Jurnal Kesehatan dr. Soebandi
ISSN : 2302-7932 (Print)
ISSN : 2527-7529 (OnLine)

Determinants of Compliance with Complication Prevention in Type 2 Diabetes Mellitus Patients in the Outpatient Unit of Tk. II Udayana Hospital

I Wayan Remiase[1*], I Gede Putu Darma Suyasa[2*], AAA Yuliati Darmini[3*], Sri Dewi Megayanti[4*]

[1,2,34*]Nursing Departement, Institute Of Technologi and Health-Bali., Indonesia

Submitted : 01-01-2022 ; Accepted : 06-09-2022
Doi : 10.36858/jkds.v10i2.354

ABSTRACT

Introduction: Diabetes Mellitus (DM) is one of the main causes of 1.6 million deaths every year in the world. Irregularity of blood sugar control and the absence of a healthy lifestyle are risk factors and complications of type 2 Diabetes Mellitus (DM) patients. Many factors need to be studied related to compliance to diabetes complication prevention. **Objective:** The objective of this research was to analyze the determinants of compliance to complication prevention in type 2 DM patients. **Methods:** This research used a correlation design with a cross-sectional approach. The sample was 233 type 2 DM patients recruited using the convenience sampling technique. Data were collected using questionnaires and analyzed using univariate, bivariate, and multivariate analyses. **Results:** The results of the Chi-Square analysis showed several factors had a significant relationship with compliance with diabetes complication prevention, including knowledge (p 0.003), attitude (p 0.000), motivation (p 0.020) and family support (p 0.000). On the other hand, the results of multivariate analysis showed that attitude (AOR: 6.148), family support (AOR: 2.846) and motivation (AOR: 1.912) were the dominant factors in preventing DM complications. **Conclusion:** Compliance with complication prevention in type 2 DM patients is the main aspect that needs to be improved through improving several factors, namely patient attitude, motivation and family support.

Keyword: CSL, Dimension, Satisfaction, Online

ABSTRAK

Pendahuluan: *Diabetes Mellitus (DM) merupakan salah satu penyebab utama 1,6 juta kematian setiap tahun di dunia. Kontrol gula darah yang tidak teratur dan tidak adanya pola hidup sehat merupakan faktor risiko dan komplikasi dari penderita Diabetes Mellitus (DM) tipe 2. Banyak faktor yang perlu dikaji terkait kepatuhan pencegahan komplikasi diabetes.* ***Tujuan:*** *Penelitian ini bertujuan untuk menganalisis determinan kepatuhan pencegahan komplikasi pada pasien DM tipe 2.* ***Metode:*** *Penelitian ini menggunakan desain korelasional dengan pendekatan cross sectional. Sampel penelitian adalah 233 pasien DM tipe 2 yang direkrut dengan teknik convenience sampling. Data dikumpulkan dengan menggunakan kuesioner dan dianalisis menggunakan analisis univariat, bivariat, dan multivariat.* ***Hasil:*** *Hasil analisis Chi-Square menunjukkan beberapa faktor memiliki hubungan yang signifikan dengan kepatuhan pencegahan komplikasi diabetes, antara lain pengetahuan (p 0,003), sikap (p 0,000), motivasi (p 0,020) dan dukungan keluarga (p 0,000). Sedangkan hasil analisis multivariat menunjukkan bahwa sikap (AOR: 6.148), dukungan keluarga (AOR: 2.846) dan motivasi (AOR: 1.912) merupakan faktor dominan dalam pencegahan komplikasi DM.* ***Kesimpulan:*** *Kepatuhan dalam pencegahan komplikasi pada pasien DM tipe 2 merupakan aspek utama yang perlu ditingkatkan melalui peningkatan beberapa faktor yaitu sikap pasien, motivasi dan dukungan keluarga.*

Kata Kunci*: CSL, Dimensi, Kepuasan, Online*

*Correspondence author: yddarmini@gmail.com

How to Cite : Remiase, I Wayan.,et al (2022). Determinants of Compliance with Complication Prevention in Type 2 Diabetes Mellitus Patients in the Outpatient Unit of Tk. II Udayana HospitalHealth Care. *Jurnal Kesehatan Dr. Soebandi*, *10*(2), 114-124. https.//doi. 10.36858/jkds.v10i2.354

Jurnal Kesehatan dr. Soebandi
ISSN : 2302-7932 (Print)
ISSN : 2527-7529 (OnLine)

Introduction:

Diabetes mellitus (DM) is a chronic and metabolic disease characterized by increased blood glucose. There are four types of DM, but the most common is type 2 diabetes, which mostly occurs in adults when the body is resistant to insulin or unable to produce enough insulin. (WHO, 2020a) WHO (2020a) states that currently, there are 422 million people affected by DM worldwide, mainly in low and middle-income countries. DM is also known as one of the leading causes of death globally. As many as 1.6 million deaths due to diabetes occur each year. In Indonesia, the DM incidence percentage based on doctor's diagnosis was 1.5% (Kemenkes, 2013) and has increased to 2.0% (Kemenkes, 2018b). Meanwhile, in Bali Province, The prevalence of DM was increasing (Asril, 2020). In 2013, the prevalence was 1.3% and has increased to 1.7% in 2018 (Kemenkes, 2018a). Data obtained at the outpatient unit of Tk. II Udayana Hospital confirmed that the total visits of DM patients were 2,116 people in 2018 and increased to 3,014 people in 2019. Until November 2020, 2,769 DM patients visited the outpatient unit of Tk. II Udayana Hospital.

The incidence of type 2 DM can increase through several risk factors. These risk factors can be divided into two: modifiable and non-modifiable risk factors (Goldstein & Muller-Wieland, 2016). Research on the risk factors and complications of type 2 DM in Brazil stated that irregular blood sugar control and the absence of a healthy lifestyle were risk factors for type 2 DM (Silva, Ferreira, & Pinho, 2017).

Patients diagnosed with type 2 DM are at risk for complications. DM complications include acute and chronic complications (Papatheodorou, Banach, Bekiari, Rizzo, & Edmonds, 2018). Acute complications include hypoglycemia, diabetic ketoacidosis, hyperosmolar hyperglycemic state, and hyperglycemic diabetic coma. Chronic microvascular complications include nephropathy, neuropathy, and retinopathy, while chronic macrovascular complications include coronary artery disease, peripheral arterial disease and cerebrovascular disease (Goyal & Jialal, 2019). WHO states that there are consequences of premature death and complications in several organs in DM patients, including stroke, blindness, heart attack, kidney failure, and amputation of the lower limbs (WHO, 2020b). In addition, research in Brazil on risk factors and complications of type 2 DM found that high blood pressure was a major complication and occurred in 70.9% of DM patients (Silva et al., 2017).

The risk of complications in DM patients is important to note because it can be fatal. In addition, maintaining or controlling glycemia, especially HbA1c levels lower than 7%, is very important to prevent diabetes-related complications. Effective early intervention for managing hyperglycemia, hypertension, and dyslipidemia can reduce the risk of these complications (Rawal et al., 2012). On the other hand, research in Indonesia also found a high incidence of chronic complications of DM in the elderly, which reaches 73.1%, especially complications in hypertension. Age, gender, obesity, smoking and physical activity were associated with diabetes complications (Rosyada & Trihandini, 2013). Research in Brazil revealed that an increase in the incidence of complications was associated with an increased acceptance of insulin therapy (Silva et al., 2017). In addition, the Covid-19 pandemic condition has worsened or increased the risk of DM patients to severe DM complications if infected with Covid-19 (IDF, 2020).

These complications need to be overcome. The most important here is ways to prevent complications. The most common complications in Indonesia are neuropathy (60%), coronary heart disease (20.5%), diabetic foot (15%), retinopathy (10%) and nephropathy (7.1%). Regarding diabetic foot, the research found that visual impairment had a significant influence on the incidence of diabetic foot (Purwanti & Maghfirah, 2016). For complications to be prevented, several efforts must be made, including blood sugar control, compliance to diet, medication, and physical exercise (Goyal & Jialal, 2019). In addition, WHO mentioned several key actions to prevent the risk of complications through eating a

Jurnal Kesehatan dr. Soebandi
ISSN : 2302-7932 (Print)
ISSN : 2527-7529 (OnLine)

healthy diet, doing physical exercise, avoiding excess weight gain, checking blood sugar regularly and complying with recommended medical therapy (WHO, 2020b).

Until now, observational studies on diabetes are generally only related to the incidence or prevalence of diabetes, the percentage of compliance to diet, physical exercise, and compliance to medication. Other studies generally examine the relationship of two variables, and some examine several factors but are associated with one of the dependent variables, such as diet and medication compliance. Compliance with physical activity and blood sugar control has not been widely studied. In addition, several previous research has also shown varying findings and have not fully focused on integrated complication prevention. The possibility of complications in DM patients continues to occur and worsens with the Covid-19 pandemic. Thus, research on the determinants of compliance with complication prevention in type 2 DM patients was carried out. The results of this research are important to prevent and reduce the incidence of complications in type 2 DM patients. This research aimed to determine the determinants of compliance with complication prevention in type 2 DM patients in the outpatient unit of Tk. II Udayana Hospital.

Methods:

This research used a cross-sectional correlation design that analyzed the determinants of compliance with complication prevention in type 2 DM patients at the Outpatient Unit of Tk. II Udayana Hospital was carried out from February to April 2021.

The population was all type 2 DM patients in the Outpatient Unit of Tk. II Udayana Hospital. The population was taken based on the average patient visits in the last 3 months with type 2 DM patients. The population was 450 people. The sampling technique used in this research was non-probability sampling, namely convenience sampling. The inclusion criteria were: (1) Type 2 DM patients who underwent outpatient treatment at the Outpatient Unit of Tk. II Udayana Hospital; (2) the patients underwent outpatient treatment from February to April 2021; (3) the patients had at least diabetes for 1 year. The exclusion criteria were: (1) not cooperative; (2) not willing to be respondents; and (3) type 1 DM patients. The sample size was determined using the Slovin's sample size formula (Swarjana), and we obtained 212 samples. 10% (21 people) of the total sample was added to anticipate missing data so that the total number was 233 samples.

$$n = \frac{N}{(1 + Ne^2)}$$

Sample size formula

The research instrument was a questionnaire consisting of 6 parts. **Part 1** deals with characteristics of respondents; **Part 2** deals with compliance with complication prevention using instruments from previous research (Hidayat & Hamid, 2014). This compliance instrument was developed based on the concept of the System Model developed by Betty Neuman, a holistic human approach based on an adaptation systems framework. The questionnaire consisted of 33 statements with 5 answer choices: never, rarely, sometimes, often, always. This questionnaire has been tested for validity and reliability. The validity test was conducted with a coefficient value limit between 0.459 and 0.947 for 25 respondents. The reliability test obtained Cronbach's alpha coefficient of 0.956. **Part 3** deals with respondents' knowledge or the diabetes knowledge test developed by (Fitzgerald et al., 2016). This questionnaire consisted of 12 questions of 2 diet questions, 3 glucose check questions, 2 physical exercise questions, 2 foot care questions, and 3 questions about evaluating insulin use (Cronbach's alpha value was 0.77). **Part 4** deals with the respondents' attitude about DM, and it used a Likert scale. Results were put into 3 categories: good (score ≥ 75%), fair (score 56-74 %), and poor (score ≤ 55%) (Budiman, 2013). In the attitude aspect, the Cronbach's Alpha (α) value was 0.767. The reliability test was done by authors that involved 30 respondents. **Part 5** deals with motivation—it was modified from the Treatment Self-

Jurnal Kesehatan dr. Soebandi
ISSN : 2302-7932 (Print)
ISSN : 2527-7529 (OnLine)

Regulation Questionnaire (TSRQ) to assess respondents' motivation in managing DM. The questionnaire consisted of 17 statements with a Likert scale. Motivation was categorized into 2: good motivation (score ≥ 80%) and poor motivation (score < 80%). Cronbach's alpha value was 0.839. The reliability test was done by authors that involved 30 respondents. **Part 6** deals with family support using the Hensarling Diabetes Family Support Scale (HDFSS) developed by (Hensarling, 2009) with a Likert scale. The validity value (r) was 0.395-0.856, and the reliability value (Cronbach's Alpha) was 0.940 (Yusra, 2011).

The data collection method used in this research was a questionnaire structure interview. Before the interview was conducted, we explained the aims and objectives of the research to the respondents. Then we gave an informed consent form to be signed if they were willing to become respondents.

This research performed data analysis using univariate, bivariate, and multivariate analysis. Univariate analysis used was the mean and median values. In addition, univariate analysis was also used to find the frequency and proportion or percentage. A bivariate analysis was carried out to test each relationship between the independent variables (the respondents' characteristics, knowledge, motivation, attitude and family support) with the dependent variable (compliance with DM complication prevention). Both variables have categorical data types, so that the bivariate test used was the Chi-square test. The multivariate analysis used in this research was logistic regression to examine the dominant factor for compliance with complication prevention of type 2 DM. This research has received ethical feasibility from the Research Ethics Commission of Bali Institute of Technology and Health (*Komisi Etik Penelitian Itekes Bali*) (04.0316/KEPITEKES-BALI/III/2021). We then took the research permit to the Ethics Commission of Tk. II Udayana Hospital (No.B/902/N/2021).

Results:

Univariate analysis

Table 1. General Characteristic of respondent (n=230)

Characteristics	f	%
Gender		
Male	117	50.9
Female	113	49.1
Age		
<55 years old	93	40.4
≥55 years old	137	59.6
Having diabetes for		
<5 years	142	61.7
≥5 years	88	38.3
Knowledge		
Poor	117	50.9
Good	113	49.1
Attitude		
Poor	134	58.3
Good	96	41.7
Motivation		
Low	149	64.8
High	81	35.2
Family Support		
Poor support	126	54.8
Good support	104	45.2
Compliance with complication prevention		
Complying	156	67.8
Not complying	74	32.2

Table 1 shows that most respondents were male (117 respondents or 50.9%). Most were ≥ 55 years old (137 respondents or 59.6%). Most of them suffered from DM for < 5 years (142 respondents, 61.7%). 117 respondents (50.9%) had poor knowledge, and 134

Jurnal Kesehatan dr. Soebandi
ISSN : 2302-7932 (Print)
ISSN : 2527-7529 (OnLine)

respondents (58.3%) had a poor attitude. 149 respondents (64.8%) had low motivation, and 126 respondents (54.8%) had poor family support. 156 respondents (67.8%) did not comply with complication prevention,

Bivariate Analysis

Table 2. The relationship between gender, age, duration of suffering from DM, knowledge, attitude, motivation and family support with compliance with complication prevention (n=230)

Variable	Compliance with DM complication prevention f (%)		X2	*P*
	Not complying	Complying		
Gender				
Male	40 (54.1%)	77 (49.4%)	0.275	0.506*
Female	34 (45.9%)	79 (50.6%)		
Age				
<55 years old	26 (35.1%)	67 (42.9%)	0.969	0.259*
≥55 years old	48 (64.9%)	89 (57.1%)		
Having diabetes for				
<5 years old	41 (55.4%)	101 (64.7%)	1.479	0.173*
≥5 years	33 (44.6%)	55 (35.3%		
Knowledge				
Poor	27 (36.5%)	90 (57.7 %)		
Good	47 (63.5%)	66 (42.3%)	8.202	0.003*
Attitude				
Poor	7 (5.2%)	127 (94.8%)		
Good	67 (69.8%)	29 (30.2%)	103.913	0.000*
Motivation				
Low	33 (44.6%)	95 (60.9%)	4.765	0.020*
High	41 (55.4%)	61 (39.1%)		
Family Support				
Poor support	25 (33.8%)	101 (64.7%)	18.192	0.000*
Good support	49 (66.2%)	55 (35.3%)		

* *Chi-Square test*

Table 2 shows that most respondents who did not comply with the complication prevention were in these categories: female (79 respondents or 50.6%), aged 55 years, (89 respondents or 57.1%), having DM for < 5 years (101 respondents or 64.7%), had poor knowledge (90 respondents or 57.7%), had a poor attitude (127 respondents or 94.8%), had a low motivation (95 respondents or 60.9%), and had poor family support (101 respondents or 64.7%). Thus, the variables that had a significant relationship with compliance with diabetes complication prevention were variables that had a p-value <0.05, namely knowledge (p 0.003), attitude (p 0.000), motivation (p 0.020) and family support (p 0.000).

Multivariate Analysis

The stages for candidate selection were seen from the bivariate analysis results by looking at the p-value. If the p-value < 0.25 or substantially the variable is considered important, it will be included in multivariate modeling (Dahlan, 2011). The results of the bivariate test between the independent variables and the characteristics of the respondents with the dependent variables are presented in the following table.

Jurnal Kesehatan dr. Soebandi
ISSN : 2302-7932 (Print)
ISSN : 2527-7529 (OnLine)

Table 3 Results of Bivariate Selection of Logistic Regression Test of Independent Variables and Characteristics of Respondents with Dependent Variables in DM patients (n = 230)

No	Independent variables and characteristics of respondents	Dependent variables
		Compliance with DM Prevention p-value
1	Gender	0.506
2	Age	0.259
3	Duration of diagnosed with DM	0.173
4	Knowledge	0.003
5	Attitude	0.000
6	Motivation	0.020
7	Family Support	0.000

Statistical test results showed that the independent variables that had a p-value >0.25 were gender (p 0.506) and age (p 0.259). Thus, gender and age would be excluded from the multivariate modeling. Multivariate modeling in this research used a logistic regression test. The following describes the stages of multivariate logistic regression modeling.

Table 4 Results of Multivariate Modeling of Logistic Regression of Independent Variables and Characteristics of Respondents with Compliance with DM Prevention Variable (n=230)

Variables	B	Exp(B)	P
Duration of having diabetes	.418	1.519	.216
Knowledge	.436	1.546	.188
Attitude	1.839	6.293	.000
Motivation	.509	1.664	.126
Family Support	.978	2.658	.004

The multivariate test confirmed 3 variables that had to be excluded from the multivariate modeling because p > 0.05. The variables were duration of having DM, knowledge, and motivation variables. These variables would be removed one by one, starting from the variable that had the largest p-value. If there was a change in exp (B) > 10% when the variable was removed, then the variable was not removed.

Jurnal Kesehatan dr. Soebandi
ISSN : 2302-7932 (Print)
ISSN : 2527-7529 (OnLine)

Table 5 Results of Multivariate Logistic Regression Analysis After Excluding the Variable of Duration of Having DM and Knowledge from Multivariate Modeling

	B	S.E	Wald	df	*p*	Odds Ratio	95% CI for odds ratio	
							Lower	Upper
Attitude	1.816	.335	29.334	1	.000	6.148	3.187	11.863
Motivation	.648	.323	4.035	1	.045	1.912	1.016	3.597
Family Support	1.046	.338	9.598	1	.002	2.846	1.468	5.515
Constant	-2.574	.367	49.113	1	.000	.076		

Interaction Effect and Output Interpretation

The results of the interaction effect of attitude, motivation and family support (independent variables) in relation to compliance with DM complication prevention can be seen from the p-value; if the p-value <0.05, there is an interaction between variables.

Table 5 Results of Interaction Effect between Attitude, Motivation and Family Support with Compliance with DM Complication Prevention in DM Patients (n = 230)

Variable	P
Attitude*Motivation	0.063
Attitude*Family Support	0.399

The interaction effect shows a p-value >0.05; it means no interaction between attitude, motivation, and family support related to DM prevention compliance.

From the Omnibus test and the Hosmer and Lemeshow test, as evidence of the interpretation of the output of the logistic regression model, the equation had met the requirements, the Omnibus test resulted in a significance value lower than 0.05 (p 0.000). This shows a significant influence of the independent variables on the dependent variable. The Hosmer and Lemeshow test results showed a p-value > 0.05 (p 0.490), meaning that the logistic regression model can explain the relationship between the independent and dependent variables.

Final Modeling

This stage presents the types of logistic regression modeling on the research variables.

Table 5.7 Results of Final Modeling of Main Variables and Characteristics of Respondents with Compliance with DM Complication Prevention (n=230)

Variable	B	p	OR/Exp (B)
Attitude	1.816	0.000	6.148
Motivation	0.648	0.045	1.912
Family Support	1.046	0.002	2.846
Constant	2.574		0.076

The final modeling results confirmed that patients who had a low attitude had a 6.1 times chance of non-compliant behavior compared to respondents in the group who had a good attitude towards DM complication prevention after being controlled with motivation and family support variables.

Discussion:

Based on the general characteristics of the 230 respondents studied, the results showed that most respondents were male (117 respondents or 50.9%). These findings supported the findings of a survey by (Yosmar, Almasdy, & Rahma, 2018) that men were more likely to develop diabetes mellitus. Because men accumulate a lot of fat around the abdomen, they are more likely to develop abdominal obesity and metabolic disorders that lead to diabetes; in other words, men are more at risk of developing diabetes. Based on the results of the chi-square analysis, it was found that the p-value was 0.506 (p > 0.05); thus, gender was not associated with DM complication prevention.

Most respondents were 55 years old (59.6%). Similar findings were also confirmed

Jurnal Kesehatan dr. Soebandi
ISSN : 2302-7932 (Print)
ISSN : 2527-7529 (OnLine

by (Goyal, Jialal, & Castano, 2021) that more respondents aged 45 years who suffered from DM than those aged < 45 years. The chi-square analysis results showed a p-value of 0.259 (p > 0.05); thus, age had no relationship with DM complication prevention.

Most respondents in this study had suffered DM for less than 5 years (61.7%). Our findings confirmed a lower compliance level of patients suffering DM for less than 5 years. This supports the theory of (Gallagher, Le Roith, & Bloomgarden, 2009) that someone who had long suffered from DM would be following treatment better. The longer the respondent suffers from diabetes mellitus, the better the knowledge and experience they have related to diet to comply with the recommended diet. In (Bertalina & Purnama, 2016) stated that the duration of suffering from type 2 DM had a positive correlation with compliance--patients who had long suffered from type 2 DM learned from the pain they had experienced during their illness so that compliance increased over time.

The analysis results for the level of knowledge showed a p-value of 0.003 (p <0.05), thus confirming the relationship between knowledge and DM complication prevention. Our findings supported (Laudya, Prasetyo, & Widyoningsih, 2021) that a significant relationship existed between knowledge about preventing complications and preventing complications in type 2 diabetes mellitus patients at the South Cilacap Health Center. Kusnanto, Sundari, Asmoro, and Arifin (2019) stated that someone with low knowledge tended to find it difficult to accept and understand the information received, so that person would be indifferent to new information and felt they did not need it.

Determinants of Attitude on DM Complication Prevention

The chi-square test results on the attitude variable showed a p-value < 0.001 (p < 0.05), thus a relationship between attitude and DM complication prevention existed. Based on the final modeling results with logistic regression, attitude is the most dominant determinant of compliance. Patients who had a low attitude had a 6.1 times chance to have non-compliant behavior towards DM complication prevention compared to respondents in the group who had a good attitude towards prevention.

Our findings supported (Lestari, 2019) that a positive attitude led to higher compliance, and a negative attitude led to lower compliance. Lustiani (2018) also stated a relationship between knowledge and patient attitude in preventing DM complications at the Wates Husada Balongpanggang Gresik Hospital in 2018. The treatment success, both primary and secondary, was strongly influenced by the compliance of DM patients. If people with DM have no self-awareness to be compliant, it will cause failure in treatment resulting in decreased health (Lestari, 2019).

Our findings also supported the theory proposed by Notoatmodjo (2007) in Fatmawati (2010) that attitude is a person's assessment of objects related to health. A person who has a positive attitude tends to do good practices for healthy living. Indicators for health attitudes are attitudes towards being ill and illness, care and healthy living, and environmental health. A person with a positive attitude towards preventing DM complications will be able to apply these attitudes to prevent DM complications and manage diabetes mellitus.

Determinants of Motivation on DM Complication Prevention

The statistical analysis results showed that most respondents had low motivation (149 respondents or 64.8%). The results of the Chi-Square analysis on the motivation variable showed a p-value of 0.020 (p <0.05), thus it can be stated that a relationship between motivation and DM complication prevention existed. The better the patient's motivation, the higher the effort for DM complication prevention; vice versa, the lower the patient's motivation, the lower the effort for DM complication prevention. We assumed that respondents' high motivation was caused by support from family or people around them in helping them to comply with DM complication prevention. The interviews with several patients confirmed that patients were motivated by their family, friends,

and health workers to encourage them to comply with DM complication prevention.

This supports (Notoatmodjo, 2013), stating that although knowledge is the basis for individuals to behave or take actions, it depends on the motivation to apply the knowledge. This also supports (Audrey, Snyder, Skiles, Spencer, & Torphy, 2016), confirming that the client's motivation to recover will affect behavior and make lifestyle changes so that the therapy program will be carried out properly.

Our findings also supported (Wijaya, 2021), stating a relationship between knowledge and motivation existed in preventing complications in people with diabetes mellitus in the Samata Health Center Work Area. Encouragement and motivation play an important role because motivation contains behavior for DM sufferers based on the patient's desire to recover and reduce the risk of complications due to suffering from DM so that they are motivated to participate in all complications prevention programs, as stated by Bertalina and Purnama (2016).

Determinants of Family Support on DM Complication Prevention

The Chi-Square analysis results on the family support variable showed a p-value of 0.000 ($p < 0.05$), thus it means there was a relationship between family support and DM complication prevention. The results of this research were in line with (Heryati, 2014), who found a significant relationship between family support and motivation with DM prevention compliance (Azis, Tombokan, & Saini, 2019), also confirmed the relationship between family support and motivation in controlling blood sugar levels in people with diabetes mellitus. The results supported our findings (Nuraisyah, Kusnanto, & Rahayujati, 2017) revealed that the respondent's lack of knowledge could be overcome with good family support-patients wanted to recover even though they did not know the disease in detail. Family support is one of the reinforcing factors that has affected compliance with complication prevention. Heryati (2014) said that patients who received family support had an opportunity to adhere to the DM diet by 5.250 times compared to patients who did not receive family support. We assume that family support is a form of positive behavior and attitude given to a family member who suffers from DM. From the interviews with people with diabetes mellitus, several factors influence the family in providing support to sufferers undergoing a diet, including the patient's age, family education, socio-economic and cultural background. The family providing support can influence patients' compliance with DM management, so that blood sugar levels become normal and complications can be prevented.

Emotional support from other family members is an important factor in ensuring compliance with DM prevention—patients will be eager to take preventive actions against DM complications (Sunaryo, 2013). D'Souza et al. (2017) showed that adult compliance helped them increase self-efficacy to comply with the DM diet to improve health status. The implementation of the diet is strongly influenced by the support from the patient's family.

Research Limitations

Several limitations were found in this research, including a cross-sectional approach where data was only taken once, which caused the possibility of not showing compliance for a longer period of time. This research also used a non-probability sampling technique so that it could not be used to generalize the results of the research to the population.

Conclusions:

This research was conducted on 230 respondents with type 2 diabetes who were treated as outpatients in the Outpatient Unit of Tk. II Udayana Hospital. From the results of univariate, bivariate and multivariate analysis, it can be concluded that (1) the majority of respondents were male (50.9%), aged 55 years (59.6%), had been suffering from DM for <5 years (61.7%), had poor knowledge (50.9%), had poor attitude (58.3%), had low motivation (64.8%), had poor family support (54.8%) and most of the respondents did not comply with the

type 2 DM complication prevention (67.8%); (2) the Chi-square test results confirmed a relationship between knowledge, attitude, motivation, and family support with compliance with diabetes complication prevention; and (3) the determinants related to DM complication prevention were attitude, motivation and family support, with attitude as the most dominant factor.

References:

Audrey, T., Snyder, S., Skiles, L., Spencer, H., & Torphy, M. D. (2016). *Student workbook and resource guide for Kozier & Erb's fundamentals of nursing*: London: Pearson.

Azis, M. R. N., Tombokan, M., & Saini, S. (2019). Hubungan Dukungan Keluarga dengan Motivasi dalam Mengontrol Kadar Gula Darah pada Penderita Diabetes Melitus di Wilayah Kerja Puskesmas Pampang Kecamatan Panakkukang Kota Makassar. *Media Keperawatan, 8*(2), 39-45.

Bertalina, B., & Purnama, P. (2016). Hubungan lama sakit, pengetahuan, motivasi pasien dan dukungan keluarga dengan kepatuhan diet pasien Diabetes Mellitus. *Jurnal Kesehatan, 7*(2), 329-340.

Budiman, R. A. (2013). Kapita selekta kuesioner: pengetahuan dan sikap dalam penelitian kesehatan. *Jakarta: Salemba Medika, 2013*, P4-8.

D'Souza, M. S., Karkada, S. N., Parahoo, K., Venkatesaperumal, R., Achora, S., & Cayaban, A. R. R. (2017). Self-efficacy and self-care behaviours among adults with type 2 diabetes. *Applied Nursing Research, 36*, 25-32.

Fatmawati, A. (2010). Faktor Risiko Kejadian Diabetes Melitus Tipe 2 Pasien Rawat Jalan (Studi Kasus di Rumah Sakit Umum Daerah Sunan Kalijaga Demak). *Semarang: Universitas Negeri Semarang*.

Fitzgerald, J. T., Funnell, M. M., Anderson, R. M., Nwankwo, R., Stansfield, R. B., & Piatt, G. A. (2016). Validation of the revised brief diabetes knowledge test (DKT2). *The Diabetes Educator, 42*(2), 178-187.

Gallagher, E. J., Le Roith, D., & Bloomgarden, Z. (2009). Review of hemoglobin A1c in the management of diabetes. *Journal of diabetes, 1*(1), 9-17.

Goyal, R., & Jialal, I. (2019). Diabetes Mellitus Type 2 [Internet]. *Ncbi. nlm. nih. gov*.

Goyal, R., Jialal, I., & Castano, M. (2021). Diabetes Mellitus Type 2 (Nursing) *StatPearls [Internet]*: StatPearls Publishing.

Hensarling, J. (2009). *Development and psychometric testing of Hensarling's Diabetes Family Support Scale.* Texas Woman's University.

Heryati, G. (2014). Faktor-Faktor yang Berhubungan dengan Kepatuhan Diet Diabetes Mellitus pada Pasien DM. *Jurnal Keperawatan, 1*(3), 97-107.

Hidayat, F., & Hamid, A. Y. S. (2014). *Hubungan Koping Individu Dengan Tingkat Kepatuhan Penyandang Diabetes Mellitus Sebagai Anggota Persadia Cabang RSMM Bogor.* Paper presented at the Prosiding Seminar Nasional & Internasional.

IDF. (2020). Covid-19 and Diabetes. Retrieved 20 November, 2020, from https://www.idf.org/aboutdiabetes/what-is-diabetes/covid-19-and-diabetes/1-covid-

Kemenkes, R. I. (2013). Riset kesehatan dasar 2013. *Jakarta: Kementerian Kesehatan Republik Indonesia*, 16.

Kemenkes, R. I. (2018a). Riset kesehatan dasar 2013. Jakarta: Kementerian Kesehatan Republik Indonesia.

Kemenkes, R. I. (2018b). Riset kesehatan Dasar 2018. *Jakarta: Kementerian Kesehatan Republik Indonesia*, 16.

Kusnanto, K., Sundari, P. M., Asmoro, C. P., & Arifin, H. (2019). Hubungan tingkat pengetahuan dan diabetes self-management dengan tingkat stres pasien diabetes melitus yang menjalani diet. *Jurnal Keperawatan Indonesia, 22*(1), 31-42.

Laudya, L., Prasetyo, A., & Widyoningsih, W. (2021). Hubungan Tingkat Pengetahuan Tentang Komplikasi Diabetes Melitus Dengan Pencegahan Komplikasi Pada Pasien Diabetes Melitus Di Puskesmas Cilacap Selatan I. *Tens: Trends of Nursing Science, 2*(1), 34-44.

Lestari, T. (2019). Pengetahuan dan Sikap Terhadap Upaya Pencegahan Penyulit Diabetes Melitus di Puskesmas Pematang Kandis Bangko dan Sikap Terhadap Upaya Pencegahan Penyulit Diabetes Melitus di Puskesmas Pematang Kandis Bangko. *Jurnal Kesehatan Masyarakat, 12*(02).

Lustiani, D. (2018). *Hubungan Pengetahuan dengan Sikap Pasien dalam Mencegah Komplikasi Diabetes Mellitus di Poli RS Wates Husada Balongpanggang Gresik.* STIKes Insan Cendekia Medika Jombang.

Notoatmodjo, S. (2013). Promosi Kesehatan Dan Perilaku Kesehatan Rineka Cipta: Jakarta.

Nuraisyah, F., Kusnanto, H., & Rahayujati, T. B. (2017). Dukungan keluarga dan kualitas hidup pasien diabetes mellitus di puskesmas Panjaitan II, Kulon Progo. *Berita Kedokteran Masyarakat, 33*(1), 25-30.

Papatheodorou, K., Banach, M., Bekiari, E., Rizzo, M., & Edmonds, M. (2018). Complications of diabetes 2017 (Vol. 2018): Hindawi.

Purwanti, L. E., & Maghfirah, S. (2016). Faktor risiko komplikasi kronis (kaki diabetik) dalam diabetes mellitus tipe 2. *The Indonesian Journal of Health Science, 7*(1).

Rawal, L. B., Tapp, R. J., Williams, E. D., Chan, C., Yasin, S., & Oldenburg, B. (2012). Prevention of type 2 diabetes and its complications in developing countries: a review. *International journal of behavioral medicine, 19*(2), 121-133.

Rosyada, A., & Trihandini, I. (2013). Determinan komplikasi kronik diabetes melitus pada lanjut usia. *Kesmas: Jurnal Kesehatan Masyarakat Nasional (National Public Health Journal), 7*(9), 395-402.

Silva, E. F. F., Ferreira, C. M. M., & Pinho, L. (2017). Risk factors and complications in type 2 diabetes outpatients. *Revista da Associação Médica Brasileira, 63*, 621-627.

Sunaryo. (2013). *Psikologi untuk Keperawatan*. Jakarta: EGC.

Swarjana, I. K. *Populasi-Sampel, Teknik Sampling & Bias Dalam Penelitian*. Yogyakarta: Penerbit Andi.

WHO. (2020a). Diabetes Retrieved 18 Desember 2020. Retrieved 18 December, 2020, from https://www.who.int/health-topics/diabetes#tab=tab_1

WHO. (2020b). Diabetes Retrieved 18 Desember 2020. . Retrieved 18 December, 2020, from https://www.who.int/health-topics/diabetes#tab=tab_1

Wijaya, N. I. S. (2021). Hubungan Pengetahuan dengan Motivasi dalam Mencegah Terjadinya Komplikasi Diabetes Melitus di Wilayah Kerja Puskesmas Samata. *Nursing Care and Health Technology Journal (NCHAT), 1*(1), 11-15.

Yosmar, R., Almasdy, D., & Rahma, F. (2018). Survei risiko penyakit diabetes melitus terhadap masyarakat Kota Padang. *Jurnal sains farmasi & klinis, 5*(2), 134-141.

Yusra, A. (2011). Hubungan antara dukungan keluarga dengan kualitas hidup pasien diabetes melitus tipe 2 di poliklinik penyakit dalam rumah sakit umum pusat fatmawati jakarta. *Universitas Indonesia, 1*.