

## ORIGINAL ARTICLE

# Factors Associated With Coping Mechanisms on Compliance With *Diabetes mellitus* Patients at the Katobu Community Health Center, Muna Regency 2023

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## ABSTRACT

**Introduction:** *Diabetes mellitus* is a disorder of carbohydrate, fat and protein metabolism resulting from abnormalities in insulin secretion, insulin action, or both and is characterized by high blood sugar levels. The stress problem of diabetes sufferers is closely related to the problem solving strategies used by diabetes sufferers. Psychosocial factors buffer the negative effects of stress on blood glucose. If the psychosocial response is negative, it will have an impact on behavior, an inability to make decisions and an unhealthy lifestyle, which can inhibit the decline in blood glucose. **Materials and methods:** This research is a quantitative research with an analytical research type with a cross sectional study approach. Population: All DM type II sufferers seeking treatment at the Katobu Community Health Center, with a sample size of 31 people, sampling technique using total sampling. Statistical test using Chi Square with ( $\alpha$ ) = 0.05. **Results:** There is a relationship level of education (p value = 0.001) age (p value = 0.002) and gender (p value = 0.001) with coping mechanisms on *diabetes mellitus* patient compliance. If a person's level of education is high then their knowledge will be good, the older a person is, the more constructive they will be in using coping with the problems they face, and women usually have better resistance to stressors than men, so that DM patients are able to behave positively and adhere to treatment. **Conclusion:** The factors of education level, age and gender are strongly related to coping mechanisms for compliance in *diabetes mellitus* patients.

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## INTRODUCTION

*Diabetes mellitus* (DM) is a non-communicable disease. Globally there will be around 6.7 million deaths in the world in 2021 due to DM. This means there is 1 death every 5 seconds. China is the country with the largest number of deaths due to diabetes in the world, reaching 1.39 million people in 2021. The next largest prevalence is followed by the United States, India, Pakistan, Japan, then Indonesia in 6th place. The number of deaths due to DM in Indonesia reached 236 thousand in 2021 (1). DM damages the body's systems, especially blood vessels and nerves (2,3). Type 2 *diabetes mellitus*, also commonly called NIDDM (Non-Insuline-Dependent *Diabetes mellitus*), is a progressive condition in which the body becomes resistant to the effects of normal insulin and/or gradually causes a loss of capacity to produce sufficient insulin (4).

*Diabetes mellitus* is a disorder of carbohydrate, fat

and protein metabolism resulting from abnormalities in insulin secretion, insulin action, or both and is characterized by high blood sugar levels (5). According to the International Diabetes Federation (IDF) report (2021), *diabetes mellitus* is one of the fastest growing global health emergencies in the 21st century (6). Diabetes not only affects adults, but also children, teenagers and pregnant women. The number of people with diabetes in this group also increases every year. The incidence of *diabetes mellitus* among people aged 20-79 years globally increases every year. In 2021, more than half a billion people from all over the world live with diabetes and this continues to increase by 74 million people, reaching 537 million people. This number is projected to reach 643 million (11.3%) in 2030, and the average increase in *diabetes mellitus* cases every two years reaches 10%. For consideration, the adult population of Indonesia in 2021 will be 179,720,500 people, meaning that the prevalence of diabetes is 10.6% in the adult population, or 1 in 9 adults in Indonesia has diabetes (6).

If diabetes is not managed well, the condition of diabetics tends to get worse. Over time diabetes can damage the heart, blood vessels, kidneys, eyes and nerves. 50%

of diabetes sufferers die from cardiovascular disease, especially heart disease and stroke, and 10-20% of diabetes sufferers die from kidney failure. Long-term damage to the small blood vessels in the eyes causes diabetic retinopathy which causes blindness after 15 years of diabetes. Nerve damage (diabetic neuropathy) affects up to 50% of people with diabetes. Diabetic neuropathy problems can increase the chances of foot ulcers and end in limb amputation. And uncontrolled diabetes in pregnant women can increase the risk of fetal death and other complications (7).

Prevention efforts are the best way to avoid DM complications, so that DM sufferers who have not experienced complications can take precautions such as adhering to the five pillars of DM management including diet planning, exercise, blood glucose monitoring, pharmacology, stress management and education. Adhering to this rule for life is certainly a heavy stressor for patients so that many fail to comply (8). Chronic diabetes sufferers have a psychological impact since being diagnosed by a doctor. Sufferers begin to experience psychological disorders, including stress because of the DM management they have to undergo. Diabetes and stress are two things that are interrelated. Stress in diabetes sufferers can increase blood glucose levels. Continuously high blood glucose levels will cause diabetes complications (9).

The development of diabetes research from a behavioral science perspective states that there is evidence that psychosocial factors are a buffer or buffer against the negative effects of stress on blood glucose. If the psychosocial response is negative, it will have an impact on behavior, an inability to make decisions and an unhealthy lifestyle, which can inhibit the decline in blood glucose. This behavior is caused by the stress experienced by the sufferer which is related to the disease, unconsciously the sufferer has to adapt to a strict diet pattern, is worried about the emergence of complications due to the disease, apart from that the sufferer must undergo regular exercise to maintain blood glucose levels within normal limits, so this worry will aggravate stress in diabetes sufferers (10).

The stress problem of diabetes sufferers is closely related to the problem-solving strategies used by diabetes sufferers. According to the American Association of Diabetes Education (AADE) (11), positive (adaptive) coping is one of the keys to diabetes self-care behavior. Coping itself obeys (12,13) namely changes made by individuals with cognitive and behavioral efforts to organize problems that come from within and from outside which are assessed as burdens by the individual. Positive coping such as optimism, support and self-reliance in managing the disease will result in better psychosocial adjustment, and with better chronic glucose control (14). According to the annual report data, there were 71 cases of *diabetes mellitus* sufferers at

the Katobu Community Health Center in 2021 with 51 people suffering from type II DM. The data above shows that *diabetes mellitus* sufferers at the Katobu Community Health Center who were diagnosed > 15 years old do not all have adaptive coping to comply with the management of their disease. The aim of this research is to find out the factors related to coping mechanisms in *diabetes mellitus* patients at the Muna Regency Health Center 2023.

## MATERIALS AND METHODS

This research is a quantitative research with an analytical research type with a cross sectional study approach. The independent variables in this research are education level, age and gender, while the dependent variable is coping mechanisms. The location of this research is the Katobu Community Health Center, Muna Regency and will be carried out from April to September 2023. The population of this research is all DM type II sufferers who received treatment at the Katobu Community Health Center, Muna Regency, totaling 31 people. Because the population is small, all type II DM sufferers were sampled as a sample of 31 people, sampling technique using total sampling.

Data collection was obtained from primary and secondary data, primary data was obtained directly by researchers through interviews using a questionnaire by asking several questions about patient coping. Meanwhile, secondary data was obtained from the community health center regarding the number of patient visits and from related agencies, as well as carrying out searches of literature related to research. The statistical analysis procedure is carried out using bivariate analysis, namely to see the relationship between the independent variables and the dependent variable and to analyze in the form of numbers and percentages between the independent variables and the dependent variable. Data analysis was carried out by testing the null hypothesis ( $H_0$ ) with a degree of significance ( $\alpha$ ) = 0.05. The statistical test used is Chi-Square.

### Ethical Clearance

This study was approved by Research Ethics Committee, Faculty of Medicine Hasanuddin University No. 467/H4.8.4.5.31/PP36-KOMETIK/2023.

## RESULTS

### The Relationship between Education Level and Diabetes Mellitus Coping Mechanisms in the Working Area of Katobu Community Health Center, Muna Regency

For the Education variable, the results of statistical tests using chi-square obtained p value = 0.001. Because the p value is smaller than  $\alpha$  0.05, meaning that the educational level factor is strongly related to coping mechanisms for compliance with *diabetes mellitus* patients at the Katobu Community Health Center,

Muna Regency. From the results of this research, when analyzed using the Phi coefficient test, the strength of the relationship is 0.609, this means that the relationship between education level and mechanism is 60.9%, so the degree of relationship is very strong (Table I).

**Table I: The Relationship between Education Level and Diabetes Melitus Type2 Coping Mechanisms in the Working Area of Katobu Community Health Center, Muna Regency**

Education Level	Coping Mechanisms DM				Total		X = 11,507 P Value = 0,001 Phi = 0,609
	good		bad		n	%	
	n	%	n	%			
High	14	82,4	3	17,6	17	100.0	
Low	3	21,4	11	78,6	14	100.0	
Total	17	54,8	14	45,2	31	100.0	

The statistical test used is Chi-Square

### The Relationship between age and Diabetes Melitus Coping Mechanisms in the Working Area of Katobu Community Health Center, Muna Regency

The results of statistical tests using chi-square obtained calculated  $X^2 = 9.521$  at degrees of freedom/df = 1 with p value = 0.002. Because the p value is smaller than 0.05, the null hypothesis is rejected and the alternative hypothesis is accepted, meaning that there is a relationship between age and DM coping mechanisms in the Katobu Community Health Center, Muna Regency work area. From the results of this research, when analyzed using the Phi coefficient test, the strength of the relationship is 0.546, this means that the relationship between age and DM coping mechanisms in the Katobu Community Health Center, Muna Regency work area is 54.6%, so the degree of relationship is strong. This means that the older the DM sufferer gets, the worse their DM coping mechanisms become. On the other hand, the younger the person with DM, the better they are at coping with DM.

**Table II: The Relationship between age and Diabetes Melitus Type 2 Coping Mechanisms in the Working Area of Katobu Community Health Center, Muna Regency**

Age	Coping Mechanisms DM				Total		X = 9,251 P Value = 0,002 Phi = 0,546
	good		bad		n	%	
	n	%	n	%			
Old	15	75,0	5	25,0	20	100.0	
Young	2	18,2	9	81,8	11	100.0	
Total	17	54,8	14	45,2	31	100.0	

The statistical test used is Chi-Square

### The Relationship between gender and Diabetes Melitus Coping Mechanisms in the Working Area of Katobu Community Health Center, Muna Regency

The results of statistical tests using chi-square showed that  $X^2 = 11.519$  at degrees of freedom / df = 1 with p value = 0.001. Because the p value is smaller than 0.05, the null hypothesis is rejected and the alternative hypothesis is accepted, meaning that there is a relationship between gender and DM coping mechanisms in the Katobu Community Health Center, Muna Regency work area. From the results of this research, when analyzed using the Phi coefficient test, the strength of the relationship is 0.610, this means that the relationship between gender and DM coping mechanisms in the Katobu Community Health Center, Muna Regency work area is 61%, so the degree of relationship is very strong. This means that if a DM sufferer is female, the DM coping mechanism is better. On the other hand, if a person is male, compliance with DM coping mechanisms is worse.

**Table III: The Relationship between gender and Diabetes Melitus Type 2 Coping Mechanisms in the Working Area of Katobu Community Health Center, Muna Regency**

Gender	Coping Mechanisms DM				Total		X = 11,519 P Value = 0,001 Phi = 0,610
	good		bad		n	%	
	n	%	n	%			
Female	15	78,9	4	21,1	19	100.0	
Male	2	16,7	10	83,3	12	100.0	
Total	17	54,8	14	45,2	31	100.0	

The statistical test used is Chi-Square

## DISCUSSION

Some of the risk factors for type 2 *diabetes mellitus* are heredity, race or ethnicity, gender, age, history of hypertension, hyperlipidemia, women with a history of gestational *diabetes mellitus*, lifestyle (diet or higher calorie intake and less physical activity), smoking, obesity, history of cardiovascular disease (15).

This means that if a DM sufferer is highly educated, their coping mechanisms will be better. This is possible because education influences human knowledge and if the acceptance of new behavior is based on knowledge, awareness and positive attitudes, the behavior will last a long time (16). If the level of education is high, the knowledge possessed is also high, so that DM sufferers are able to behave positively in implementing DM coping mechanisms (17). According to (18) One of the factors that influences a person's empowerment is the

educational factor. The level of education influences a person's behavior in seeking care and treatment as well as choosing and deciding what action or therapy to undergo to overcome their health problems. The education of the patients in this study was mostly secondary education. Research (19) regarding the influence of demographic factors on diabetes clients' compliance in managing stress, anxiety and depression concluded that educational factors are one of the variables that have a significant relationship to diabetes clients' compliance in managing their disease. The results of this research are in line with research (20) which states that the higher the education of diabetes sufferers, the better their empowerment will be. Other research (21) also states that there is quite a large influence between health education about *diabetes mellitus* and changes in the behavior of diabetes sufferers.

For the Age variable, the results of statistical tests using chi-square were obtained with p value = 0.002. Because the p value is smaller than  $\alpha = 0.05$ , meaning that the age factor is strongly related to coping mechanisms for compliance in *diabetes mellitus* patients at the Katobu Community Health Center, Muna Regency. From the results of this research, when analyzed using the Phi coefficient test, the strength of the relationship is 0.546, this means that the relationship between age and DM coping mechanisms is 54.6%, so the degree of relationship is strong. This means that the older the DM sufferer gets, the worse their DM coping mechanisms become (22). On the other hand, the younger the DM sufferer, the better the DM coping mechanism. This is possible because at a young age they will use problem focus coping, while at an older age they will use emotion focus coping (23).

For the Gender variable, statistical test results obtained using chi-square obtained p value = 0.001. Because the p value is smaller than 0.05, it means that the gender factor is strongly related to coping mechanisms for compliance in *diabetes mellitus* patients at the Katobu Community Health Center, Muna Regency. From the results of this research, when analyzed using the Phi coefficient test, the strength of the relationship was 0.610, this means that the relationship between gender and DM coping mechanisms at the Katobu Community Health Center was 61%, so the degree of relationship was very strong. Female DM sufferers have better coping mechanisms than male DM sufferers. This is possible because women usually have better resistance to stressors than men, Biologically, women's body flexibility will tolerate stress better than men. In line with research (24) that there is a relationship between gender and adherence to a *diabetes mellitus* diet at the Polyclinic of the Tidore City Hospital, Islands, North Maluku Province.

Another study on the overall prevalence of T2DM was

3500 samples where men had a higher percentage, namely 11.2%, while women were only 9.6%, the average age 46-60 had a higher percentage, where men were 23.70% and women as much as 29.39%. Age, poor eating habits, high adiposity index, physical inactivity, positive family history and educational status were significantly associated with T2DM in both sexes. Smoking status was only significant in men (25). This research shows that the prevalence of type 2 DM is more common in men. A qualitative study showed that men pay less attention to self-management practices in the social environment whereas women can integrate management into daily life (26).

The limitations of this research are the limited sample size of only 31 people, of course it is still not enough to describe the real situation, there are limited research time, energy and abilities of researchers, there is a lack of ability of respondents to understand the statements on the questionnaire and also honesty in filling out the questionnaire so there is a possibility that the results less accurate, this research only examines several factors of coping mechanisms on *diabetes mellitus* patient compliance so further research needs to be developed to examine the influence of other factors that have not been studied, conclusions are drawn only based on the data analysis obtained so further research is expected with different research methods wider samples and the use of different and more complete research instruments.

The practical implications of this research are that patients can avoid the complications of type 2 *diabetes mellitus* due to poor coping mechanisms, besides that it can support and strengthen the patient's psychology to form adaptive coping with good education and knowledge. It is hoped that policy makers will re-evaluate health services for patients, especially *diabetes mellitus* patients, regarding medical and paramedic concern for providing psychological strengthening to patients. The results of this research can be implemented in clinical practice by taking into account age and gender as well as the patient's educational background and knowledge. Patients who have insufficient knowledge about type 2 *diabetes mellitus* must be given health education and strengthen the patient's coping mechanisms, so that patients can comply with a series of therapies. run and have a stable coping mechanism.

## CONCLUSION

From the results of the research above, it can be concluded that the educational level, age factor and gender factor are closely related to coping mechanisms for *diabetes mellitus* patient compliance at the Katobu Community Health Center, Muna Regency. It is hoped that medical staff in providing therapy and care to *diabetes mellitus* patients will not only pay attention

to their biology, but must be complete, including supporting and strengthening the patient's psychology to form adaptive coping.

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