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The relationship between nutritional knowledge and dietary adherence of people with diabetes mellitus

Hubungan pengetahuan gizi dan kepatuhan diet penderita diabetes melitus

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Abstract

Background: Knowledge of nutrition and adherence to diet affects the healing process and health status of individuals with diabetes mellitus.
Objectives: To determine the level of nutritional knowledge and dietary compliance of patients with diabetes mellitus (DM).
Methods: This study used a quantitative approach with a descriptive study design and was conducted at a community health center in the Gorontalo City area from March to August 2024. Purposive sampling of 141 respondents was conducted. Diet adherence was measured using the Perceived Dietary Adherence Questionnaire (PDAQ), whereas knowledge was assessed using the Diabetes Knowledge Questionnaire (DKQ), which was analyzed using descriptive frequency.
Results: The results of the knowledge measurement study show that 36,2% of the participants had low knowledge, while 78,7% had a low level of compliance. The PDAQ analysis showed the highest score regarding compliance in fish consumption (score=6,5±1,1), while the lowest score pertained to compliance in the selection and use of healthy oils (olive oil and organic oil) (0,3±1,2).
Conclusion: A low level of knowledge can affect the dietary compliance of patients with DM.

Keywords :
Diabetes mellitus, Dietary adherence, Knowledge

Abstrak

Latar Belakang: Pengetahuan gizi dan kepatuhan diet penderita diabetes melitus akan memengaruhi proses penyembuhan dan status kesehatan.
Tujuan: Untuk mengetahui tingkat pengetahuan gizi dan kepatuhan diet penderita diabetes melitus.
Metode: Metode penelitian menggunakan penelitian kuantitatif dengan desain study deskriptif. Penelitian dilakukan di sejumlah Puskesmas di Kota Gorontalo. Pengambilan sampel secara purposive sampling sebanyak 141 responden. Pengukuran kepatuhan diet menggunakan perceived dietary adherence questionnaire (PDAQ) sementara pengetahuan diukur menggunakan Diabetes Knowledge Questionnaire (DKQ).
Hasil: Hasil studi pengukuran pengetahuan menunjukkan bahwa 36,2% memiliki pengetahuan yang rendah, sementara 78,7% memiliki tingkat kepatuhan yang rendah. Analisis PDAQ menunjukkan skor tertinggi terkait kepatuhan dalam konsumsi ikan (skor = 6,5±1,1), sedangkan skor terendah terkait kepatuhan dalam pemilihan dan penggunaan minyak sehat (minyak zaitun, minyak organik) (0,3±1,2).
Kesimpulan: Rendahnya tingkat pengetahuan dapat memengaruhi kepatuhan diet pasien diabetes melitus.

Kata Kunci:
Diabetes melitus, Kepatuhan diet, Pengetahuan

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Introduction

Diabetes mellitus (DM) is a chronic metabolic disorder characterized by increased blood glucose levels due to impaired secretion, action, or both of the hormones insulin. The ineffectiveness of insulin causes hyperglycemia, which, if not controlled, can lead to various chronic complications, such as cardiovascular disease, neuropathy, nephropathy, and retinopathy (Febrinasari et al., 2020). According to data from the International Diabetes Federation, there are an estimated 425 million cases of diabetes worldwide, and this number continues to increase every year (Atlas, 2019). Of the various types of DM, Type 2 Diabetes Mellitus (T2DM) is the most common, accounting for approximately 90% of all cases (Al Rahmad, 2021; Holman et al., 2015).

DM has become a serious public health problem in Indonesia. Based on the results of blood glucose level checks in the population aged ≥15 years, the national prevalence of DM in 2023 has reached 17.2% for the age group 15-44 years. The prevalence of T2DM in Gorontalo Province was 46.1%, which is close to the national figure of 50.2% (MOH, 2023). This emphasizes the importance of comprehensive interventions in DM management to reduce morbidity and mortality.

Effective DM management aims to maintain blood glucose levels within normal limits and to prevent complications. The Indonesian Medical Association (Perkeni) established four pillars for DM management: continuing education, medical nutrition therapy, physical activity, and pharmacological therapy (Soelistijo et al., 2021). An important component of such management is adherence to a healthy and planned diet. However, the level of dietary compliance of patients with diabetes is often low, one of which is caused by limited nutritional knowledge (Han et al., 2020).

Nutritional knowledge plays an important role in shaping healthy eating behaviors in patients with diabetes. Individuals with good nutritional knowledge tend to better understand the importance of choosing foods according to their needs, avoiding foods high in sugar and fat, and implementing a balanced diet (Labatjo et al., 2023). Therefore, improved nutritional knowledge is expected to encourage better dietary compliance and improve blood glucose levels.

Therefore, this study aimed to determine the relationship between nutritional knowledge and dietary compliance in patients with diabetes mellitus. The results of this study are expected to form the basis for developing more effective nutrition education programs to support optimal diabetes management.

Method

This is a quantitative research with a descriptive research design. This study was conducted in Gorontalo, Brazil. The location of the study was determined based on the large number of diabetic patients according to the Health Center (five Puskesmas), namely, the West City Health Center, South City, East City, North City, and Central City. The research was conducted for one year from January 2024 to August 2024. The study population included patients with diabetes domiciled in Gorontalo City. The number of samples based on the sample distribution formula was 141, and stratified random sampling was conducted at five Puskemas locations where the research was conducted.

Data were collected through questionnaires, interviews, and direct measurements. The research variables included knowledge and dietary adherence. Dietary adherence was measured using the Perceived Dietary Adherence Questionnaire (PDAQ), which was categorized as low (score 0–31) or high (score 32–63) (Mardhatillah et al., 2022). The scale validity index of PDAQ was obtained as 0.93, the item validity index ranged between 0.80 and 1.00, and the alpha coefficient was 0.723 (Khusna et al., 2023). Knowledge was measured using the Knowledge, Attitude, and Practice (KAPKAP) questionnaire and categorized as poor (total score <60%) and good (score ≥ 60) (Hyder et al., 2021).

Data processing and analysis were performed using Microsoft Excel, an amino acid survey, and the SPSS software. This study was approved by the Health Research Ethics Commission (KEPK) of the Gorontalo Ministry of Health (Polytechnic number: DP.04.03/KEPK/127/2024).

Result

Table 1 presents an overview of the respondents' characteristics. The characteristics of the residence of the research respondents based on the working area of the Health Center in Gorontalo City showed that most of them were in the West City Health Center (35,5% and the East City Health Center (29,8%.

Table 1. Characteristics of research respondents

Variable	f	%
Domicile		
Kota Timur	42	29,8
Kota Utara	17	12,1
Kota Selatan	17	12,1
Kota Tengah	15	10,6
Kota Barat	50	35,5
Age (years)		
31-40 years old	10	7,1
41-50 years old	34	24,1
51-60 years old	49	34,8
> 61 years old	48	24,0
Gender		
Marry	98	69,5
Unmarried	4	2,8
Other	39	27,7
Etnicity		
Gorontalo	136	96,5
Aceh	1	0,7
Jawa	3	2,1
Padang	1	0,7
Smoking habits		
Yes	11	7,8
Not	130	92,2
Gender		
Men	35	24,8
Woman	106	75,2
Education		
Elementary school	48	34,1
Junior high school	30	21,3
Senior high school	44	31,2
University level	19	13,5
Occupation		
Civil servant	10	7,1
Private sector	5	3,5
Entrepreneur	9	6,4
Laborer	28	19,9
housewives	89	63,1
Income per month		
< RMW	110	78,0
≥ RMW	31	22,0
Living with DM (years)		
< 10	114	80,9
≥ 10	27	19,1
Family member with DM		
Yes	48	34,1
None	93	65,9
Types of treatment		
Farmakologis	134	95,0
Herbal	7	5,0
Knowledge		
Low	51	36,2
Good	90	63,8
Dietary adherence		
Low	111	78,7
High	40	21,3

Based on the age category, the incidence of diabetes mellitus increased with increasing age, with the largest number in the age category of 51-60 years old, namely 34,8%. Based on marital status, most of the respondents were married, namely 69,5% while other marital statuses (separated, divorced) were 27,7%. Based on the tribal characteristics, most of the Gorontalo tribe was 96,5%. There were 7,8% of the research respondents who had a smoking habit. Based on gender characteristics, most of the research respondents were women, namely 75,2%. Based on their level of education, most respondents were high school equivalent, namely 31,2%. The employment status was mostly housewives, 63,1%. Meanwhile, the monthly income characteristics show as much as 78,0% revenue below the UMR of Gorontalo Province. The incidence of prediabetes tends to increase with age (CDC 2020). The highest prevalence of DM is found in adults ≥ 35 years (Ministry of Health, 2018).

The diet adherence overview showedshowed that 78,7% of the patients with diabetes mellitus had a relatively low level of dietary adherence. Dietary adherence plays an important role in stabilizing the blood glucose levels in patients with DM. Dietary adherence is an important component of routine development that helps patients with DM to follow a dietary schedule. Patients who did not comply with the diet therapy had uncontrolled sugar levels. Knowledge related to diabetes plays a significant role in improving diet. The overall level of dietary adherence in people with diabetes mellitus is still relatively low,

which is also in line with a previous study that found that 50,9% of people with diabetes mellitus had a low level of adherence (Mardhatillah et al., 2022).

Table 2. Dietary adherence of DM based on *the Perceived Dietary Adherence Questionnaire* (PDAQ)

No	Variable	Mean ± SD
1	Compliance with implementing a healthy diet for patients with diabetes mellitus	2,5 ± 2,1
2	Compliance with consuming vegetables and fruits according to balanced nutrition recommendations	2,8 ± 2,1
3	Compliance with consuming low glycemic index carbohydrates	0,7 ± 1,6
4	Compliance with limiting food and sweet beverages	4,3 ± 2,2
5	Compliance with eating high-fiber	0,9 ± 1,6
6	Compliance with maintaining food consumption / carbohydrate intake intervals	3,8 ± 3,0
7	Compliance with consuming fish and other foods high in omega 3	6,5 ± 1,1
8	Compliance with using healthy oils (olive oil, organic oil)	0,3 ± 1,2
9	Adherence to restricting fat intake	3,5 ± 2,4

Discussion

An overview of the history of patients with DM among the study respondents is shown in Table 1. Based on the length of time suffering from diabetes mellitus, most of the respondents were aged < 10 years, which is 80,9%, although there are 19,1% of who had experienced diabetes for more than 10 years. The number of new patients with diabetes mellitus is still relatively low for a long time, which is similar to previous research in Yigyakarta which found 18,8% of people with diabetes mellitus aged > 10 years (Khusna et al., 2023). A history of family members with diabetes mellitus showed that 34,1% of the study respondents had family members who also had diabetes mellitus. Most treatments performed by patients with diabetes mellitus are pharmacological therapies, such as the use of drugs. Therapeutic therapy for patients with diabetes mellitus is generally in the form of pharmacological and non-pharmacological therapies (Soelistijo et al., 2021).

An overview of the research respondents' level of knowledge showed that 36,2% were classified as lacking knowledge. Low knowledge leads to poor outcomes, comorbid complications, and poor quality of life in diabetic patients (Bano et al., 2017). Sufficient knowledge, as an essential component in the treatment of diabetes, can trigger patients to make dietary improvements, dietary adherence, and prevent health complications (Raaijmakers et al., 2013). Lack of knowledge was observed in 20,8% of patients and 91,7% of non-compliant patients (Kartini et al., 2018). Only 28,5% of patients with diabetes have breakfast habits (Mphasha et al., 2021).

An overview of study respondents' dietary adherence is presented in Table 2. Measurement of dietary adherence of patients with diabetes mellitus using *the perceived dietary adherence questionnaire* (PDAQ) instrument. The PDAQ explores dietary patterns among diabetic patients using these questions. The mean score for each item on the PDAQ provides information on dietary intake among patients with diabetes. The mean score of each item ranged from 0,3±1,2 6,5±1,1. Although most of the mean scores were characterized by values above four, there were items that had lower scores. The results of the PDAQ showed that the compliance score for implementing a healthy diet for patients with diabetes mellitus was 2,5±2,1, the highest dietary compliance score at point 7 regarding compliance with consuming fish and other foods high in omega 3 with a score of 6,5±1,1. This could be due to the high consumption of fish in the Gorontalo community, because the availability of fish food is quite large. The lowest PDAQ score at point 3 regarding compliance with consuming low glycemic index carbohydrates with a score of 0,7±1,6, whichwhich shows that compliance with the consumption of low glycemic index carbohydrates is still low due to the habit of consuming staple foods in the form of white rice by patients with diabetes mellitus.

Dietary adherence of patients with DM related to meal management and planning is relatively low. Nutritional therapy is the primary component supporting the success of DM management (Yuliastuti et al., 2019). Appropriate dietary intake is important to maintain blood glucose stability (Fang et al., 2020). Several studies have shown that dietary adherence is low among individuals with diabetes. Patients with DM who are hospitalized, do not comply with the diet given, have less knowledge and low fiber consumption (fiber intake 2,8 ± 1,3 g) (Nalole et al., 2021). The frequency of rarely consuming vegetables was 59,8%, and that of rarely consuming fruit was 85,9% (Lasimpala et al., 2021).

Conclusion

White rice is a staple food often consumed by patients with diabetes mellitus. However, they still show a lack of adherence to the consumption of low glycemic index carbohydrates, and are still not very compliant with dietary planning and management.

Conflict of Interest Declaration

in the preparation of this article has no conflicts of interest from either the author or the Faculty of Health, University of Muhammadiyah Gresik. In this research, the publication of the article has been agreed upon according to the input of each author.

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