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Original Research

Predictors of Healthy Diet Adherence Intention Among Type 2 Diabetes Patients in Public Hospitals of Dire Dawa, Eastern Ethiopia: A Theory of Planned Behavior Approach

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Abstract

Background: Type 2 Diabetes Mellitus (T2DM) is an increasing public health problem in Ethiopia and globally, with poor dietary adherence posing a major challenge to effective disease management. Although dietary modification is a cornerstone of diabetes care, many patients fail to adhere to recommended dietary practices. Understanding the determinants of dietary intention is therefore essential. The Theory of Planned Behavior (TPB) provides a robust framework to examine psychological and behavioral factors influencing intention to adhere to a healthy diet among patients with T2DM attending public hospitals in Dire Dawa, Eastern Ethiopia.
Methods: A facility-based cross-sectional study was conducted from March to April 2025 among 422 systematically selected T2DM patients attending Dilchora and Sabian public hospitals. Data were collected using a structured TPB-based questionnaire and analyzed using SPSS version 26. Bivariable and multivariable logistic regression analyses were performed, and associations were reported using adjusted odds ratios (AOR) with 95% confidence intervals (CI).
Results: Overall, 51.4% of participants had good intention to adhere to a healthy diet, while 73% demonstrated low actual dietary adherence. Significant predictors of good intention included female sex (AOR=2.40, 95% CI: 1.35, 4.26), urban residence (AOR=0.51, 95% CI: 0.27, 0.95), regular physical exercise (AOR=0.47, 95% CI: 0.24, 0.92), positive attitude (AOR=3.44, 95% CI: 1.59, 7.46), strong behavioral belief (AOR=7.93, 95% CI: 3.31, 19.01), and high perceived control (AOR=7.92, 95% CI: 2.61, 23.99).
Conclusion: Although intention to adhere to a healthy diet was moderate, actual dietary adherence was low. Interventions should strengthen TPB constructs particularly attitude, behavioral beliefs, and perceived control to effectively translate intention into sustained dietary behavior.

Keywords: Dietary Adherence, Ethiopia, Health Behavior, Intention, Public Hospitals, Theory of Planned Behavior, Type 2 Diabetes Mellitus

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1. Introduction

Diabetes mellitus (DM) is a group of metabolic and physiological disorders characterized by chronic hyperglycemia resulting from defects in insulin secretion, insulin action, or both, as well as excessive glucagon production [1]. Persistent hyperglycemia is associated with long-term damage, dysfunction, and failure of various organs, particularly the eyes, kidneys, nerves, heart, and blood vessels. The global burden of diabetes has increased substantially over recent decades, with Type 2 Diabetes Mellitus (T2DM) accounting for the majority of cases. The rising prevalence of T2DM, particularly in low- and middle-income countries, represents a major public health challenge due to rapid urbanization, lifestyle transitions, and limited health system capacity [2]. In Ethiopia, the number of people living with diabetes is steadily increasing, underscoring the need to better understand factors influencing patients' adherence to recommended dietary practices as part of comprehensive diabetes management [3].

Adults with T2DM are predominantly affected, especially individuals aged 45 years and above. According to the Centers for Disease Control and Prevention (CDC), the prevalence of T2DM is higher among middle-aged and older adults, with risk increasing progressively with age [4]. Age-related physiological changes, reduced physical activity, increased insulin resistance, and the cumulative impact of unhealthy lifestyle behaviors contribute to this elevated risk [5].

The World Health Organization (WHO) identifies diabetes mellitus as the third leading risk factor for premature mortality worldwide, following hypertension and tobacco use [6]. Sub-Saharan Africa is experiencing a rapid epidemiological transition, with a marked increase in non-communicable diseases such as diabetes [7]. While T2DM accounts for approximately 85–95% of all diabetes cases in high-income countries, the proportion is even higher in low- and middle-income countries. Ethiopia, like many developing nations, is particularly vulnerable to a rising diabetes burden due to changing dietary patterns and sedentary lifestyles [8].

A healthy diet plays a critical role in preventing non-communicable diseases, including diabetes, cardiovascular disease, stroke, and certain cancers, while also addressing various forms of malnutrition [9]. The American Diabetes Association (ADA) recommends diets rich in fruits, vegetables, whole grains, legumes, and fiber, and low in added sugars, as a key strategy for secondary prevention and management of T2DM [10]. Dietary modification is considered the foundation of diabetes management and is typically the first-line intervention; however, it remains one of the most challenging aspects of long-term diabetes care [11].

Effective glycemic control requires a high level of sustained dietary adherence, which is often difficult to achieve in real-world settings [12].

This study aims to examine the intention to adhere to healthy dietary practices among patients with Type 2 Diabetes attending public hospitals in Dire Dawa, Eastern Ethiopia. The Theory of Planned Behavior (TPB) has been widely applied to understand and predict health-related behaviors, particularly individuals' intentions to adopt and maintain healthy eating practices, making it a suitable theoretical framework for this investigation [13]. This study aimed to predict the intention to adhere to a healthy diet among patients with type 2 diabetes mellitus attending public hospitals in Dire Dawa, Eastern Ethiopia, using the Theory of Planned Behavior.

2. Methods

2.1. Study Area, Period and Design

This study was conducted in Dire Dawa Administrative City, located in the eastern part of Ethiopia, approximately 515 km from the capital city, Addis Ababa. Dire Dawa has an estimated population of 453,000, of whom 227,406 (50.2%) are male and 225,594 (49.8%) are female [56].

The administration has a total of six hospitals, including two public hospitals, three private hospitals, and one military hospital. The two public hospitals: Dilchora Referral Hospital (DRH) and Sabian General Hospital (SGH) provide both pediatric and adult outpatient services, including follow-up care for diabetes mellitus and other chronic conditions. On average, approximately 470 and 196 diabetes mellitus patients attend monthly follow-up services at DRH and SGH, respectively. These services are delivered by physicians and nurses during regular working days, five days per week [8]. The study population comprised patients with type 2 diabetes mellitus attending follow-up clinics at the two public hospitals. Data collection was conducted from March to April 2025.

2.2. Study Design

The hospital based cross-sectional study design was used.

2.3. Population

2.3.1. Source Population

The source population consisted of all type II diabetic patients attending follow-up clinics at Dilchora and Sabian Hospitals.

2.3.2. Study Subject

Systematically selected T2DM patients who fulfilled the eligibility criteria and attended follow-up clinics during the data collection period were included in the study.

2.4. Eligibility Criteria

2.4.1. Inclusion Criteria

Adult diabetes patients above 18 years and who had follow-up at least once in advance of actual data collection period were included.

2.4.2. Exclusion Criteria

Adults with diabetes who were critically ill or had mental illness were excluded from the study.

2.5. Sample Size Determination

The sample size for the first objective was determined using the single population proportion formula. Since no comparable study on intention for dietary adherence among patients with type 2 diabetes mellitus had been conducted in Eastern Ethiopia, the proportion (p) was assumed to be 0.5 to obtain the maximum sample size. A 95% confidence level (Z = 1.96) and a margin of error (d) of 5% were considered. Accordingly, the calculated sample size was 384 participants. After adding a 10% allowance for non-response, the final sample size for the first objective became 422 participants.

For the second objective, which aimed to identify behavioral factors affecting healthy dietary adherence, attitude was considered as one of the key behavioral determinants. Evidence from the Theory of Planned Behavior (TPB) direct constructs indicated that 63.9% of participants had a favorable attitude toward dietary adherence. Therefore, the sample size for the second objective was determined using the double population proportion formula, which is appropriate for comparing two proportions, such as intention to adhere to a healthy diet among participants with favorable versus unfavorable attitudes or subjective norms.

From the TPB direct constructs, 63.9% of participants strongly agreed that following the recommended dietary plan is beneficial for the prevention of diabetes-related complications, indicating a generally positive attitude toward dietary adherence. Let:

- P1 = 0.64 (proportion with favorable attitude)
- P2 = 0.50 (assumed comparison group without favorable attitude)
- Confidence level = 95% → $Z_{a}/_{2} = 1.96$
- Power = 80% → $Z_{\beta} = 0.84$
- d = P1 – P2 = 0.64 – 0.50 = 0.14 $n = 192$

By adding 10% non-response rate the final sample size will be 211.
For subjective norm items (social pressure) 222(57%) of participant strongly agreed that it is expected for them to follow their diet plan.

For the second objective, which aimed to identify behavioral factors affecting healthy dietary adherence, subjective norm was considered as one of the key behavioral determinants. The prevalence of subjective norm was obtained from the Theory of Planned Behavior (TPB) direct constructs, where 57% of participants strongly agreed that they were expected to follow their recommended diet plan. This finding indicates that the participants generally had a favorable subjective norm toward dietary adherence.

The sample size for this objective was calculated using the double population proportion formula, which is appropriate for comparing two proportions. The following assumptions were used: P_1 = 0.57, P_2 = 0.43, a 95% confidence level ($Z_a/2$ = 1.96), 80% power (Z_β = 0.84), and a margin of error (d) of 0.14. Based on these parameters, the calculated sample size was 196 participants. After adding a 10% allowance for non-response, the final sample size for the second objective became 216 participants.

Overall, the final sample size for the study was determined by selecting the largest sample size obtained from the calculations for the first and second objectives. Accordingly, the sample size calculated for the first objective (384 participants) was larger. After adding a 10% non-response rate, the final sample size for the study was 422 participants.

2.6. Sampling Procedures

A systematic random sampling technique was employed to select the study participants. The study was conducted in the two public hospitals in Dire Dawa City Administration that provide follow-up care for diabetes mellitus (DM) patients. The total sample size was proportionally allocated to these hospitals based on the number of DM patients attending their follow-up clinics.

At Dilchora Hospital, the total number of DM patients attending follow-up during the study period was 470. This number was divided by the allocated sample size for the facility (298), resulting in a sampling interval (k) of approximately 2. Similarly, at Sabiyan Hospital, 196 DM patients were divided by the allocated sample size (124), yielding a sampling interval of approximately 2.

Accordingly, every second DM patient from the follow-up registration list at both Dilchora and Sabiyan Hospitals was selected for inclusion in the study. To identify the starting point, a random

number between 1 and 2 was generated using a random number generator. In this case, the number 2 was selected, and sampling then continued systematically by including every second patient thereafter.

2.7. Variables of the Study

2.7.1. Dependent Variables

- Intention to healthy dietary adherence among type 2 DM patients

2.7.2. Independent Variables

- Subjective norm, and perceived behavioral control of dietary adherence type 2 diabetes patients.
- Adherence to a healthy diet among diabetic patients.
- Socio demographic, Variables age, Sex, educational status, Income, Family history, place of residence, marital status.
- Co-morbidity
- Physical exercise
- Health Insurance Coverage
- Duration of diagnosis and starting treatment are independent variables

2.8. Data Collection Tools, Data Collectors, and Procedures

Data were collected using a structured, interviewer-administered questionnaire developed based on the Theory of Planned Behavior (TPB) manuals and relevant literature. The questionnaire was organized into three main sections. The first section included sociodemographic characteristics of the respondents. The second section comprised items measuring dietary adherence. The third section assessed psychometric variables based on TPB constructs.

The psychometric section was further divided into six components, consisting of both indirect and direct TPB measures. Indirect measures included normative beliefs with their corresponding motivation to comply, behavioral beliefs with their corresponding outcome evaluations, and control beliefs with their corresponding perceived power. Direct measures assessed attitude, subjective norm, perceived behavioral control, and behavioral intention. The development of all TPB constructs followed standard TPB guidelines and previously published studies.

A five-point Likert scale was used for all TPB-related items, with response options ranging from strongly agree (5) to strongly disagree (1). Behavioral beliefs and their corresponding outcome evaluations consisted of eight items, as did control beliefs and their corresponding perceived power.

Direct attitude was measured using four items, subjective norm using five items, perceived behavioral control using four items, and behavioral intention using four items.

Dietary adherence was assessed using a modified Morisky Medication Adherence Scale (MMAS), consisting of ten items, adapted for dietary adherence based on existing literature. In addition, thirteen questions were included to capture sociodemographic information.

Data were collected using the Kobo Collect mobile application. Prior to the actual data collection, the questionnaire was pretested on 5% (21 diabetic patients) of the total sample size at Shenille Primary Hospital, two weeks before the commencement of data collection. Based on the pretest findings, necessary modifications were made to improve clarity and consistency.

Data collection was conducted by trained medical staff working in the diabetic follow-up clinics at Dilchora and Sabiyan Hospitals. The entire data collection process was closely supervised by the principal investigator and supervisors. Data quality was ensured through comprehensive training of data collectors and supervisors on the objectives of the study, the content of the questionnaire, interview techniques, and ethical considerations. Each completed questionnaire was checked daily for completeness, clarity, and consistency, and immediate feedback was provided to data collectors to address any identified issues.

2.9. Data Processing, Analysis, and Interpretation

Data collected using the Kobo Collect application were exported to a computer for processing and analysis. The data were cleaned, edited, coded, and entered into the Statistical Package for the Social Sciences (SPSS) version 26 for statistical analysis. Reliability of the measurement tools was assessed prior to analysis. Internal consistency reliability was evaluated using Cronbach's alpha, with a value of ≥0.70 considered acceptable for each scale. Test–retest reliability was examined using the intraclass correlation coefficient (ICC), with values of ≥0.70 indicating adequate stability. Descriptive statistics, including mean and standard deviation, were computed for sociodemographic variables, dietary adherence, and TPB-related questionnaire items.

The primary outcome of the analysis was intention toward healthy dietary adherence. The reliability coefficients (Cronbach's alpha) for all TPB constructs were within acceptable ranges: intention (0.920), attitude (0.848), subjective norm (0.898), perceived behavioral control (0.759), behavioral beliefs (0.885), outcome evaluation (0.852), normative beliefs (0.831), motivation to comply (0.802), control beliefs (0.821), and perceived power (0.755).

Prior to inferential analysis, data were thoroughly cleaned to identify and address outliers, missing values, and inconsistencies. Descriptive analyses, including frequencies, percentages, means, medians, and standard deviations, were used to summarize the data. To identify factors associated with intention toward dietary adherence, logistic regression analysis was conducted in two stages. First, bivariable logistic regression was performed to estimate crude odds ratios (COR) with 95% confidence intervals (CI). Independent variables with p-values ≤ 0.20 in the bivariable analysis were entered into the multivariable logistic regression model. In the final model, adjusted odds ratios (AOR) with 95% confidence intervals were calculated to determine the strength of associations between independent variables and outcome variable while controlling for potential confounders.

3. Results

3.1. Socio-Demographic Characteristics

A total of 422 participants were included in this study. The mean age (± SD) of the participants was 54.9 ± 11 years. Among the respondents, slightly more than half were male (51.2%). Participants aged 45–64 years constituted the largest proportion (58.1%), whereas those aged 18–44 years accounted for the smallest proportion (15.6%). Participants aged 65 years and above represented 26.3% of the study population. Regarding educational status, 81 (19.2%) participants were illiterate, while 202 (47.9%) were able to read and write. From a clinical perspective, 233 (55.2%) participants reported having a family history of diabetes, and 232 (54.9%) had one or more comorbid conditions. Additionally, 42.6% of participants reported engaging in regular physical exercise, whereas 57.3% did not (Table 1).

Table 1: Socio-demographic characteristics and clinical factors of DM patients in Dilchora and Sabian Hospital Dire Dawa, Ethiopia 2024.

Characteristics	Category	Number (n)	Percentage (%)
Age category (years)	18–44	66	15.6
	45–64	245	58.0
	>65	111	26.3
Sex	Female	206	48.8
	Male	216	51.1
Marital status	Single	68	16.1
	Married	292	69.1
	Divorced	25	5.9
	Widowed	37	8.7
Educational level	No formal education	81	19.1
	Read and write	201	47.6
	Grade 1–8	56	13.2
	Grade 9–12	44	10.4
	College and above	40	9.4
Occupational status	Government employee	88	20.8
	Farmer	67	15.8
	Merchant	156	36.9
	Pensioner	83	19.6
	Other	26	6.1

Monthly income (ETB)	<500	11	2.6
	500–1000	60	14.2
	1001–2000	92	21.8
	>2000	259	61.3
Residence	Urban	284	67.2
	Rural	138	32.7
Health insurance coverage	Yes	163	38.6
	No	259	61.3
Family history of diabetes	Yes	233	55.2
	No	189	44.7
Co-morbidity	Yes	232	54.9
	No	190	45.1
Physical exercise	Yes	180	42.6
	No	242	57.3
Duration since diagnosis	0–5 years	260	61.6
	6–10 years	116	27.4
	>10 years	46	10.9
Duration since treatment	0–5 years	262	62.0
	6–10 years	118	28.0
	>10 years	42	10.0

3.2. Level of Dietary Adherence

The findings indicate that the majority of participants (73.0%) had low dietary adherence, irrespective of their level of intention. Among participants with poor intention, 154 (75.1%) demonstrated low adherence, while 25 (12.2%) and 26 (12.7%) exhibited high and medium adherence, respectively. Similarly, among participants with good intention, 154 (70.9%) showed low adherence, whereas 31 (14.3%) had high adherence and 32 (14.7%) had medium adherence. Although a slightly higher proportion of participants with good intention demonstrated medium or high adherence compared to those with poor intention, low dietary adherence was prevalent across both groups. Overall, 217 (51.4%) participants had good intention toward dietary adherence, while 205 (48.6%) exhibited poor intention (Table 2).

Table 2: Distribution of Dietary Adherence Levels by Intention to Adhere Among Adults with T2DM (n=422)

		Level of Dietary Adherence			**Total**
		High Dietary Adherence n (%)	Medium Dietary Adherence n (%)	Low Dietary Adherence n (%)	
Intention	Poor Intention	25 (12.2)	26 (12.7)	154 (75.1)	205
	Good Intention	31 (14.3)	32 (14.7)	154 (71.0)	217
Total		56 (13.3)	58 (13.7)	308 (73.0)	422

3.3. Theory of Planned Behavior Construct Variables

Direct TPB Constructs, Direct Attitude

Cross-tabulation analysis revealed marked differences in beliefs and attitudes between participants with good and poor intentions to follow a diabetes diet. Most participants with good intention believed that dietary adherence helps prevent complications (88.4%) and control blood glucose levels (93.1%), whereas the majority of poor intenders disagreed with these statements. Furthermore, poor intenders perceived greater restriction, with 34.6% reporting

that the diet limits their freedom and 35.6% stating that it makes them feel different from others, compared with 12.4% and 18.0% of good intenders, respectively. A strong positive association was observed between direct attitude and intention: 80% of participants with a favorable attitude had good intention, while 74% of those with an unfavorable attitude had poor intention (Table 3)

Table 3: Distribution of Dietary Adherence Metrics by Intention to Adhere among Adults with T2DM (n=422)

Dietary Adherence Metrics	Category	Total (n=422)	Intention to Dietary Adherence		P-value
			Good (n=217)	Poor (n=205)	
		n (%)	n (%)	n (%)	
Do you sometimes Forgetting to plan the meals you eat ahead?	Yes	278 (65.8)	136 (62.6)	142 (69.2)	0.154
	No	144 (34.1)	81 (37.3)	63 (30.7)	
Did you miss your dietary plan yesterday	Yes	167 (39.5)	83 (38.2)	84 (40.9)	0.567
	No	255 (60.4)	134 (61.7)	121 (59.0)	
People sometimes miss their diet plan for reasons other than forgetting.	Yes	259 (61.3)	142 (65.4)	117 (57.0)	0.078
	No	163 (38.6)	75 (34.5)	88 (42.9)	
Over the past two weeks, were there any days when you did not take your dietary plan properly?					
Do you sometimes forget to comply your dietary plan with everyday life?	Yes	230 (54.5)	108 (49.7)	122 (59.5)	0.045
	No	192(45.49)	109 (50.2)	83 (42.9)	
When you feel like your DM is under control, do you sometimes stop taking your dietary plan?	Yes	255 (60.4)	132 (60.8)	123 (60)	
	No	167 (39.5)	85 (39.1)	82 (40)	
Do you ever feel hassled about sticking to your dietary plan?	Yes	221 (52.3)	107 (49.3)	114 (55.6)	0.196
	No	201(47.6)	110 (50.6)	91 (40.9)	
Did you have feelings of dietary deprivation?	Yes	222 (52.6)	114 (52.5)	108 (52.7)	0.976
	No	200 (47.3)	103(47.5)	97 (47.3)	
Forgetting to include fruits in your food daily?	Yes	248 (58.7)	127 (58.5)	121 (59.0)	0.917
	No	174 (41.2)	90 (41.5)	84 (40.9)	
Do you forget to include vegetables in your food daily?	Yes	262 (62.0)	132 (60.8)	130 (63.4)	0.584
	No	160 (37.9)	85 (39.1)	75 (36.5)	
Do you forget to cut down butter and fat intake in your food?	Yes	258 (61.1)	139 (64.0)	119 (58.0)	0.206
	No	164 (38.8)	78 (35.9)	86 (41.9)	

3.4. Direct Subjective Norm

The analysis demonstrated a strong association between subjective norms and intention to follow a diabetes diet. Participants with good intention were more likely to perceive expectations and support from important others, with over half agreeing or strongly agreeing with key statements, compared to very low agreement among poor intenders. In contrast, the majority of poor intenders disagreed or strongly disagreed with these perceptions. Overall, 84.5% of participants with good subjective norms had good intention, while 69.0% of those

with poor subjective norms had poor intention, indicating that perceived social support strongly influences dietary intention (Table 4).

Table 4: Summary TPB Variables vs. Intention

Variable	Category	Good Intention (Count, %)	Poor Intention (Count, %)	Total (Category)
Direct Attitude	Good Attitude	158 (72.8)	59 (27.2)	217
	Poor Attitude	165 (80.5)	40 (19.5)	205
Subjective Norm	Good Subjective Norm	136 (62.7)	81 (37.3)	217
	Poor Subjective Norm	180 (87.8)	25 (12.2)	205
Perceived Control	Good Perceived Control	115 (53.0)	102 (47.0)	217
	Poor Perceived Control	149 (72.7)	56 (27.3)	205
Behavioral Belief	Good Behavioral Belief	158 (72.8)	59 (27.2)	217
	Poor Behavioral Belief	176 (85.9)	29 (14.1)	205
Outcome Evaluation	Good Outcome Eval.	135 (62.2)	82 (37.8)	217
	Poor Outcome Eval.	140 (68.3)	65 (31.7)	205
Normative Belief	Good Normative Belief	126 (58.1)	91 (41.9)	217
	Poor Normative Belief	152 (74.1)	53 (25.9)	205
Motivation to Comply	Good Motivation	129 (59.4)	88 (40.6)	217
	Poor Motivation	176 (85.9)	29 (14.1)	205
Control Belief	Good Control Belief	133 (61.3)	84 (38.7)	217
	Poor Control Belief	159 (77.6)	46 (22.4)	205
Power Control	Good Power Control	146 (67.3)	71 (32.7)	217
	Poor Power Control	177 (86.3)	28 (13.7)	205

Analysis of perceived behavioral control revealed notable differences between participants with good and poor intentions. Although poor intenders reported higher confidence and perceived ease in following the diet, participants with good intention expressed significantly stronger beliefs regarding autonomy and control over their dietary decisions. More than 80% of good intenders believed that adherence was under their control, compared to only 27.3% of poor intenders. Additionally, 74.1% of poor intenders disagreed that following the dietary plan was entirely up to them. Overall, 67.3% of participants with good perceived control had good intention, whereas 59.4% of those with poor perceived control had poor intention, indicating a moderate association between perceived control and intention.

The analysis of behavioral beliefs and outcome evaluations demonstrated clear differences between participants with good and poor intentions. Participants with good intention were more likely to believe that dietary adherence prevents complications and controls blood glucose levels, while poor intenders frequently disagreed or remained neutral. Although both groups perceived dietary restrictions as burdensome, only good intenders strongly associated adherence with health benefits. Regarding outcome evaluation, good intenders more strongly endorsed the positive effects of dietary adherence. Overall, 84.5% of participants with strong behavioral beliefs and 67.5% of those with positive outcome evaluations had good intention, indicating strong and moderate associations, respectively.

Clear differences were observed in normative beliefs and motivation to comply between participants with good and poor intentions. Good intenders were more likely to perceive support from family and friends, whereas poor intenders tended to reject these perceptions. Both groups, however, showed some agreement that other diabetes patients follow their dietary plans, suggesting shared observational learning. Motivation to comply further distinguished the groups, as good intenders valued approval from family, friends, and healthcare providers more than poor intenders. Overall, 70.4% of participants with strong normative beliefs and 81.6% of those with high motivation to comply had good intention, underscoring the importance of social expectations and compliance motivation.

Analysis of control beliefs and perceived power highlighted important differences between participants with good and poor intentions. Good intenders were more likely to acknowledge barriers such as low income and social gatherings as challenges to dietary adherence, whereas poor intenders tended to downplay these obstacles. For example, 86.2% of good intenders identified income as a barrier, compared to only 28.8% of poor intenders. Good intenders were also more likely to acknowledge difficulties during emotionally driven social events. Although travel was perceived as a challenge by both groups, poor intenders were less likely to report its impact on adherence. Overall, 74.3% of participants with strong control beliefs and 83.9% of those with high perceived power had good intention, indicating that recognizing barriers and believing in one's ability to overcome them are strongly associated with intention.

3.5. Factors Associated with Intention Toward Dietary Adherence

Binary logistic regression analysis was conducted to assess the association between socio-demographic variables, TPB constructs, and intention to adhere to a healthy diet among patients with type 2 diabetes. Bivariable analysis revealed that age, sex, residence, occupational status, duration since treatment initiation, physical exercise, family history of diabetes, attitude, subjective norm, perceived behavioral control, behavioral belief, outcome evaluation, normative belief, and perceived power were associated with intention at a p-value < 0.20.

Variables meeting this criterion were entered into a multivariable logistic regression model. From the bivariate analysis, 15 variables showed evidence of association with intention. In the multivariable analysis using a backward stepwise approach, eight variables remained statistically significant at $p < 0.05$. These included three socio-demographic variables (sex, residence, and physical exercise) and five TPB constructs (attitude, behavioral belief, outcome evaluation, normative belief, and perceived power) (Table 5).

Table 5*:* Results of bivariable analyses of factors associated with Intention to Adhere to a healthy diet among type 2 Diabetic patients at Dire Dawa City Public Hospital, Dire Dawa, Ethiopia, 2025.

Variables	Category	Good Intention (n = 217) n (%)	Poor Intention (n = 205) n (%)	COR (95% CI)	P-value
Age (years)	18–44	38 (57.6)	28 (42.4)	0.92 (0.53–1.59)	0.764
	45–64	136 (55.5)	109 (44.5)	0.47 (0.25–0.87)	0.016*
	>65	43 (38.7)	68 (61.3)	1	—
Sex	Female	98 (45.2)	108 (52.7)	1.35 (0.92–1.98)	0.123
	Male	119 (54.8)	97 (47.3)	1	—
Residence	Rural	58 (26.7)	80 (39.0)	0.57 (0.38–0.86)	0.007*
	Urban	159 (73.3)	125 (61.0)	1	—
Since starting medication	0–5 years	123 (47.0)	139 (53.0)	1.59 (1.03–2.47)	0.038*
	6–10 years	69 (58.5)	49 (41.5)	1.66 (0.86–3.22)	0.133
	>10 years	25 (59.5)	17 (40.5)	1	—
Since diagnosis	0–5 years	120 (46.2)	140 (53.8)	2.06 (1.31–3.23)	0.002*
	6–10 years	74 (63.8)	42 (36.2)	1.17 (0.62–2.19)	0.630
	>10 years	23 (50.0)	23 (50.0)	1	—
Family history of DM	Yes	127 (54.5)	106 (45.5)	1.32 (0.90–1.94)	0.160
	No	90 (47.6)	99 (52.4)	1	—
Physical exercise	Yes	81 (45.0)	99 (55.0)	0.64 (0.43–0.94)	0.023*
	No	136 (56.2)	106 (43.8)	1	—
Occupational status	Government employee	44 (50.0)	44 (50.0)	0.86 (0.46–1.63)	0.645
	Farmer	31 (46.3)	36 (53.7)	1.03 (0.61–1.73)	0.923
	Merchant	79 (50.6)	77 (49.4)	1.08 (0.59–1.96)	0.813
	Pensioner	43 (51.8)	40 (48.2)	3.33 (1.22–9.09)	0.019*
	Other	20 (76.9)	6 (23.1)	1	—
Attitude	Good	158 (72.8)	40 (19.5)	11.05 (6.99–17.44)	<0.001*
	Poor	59 (27.2)	165 (80.5)	1	—
Subjective norm	Good	136 (62.7)	25 (12.2)	12.09 (7.33–19.95)	<0.001*
	Poor	81 (37.3)	180 (87.8)	1	—
Perceived behavioral control	Good	115 (53.0)	56 (27.3)	3.00 (2.00–4.51)	<0.001*
	Poor	102 (47.0)	149 (72.7)	1	—
Behavioral belief	Good	158 (72.8)	29 (14.1)	0.06 (0.04–0.10)	<0.001*
	Poor	59 (27.2)	176 (85.9)	1	—
Outcome evaluation	Good	135 (62.2)	65 (31.7)	3.55 (2.37–5.30)	<0.001*
	Poor	82 (37.8)	140 (68.3)	1	—
Normative belief	Good	126 (58.1)	53 (25.9)	3.97 (2.63–6.00)	<0.001*
	Poor	91 (41.9)	152 (74.1)	1	—
Power control	Good	146 (67.3)	28 (13.7)	13.00 (7.97–21.20)	<0.001*
	Poor	71 (32.7)	177 (86.3)	1	—

Females were 2.4 times more likely to have good intention toward dietary adherence compared to males (AOR = 2.40; 95% CI: 1.35, 4.26; p = 0.003). Participants residing in rural areas were significantly less likely to have good intention than urban residents (AOR = 0.51; 95% CI: 0.27, 0.96; p = 0.035), indicating that rural residence may hinder dietary adherence intention. Regular physical exercise was positively associated with intention, with physically active participants being 53% less likely to have poor intention (AOR = 0.47; 95% CI: 0.24, 0.92; p = 0.027).

Regarding psychosocial factors, participants with a favorable attitude toward dietary adherence were significantly more likely to intend adherence (AOR = 3.44; 95% CI: 1.59–7.46; p = 0.002). Those with strong behavioral beliefs were nearly eight times more likely to have good intention (AOR = 7.93; 95% CI: 3.31, 19.01; p < 0.001). Conversely, positive outcome evaluation was associated with lower odds of intention (AOR = 0.34; 95% CI: 0.12, 0.93; p = 0.037), suggesting possible confounding or complex perceptions of dietary benefits. Similarly, strong normative beliefs were inversely associated with intention (AOR = 0.28; 95% CI: 0.08, 0.95; p = 0.042). Finally, participants with high perceived power and control over their dietary behaviors were significantly more likely to intend dietary adherence (AOR = 7.92; 95% CI: 2.61, 23.99; p < 0.001) (Table 6).

Table 6*:* Factors associated with intention to Adhere to a healthy diet among type 2 Diabetic patients at Dire Dawa City Public Hospital, Dire Dawa, Ethiopia, 2025.

Variable	Category	COR (95% CI)	P-value	AOR (95% CI)	P-value
Sex	Female	1.352 (0.922–1.983)	0.123	2.400 (1.351–4.263)	0.003*
	Male	1	—	1	—
Residence	Rural	0.570 (0.378–0.860)	0.007*	0.506 (0.268–0.955)	0.035*
	Urban	1	—	1	—
Physical exercise	Yes	0.638 (0.433–0.940)	0.023*	0.470 (0.240–0.919)	0.027*
	No	1	—	1	—
Attitude	Good	11.047 (6.995–17.444)	<0.001*	3.438 (1.585–7.457)	0.002*
	Poor	1	—	1	—
Behavioral belief	Good	0.062 (0.038–0.101)	<0.001*	7.928 (3.306–19.008)	<0.001*
	Poor	1	—	1	—
Outcome evaluation	Good	3.546 (2.371–5.302)	<0.001*	0.335 (0.120–0.934)	0.037*
	Poor	1	—	1	—
Normative belief	Good	3.971 (2.628–6.001)	<0.001*	0.277 (0.081–0.953)	0.042*
	Poor	1	—	1	—
Perceived power control	Good	12.999 (7.970–21.201)	<0.001*	7.918 (2.614–23.985)	<0.001*
	Poor	1	—	1	—

4. Discussion

This study examined the intention to adhere to a healthy diet and the factors influencing it among patients with type 2 diabetes mellitus (T2DM) attending public hospitals in Dire Dawa, Eastern Ethiopia, using the Theory of Planned Behavior (TPB). Slightly more than half of the participants (51.4%) demonstrated strong intention to follow dietary recommendations, while actual dietary adherence was low, with 73% of respondents classified as having poor adherence. This discrepancy between intention and behavior represents a major public health concern and highlights the complexity of dietary behavior change in chronic disease management.

Attitude, one of the cores TPB constructs, was found to be strongly associated with intention to adhere to a healthy diet. This finding is consistent with previous studies conducted in

Ethiopia and internationally, which confirmed the relevance of TPB in predicting health-related behaviors among diabetic patients [13,14]. Participants who believed that dietary adherence could prevent complications and improve glycemic control were more likely to report strong intention.

A TPB-based study conducted at Tikur Anbessa Specialized Hospital in Addis Ababa reported that 59% of participants had strong intention to adhere to a diabetes-friendly diet, and 63.9% demonstrated positive attitudes toward dietary adherence [36]. These findings are comparable with the current study, in which attitude showed a strong predictive value for intention (AOR = 15.212, $p < 0.001$). However, the present study identified a lower level of actual dietary adherence, which may be attributed to differences in health education access, urbanization, socioeconomic resources, and health literacy in Dire Dawa [36].

Internationally, lower rates of dietary non-adherence have been reported, including 24% in Nigeria [27] and 37% in Botswana [26]. Studies from Egypt have shown that poor dietary practices, such as low fruit and vegetable intake and high fat consumption, were common among T2DM patients and were largely influenced by low income [34]. These findings indicate that economic and contextual factors play a substantial role in dietary behavior.

Despite relatively favorable intention levels, the actual dietary adherence in this study remained low, with 73% of participants categorized as having poor adherence. This mismatch highlights a critical gap in diabetes self-management. Although TPB emphasizes intention as the most proximal determinant of behavior, the findings suggest that intention alone may not result in behavior change, particularly in resource-limited settings where socioeconomic and systemic barriers exist.

Behavioral beliefs and outcome evaluations were significantly associated with intention. Participants with strong intention were more likely to believe that dietary adherence leads to positive health outcomes, while those with poor intention perceived dietary plans as restrictive or socially isolating. This observation is consistent with previous research demonstrating that favorable outcome evaluations are important predictors of dietary intention [14].

Subjective norm also played an important role. Participants who perceived those significant others, such as family members, friends, or healthcare providers, expected them to follow dietary recommendations were more likely to report good intention. This finding is consistent

with a study conducted in Nigeria, which identified social support as a key predictor of adherence behavior [24]. However, in the multivariable analysis, subjective norm showed an inverse association with intention, suggesting that social expectations alone may not enhance intention in the absence of strong internal motivation.

Perceived behavioral control (PBC) was another significant determinant of intention. Participants with higher intention perceived greater control over adhering to dietary recommendations, even when facing challenges. This finding supports previous studies indicating that higher PBC is associated with stronger intention and improved behavior change [13]. Nevertheless, participants with low PBC may lack the psychological capacity or external resources required to implement intended dietary changes.

Sociodemographic factors, including residence, age, and duration of treatment, were also significantly associated with intention. Urban residents and participants aged 45–64 years demonstrated higher intention, possibly due to better access to health information and healthcare services. Conversely, longer duration of diabetes treatment was associated with lower intention, which may reflect treatment fatigue or habituation, requiring further investigation.

This study also identified key barriers to dietary adherence, such as forgetfulness and difficulty integrating dietary recommendations into social and cultural contexts. Cultural food preferences and financial constraints were likely contributors to poor adherence, consistent with findings from studies conducted in Egypt and India [34].

Overall, the findings indicate that intention to adhere to a healthy diet among T2DM patients in Dire Dawa is significantly influenced by core TPB constructs, particularly attitude, behavioral belief, and perceived power control. Multivariable logistic regression analysis showed that participants with positive attitudes were more than three times more likely to have strong intention, while those with strong behavioral beliefs and perceived power control were nearly eight times more likely to report good intention. These findings support Ajzen's TPB model, which emphasizes the role of internal beliefs and perceived control in shaping behavioral intention [13]. Although subjective norm showed a strong association in the crude analysis (COR = 12.09), its inverse association in the adjusted model suggests that social influence alone may be insufficient without internal motivation, consistent with evidence from similar studies conducted in Ethiopia and other settings [14].

5. Conclusion

The findings revealed that more than half (51.4%) of the participants had a good intention to follow dietary recommendations; however, actual dietary adherence remained low, with 73% of participants classified as having poor adherence. In addition, socio-demographic factors such as sex, residence, and physical activity were significantly associated with intention. Female participants, urban residents, and those who engaged in regular physical exercise had higher odds of developing a strong intention to adhere to a healthy diet. Interestingly, although subjective norm showed a strong association in the crude analysis, it was inversely associated in the adjusted model, suggesting that social pressure alone may be insufficient to enhance intention unless accompanied by personal conviction and perceived behavioral control.

In conclusion, this study highlights that strengthening intention through positive attitudes, strong behavioral beliefs, and perceived behavioral control is essential but not sufficient on its own. Effective interventions must also address environmental, economic, and social barriers that hinder patients from translating intention into action. Tailored nutrition education, patient empowerment strategies, and strengthened support systems are therefore critical to bridging the gap between intention and actual behavior and improving dietary adherence among type 2 diabetic patients in similar settings.

Abbreviations

AOR: Adjusted Odds Ratio; COR: Crude Odds Ratio; DM: Diabetes Mellitus; DRH: Dilchora Referral Hospital; IDF: International Diabetes Federation; MMAS-8: Morisky Medication Adherence Scale–8 Item; PBC: Perceived Behavioral Control; SGH: Sabian General Hospital; SN: Subjective Norm; SPSS: Statistical Package for the Social Sciences; TRA: Theory of Reasoned Action; TPB: Theory of Planned Behavior; T2DM: Type 2 Diabetes Mellitus; USD: United States Dollar; WHO: World Health Organization.

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Author's Contribution

All authors made equal contributions to the conception and design of the study. They were actively involved in developing the methodology, collecting and analyzing the data, and interpreting the results. In addition, all authors participated in drafting, critically reviewing, and revising the manuscript, and each approved the final version for submission.

Ethical Approval

Ethical approval was obtained from the Institutional Review Board (IRB) of Dire Dawa University. Additional permission was also secured from the Dire Dawa City Health Office and the respective public health facilities. The purpose of the study was clearly explained to all participants, and they were informed of their right to decline participation or withdraw from the study at any time without any consequences. Informed oral consent was obtained from the heads of the selected public health facilities, and subsequently from each study participant prior to data collection. Confidentiality of all information was strictly maintained throughout the study.

Conflicting Interests

The authors declare that there are no conflicts of interest related to the conduct of the research, authorship, or publication of this article.

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Availability of Data and Materials

The data that support the findings of this study can be obtained from the corresponding author upon reasonable request.

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