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Diet Compliance, Blood Glucose Levels and Hospitalization Duration of Type II Diabetes Mellitus Patients with Hypertension Complications in The Pancaran Kasih General Hospital, Manado

ABSTRACT

Backgroud: Diabetes mellitus is an assembly of symptoms that arise in a person caused by increased blood sugar levels due to insulin deficiency, both absolute and relative. The highest prevalence in North Sulawesi is in Tomohon City (4.8%) then Manado City (3.2%). **Objective:** This study aimed to determine the correlation between dietary compliance with blood glucose levels and duration of hospitalization of type 2 diabetes mellitus patients with hypertension complications in the Pancaran Kasih General Hospital, Manado. **Method:** This research was observational with a cross-sectional design. The population in this study were all patients with type 2 diabetes who were hospitalized and 34 people involved as a sample through purposive sampling technique. **Results:** The results showed that 88.2% of respondents with not normal blood glucose did not adhere to the diet. Fisher's test obtained p-value = 0.011 (p <0.05), indicated a significant correlation between dietary compliance with blood glucose levels. About 82.4% of patients did not adhere to the diet with a long day of hospitalization and a p-value of 0.027 (p<0.05). It indicated a significant correlation between dietary compliance and length of stay. **Conclusion:** This study concluded a correlation between dietary compliance with blood glucose levels and dietary compliance and length of stay for type 2 DM patients with hypertension complications.

Keywords: Dietary Compliance, Blood Glucose Levels, Length of Hospitalization, Type 2 DM

INTRODUCTION

According to the World Health Organization (WHO), diabetes mellitus is a chronic disease that occurs when the pancreas does not produce enough insulin or when the body does not use the insulin it produces effectively(1). Meanwhile, according to the American Diabetes Association (ADA), diabetes is a group of diseases characterized by high glucose levels due to insulin production, how insulin works, or both (2). Diabetes mellitus according to the International Diabetes Federation (IDF), there are 415 million people worldwide who suffer from diabetes mellitus, of which one in eleven people already has diabetes and is expected to increase in 2040 to 642 million people where one in ten people will have diabetes(3).

In Indonesia, diabetes mellitus reach 1.5%, with the highest prevalence in DI Yogyakarta at 2.6%, and the lowest is in Lampung at 0.7%. Specifically, in North Sulawesi Province, the

highest prevalence of diabetes mellitus is in Tomohon City at 4.8% and followed by Manado City at 3.2% (4). Diet is one of the main treatments in the management of diabetes mellitus. The main purpose of this diabetes mellitus diet is to improve general health, maintain blood glucose levels close to normal, meet nutritional needs in achieving and maintaining nutritional status (5).

Disobedience to diet can also cause complications. According to Risnasari (2014) (6), there is an association between the level of dietary adherence of diabetes mellitus patients with the emergence of complications. In addition, the length of hospitalization is influenced by nutritional status, where nutrition can play a role in the healing process (7).

This study aimed to determine the correlation between dietary compliance with blood glucose levels and duration of hospitalization of type 2 diabetes mellitus patients with hypertension complications in the Pancaran Kasih General Hospital, Manado.

METHODS

This research was observational with a cross-sectional study design. This research was conducted at the General Hospital of GMIM Pancaran Kasih, Manado. The variables in this study consisted of the independent variable (dietary compliance) and the dependent variable (blood glucose levels and length of hospitalization). The population in this study were patients with type II diabetes mellitus who were hospitalized. Through purposive sampling, the samples were 34 respondents, taken based on the inclusion criteria (adult patients aged 19 years, DM with complications of hypertension, good awareness, had undergone at least 1 day of hospitalization, could communicate well and were willing to be respondents).

The instruments used were the respondent's identity form, the estimated food waste form to measure dietary compliance and medical records. Data were collected through interviews with primary data collected, including respondent's identity, dietary compliance, and length of hospitalization (counting the initial days of admission until the end of the study). Secondary data were the general description of the hospital obtained from the hospital report book, fasting blood glucose levels were obtained from medical records, and the standard portion of the hospital was obtained from data at the nutrition installation.

The category of dietary compliance is obey if the remaining food is less than 20% . Disobedience if the remaining food is above 20%. Kategori status gizi (BMI) dibagi menjadi 3 yaitu normal (18,5-25), Overweight (25 – 27), dan Obesitas (> 27). The criteria for high blood pressure used the JNC7 criteria (8): systolic blood pressure (SBP) $\geq$140 mmHg or diastolic blood pressure (DBP) $\geq$90 mmHg. The criteria for high blood sugar levels used the WHO

Statistically, data were analyzed by the Fisher Exact Test with α = 0.05 and using SPSS Program.

RESULTS

Characteristics Respondent

Table 1. Characteristics of Respondent

Variables	Categories	n	%
Gender	Males	13	38.2
	Females	21	61.8
	Total	**34**	**100**
Age (y.o)	40 – 46	7	20.6
	47 – 53	8	23.5
	54 – 60	6	17.6
	61 – 67	10	29.4
	68 – 74	2	5.9
	75 – 81	1	2.9
	Total	**34**	**100**
Nutritional Status (BMI)	Normal	23	67.6
	Overweight	6	17.6
	Obesitas	5	14.7
	Total	**34**	**100**
Education	Primary school	8	23.5
	Junior high school	10	29.4
	Senior high school	11	32.4
	Associate degree (D-III)	1	2.9
	Bachelor degree	4	11.8
	Total	**34**	**100**
Job	Civil servants	3	8.8
	Private	6	17.6
	Housewife	15	44.1
	Trader	1	2.9
	Farmer	2	5.9
	Pensionary	3	8.8
	Fisherman	1	2.9
	Teacher	3	8.8
	Total	**34**	**100**

Table 1 shows that of the 34 subjects, 61.8% were female, and 38.2% were male. The number of respondents based on age was the highest in the range of 61-67 years old (29.4%) and the least in the age range of 75-81 years old (2.9%). For the nutritional status, 67.6% of

respondents with normal nutritional status, 17.6% of respondents with overweight, and 14.7% of respondents with obese. Based on education level, most respondents have a high school education level of 32.4%, and the least 2.9% of an associate degree (D-III) graduates. Distribution by occupation shows that the most significant percentage was household workers at 44.1%, and the lowest percentage was traders and fishermen at 2.9% each.

Research variable

Table 2. Research variable

Variable	n	%
Blood Pressure		
Hypertension	34	100
Not hypertension	0	0
Diet Compliance		
Yes	2	5.9
No	32	94.1
Fasting Blood Glucose		
Normal	4	11.8
Not normal	30	88.2
Length of Hospitalization		
Short	6	17.6
Long	28	82.4
Total	34	100%

Table 2 shows that all respondents had systolic blood pressure 140 mmHg and diastolic 90 mmHg, about 34 respondents or 100%, classified as hypertension. Most patients with Type 2 Diabetes Mellitus did not comply with 32 respondents or 94.1%, while 2 respondents (5.9%) classified complied.Fasting blood glucose levels in Type 2 Diabetes Mellitus patients mainly were not normal, about 30 respondents (88.2%), while normal values were 4 respondents (11.8%). Most patients with Type 2 Diabetes Mellitus had long hospitalized days of 28 respondents (82.6%), while the category of short hospitalization was 17.6% (6 respondents).

Dietary Compliance with Blood Glucose Levels

Table 3. Relationship of Dietary Compliance with Blood Glucose Levels

Compliance to Diet	Fasting Blod Glucose				Total		p-value*
	Normal		Not normal				
	n	%	n	%	n	%	
Yes	2	5.9	0	0	2	5.9	0.011
No	2	5.9	30	88.2	32	94.1	
Total	4	11.8	30	88.2	34	100	

Note: *Fisher Exact Test

Table 3 shows that out of 34 respondents, 82% of respondents did not comply with the diet given with abnormal blood glucose levels, while 5.9% of respondents had normal blood glucose levels.

Dietary Compliance with Length of Hospitalization

Table 4. Correlation of Dietary Compliance with Length of Hospitalization

| Compliance to Diet | Length of Hospitalization | | | | Total | | p-value* |
| | Short | | Long | | | | |
	n	%	n	%	n	%	
Yes	2	5.9	0	0	2	5.9	0.027
No	4	11.8	28	82.4	32	94.1	
Total	6	17.6	28	82.4	34	100	

Note: *Fisher Exact Test

Table 4 shows that 34 respondents with dietary compliance in the non-comply category and 82.4% tend to have prolonged hospital days.

DISCUSSION

Based on the characteristics, there were 21 females (61.8%) and 13 males (38.2%) with type 2 diabetes mellitus. Fathurohman et al. (2016) revealed that female respondents tend to be risky toward DM than male respondents (10). The female sex tends to be more at risk of developing diabetes mellitus related to a large body mass index and menstrual cycle syndrome and during menopause which results in easy accumulation of fat which results in inhibition of glucose transport into cells.(11). Other research shows that respondents with diabetes are mostly middle age adults with an average age of 53 years. Most of them were female as many as 60 people (69.8%) with most of them having suffered >5 years with an average length of suffering 5 years. From the results of the study, there was a relationship between age (p value 0.001), gender (p value 0.043) and length of time suffering from diabetes (p value 0.001). with the incidence of diabetic peripheral neuropathy. (12).

Besides, respondents who are obedient to the DM diet have short hospitalization too. It is associated with an increased risk of diabetes because it can elevate insulin resistance and pancreatic beta-cell dysfunction (13). Changes in body composition and hormones that occur during menopause can also affect the risk of diabetes (14). Respondents in this study are >40 years old, who experience diabetes mellitus over 40 years. This is supported by the results of research conducted by Kurniawaty et al. (2016) (15). There is a correlation between age and the incidence of type II diabetes mellitus. According to Smeltzer et al. (2010), age is one of the risk factors for type II DM disease, where this disease most often occurs in patients over 30 years of age (16). The incidence of this disease increases with age, where the number of productive cells decreases with age (17).

The nutritional status of most respondents is in the normal category, followed by overweight and obesity. Besides being caused by genetic factors, obesity can also cause diabetes. However, not all obese people can develop diabetes. Individuals who already have heredity diabetes plus an obese body condition are more likely to develop diabetes (18). Glucose intolerance is also associated with obesity. In the elderly, there has been a decrease in insulin secretion and insulin resistance (19).

The majority of respondents in this study have high educational background. In line with Worang et al. (2013), most type 2 DM patients had the last education, namely high school (57.1%) (20). The level of education can affect a person's acceptance of information. Patients with low education can make their level of knowledge less so that it will impact lifestyle, uncontrolled eating patterns, inappropriate food choices, and vice versa (21).

All respondents have blood pressure above normal which refers to hypertension. According to Trisnawati (2013) (11), people with hypertension are at greater risk of suffering from diabetes. Hypertension can appear as a complication of diabetes mellitus. Insulin can cause an increase in sodium retention in the kidneys, activity of the sympathetic nervous system, and potassium concentration in cells which causes an increase in vascular resistance so that it can affect an increase in blood pressure(22).

This study indicated many patients with type 2 diabetes mellitus who have not fully adhered to the given diet. This occurred because the respondent's condition is weak, resulting in reduced appetite. In terms of taste, it can also affect the respondent not spending the DM diet given by the hospital. This study is in line with Risnasari (2013) (11); 56% of DM patients with a level of patient compliance do not comply with the recommended diet. Dietary compliance is one of the keys to success in the management of DM. This is because meal planning is one of the four main pillars in managing DM.

Diet is determined starting from the patient's condition, DM Types, and the overall treatment program. Nutritional therapy is a significant component of success in the management of DM. Patient adherence to nutrition and meal planning principles is one of the obstacles in patients with diabetes mellitus. Many patients feel tormented concerning the amount and type of food recommended (16).

This study found that the number of respondents who had abnormal blood glucose levels was more than normal blood glucose. This is because the treated patients prefer to consume food from outside the hospital with the amount and type of food that is not following the DM diet. This is in line with the results of Dini et al. (2018) shows that 100% of respondents

with type 2 diabetes have blood glucose levels > 126 mg/dL and include uncontrolled sugar levels (23).

Based on the data obtained that most of the respondents had a length of hospitalization of 5 days. It was calculated from the time the patient entered the hospital until the patient went home. This length of hospitalization occurs due to the condition of the body that is still weak and the condition of the disease and its complications. Complications of diabetes mellitus can be in the form of acute diseases such as hypoglycemia and chronic diseases such as kidney failure, heart and blood vessel disease, visual disturbances, foot ulcers and gangrene, and impotence. According to Lubis et al. (2018) (24), 54% of type 2 DM patients have a length of stay 5 days. This is similar to the study conducted by Kasim et al. (2016) (7), which shows that 76.7% of patients with a length of stay >6 days are due to poor nutritional status or illness.

The Fisher Exact Test results showed a significant relationship between dietary compliance with blood glucose levels where p-value = 0.011 (p <0.05) (Table 3). The results of checking blood glucose levels were strongly influenced by dietary compliance of people with diabetes mellitus, where non-compliance had an impact, namely the risk of decreasing health status leading to complications(25). DM patient compliance in carrying out a diet is one of the essential matters in controlling DM (26). Patients must adjust their diet according to the principles of the DM diet suggested by health workers since they can keep their blood sugar under control by adjusting the patient's diet(27). Many DM patients experience failure in treatment, which might be caused by various factors, not complying with the proper diet. Complications from DM that can arise due to non-compliant patients carrying out the therapy program are dietary regulation, exercising, and drug usage (26). Other research shows that the level of education has an important role in diet compliance where patients are required to understand 3J "Types, Amounts and Schedules" so that the lower level of education causes lower diet compliance(28). Disobedience to diets causes sufferers to consume irregular foods which cause a pile of glucose and blood so that hyperglycemia occurs(28).

The Fisher Exact Test results showed a significant relationship between dietary compliance with the number of days of hospitalization, where the value of p=0.027 (p<0.05) (Table 4). People with diabetes can be at risk for complications such as retinopathy, neuropathy, and nephropathy(29). Complications of diabetes mellitus can affect life expectancy and patient motivation(30). Psychological conditions also impact the length of hospitalization so that patients are required to be obedient in undergoing treatment. The results of the study state that non-compliance causes the patient's health status to deteriorate so that the risk is higher for hospitalization and can even be at risk of death (31). Suppose the patient

CONCLUSION

Dietary compliance of patients with Type 2 Diabetes Mellitus with hypertension in the General Hospital of Pancaran Kasih, Manado, was not complied (94.1%) and complied (5.9%). Most of them had not normal fasting blood glucose (88.2%) and long hospitalization (82.4%). There was a significant correlation between dietary compliance toward blood glucose levels and length of hospitalization in patients with type 2 diabetes mellitus complications of hypertension in the Pancaran Kasih General Hospital, Manado. Patients with type 2 diabetes mellitus are suggested to obey the diet to control blood glucose levels and do not trigger other complications that weaken the body that affect the length of hospitalization. The patient's family needs to support and motivation to the patient in carrying out dietary recommendations. The Pancaran Kasih General Hospital, Manado, is suggested for special education and nutrition consultation for diabetes mellitus patients and their families related to the disease and DM management. It also includes educational media, such as leaflets, to install posters/billboards in the hospital environment. It is expected that it can be input and data for further researchers related to DM patients.

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Diet Compliance, Blood Glucose Levels, and Hospitalization Duration of Type II Diabetes Mellitus Patients with Hypertension Complications in the Pancaran Kasih General Hospital, Manado

Rivolta G. M. Walalangi[1]*, Nonce N. Legi[1], Olivia Ondang[1], Yohanis A. Tomastola[1], Vera T. Harikedua[1], Ellen Pesak[2], Irza N. Ranti[1], Ana B. Montol[1], Olga L. Paruntu[1], Daniel Robert[1], Jufri Sineke[1], Phembriah S. Kereh[1], Olfie Sahelangi[1]

[1]Department of Nutrition, Politeknik Kesehatan Kementerian Kesehatan Manado, Indonesia; [2]Department of Nursing, Politeknik Kesehatan Kementerian Kesehatan Manado, Indonesia

Abstract

BACKGROUND: Diabetes mellitus is an assembly of symptoms that arise in a person caused by increased blood sugar levels due to insulin deficiency, both absolute and relative. The highest prevalence in North Sulawesi is in Tomohon City (4.8%) then Manado City (3.2%).

OBJECTIVE: This study aimed to determine the correlation between dietary compliance with blood glucose levels and duration of hospitalization of type 2 diabetes mellitus (T2DM) patients with hypertension complications in the Pancaran Kasih General Hospital, Manado.

METHOD: This research was observational with a cross-sectional design. The population in this study were all patients with type 2 diabetes who were hospitalized and 34 people involved as a sample through purposive sampling technique.

RESULTS: The results showed that 88.2% of respondents with not normal blood glucose did not adhere to the diet. Fisher's test obtained p = 0.011 (p < 0.05), indicated a significant correlation between dietary compliance with blood glucose levels. About 82.4% of patients did not adhere to the diet with a long day of hospitalization and p = 0.027 (p < 0.05). It indicated a significant correlation between dietary compliance and length of stay.

CONCLUSION: This study concluded a correlation between dietary compliance with blood glucose levels and dietary compliance and length of stay for T2DM patients with hypertension complications.

Introduction

According to the World Health Organization (WHO), diabetes mellitus is a chronic disease that occurs when the pancreas does not produce enough insulin or when the body does not use the insulin it produces effectively [1]. Meanwhile, according to the American Diabetes Association (ADA), diabetes is a group of diseases characterized by high glucose levels due to insulin production, how insulin works, or both [2]. Diabetes mellitus according to the International Diabetes Federation (IDF), there are 415 million people worldwide who suffer from diabetes mellitus, of which one in 11 people already has diabetes and is expected to increase in 2040 to 642 million people where one in 10 people will have diabetes [3].

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Statistically, data were analyzed by the Fisher's exact test with α = 0.05 and using SPSS program.

Results

Characteristics respondent

Table 1 shows that of the 34 subjects, 61.8% were female and 38.2% were male. The number of respondents based on age was the highest in the range of 61–67 years old (29.4%) and the least in the age range of 75–81 years old (2.9%). For the nutritional status, 67.6% of respondents with normal nutritional status, 17.6% of respondents with overweight, and 14.7% of respondents with obese. Based on education level, most respondents

AQ3

have a high school education level of 32.4% and the least 2.9% of an associate degree (D-III) graduates. Distribution by occupation shows that the most significant percentage was household workers at 44.1%, and the lowest percentage was traders and fishermen at 2.9% each.

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	54–60	6	17.6
	61–67	10	29.4
	68–74	2	5.9
	75–81	1	2.9
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Nutritional status (BMI)	Normal	23	67.6
	Overweight	6	17.6
	Obesitas	5	14.7
	Total	34	100
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	Junior high school	10	29.4
	Senior high school	11	32.4
	Associate degree (D-III)	1	2.9
	Bachelor degree	4	11.8
	Total	34	100
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	Private	6	17.6
	Housewife	15	44.1
	Trader	1	2.9
	Farmer	2	5.9
	Pensionary	3	8.8
	Fisherman	1	2.9
	Teacher	3	8.8
	Total	34	100

Research variable

Table 2 shows that all respondents had SBP 140 mmHg and diastolic 90 mmHg, about 34 respondents or 100%, classified as hypertension. Most patients with T2DM did not comply with 32 respondents or 94.1%, while 2 respondents (5.9%) classified complied. FBG levels in T2DM patients mainly were not normal, about 30 respondents (88.2%), while normal values were 4 respondents (11.8%). Most patients with T2DM had long hospitalized days of 28 respondents (82.6%), while the category of short hospitalization was 17.6% (six respondents).

Table 2: Research variable

Variable	n	%
Blood pressure		
Hypertension	34	100
Not hypertension	0	0
Diet compliance		
Yes	2	5.9
No	32	94.1
Fasting blood glucose		
Normal	4	11.8
Not normal	30	88.2
Length of hospitalization		
Short	6	17.6
Long	28	82.4
Total	34	100

Dietary compliance with blood glucose levels

Table 3 shows that out of 34 respondents, 82% of respondents did not comply with the diet given

with abnormal blood glucose levels, while 5.9% of respondents had normal blood glucose levels.

Table 3: Relationship of dietary compliance with blood glucose levels

Compliance to diet	Fasting blood glucose				Total		p-value*
	Normal		Not normal				
	n	%	n	%	n	%	
Yes	2	5.9	0	0	2	5.9	0.011
No	2	5.9	30	88.2	32	94.1	
Total	4	11.8	30	88.2	34	100	

Note: *Fisher's exact test

Dietary compliance with length of hospitalization

Table 4 shows 34 respondents with dietary compliance in the non-comply category and 82.4% tend to have prolonged hospital days.

Table 4: Correlation of dietary compliance with length of hospitalization

Compliance to diet	Length of hospitalization				Total		p-value*
	Short		Long				
	n	%	n	%	n	%	
Yes	2	5.9	0	0	2	5.9	0.027
No	4	11.8	28	82.4	32	94.1	
Total	6	17.6	28	82.4	34	100	

*Fisher's exact test

Discussion

Based on the characteristics, there were 21 females (61.8%) and 13 males (38.2%) with T2DM. Fathurohman *et al*. (2016) revealed that female respondents tend to be risky toward DM than male respondents [10]. The female sex tends to be more at risk of developing diabetes mellitus related to a large BMI and menstrual cycle syndrome and during menopause which results in easy accumulation of fat which results in inhibition of glucose transport into cells [11]. Other research shows that respondents with diabetes are mostly middle age adults with an average age of 53 years. Most of them were female as many as 60 people (69.8%) with most of them having suffered >5 years with an average length of suffering 5 years. From the results of the study, there was a relationship between age (p = 0.001), gender (p = 0.043), and length of time suffering from diabetes (p = 0.001) with the incidence of diabetic peripheral neuropathy [12].

Besides, respondents who are obedient to the DM diet have short hospitalization too. It is associated with an increased risk of diabetes because it can elevate insulin resistance and pancreatic beta-cell dysfunction [13]. Changes in body composition and hormones that occur during menopause can also affect the risk of diabetes [14]. Respondents in this study are >40 years old, who experience diabetes mellitus over 40 years. This is supported by the results of research conducted by Kurniawaty *et al*. (2016) [15].

There is a correlation between age and the incidence of T2DM. According to Smeltzer *et al*. (2010), age is one of the risk factors for T2DM disease, where this disease most often occurs in patients over 30 years of age [16]. The incidence of this disease increases with age, where the number of productive cells decreases with age [17].

The nutritional status of most respondents is in the normal category followed by overweight and obesity. Besides being caused by genetic factors, obesity can also cause diabetes. However, not all obese people can develop diabetes. Individuals who already have heredity diabetes plus an obese body condition are more likely to develop diabetes [18]. Glucose intolerance is also associated with obesity. In the elderly, there has been a decrease in insulin secretion and insulin resistance [19].

The majority of respondents in this study have high educational background. In line with Worang *et al*. (2013), most T2DM patients had the last education, namely, high school (57.1%) [20]. The level of education can affect a person's acceptance of information. Patients with low education can make their level of knowledge less so that it will impact lifestyle, uncontrolled eating patterns, inappropriate food choices, and vice versa [21].

All respondents have blood pressure above normal which refers to hypertension. According to Trisnawati (2013) [11], people with hypertension are at greater risk of suffering from diabetes. Hypertension can appear as a complication of diabetes mellitus. Insulin can cause an increase in sodium retention in the kidneys, activity of the sympathetic nervous system, and potassium concentration in cells which causes an increase in vascular resistance so that it can affect an increase in blood pressure [22].

This study indicated many patients with T2DM who have not fully adhered to the given diet. This occurred because the respondent's condition is weak, resulting in reduced appetite. In terms of taste, it can also affect the respondent not spending the DM diet given by the hospital. This study is in line with Risnasari (2013) [11]; 56% of DM patients with a level of patient compliance do not comply with the recommended diet. Dietary compliance is one of the keys to success in the management of DM. This is because meal planning is one of the four main pillars in managing DM.

Diet is determined starting from the patient's condition, DM types, and the overall treatment program. Nutritional therapy is a significant component of success in the management of DM. Patient adherence to nutrition and meal planning principles is one of the obstacles in patients with diabetes mellitus. Many patients feel tormented concerning the amount and type of food recommended [16].

This study found that the number of respondents who had abnormal blood glucose levels

was more than normal blood glucose. This is because the treated patients prefer to consume food from outside the hospital with the amount and type of food that is not following the DM diet. This is in line with the results of Dini *et al*. (2018) shows that 100% of respondents with type 2 diabetes have blood glucose levels > 126 mg/dL and include uncontrolled sugar levels [23].

AQ3   Based on the data obtained that most of the respondents had a length of hospitalization of 5 days. It was calculated from the time the patient entered the hospital until the patient went home. This length of hospitalization occurs due to the condition of the body that is still weak and the condition of the disease and its complications. Complications of diabetes mellitus can be in the form of acute diseases such as hypoglycemia and chronic diseases such as kidney failure, heart and blood vessel disease, visual disturbances, foot ulcers and gangrene, and impotence. According to Lubis *et al*. (2018) [24], 54% of T2DM patients have a length of stay 5 days. This is similar to the study conducted by Kasim *et al*. (2016) [7], which shows that 76.7% of patients with a length of stay >6 days are due to poor nutritional status or illness.

     The Fisher's exact test results showed a significant relationship between dietary compliance with blood glucose levels where p = 0.011 (p < 0.05) (Table 3). The results of checking blood glucose levels were strongly influenced by dietary compliance of people with diabetes mellitus, where non-compliance had an impact, namely, the risk of decreasing health status leading to complications [25]. DM patient compliance in carrying out a diet is one of the essential matters in controlling DM [26]. Patients must adjust their diet according to the principles of the DM diet suggested by health workers since they can keep their blood sugar under control by adjusting the patient's diet [27]. Many DM patients experience failure in treatment, which might be caused by various factors, not complying with the proper diet. Complications from DM that can arise due to non-compliant patients carrying out the therapy program are dietary regulation, exercising, and drug usage [26]. Other research shows that the level of education has an important role in diet compliance where patients are required to understand 3J "Types, Amounts and Schedules" so that the lower level of education causes lower diet compliance [28]. Disobedience to diets causes sufferers to consume irregular foods which cause a pile of glucose and blood so that hyperglycemia occurs [28].

     The Fisher's exact test results showed a significant relationship between dietary compliance with the number of days of hospitalization, p = 0.027 (p < 0.05) (Table 4). People with diabetes can be at risk for complications such as retinopathy, neuropathy, and nephropathy [29]. Complications of diabetes mellitus can affect life expectancy and patient motivation [30]. Psychological conditions also impact the length of hospitalization so that patients are required to

be obedient in undergoing treatment. The results of the study state that non-compliance causes the patient's health status to deteriorate so that the risk is higher for hospitalization and can even be at risk of death [31]. Suppose the patient adheres to the diet given. In that case, it can speed up the healing process and shorten the day of hospitalization. Although the results of other studies show that there is no significant relationship between dietary compliance and length of stay for T2DM patients treated in the Inpatient Room at Pertamina Hospital Balikpapan in 2012 with p = 0.568 > an alpha value of 0.05 and an odds value. Ratio (OR) of 1688 [32]. AQ3 The success of dietary management requires that the health professionals should have an orientation about the cultural beliefs, thoughts, family, and communal networks of the patients. As diabetes is a disease which continues for the lifetime, proper therapy methods with special emphasis on diet should be given by the healthcare providers in a way to control the disease, reduce the symptoms, and prevent the appearance of the complications [33].

Conclusion

     Dietary compliance of patients with T2DM with hypertension in the General Hospital of Pancaran Kasih, Manado, was not complied (94.1%) and complied (5.9%). Most of them had not normal FBG (88.2%) and long hospitalization (82.4%). There was a significant correlation between dietary compliance toward blood glucose levels and length of hospitalization in patients with T2DM complications of hypertension in the Pancaran Kasih General Hospital, Manado. Patients with T2DM are suggested to obey the diet to control blood glucose levels and do not trigger other complications that weaken the body that affects the length of hospitalization. The patient's family needs to support and motivation to the patient in carrying out dietary recommendations. The Pancaran Kasih General Hospital, Manado, is suggested for special education and nutrition consultation for diabetes mellitus patients and their families related to the disease and DM management. It also includes educational media, such as leaflets, to install posters/billboards in the hospital environment. It is expected that it can be input and data for further researchers related to DM patients.

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Author Queries???
AQ1:   Kindly provide running title
AQ2:   Kindly provide history details
AQ3:   Kindly review the sentence as it seems to be incomplete.
AQ4:   Kindly provide in English language
AQ5:   Kindly provide author initial

OJS 6970

Diet Compliance, Blood Glucose Levels, and Hospitalization Duration of Type II Diabetes Mellitus Patients with Hypertension Complications in the Pancaran Kasih General Hospital, Manado

AQ	Comment	Response
1	Kindly provide running title	Diet Compliance, Blood Glucose Levels, and Hospitalization Duration of Type II Diabetes Mellitus Patients with Hypertension Complications
2	Kindly provide history details	Received: 1 August 2021 Revised: 10 September 2021 Accepted: 30 September 2021
3	Kindly review the sentence as it seems to be incomplete	Before: For the nutritional status, 67.6% of respondents with normal nutritional status, 17.6% of respondents with overweight, and 14.7% of respondents with obese. After: Table 1 shows that the nutritional status of respondent that is 67.6% (normal), 17.6% (overweight), and 14.7% (obese) Before: Based on the data obtained that most of the respondents had a length of hospitalization of 5 days After: Based on the results of this study, it shows that most of the respondents had a length of hospitalization of 5 days. Before: Although the results of other studies show that there is no significant relationship between dietary compliance and length of stay for T2DM patients treated in the Inpatient Room at Pertamina Hospital Balikpapan in 2012 with $p = 0.568 >$ an alpha value of 0.05 and an odds value. Ratio (OR) of 1688 [32]. After: The results of this study are not in line with other studies, namely there is no significant relationship between dietary compliance and length of stay for T2DM patients treated in the Inpatient Room at Pertamina Hospital Balikpapan in 2012 with $p = 0.568$ [32].

4	Kindly provide in English language	7. Kasim DA, Harikedua VT, Paruntu OL. Food Intake, Nutritional Status and Length of Hospitalization for Internal Medicine Patients at Manado Adventist Hospital. Jurnal GIZIDO. 2016 Nov 1;8(2):22–34
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