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ORIGINAL ARTICLE

Factors associated with dietary adherence among patients with type 2 diabetes mellitus at Royal Prima General Hospital

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ABSTRACT

Background: Type 2 Diabetes Mellitus (T2DM) is a significant health issue in Indonesia, where management relies heavily on patient dietary adherence. However, adherence levels are often suboptimal. This study aimed to identify the factors associated with dietary adherence among T2DM patients at a major hospital in Medan, Indonesia.
Methods: This cross-sectional study was conducted in December 2024 at Royal Prima General Hospital, involving 64 T2DM patients selected through total sampling. Data on demographic characteristics, knowledge, family support, and healthcare provider (HCP) support were collected via structured questionnaires. Dietary adherence was the dependent variable. Data were analyzed using chi-square tests and multivariate logistic regression.
Results: A slight majority of patients (53.1%) were adherent to their diet. Multivariate analysis identified age as the most dominant predictor, with patients aged ≥45 years being 18.9 times more likely to be adherent than younger patients (AOR = 18.935, p=0.004). Male gender was also a significant predictor of higher adherence (AOR = 7.652, p=0.01). Paradoxically, good knowledge (AOR = 0.161) and HCP support (AOR = 0.109) were significantly associated with lower odds of adherence. Education and employment status showed no significant association.
Conclusion: Age is the most critical factor influencing dietary adherence among T2DM patients in this cohort, with older individuals demonstrating significantly better compliance. Interventions should specifically target younger patients and women, who are at higher risk for non-adherence.

Keywords: type 2 diabetes mellitus, dietary adherence, risk factors, age

Introduction

Type 2 Diabetes Mellitus (DM) is a chronic metabolic disorder that represents a major global health challenge. The condition is characterized by hyperglycemia, or elevated blood glucose levels, resulting from the body's inability to produce or effectively utilize insulin.[1] Over time, uncontrolled hyperglycemia can lead to severe damage to vital organs, including the heart, blood vessels, eyes, kidneys, and nerves. The key risk factors driving the global epidemiology of Type 2 DM include increasing rates of obesity, sedentary

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lifestyles, high-calorie diets, and population aging.[2] One of the primary pillars of Type 2 DM management is adherence to a structured dietary plan, which directly influences the control of blood glucose levels.[3,4]

Globally, the prevalence of diabetes continues to rise significantly. According to the International Diabetes Federation (IDF) data from 2019, an estimated 483 million adults aged 20–79 were living with diabetes. This figure is projected to increase to 578 million by 2030 and 700 million by 2045.[5] In Indonesia, diabetes mellitus ranks as the third leading cause of death (6.7%), following stroke (21.1%) and heart disease (12.9%). The Basic Health Research (Riskesdas) data show an increase in diabetes prevalence from 1.5% in 2013 to 2.0% in 2018. This pattern is also evident at the provincial level, where the 2018 Riskesdas report for North Sumatra documented 249,519 diabetes cases, with 42.08% of patients not receiving direct medical treatment.[6]

Dietary adherence, defined as the behavior of patients in following nutritional recommendations provided by healthcare professionals, plays a crucial role in the success of Type 2 DM therapy. Good adherence helps maintain stable blood glucose levels and prevent long-term complications.[7,8] However, previous studies have shown that patient adherence remains suboptimal. Research by Anggi and Rahayu[9] found that 80% of respondents continued consuming sweet foods and did not comply with dietary recommendations. Another study found that higher dietary adherence is significantly related to better random blood glucose control in type 2 diabetes patients, underscoring the importance of consistent diet management.[10] Factors that may influence dietary adherence include patient knowledge, self-motivation, family support, and education provided by healthcare workers.[11–14]

Preliminary data from Royal Prima General Hospital (RSU Royal Prima) Medan recorded 334 diabetes mellitus cases in January 2024, of which 64 were identified as Type 2 DM. Despite the availability of clinical case data, no study has specifically analyzed factors related to dietary adherence among Type 2 DM patients in this hospital. Therefore, this study aims to analyze the factors associated with dietary adherence among patients with Type 2 Diabetes Mellitus at Royal Prima General Hospital.

Method

This study employed an analytical survey design with a cross-sectional approach to identify the relationships between independent and dependent variables. Data collection was conducted at a single point in time to examine these relationships simultaneously. The study was carried out at Royal Prima General Hospital, Medan, in December 2024. The study population consisted of all patients diagnosed with type 2 diabetes mellitus (DM) at the hospital, totaling 64 individuals. Due to resource constraints, a total sampling technique was employed, in which the entire population was included as the study sample. Consequently, the total sample size was 64 patients.

Data were collected from two primary sources. Primary data were obtained directly from respondents through structured interviews using a questionnaire designed to assess dietary adherence and its influencing factors. Secondary data were gathered from patient medical records at Royal Prima General Hospital and relevant literature sources to complement the primary data. The dependent variable in this study was dietary adherence among patients with type 2 diabetes mellitus. This variable was measured based on the respondents' compliance with the recommended intake of carbohydrates, saturated fats, and sugars as advised by healthcare providers. Adherence was assessed using a questionnaire scored from 0 to 10, with scores of 6–10 classified as "Adherent" and scores of 0–5 as "Non-Adherent."

The independent variables examined included demographic characteristics and supporting factors. Demographic characteristics comprised age (categorized as ≥45 years and <45 years), sex (male and female), educational level (high: ≥9 years of formal education; low: <9 years), and employment status (employed and unemployed). The supporting factors consisted of knowledge of DM dietary management, family support, and healthcare provider support. These variables were also measured using a questionnaire scored from 0 to 10 and categorized as "Good" (scores 6–10) and "Poor" (scores 0–5).

Data processing involved four stages. The first stage, editing, involved checking the completeness and consistency of the collected data. The second stage, coding, converted qualitative responses into numerical codes for ease of analysis. The third stage, data entry, consisted of inputting the coded data into the computer program. The final stage, tabulating, presented the processed data in frequency distribution tables to facilitate interpretation.

Data analysis was conducted in several phases. First, univariate analysis was used to describe each variable in terms of frequency and percentage distributions. Second, bivariate analysis was performed using

the chi-square test with a 95% confidence level (α=0.05) to determine the relationship between each independent variable and the dependent variable. Finally, multivariate analysis using logistic regression was conducted to identify the most dominant independent variables influencing dietary adherence among patients with type 2 diabetes mellitus.

Results

This study was conducted at Royal Prima General Hospital in Medan, a major private referral hospital in North Sumatra. Data collection commenced after receiving approval from the hospital's director and medical records department. A total of 64 patients with Type 2 Diabetes Mellitus (T2DM) provided informed consent to participate. The descriptive statistics for participant characteristics are presented in Table 4.1. The analysis of the primary outcome revealed that a slight majority of participants (n=34, 53.1%) were adherent to their dietary regimen. The cohort was predominantly aged ≥45 years (62.5%), male (53.1%), and had completed nine or fewer years of formal education (53.1%). A majority of participants were unemployed (51.6%). Regarding psychosocial factors, most participants demonstrated good knowledge about their condition (62.5%), reported receiving support from their family (65.6%), and felt supported by healthcare providers (54.7%).

Table 1. Participant characteristics and dietary adherence (n=64)

Characteristic	Frequency (n)	Percentage (%)
Dietary Adherence		
Adherent	34	53.1
Non-adherent	30	46.9
Age		
≥ 45 years	40	62.5
< 45 years	24	37.5
Gender		
Male	34	53.1
Female	30	46.9
Education		
Low (≤ 9 years)	34	53.1
High (≥ 9 years)	30	46.9
Knowledge		
Good	40	62.5
Poor	24	37.5
Employment Status		
Unemployed	33	51.6
Employed	31	48.4
Family Role		
Supportive	42	65.6
Less Supportive	22	34.4
HCP Support		
Supported	35	54.7
Not Supported	29	45.3

To investigate the relationship between independent variables and dietary adherence, bivariate and multivariate analyses were performed. The results are summarized in Table 2. Bivariate analysis using the chi-square test identified several factors significantly associated with dietary adherence. A significant relationship was found for age (p=0.003) and gender (p=0.013). Participants aged ≥45 years had 5.0 times higher odds of being adherent compared to younger participants (OR = 5.044, 95% CI [1.677-15.170]).

Similarly, male participants were 3.6 times more likely to be adherent than female participants (OR = 3.612, 95% CI [1.285-10.149]). Knowledge level (p=0.028), family role (p=0.005), and support from healthcare providers (p=0.001) also showed statistically significant associations. However, these variables were associated with lower odds of adherence. No significant association was observed between dietary adherence and education level (p=0.638) or employment status (p=0.790).

Following the bivariate analysis, a multivariate logistic regression was conducted to identify the most dominant predictors of dietary adherence. The final model confirmed that age was the most influential factor (). After adjusting for other significant variables, participants aged ≥45 years were 18.9 times more likely to adhere to their dietary management plan than those in the younger age group (Adjusted OR = 18.935).

Gender, knowledge level, and support from healthcare providers also remained significant predictors in the final adjusted model.

Table 2. Bivariate and multivariate analysis of factors associated with dietary adherence

Independent Variable	Bivariate p-value	Crude OR (95% CI)	Multivariate p-value	AOR
Age (≥ 45 years)	0.003	5.044 (1.677-15.170)	0.004	18.935
Gender (Male)	0.013	3.612 (1.285-10.149)	0.01	7.652
Education (High)	0.638	0.789 (0.295-2.114)	-	-
Knowledge (Good)	0.028	0.304 (0.103-0.897)	0.031	0.161
Employment Status (Employed)	0.79	1.143 (0.428-3.054)	-	-
Family Role (Supportive)	0.005	0.200 (0.062-0.646)	-	-
HCP Support (Supported)	0.001	0.166 (0.055-0.499)	0.004	0.109

Discussion

The objective of this study was to analyze factors associated with dietary management adherence among 64 patients with Type 2 Diabetes Mellitus (T2DM) at Royal Prima General Hospital Medan. The analysis revealed that overall dietary adherence was nearly evenly distributed, with 53.1% of respondents classified as adherent. The key finding of this study identified age as the most dominant predictor of dietary adherence, followed by gender, healthcare worker support, and knowledge, all of which demonstrated significant associations. In contrast, educational level and employment status did not show statistically significant associations.

The most influential factor identified was age: patients aged ≥45 years were 18.9 times more likely to adhere to dietary recommendations compared with younger counterparts. This finding aligns with several previous studies that have also demonstrated older age as an independent predictor of better adherence to treatment among diabetic patients.[15,16] This may be explained by the tendency of older individuals to have a heightened risk perception of disease complications, a more stable daily routine, and longer experience living with chronic conditions, which collectively encourage greater discipline in dietary management.

The study further found that male patients exhibited higher adherence rates compared to female patients. This finding is noteworthy given the heterogeneity of results in existing literature regarding gender roles in dietary adherence among diabetic patients. Some studies have not observed any significant gender differences.[17,18] The variation in findings may be influenced by sociocultural factors specific to the study population, where social support or expectations related to gender roles may shape health behaviors.

A particularly striking and contrary finding to the initial hypothesis was the inverse relationship between knowledge, family involvement, and healthcare support with adherence. In this study, respondents with good knowledge, family support, and health professional support actually showed lower adherence likelihood. This paradoxical result warrants careful interpretation. First, it might reflect a knowledge–practice gap, whereby possessing information does not necessarily translate into behavioral change. This phenomenon has been widely documented, with previous research emphasizing that interventions should prioritize strategies that promote behavior change rather than mere information transfer.[19] Second, patients receiving greater support might be those with more severe disease conditions or complications, making dietary management more complex and difficult to follow. The support received may therefore be reactive to worsening conditions rather than a proactive booster of adherence. Additionally, the nature of the support itself is crucial; overly controlling or stressful support may have detrimental effects—a concept explored in the literature on "diabetes distress" and unsupportive family interactions.[20,21]

Meanwhile, the absence of a significant relationship between educational level and dietary adherence is consistent with several other studies. For example, one research found no significant association between education level and dietary compliance, suggesting that other factors—such as internal motivation, independence, and practical skills in food management—may exert stronger influence than formal education alone.[22]

This study's findings bear several important implications. Clinically, healthcare providers should pay special attention to younger patients with T2DM (under 45 years) and female patients, as they constitute high-risk groups for non-adherence. Educational interventions should extend beyond information dissemination, focusing instead on empowering patients with practical skills, problem-solving strategies, and motivational support to bridge the gap between knowledge and practice. Furthermore, family and healthcare support programs should evaluate the quality and nature of the assistance provided to ensure that support is empowering rather than burdensome for patients.

The study also acknowledges several limitations. First, its cross-sectional design prevents the establishment of causal relationships between variables. Second, data collection from a single healthcare facility (Royal Prima General Hospital Medan) limits the generalizability of findings to broader populations. Third, the use of questionnaires as the primary data collection tool depends on respondents' honesty and recall—subject to social desirability bias—where respondents may report higher adherence than in reality. Lastly, the presence of unmeasured confounding variables, such as economic status, duration of diabetes, and comorbid conditions, may also influence dietary adherence. Future research should employ longitudinal designs and include more diverse samples to validate these findings and explore qualitatively the dynamics of social support in diabetes management.

Conclusion

In conclusion, this study identifies age as the most powerful predictor of dietary adherence among patients with Type 2 Diabetes Mellitus at Royal Prima General Hospital, with individuals aged 45 years and older being significantly more compliant. Male gender was also associated with better adherence. Counterintuitively, good knowledge and receiving support from family and healthcare providers were linked to lower adherence, suggesting a knowledge-practice gap or that support may be reactive to more severe disease states. These findings underscore the need for targeted interventions focusing on younger patients and women. Furthermore, support systems should be re-evaluated to ensure they provide practical, empowering strategies that translate knowledge into sustained behavioral change rather than simply disseminating information.

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