in line with a previous study that states that most people with T2DM are the late elderly (Ang et al., 2019; Jangra et al., 2019). Aging is closely related to the incidence of diabetes. Aging causes physiological changes that reduce the body's ability to metabolize glucose. Likewise, the insulin hormone cannot work optimally and causes an increase in blood sugar levels (International Diabetes Federation, 2021). The result of the study showed that most respondents were female. It is in line with previous studies (Ang et al., 2019; Mphasha et al., 2021). Differences in body composition and levels of sex hormones between men and women. Women have more adipose tissue and fat than men. The decrease in estrogen levels with age leads to fat accumulation and an increase in free fatty acids. It impacts increasing the risk of insulin hormone resistance which plays a role in blood glucose regulation (International Diabetes Federation, 2021). Most respondents in this study had an elementary school. This study is in line with a previous study that stated that most people with T2DM had low education (Jangra et al., 2019; Mphasha et al., 2021). Awareness of health issues related to education. The lower the level of education, the person has an unhealthy diet and tends not to know the symptoms of diabetes (International Diabetes Federation, 2021). Low education is related to low health awareness and low disease prevention and control capabilities (Jangra et al., 2019). In this study, most respondents had incomes less than the minimum wage. It is in line with a previous study that stated that most people with T2DM had earned below the minimum wage. The lower the family's economic level, the higher the risk of experiencing T2DM (Assari et al., 2017). People with diabetes who have a high socioeconomic status have a better ability to manage diabetes concerning their ability to finance health and access health services (International Diabetes Federation, 2021).

Most respondents had moderate diabetes knowledge (Table 2). Knowledge plays a vital role in disease management. It is in line with a previous study that stated that most people with T2DM said they did not comply with the diet because they did not know and had a low capability to perform diet diabetes (Ghimire, 2017; Babikr et al., 2017). This study revealed that most respondents had moderate coping (Table 2). Coping skills have a close relationship with self-care adherence. People with T2DM will face various requirements, including changing their lifestyle and behavior. Barriers to coping mechanisms must be identified to encourage adherence to diabetes self-management, such as a healthy diet (Fidan et al., 2020). The tendency to use passive coping mechanisms is also an obstacle to self-care behavior and adherence to medical treatment. People with depression tend to regulate their negative emotions by overeating and overeating, which can exacerbate chronic diseases such as diabetes. So it can be seen that non-adherence to diet is also a person's maladaptive coping mechanism (Albai et al., 2017; Edraki et al., 2018; Polhuis et al., 2020).

Most respondents experienced high distress (Table 3). Diabetic distress significantly affects a person's dietary behavior. Diabetic distress will result in poor diet and becoming more depressed over time, leading to increased HbA1c and diabetes complications (Kurnia et al., 2017). Depression and diabetes distress are major psychological problems in diabetic patients related to self-management, where one of them is diet (Edraki et al., 2018; Fidan et al., 2020; Kokoszka et al., 2022). A previous study found that 25% of screened people with T2DM had moderate to high diabetic distress. Regarding the components of diabetes

distress, emotional distress is the most commonly experienced by people with T2DM (Skinner et al., 2019).

Most respondents feel moderate family support (Table 2). Family support is essential in compliance with chronic disease management and an indicator of self-care in diabetic patients. The support provided by the family to people with type 2 diabetes mellitus includes four dimensions, one of which is instrumental support, including providing food (International Diabetes Federation, 2021). The family is the most important source of information, it is easier for people with diabetes mellitus to receive information and be motivated to maintain their health, and this information can be in the form of advice and information about food and eating patterns (Gupta et al., 2019; Luthfa & Ardian, 2019; Yamin & Sari, 2018).

The study result showed that most respondents feel the support of nurses in the moderate category (Table 2). Nurses play a significant role in influencing patients' health to achieve better health status. Nurses give education to people with diabetes mellitus regarding lifestyle changes and self-care. Educating nurses can lead to perceptions that determine the patient's health behavior towards their disease, increase motivation, and increase understanding and confidence of patients in managing the disease (Alshammari et al., 2021; Fidan et al., 2020; Rondhianto et al., 2020). The role of nurses in providing patient-centered care can be done by empowering and encouraging diabetes management, including diabetes diet. Patients who receive support from nurses feel that the role of nurses is to contribute to providing patient-focused interventions and resulting in a better quality of life (Alshammari et al., 2021).

Most respondents had a moderate adherence to dietary behavior (Table 3). A good diet arrangement will improve glycemic control, preventing morbidity that impacts the quality of life. A poor diet contributes to increasing poor diabetes control, complications, and mortality due to diabetes (American Diabetes Association, 2021; International Diabetes Federation, 2021). A previous study has shown that most people with T2DM can choose healthier foods. In dietary practice, the response varies. People with T2DM can choose not to eat fast food and not to consume sugary drinks and foods. In addition, most people with T2DM also choose healthy whole wheat bread over white bread, which is high in glucose levels (Ang et al., 2019).

There was no significant effect of knowledge, coping, and perceived nurse support on dietary behavior (Table 4). This study's results were in line with previous research, which stated that good knowledge does not guarantee a person's adherence to the diet (Ang et al., 2019; Babikr et al., 2017; Gupta et al., 2019). Control of dietary behavior in patients with T2DM does not come from the concept of knowledge. Previous studies stated that the higher the level of knowledge, the higher the success of a person in dealing with stress. However, if the knowledge is not implemented adequately, it certainly cannot affect a person's health practices including dietary behavior (Ang et al., 2019; Nurkamilah et al., 2018).

This study is not in line with previous research, which states that good coping skills increase self-efficacy and correlate with dietary compliance (Edraki et al., 2018). Various coping mechanisms such as spirituality become a solid coping strategy for people with debilitating health conditions such as diabetes mellitus. Tool coping with spirituality produces a positive attitude towards life, life experiences, and motivation.

This coping mechanism is effective in increasing acceptance of diabetes and self-care behaviors such as the dietary behavior of people with diabetes (Albai et al., 2017; Fidan et al., 2020; Polhuis et al., 2020).

The result of the study is in line with a previous study that stated that diabetic distress and perceived family support would affect dietary behavior (Demilew et al., 2018; Jannoo et al., 2017; Kokoszka et al., 2022; Kurnia et al., 2017; Skinner et al., 2019). Patients who perform self-care activities well will improve their quality of life. The level of distress contributes to increased motivation to follow behavioral and dietary recommendations (Kokoszka et al., 2022; Jannoo et al., 2017). People with T2DM, with or without complications, are at risk for developing diabetes distress in self-management. People with T2DM who have diabetic distress will feel alone, unsupported, and tired of diabetes management efforts, which will be related to decreased self-care. Diabetic distress will result in poor diet and more depression over time, leading to increased HbA1c and complications (Kurnia et al., 2017; Skinner et al., 2020).

Family support is essential in diet self-management. Family support as caregivers is necessary to support monitoring the diet of people with diabetes mellitus in daily life (Gupta et al., 2019; Rondhianto et al., 2020; Yamin & Sari, 2018). Family support is one determining factor in adherence to proper dietary practices. Positive family support is a means to promote good nutritional management (Demilew et al., 2018; Gupta et al., 2019; Luthfa & Ardian, 2019). Saturation in the recommended eating arrangements and difficulty controlling the number of calories, portions, and types of food are obstacles for people with diabetes in implementing the diet. In addition, they need optimal family support to remain obedient to diet management. Family support as part of health care is beneficial for glycemic control and improving quality of life (Gupta et al., 2019). Support from family can increase motivation and prevent stress (Chew et al., 2017), self-management behavior (Kurnia et al., 2017; Yamin & Sari, 2018), especially in dietary behavior compliance (Demilew et al., 2018; Ghimire, 2017). It impacts the quality of life of people with T2DM (Gupta et al., 2019; Jannoo et al., 2017; Yamin & Sari, 2018). Material and spiritual support from the family will reduce psychological stress, relieve stress, increase social adaptability, and face challenges in disease management (Yamin & Sari, 2018).

This study is in line with previous studies which say that there is no effect of health workers on the level of dietary adherence of people with diabetes mellitus. Nurses with inadequate knowledge about diabetes cannot provide proper education about diabetes. Nurses with less knowledge can lead to inadequate health care instructions for people with T2DM (Alshammari et al., 2021; Morris et al., 2020; Rondhianto et al., 2018).

The limitation of this study is that this study only measured the influence of psychosocial factors on dietary behavior in T2DM patients. Many other factors may influence a diabetic diet, such as demographic factors, disease situational factors, and other factors.

CONCLUSION AND RECOMMENDATION
Psychosocial factors, especially distress and perceived family support, significantly influence dietary behavior in T2DM patients. Therefore, efforts to improve diabetes self-management behavior, especially diet, must consider psychosocial factors, especially aspects of distress and perceptions of family support. Nurses and other health workers can make efforts to reduce distress and increase family support so that people with T2DM can perform optimal dietary behavior. It certainly has a positive impact on improving self-management and the quality of life of people with T2DM.

Further researchers can re-identify the influence of psychosocial factors on dietary behavior, especially knowledge, coping, and perceived nurse support factors, to strengthen this study's results. Further research using other designs (cohort study, experimental study, and others) can identify other factors influencing dietary behavior, such as sociodemographic factors, situational treatment factors, and others.

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