

# FACTORS ASSOCIATED WITH UNCONTROLLED TYPE 2 DIABETES MELLITUS IN FISHER FAMILIES IN BANDAR LAMPUNG CITY

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## ABSTRACT

**Background:** Diabetes Mellitus (DM) is one of the main causes of morbidity and mortality in the cardiovascular system. The prevalence of DM is increasing in all community groups, including fisher families. This study aims to analyze factors related to uncontrolled DM in fisher's families in Bandar Lampung City.

**Subjects and Method:** This study uses a quantitative method with a cross-sectional approach. The sample consisted of 260 type 2 DM patients in fisher families, aged more than 30-59 years in the city of Bandarlampung. Data were taken from Februari to April 2022. The sample was taken by purposive sampling method. Dependent variable was uncontrolled DM and the independent variable were knowledge, attitude, lifestyle, motivation, self-efficacy, doctor's role, health services and family support. Data was analyzed using chi square test and logistic regression.

**Results:** Statistically, the factors related to uncontrolled DM were knowledge (OR=1.70; 95% CI= 1.04 to 2.89; p=0.044), attitude (OR= 2.20; 95% CI= 1.35 to 3.78; p=0.003), lifestyle (OR= 6.20; 95% CI= 3.57 to 10.86; p<0.001), motivation (OR= 2.10; 95% CI= 1.28 to 3.58; p=0.005), self-efficacy (OR= 1.80; 95% CI= 1.11 to 3.21; p=0.026), doctor role (OR= 2.20; 95% CI= 1.30 to 3.72; p=0.004), health services (OR= 2.50; 95% CI= 1.50 to 4.31; p=0.001), family support (OR= 1.90; 95% CI= 1.09 to 3.35; p=0.030). The most associated factors in uncontrolled DM patients are attitude, life-style, motivation, self-efficacy, doctor role and health services.

**Conclusions:** The prevalence of uncontrolled DM patients in fisher family is 36.9% and the most associated factors are attitude, life-style, motivation, self-efficacy, doctor role and health services.

**Keyword:** uncontrolled DM, fisher family, associated factors.

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## BACKGROUND

Non-Communicable Diseases (NCD) are diseases that are considered not to be transmitted or spread from one person to another, so they are not a threat to other sufferers. Non-Communicable Diseases (NCD) with high morbidity and mortality

rates, namely heart disease (cardiovascular), cancer, chronic obstructive respiratory disease, diabetes mellitus (Irwan, 2018). Diabetes Mellitus (DM) is a disease that occurs in metabolic disorders due to the pancreas gland being unable to

produce the insulin hormone as a regulator of sufficient blood glucose levels or the insulin hormone cannot be used by the body (Kemenkes RI, 2014).

Diabetes mellitus in the world the number is increasing. The prevalence of Diabetes Mellitus in Lampung Province is 0.99% and Bandar Lampung is 1.63%, greater than the prevalence of DM in Lampung Province and ranks second in Lampung Province in all age groups. The prevalence of DM for the age group above 15 years in Lampung province is 1.37% and Bandar Lampung city is 2.25%. The prevalence of DM in the fishermen group is 0.1%. The prevalence of untreated DM in Lampung Province is 11.06% and in Bandar Lampung is 22.42% (Kemenkes RI, 2019).

The prevalence of DM in fishing groups/families is increasing, one of which is caused by changes in lifestyle. The increasing number of people with diabetes mellitus can cause serious problems in society (Tandra, 2008). Problems in people with diabetes mellitus are caused by various factors, namely lifestyle changes (Soegondo et al., 2009). Lifestyles such as physical activity and poor eating arrangements will cause uncontrolled blood sugar (Bataha, 2017). Blood sugar that cannot be controlled regularly can have a bad influence on the body and can cause complications in people with diabetes mellitus (Buckman and Chris, 2010). The low awareness to control blood sugar in people with diabetes mellitus can be influenced by several factors, namely emotional psychosocial, lifestyle, medication and lack of knowledge (Tong et al., 2015).

Knowledge about diabetes mellitus in persons with disabilities can be used as a means of managing diabetes (Alfiani et al., 2017). Diabetes mellitus requires behavioral changes. Changes in behavior such as self-confidence (Al-Khawaldeh et al., 2012). Knowledge or cognitive is a very important domain for the formation of one's actions or behavior. Behavior that is based on knowledge and a positive attitude will last forever. Patients' knowledge about DM is a tool that can help sufferers to carry out DM management throughout their lives, so that the more and better patients understand about their disease, the more they understand how to change their behavior and why it is needed (Waspadji, 2005).

In Indonesia, especially in big cities, there is a change in the lifestyle of the people which leads to the lifestyle of westerners. This has resulted in changes in people's eating/consumption patterns which refer to a high-calorie, high-fat and cholesterol diet, especially for fast food offerings which have an impact on increasing the risk of obesity. The frequency of consumption of pizza (2 times/week) and fried fries (1 time/week) was found to be more common in obese adults, while consuming fast food such as fried chicken, spaghetti and burgers was found more often in people with normal weight. Diet is a determinant of obesity which can indirectly cause type 2 DM disease (Rosaulina and Girsang, 2018).

Diet compliance in meal planning is influenced by several intermediary factors such as education, accommodation, changes in therapeutic models, modifi-

cation of environmental and social factors, as well as increasing professional interactions of health workers with patients. Modification of environmental factors can be built through social support from the family. Motivation has a very important role because motivation is able to make someone do something to achieve the desired goal (Indarwati et al, 2012). Based on research conducted by Gustina et al (2014), that the factors that influence dietary compliance in people with Diabetes Mellitus are patient motivation and family support. Self-confidence or self-efficacy is important to control and manage diabetes mellitus (Yaqin et al., 2017). The higher the knowledge, the higher a person's self-efficacy (Pratama and Widodo, 2017).

To obtain effective treatment, it is necessary to have family support. The family is the smallest unit of society consisting of the head of the family and several people who gather and live in one place under one roof in a state of interdependence. Overcoming health problems that occur in the family, the decision in the solution is to remain the head of the family or an elder family member. Family support can be in the form of emotional support, informational support and material support. Family support is expected to increase the interest of Diabetes Mellitus patients for treatment adherence or control in health services so that DM can be controlled (Surnarni, 2009).

The prevalence of DM will continue to increase based on research on the incidence of DM in North Halmahera Regency, especially in Tobelo Subdistrict, most

suffer from DM at the age of 51-60 years by 53.1%. For this reason, the role of the Puskesmas is very much needed, in this case the need for implementing community health center programs related to the elderly (elderly) to improve the health and welfare of the elderly in the form of health counseling and examinations for the elderly to find out the signs and symptoms of DM so that DM disease prevention and lifestyle healthy can be applied (Sujana et al, 2019). The purpose of this study was to analyze the relationship between knowledge, attitudes, lifestyle, motivation, self-efficacy, the role of doctors, the role of health services and the role of the family on uncontrolled DM in fishing families in Bandar Lampung City.

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## SUBJECTS AND METHOD

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### 1. Study Design

This was a cross-sectional study conducted in Bandar Lampung, Indonesia, from February to April 2021.

### 2. Population and Sample

The study population were DM patients in Bandar Lampung. A sample of 260 DM patients in fisher families in Bandar Lampung was selected for this study by purposive sampling.

### 3. Study Variables

The independent variables in this study were knowledge, attitude, lifestyle, motivation, self-efficacy, the doctor's role, health services, and family support. The dependent variable in this study is uncontrolled DM.

### 4. Operational Definition of Variables

**Diabetes Melitus** is a chronic metabolic disease or disorder with multiple

etiologies characterized by high blood sugar levels accompanied by disturbances of carbohydrate, lipid and protein metabolism as a result of insulin function insufficiency.

### 5. Study Instruments

Data on knowledge, attitude, lifestyle, motivation, self-efficacy, the doctor's role, health services, and family support were obtained from interviews using a validated questionnaire. Uncontrolled DM were measured by medical record and blood sugar check.

### 6. Data Analysis

The data was analyzed with a significant degree of 95% ( $p < 0.05$ ) univariate, bivariate with chi-square test, and multivariate logistic regression.

**Table 1. Characteristics Sample**

Variables	Category	frekuensi	Percentage
<b>Type 2 DM</b>	Uncontrolled	96	36.9 %
	Controlled	164	63.1 %
<b>Knowledge</b>	Poor	121	46.5 %
	Good	139	53.5 %
<b>Attitude</b>	Negative	116	44.6 %
	Positive	144	55.4 %
<b>Lifestyle</b>	Bad	114	43.8 %
	Good	146	56.2 %
<b>Motivation</b>	Less	129	49.6 %
	Good	131	50.4 %
<b>Self-effication</b>	Low	85	32.7 %
	Good	175	67.3 %
<b>Doctor's role</b>	Dissatisfied	142	54.6 %
	Satisfied	118	45.4 %
<b>Health services</b>	Dissatisfied	139	53.5 %
	Satisfied	121	46.5 %
<b>Family support</b>	Less	172	66.2 %
	Good	88	33.8 %

### 2. Bivariate Analysis

Bivariate analysis showed the influence of factors associated with uncontrolled DM. The analysis of factors associated

## RESULTS

### 1. Analysis Univariat

Univariate analysis provides an overview of the characteristics of all the variables studied, namely uncontrolled DM in fisher families and the factors that influence it. The results showed that most of the respondents had controlled DM (63.1%), good knowledge (53.5%), positive attitude (55.4%), good lifestyle (56.2%), good motivation (50.4%), good self-efficacy (67.3%), dissatisfied to doctor's role (54.6%), poor health services (53.5%), and less family support (66.2%). Characteristics of subjects are presented in Table 1.

with uncontrolled DM in fisher families is presented in Table 2. Chi square test resulted that poor knowledge is a risk factor for uncontrolled DM in DM

patients in fisher families with (OR = 1.70; 95% CI= 1.04 to 2.89; p= 0.044).

Negative attitude was increased the risk of with uncontrolled DM (OR= 2.20; 95% CI= 1.35 to 3.78; p= 0.003).

Poor lifestyle is a risk factor for uncontrolled DM in DM patients in fisher families with (OR= 6.20; 95% CI= 3.57 to 10.86; p= 0.001).

Low motivation is a risk factor for uncontrolled DM in DM patients in fisher families with (OR= 2.10; 95% CI= 1.28 to 3.58; p= 0.005).

Low self-efficacy is a risk factor for

uncontrolled DM in DM patients in fisher families with (OR= 1.80; 95% CI= 1.11 to 3.21; p= 0.026).

The dissatisfied role of doctors is a risk factor for uncontrolled DM in DM patients in fisher families with (OR= 2.20; 95% CI= 1.30 to 3.72; p= 0.004).

Poor health services were associated with uncontrolled DM (OR= 2.50; CI 95%= 1.50 to 4.31; p= 0.001).

Low family support was associated with uncontrolled DM (OR= 1.90; 95% CI= 1.09 to 3.35; p= 0.030).

**Table 2. The Analysis of Factors Associated with Uncontrolled DM in Fisher Families**

Independent Variables	Uncontrolled Type 2 DM		Controlled Type 2 DM		OR	95% CI		P
	n	%	n	%		Upper Limit	Lower Limit	
<b>Knowledge</b>								
Poor	53	43.8	68	56.2	1.70	1.04	2.89	0.044
Good	43	30.9	96	69.1				
<b>Attitude</b>								
Negative	55	47.4	61	52.6	2.20	1.35	3.78	0.003
Positive	41	28.5	103	71.5				
<b>Lifestyle</b>								
Bad	68	59.6	46	40.4	6.20	3.57	10.86	0.001
Good	28	19.2	118	80.8				
<b>Motivation</b>								
Less	59	45.7	70	54.3	2.10	1.28	3.58	0.005
Good	37	28.2	94	71.8				
<b>Self-efficacy</b>								
Low	40	47.1	45	52.9	1.80	1.11	3.21	0.026
Good	56	32	119	68				
<b>Doctor role</b>								
Dissatisfied	64	45.1	78	54.9	2.20	1.30	3.72	0.004
Satisfied	32	27.1	86	72.9				
<b>Health Services</b>								
Dissatisfied	65	46.8	74	53.2	2.50	1.50	4.31	0.001
Satisfied	31	25.6	90	74.4				
<b>Family support</b>								
Less	72	41.9	100	58.1	1.90	1.09	3.35	0.030
Good	24	27.3	64	72.7				

### 3. Multivariate Analysis

Multivariate analysis with binary logistic regression will get the results of what factors have the most influence on uncontrolled DM in fisher families. The condition for the variables that can be selected as a candidate for multivariate logistic regression is if the relationship between the significance of the bivariate analysis  $p < 0.25$ , especially for variables that have just been tested for bivariate, and there is not much literature showing a relationship with the dependent variable studied, as well as variables that are important theoretical.

Multivariate analysis was carried out after obtaining multivariate candidates with binary logistic regression analysis using the backward LR method. In the backward method, the analysis was carried out by including all of the multivariate candidate variables (knowledge, attitudes, lifestyle, motivation, self-efficacy, the role of doctors, health services and family support). Then, at each step/model will

be eliminated/excluded one by one the non-significant variables ( $p > 0.05$ ) from the largest p-value until the final model is obtained. In this study, modeling with logistic regression analysis was obtained up to model 3 as the last model.

In the initial model of binary logistic regression analysis  $p > 0.05$  and the largest is the knowledge variable ( $p = 0.307$ ) so that the knowledge variable will be eliminated and not included in the next model (model 2), and so on until all variables have a  $p < 0.05$  and this stage is the final model. The final model of binary logistic regression analysis is presented in table 3.

Based on the final model of multivariate logistic regression analysis using the backward method, the results showed that the variables of attitude, lifestyle, motivation, self-efficacy, the role of doctors and health services were the factors most associated with uncontrolled DM in fisher families.

**Table 3. The Final Model of Binary Logistic Regression Analysis**

Variables	b	p
Lifestyle	2.00	0.001
Motivation	1.16	0.001
Self-efficacy	0.73	0.028
Doctor role	1.32	0.001
Health services	0.81	0.011
Constant	-9.65	0.001

### DISCUSSION

The prevalence of uncontrolled DM in fishing families is high at 36.9%. Fisher-man community is particularly at high risk due to poor health outcomes when compared to general population. Fisher-man display high risk-taking behaviour,

with higher rates of smoking, poorer diets and poorer health knowledge. In addition, poor socio-economic status with low literacy rates with ignorance towards health among the same community increases the burden of the disease (Mutalik et al., 2017).

Knowledge of diabetes and uptake of blood or urine glucose testing was significantly higher among known diabetics, although these represent less than one quarter of diabetics in this population. This finding is not surprising and we have previously reported that most known diabetics do receive at least some treatment or advice for their condition, although for many bloods sugar remains poorly controlled (Fottrel, 2018).

There is an increasing amount of evidence that patient education is the most effective way to lessen the complications of diabetes and its management by improving their attitude and practice. Unfavorable attitudes and psychological problems like depression are common among diabetes patients and can lead to poor diabetes care provoking diabetic complications. There is powerful evidence that individuals who are educated and diligent in their diabetes self-care achieve better and durable diabetic control. Past studies on knowledge, attitude, and practice towards the prevention of diabetes complications consistently revealed the requirements of better awareness on prevention, diagnosis, and risk factor control of diabetes. A good attitude towards DM complications helps patients to change any harmful dietary and lifestyle habits (Belsti et al., 2020).

In most countries, 15%–30% of the adult population and more than 50% of the elderly suffer from chronic problems such as diabetes and high blood pressure, making it a clear general public health problem. The majority of the patients with diabetes and hypertension are treated by primary care physicians. Tobacco

use, unhealthy diet, insufficient physical activity, and harmful use of alcohol are the four major risk factors leading to NCDs. These risk factors, leading to diabetes, hypertension, and dyslipidemia, are an important feature leading to cardiovascular diseases, which are responsible for nearly 30% of deaths worldwide. Large prospective population study has proven that a substantial reduction in the burden of NCDs could be achieved by adherence to a healthy lifestyle pattern (Kundapur et al., 2022).

Motivation is individual's behavior or attitude to satisfy their needs, and it is because basically human has needs and desires. Motivation is also a person's thoughts in viewing the task or goal. Motivation is a concept that explains behavior; an innate response is referred to behavior. Motivation is a process in humans, causing individuals to move towards the goals they have or move away from improper situations. Behavioral attitudes individual health is also influenced by individual self-motivation to act healthily and maintain health. Without motivation in dietary settings, DM patients will experience non-compliance in regulating their daily diet. DM patient compliance in carrying out a diet is one of the essential matters in controlling DM (Nashrullah et al., 2021).

High self-efficacy and knowledge have a positive impact on lifestyle adherence and consequently result in better clinical outcomes. Self-efficacy is very important for diabetic people. When the self-efficacy is low, doing self-care will be hampered. On the contrary, when self-efficacy is good, self-care behavior will be

more obedient. The higher the self-efficacy, the higher the compliance level in carrying out self-management of diabetic people. As a result, hopes or desires to improve health status or recover were more significant. Self-efficacy was the essential element to increase compliance in diabetic individuals in terms of self-management or self-care. The formation of a person's self-efficacy is obtained from experienced others by fostering self-confidence to affect the behavior to carry out well-planned tasks and goals, such as self-care compliance (Dewi et al., 2021).

Health care providers also provide services to help the people living with DM about self-care management which includes analysis of their home environment. Despite these efforts, the rate of patient re-admission in the hospital remains very high. Even though a lot of research has been conducted on diabetes, there is a lack of research on life-style change, effects of illness, and self-care of persons with diabetes in Thailand. In order to address the gap in knowledge about diabetes self-care management in Thailand and on why diabetes patients cannot control their blood sugar levels, a study was developed to explore the phenomenon of self-care management from the perspective of Thai persons living with diabetes (Tho jampa, 2018).

Better family support, the better self-care. Diabetic people with sufficient support from their families could influence the success rate in dealing with and overcoming their problems better than those who were not. This study also fo-

und an association between family support and self-care in the elderly with type 2 diabetes mellitus. They had good family support to elevate their self-confidence and hope in self-care behavior (Dewi et al., 2021).

The high prevalence of uncontrolled DM in fisher families is strongly influenced by attitudes, lifestyle, motivation, self-efficacy, the role of doctors and health services. It is recommended for health workers to be able to better educate DM patients and their families, especially fisher families to be able to take care of themselves so that DM can be controlled.

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#### **AUTHOR CONTRIBUTION**

All authors contributed to this study.

#### **CONFLICT OF INTEREST**

The authors have no conflicts of interest to declare.

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None.

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