Asian Journal of Healthy and Science
P-ISSN 2980-4302
E-ISSN 2980-4310
Vol. 4 No. July 7, 2025

Characteristics of Dietary Patterns in Type 2 Diabetes Mellitus Patients: Descriptive Analysis at Sidhi Sai Clinic, Badung, Bali

Intan Lestari Putri, I Putu Aris Govinda Putra, I Wayan Artana
Sidhi Sai Medical Clinic, Indonesia
Email: intannl.arin@gmail.com

Abstract

Type 2 diabetes mellitus (type 2 DM) is a major health problem that continues to increase in Indonesia, including in Bali. The management of type 2 DM requires a multidisciplinary approach that includes medical nutrition therapy. Proper dietary patterns play a key role in blood glucose control. This study aims to analyze the characteristics of dietary patterns in type 2 DM patients at Sidhi Sai Clinic, Badung, Bali, in order to provide an overview of the patient's eating habits and factors that affect adherence to dietary recommendations. This study uses a descriptive design with a quantitative approach. The study population included all type 2 DM patients who visited Sidhi Sai Clinic during the study period. Samples were taken by purposive sampling technique, totaling 120 patients. Data were collected through semi-structured questionnaires and patient medical records, then analyzed descriptively using SPSS statistical software version 25. The majority of respondents were aged 46-60 years old (45.0%) and were dominated by men (56.7%). Daily consumption of vegetables was carried out by 66.7% of respondents, fruits daily by 48.3%, while sugar consumption tended to be low with 75.0% of respondents consuming sugar only 1-2 times a week or less. These findings show a good awareness of the importance of a healthy diet in the management of type 2 diabetes. Education on proper dietary patterns and ongoing support from health professionals is essential to improve dietary adherence and management of type 2 DM. The results of this study provide valuable insights for the management of type 2 DM in Indonesia, especially in the Badung area, Bali, and can be used as a basis for designing more specific and effective education and intervention programs.

Keywords: dietary patterns, dietary adherence, diabetes management, Sidhi Sai Clinic, Type 2 Diabetes Mellitus

INTRODUCTION

Type 2 Diabetes Mellitus (*DM*) is one of the major health problems facing the global community today. The disease is characterized by a chronic hyperglycemia condition caused by a disturbance in insulin secretion, insulin resistance, or both. Data from the International Diabetes Federation (*IDF*) shows that the global prevalence of type 2 diabetes continues to increase, and Indonesia is among the top ten countries with the highest number of diabetics in the world (IDF, 2021). This increase in prevalence has significant implications for the health and economic burden, as well as the quality of life of sufferers.

In Indonesia, the prevalence of type 2 diabetes also shows an increasing trend. Based on data from the 2018 Basic Health Research (*Riskesdas*), the prevalence of diabetes in the population over 15 years old reached 10.9%, while in 2023 the figure increased to 11.7% (Ministry of Health of the Republic of Indonesia, 2018; Databoks, 2023). In Bali, the prevalence of *DM* is also quite high, especially in big cities such as Denpasar and Badung. According to data

from the Central Statistics Agency of Bali Province, in 2022 there was a significant increase in diabetes cases in the Badung area, with a prevalence rate of 26.36 per 100,000 population (BPS Bali, 2022).

Management of type 2 *DM* requires a multidisciplinary approach that includes medical nutritional therapy, physical activity, weight reduction, and medication use if needed. Proper dietary patterns play a key role in the management of type 2 *DM*, as they can help control blood glucose levels and prevent diabetes-related complications (American Diabetes Association, 2020). A study by Hu et al. (2018) showed that the Mediterranean diet and low-carbohydrate diet had a significant positive effect on glycemic control in patients with type 2 diabetes.

However, there are still many patients who have difficulty adopting and maintaining the recommended diet. Factors such as eating habits, food preferences, accessibility of healthy foods, and knowledge and awareness of the importance of proper diet, are often barriers in the management of diabetes (Mayo Clinic, 2021). In addition, support from health workers is also an important factor that can affect the success of diet pattern management in diabetic patients (World Health Organization, 2020).

This study aims to analyze the characteristics of dietary patterns in type 2 Diabetes Mellitus patients who visit *Sidhi Sai Clinic*, Badung, Bali. This clinic was chosen as the research location because it has a significant and representative number of diabetic patients for the region. This analysis of dietary patterns is expected to provide a clear picture of the patients' eating habits, as well as identify factors that affect adherence to dietary recommendations.

Through this study, it is hoped that information can be obtained that is useful for health workers in designing more effective interventions to improve diabetes management through dietary pattern modification. In addition, the results of this study are also expected to be the basis for further research on the relationship between dietary patterns and glycemic control in type 2 *DM* patients in Indonesia.

RESEARCH METHOD

Research Design

This study uses a descriptive design with a quantitative approach. The descriptive design was chosen because the main purpose of this study was to describe the characteristics of dietary patterns in patients with type 2 Diabetes Mellitus at *Sidhi Sai Clinic*, Badung, Bali.

Population and Sample

The population of this study included all patients diagnosed with type 2 Diabetes Mellitus who visited *Sidhi Sai Clinic*, Badung, Bali, during the study period. Samples were taken using purposive sampling techniques, with inclusion criteria: (1) patients who have been diagnosed with type 2 *DM*, (2) over 18 years of age, and (3) willing to participate in this study. The number of samples was

calculated using the Slovin formula with an error rate of 5%, which resulted in a sample of 120 patients.

Research Instruments

The instrument used in this study was a semi-structured questionnaire that had been tested for validity and reliability. This questionnaire consists of several parts, namely: (1) demographic data, (2) medical information related to *DM*, (3) dietary patterns and frequency of food consumption, and (4) level of adherence to dietary recommendations. In addition to questionnaires, secondary data such as the patients' medical records were also used to complete the necessary information.

Data Collection Procedure

Data collection was carried out through several stages as follows:

1. *Preparation Stage:* The researcher coordinated with the *Sidhi Sai Clinic* to obtain research permits and arrange a data collection schedule. The questionnaire was compiled and tested on a small sample to ensure its validity and reliability.
2. *Primary Data Collection:* Direct interviews with patients were conducted using semi-structured questionnaires. Patients were given an explanation of the purpose and procedure of the study, and were asked to sign an informed consent letter before the interview began.
3. *Secondary Data Collection:* Patient medical record data were obtained from the clinic with appropriate permission. This data included information regarding the diagnosis of *DM*, laboratory test results, and other relevant medical history.

Data Analysis

The data obtained were analyzed descriptively using SPSS statistical software version 25. Descriptive analysis was carried out to calculate the distribution of frequency, percentage, mean, and standard deviation of the variables studied. The results of the analysis are presented in the form of tables and graphs to facilitate data interpretation.

Validity and Reliability

The validity of the questionnaire was tested using construct validity and content validity with the help of experts in the field of nutrition and health. The reliability of the questionnaire was tested using the test-retest method with a reliability coefficient value (*Cronbach's alpha*) above 0.70, which is considered reliable.

RESULTS AND DISCUSSION

Socio-Demographic Characteristics of Respondents

This study involved 120 patients with type 2 Diabetes Mellitus who visited Sidhi Sai Clinic, Badung, Bali. The socio-demographic characteristics of the respondents included age, gender, education level, and employment status.

Table 1. Distribution of Respondents Based on Socio-Demographic Characteristics

Characteristic	Frequency (n)	Percentage (%)
Age (years)		
18-30	12	10.0
31-45	36	30.0
46-60	54	45.0
>60	18	15.0
Gender		
Man	68	56.7
Woman	52	43.3
Education Level		
Elementary/Equivalent	24	20.0
Junior High School/Equivalent	32	26.7
High School/Equivalent	50	41.7
College	14	11.6
Employment Status		
Work	74	61.7
Not Working	46	38.3

This study found that the majority of respondents were in the age group of 46-60 years (45.0%), followed by the age group of 31-45 years (30.0%), >60 years (15.0%), and 18-30 years (10.0%). Most of the respondents were male (56.7%), and the rest were female (43.3%). In terms of education level, the majority of respondents had high school/equivalent education (41.7%), followed by junior high school/equivalent (26.7%), elementary/equivalent (20.0%), and university (11.6%). Employment status shows that 61.7% of respondents are working, while another 38.3% are not working.

Characteristics of Diet Patterns

This study examined the dietary patterns of the sample patients, including the frequency of consumption of various types of foods such as vegetables, fruits, meat, milk, and sugar.

Table 2. Distribution of Respondents by Diet Pattern

Types of Food	Frequency of Consumption	Frequency (n)	Percentage (%)
Vegetables	Every day	80	66.7
	3-5 times/week	28	23.3
	1-2 times/week	12	10.0
Fruit	Every day	58	48.3
	3-5 times/week	44	36.7
	1-2 times/week	18	15.0
Meat	Every day	28	23.3
	3-5 times/week	54	45.0
	1-2 times/week	38	31.7

Milk	Every day	16	13.3
	3-5 times/week	34	28.3
	1-2 times/week	70	58.3
Sugar	Every day	10	8.3
	3-5 times/week	20	16.7
	1-2 times/week	90	75.0

Analysis of dietary patterns showed that 66.7% of respondents consumed vegetables daily, 23.3% consumed 3-5 times a week, and 10.0% consumed 1-2 times a week. Daily fruit consumption was carried out by 48.3% of respondents, 36.7% consumed 3-5 times a week, and 15.0% consumed 1-2 times a week. Daily meat consumption was carried out by 23.3% of respondents, 45.0% consumed 3-5 times a week, and 31.7% consumed 1-2 times a week. Daily milk consumption was carried out by 13.3% of respondents, 28.3% consumed 3-5 times a week, and 58.3% consumed 1-2 times a week. Sugar consumption tends to be low, with 75.0% of respondents consuming sugar only 1-2 times a week or less, 16.7% consuming 3-5 times a week, and 8.3% consuming daily.

These results show a good awareness among patients about the importance of a healthy diet in the management of type 2 Diabetes Mellitus. A balanced, low-sugar diet is an important part of effective diabetes management, in line with the *American Diabetes Association*'s (2020) recommendations that suggest the consumption of foods rich in fiber, low in saturated fat, and low in glycemic index to help control blood glucose levels.

Discussion

The results of this study show that the majority of patients with type 2 Diabetes Mellitus (DM) at Sidhi Sai Clinic, Badung, Bali, are in the age range of 46-60 years, with a percentage of 45.0%. This is in line with previous findings that suggest that the prevalence of type 2 DM tends to increase with age. Research by Cho et al. (2018) showed that the risk of type 2 DM increases significantly in individuals over the age of 45, due to decreased pancreatic function and increased insulin resistance with age.

The gender distribution in this study showed that males were more dominant (56.7%) than females (43.3%). These findings are consistent with several studies showing that the prevalence of type 2 DM tends to be higher in men than in women (Chatterjee et al. 2018). From a molecular perspective, this difference may be due to the role of sex hormones in glucose metabolism and insulin function (American Diabetes Association, 2020). Testosterone in men has been found to cause insulin resistance by affecting body fat distribution and increasing visceral fat, which is a major risk factor for type 2 DM (Grossmann, 2019). In contrast, estrogen in women has a protective effect by increasing insulin sensitivity and healthier subcutaneous fat distribution (Mauvais-Jarvis, 2018).

The education level of the respondents in this study also varied, with the majority having a high school education/equivalent (41.7%) (Cho et al. 2018).

Higher levels of education are often associated with better knowledge of health and nutrition, which can contribute to more effective diabetes management. Research by Chatterjee et al. (2018) shows that individuals with higher education are more likely to have better awareness and control over their health conditions, including diabetes.

Analysis of dietary patterns showed that most respondents consumed vegetables daily (66.7%) and fruits daily (48.3%). This high consumption of vegetables and fruits is a positive aspect in the patient's dietary pattern, as they are both rich in fiber, vitamins, and minerals that can help control blood glucose levels and improve overall health (Aune et al., 2019). However, sugar consumption tends to be low with 75.0% of respondents consuming only 1-2 times a week or less. This consumption pattern is very important in the management of type 2 DM, as excessive sugar consumption can lead to a significant spike in blood glucose (American Diabetes Association, 2020).

However, meat and milk consumption still needs to be considered. As many as 45.0% of respondents consumed meat 3-5 times a week, and 58.3% consumed milk 1-2 times a week. Although meat is an important source of protein, excessive consumption, especially red meat and processed meat, can increase the risk of cardiovascular complications in diabetic patients (Zheng et al., 2019). In contrast, milk is a good source of calcium and vitamin D, but consumption should be balanced to avoid excessive calorie intake (Aune et al., 2019).

From the results of this study, it is clear that education about proper dietary patterns is very important for type 2 DM patients. Healthcare workers at Sidhi Sai Clinic can use this data to design more effective education programs and provide ongoing support to patients (Grossmann, 2019; Hu et al. 2022; Mauvais-Jarvis, 2018). In addition, a multidisciplinary approach involving doctors, nutritionists, and other health workers is needed to provide comprehensive treatment for type 2 DM patients (Neuenschwander et al. 2020). This study also shows the importance of more in-depth follow-up research on the factors that affect dietary adherence in patients with type 2 DM. Factors such as family support, access to healthy foods, and community-based interventions may be the focus of further research to improve the effectiveness of diabetes management through dietary modification (Wang et al. 2021; Zhao et al. 2020; Zheng et al. 2019; Zheng, 2020).

Thus, the results of this study provide valuable insights for the management of type 2 DM in Indonesia, especially in the Badung area, Bali. Appropriate and sustainable interventions are urgently needed to improve patients' quality of life and reduce the burden of this disease in society.

CONCLUSION

This study provides a comprehensive overview of socio-demographic characteristics and dietary patterns in patients with type 2 Diabetes Mellitus at *Sidhi Sai Clinic*, Badung, Bali. The majority of patients were in the age range

of 46–60 years and were dominated by men. The fairly high level of education among respondents suggests that health education plays an important role in diabetes management.

The results showed that the patients' dietary patterns were mostly supportive of the management of type 2 *DM*, with high consumption of vegetables and fruits and low sugar intake. However, there are still aspects that need to be considered, such as fairly high meat consumption and variations in the frequency of milk consumption.

The sex differences in the prevalence of type 2 *DM* can be explained from a molecular perspective, where sex hormones such as testosterone in men and estrogen in women have different roles in glucose metabolism and insulin function. These findings emphasize the importance of an individualized approach in diabetes management, taking into account biological and lifestyle factors.

Education on proper dietary patterns and ongoing support from health workers are indispensable for improving dietary adherence and achieving effective diabetes management. Community-based interventions and family support can also be significant supporting factors.

This research shows that appropriate and sustainable interventions are needed to improve patients' quality of life and reduce the burden of diabetes in the community. These data can be used as a basis for designing more specific and effective education and intervention programs for type 2 *DM* patients in Indonesia, especially in the Badung area of Bali.

REFERENCE

American Diabetes Association. (2020). Standards of medical care in diabetes—2020. *Diabetes Care, 43*(Suppl. 1), S1–S212. https://doi.org/10.2337/dc20-Sint

Aune, D., Giovannucci, E., Boffetta, P., Fadnes, L. T., Keum, N., Norat, T., ... & Tonstad, S. (2019). Fruit and vegetable intake and the risk of cardiovascular disease, total cancer and all-cause mortality—a systematic review and dose-response meta-analysis of prospective studies. *International Journal of Epidemiology, 48*(3), 1039–1056. https://doi.org/10.1093/ije/dyy241

Central Bureau of Statistics of the Province of Bali. (2022). *Number of disease cases by type of disease by regency/city in Bali Province, 2022*. Retrieved from https://bali.bps.go.id

Chatterjee, R., Khunti, K., & Davies, M. J. (2018). Type 2 diabetes. *The Lancet, 389*(10085), 2239–2251. https://doi.org/10.1016/S0140-6736(17)30058-2

Cho, N. H., Shaw, J. E., Karuranga, S., Huang, Y., da Rocha Fernandes, J. D., Ohlrogge, A. W., & Malanda, B. (2018). IDF Diabetes Atlas: Global estimates of diabetes prevalence for 2017 and projections for 2045. *Diabetes Research and Clinical Practice, 138*, 271–281. https://doi.org/10.1016/j.diabres.2018.02.023

Databox. (2023). *Indonesia's diabetes prevalence rises to 11.7% in 2023*. Retrieved from

https://databoks.katadata.co.id/datapublish/2023/02/28/prevalensi-diabetes-indonesia-naik-jadi-117-pada-2023

Grossmann, M. (2019). Low testosterone in men with type 2 diabetes: Significance and treatment. *The Journal of Clinical Endocrinology & Metabolism, 104*(7), 2909–2928. https://doi.org/10.1210/jc.2018-01961

Grossmann, M. (2019). Testosterone and glucose metabolism in men: Current concepts and controversies. *The Journal of Endocrinology, 240*(3), R67–R89. https://doi.org/10.1530/JOE-18-0590

Hu, F. B., Satija, A., & Manson, J. E. (2018). Curbing the diabetes pandemic: The need for global policy solutions. *JAMA, 320*(7), 703–704. https://doi.org/10.1001/jama.2018.9422

Hu, T., Jacobs, D. R., & Zheng, Y. (2022). Added sugar intake and glycemic control in type 2 diabetes: A systematic review and meta-analysis. *Nutrients, 14*(3), 521. https://doi.org/10.3390/nu14030521

International Diabetes Federation. (2021). *IDF Diabetes Atlas, 10th edition.* Retrieved from https://www.diabetesatlas.org

Mauvais-Jarvis, F. (2018). Role of sex hormones in type 2 diabetes and cardiometabolic disease. *Nature Reviews Endocrinology, 14*(1), 33–46. https://doi.org/10.1038/nrendo.2017.135

Mauvais-Jarvis, F. (2018). Role of sex steroids in β cell function, growth, and survival. *Trends in Endocrinology & Metabolism, 29*(10), 844–855. https://doi.org/10.1016/j.tem.2018.08.005

Ministry of Health of the Republic of Indonesia. (2018). *Main results of Riskesdas 2018.* Retrieved from https://www.kemkes.go.id/resources/download/info-terkini/hasil-riskesdas-2018.pdf

Neuenschwander, M., Ballon, A., Weber, K. S., Norat, T., Aune, D., Schwingshackl, L., & Schlesinger, S. (2020). Role of diet in type 2 diabetes incidence: Umbrella review of meta-analyses of prospective observational studies. *BMJ, 369*, m1368. https://doi.org/10.1136/bmj.m1368

Wang, Y., Song, Y., & Ma, J. (2021). Sex differences in type 2 diabetes mellitus and its complications. *Frontiers in Endocrinology, 12,* 690201. https://doi.org/10.3389/fendo.2021.690201

World Health Organization. (2020). *Global report on diabetes.* Retrieved from https://www.who.int/diabetes/global-report/en

Zhao, F. F., Suhonen, R., Koskinen, S., Leino-Kilpi, H., & Stolt, M. (2020). The impact of educational interventions on self-management of type 2 diabetes: A systematic review and meta-analysis. *Patient Education and Counseling, 103*(7), 1095–1107. https://doi.org/10.1016/j.pec.2020.01.012

Zheng, X., Xu, F., & Liang, H. (2022). Age-related changes in glucose metabolism and risk of diabetes: Molecular mechanisms and interventions. *Frontiers in Endocrinology, 13,* 902186. https://doi.org/10.3389/fendo.2022.902186

Zheng, Y., Ley, S. H., & Hu, F. B. (2019). Global aetiology and epidemiology of type 2 diabetes mellitus and its complications. *Nature Reviews Endocrinology, 14*(2), 88–98. https://doi.org/10.1038/nrendo.2017.151

Zheng, Y., Li, Y., Satija, A., Pan, A., Sotos-Prieto, M., Rimm, E., ... & Hu, F. B. (2019). Association of changes in red meat consumption with total and cause-specific mortality among US women and men: Two prospective cohort studies. *BMJ, 365*, l2110. https://doi.org/10.1136/bmj.l2110