Dietary Attitudes and Knowledge Assessment: A Cross-Sectional Study among Type 2DM Patients in Saudi Arabia

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Abstract

Diabetes, which is known as hyperglycemia caused by a complete or partial lack of insulin or by a reduction in its effectiveness, is one of the most common chronic diseases in the world. KSA ranks 7th globally and 2nd in the Middle East in terms of diabetes prevalence. To assess and evaluate the knowledge and attitude level of dietary among type 2 DM patients in Saudi Arabia. An online questionnaire was used to carry out this cross-sectional study. The survey was made available via social media platforms targeting type 2 diabetes patients living in Saudi Arabia. A total of 384 diabetic patients in Saudi Arabia older than 18 years, males and females were included in the study sample. SPSS software was used to conduct statistical analysis. The study included 405 participants, 55.6% of them were females while 44.4% were males. A significant proportion of individuals possess poor knowledge of diet, accounting for 69.9% of the total. Meanwhile, 25.2% exhibit a moderate level of understanding, while only 4.9% possess good knowledge. 58% of participants expressed a positive attitude towards diet, 36% a neutral attitude, and 5.9% a negative attitude. In conclusion, the study shows that participants exhibited poor knowledge and attitude toward diet among T2DM patients. Knowledge and attitude scores were not statistically significant with any of the sociodemographic characters. By conducting a comprehensive assessment, healthcare providers can develop targeted interventions and educational programs to improve dietary practices and ultimately enhance the overall health outcomes of T2DM patients in Saudi Arabia.

Keywords: Diabetes, Dietary, Saudi Arabia, Knowledge, Attitude

INTRODUCTION

Diabetes, which is a form of hyperglycemia brought on by an absolute or relative lack of circulating insulin or its diminished efficacy [1] is one of the most prevalent chronic diseases in the world [2]. The prevalence of DM is rising globally due to changing dietary patterns and decreased physical activity [3]. As a consequence, Dietary Knowledge (DK) is the body of knowledge that addresses the principles and ideas around healthy eating, the avoidance of disease, the nutritional value of foods, and the rules that should be adhered to [4]. According to the IDF's 10th edition, there were 537 million cases of diabetes worldwide in 2021, 643 million by 2030, and 783 million by 2045, with 50% of patients being type 2. (i.e., one in two persons with diabetes) remain undiagnosed [5]. According to WHO 2019 data, type 2 diabetes accounts for around 90-95% of all cases, with type 1 diabetes accounting for the remaining 2-5% [6]. With age, the likelihood of developing diabetes rises dramatically, from 4.2% of younger persons (18–44 years) to 17.5% and 26.8% of middle-aged adults (45–64 years) and older adults (65+), respectively [7]. Saudi Arabia is ranked seventh worldwide and second in the Middle East for diabetes prevalence. Another study found that in Saudi Arabia, approximately three million people with prediabetes and seven million with diabetes [8]. Also, in some recent studies, the prevalence of diabetes in Saudi Arabia is around 23.4%, with males being more affected than females [9], in 2021, a cross-sectional study was conducted in Cotonou, Benin, demonstrating that people with diabetes lacked understanding, had an unfavorable perspective, and had inappropriate diabetic habits [10]. A nationwide in 2023, A cross-sectional study found that individuals with Type 2 diabetes had an elevated

level of awareness, positive conduct, and high compliance to therapy [8]. Additionally, When the researchers evaluated the KAP scores of the study attendees in 2022, they found that their understanding was inadequate in fifty-one percent of the cases. Otherwise, Favorable attitude levels were observed in 92.2 percent of the individuals. Ultimately, it was demonstrated that 75.2 percent of the cases had good practice levels [11]. In addition, An Indian study in 2019 showed that KAP scores were enhanced by clinical pharmacist intervention through patient counseling [12]. Moreover, a study conducted in 2020 with 422 participants revealed that 59% of them were knowledgeable, 53% had a positive attitude, and 41% had decent behavior [13]. We need this study because dietary habits play a crucial role in managing and preventing T2DM, making it essential to assess the dietary attitudes and knowledge of individuals living with this condition. This study wasn't for both T2DM patients and healthcare providers in KSA. By understanding the dietary attitudes and knowledge of individuals with T2DM, healthcare professionals can tailor their counseling and education strategies to address specific challenges and misconceptions. Additionally, T2DM patients can benefit from improved self-management skills, better glycemic control, and reduced risk of diabetes-related complications. To assess the knowledge and attitude level of dietary among type 2 DM patients in Saudi Arabia.

MATERIALS AND METHODS

Study Design
This is a cross-sectional study that was done using an online survey. The online questionnaire was distributed through social media platforms targeting type 2 diabetes patients.

Study Setting: Participants, Recruitment, and Sampling Procedure
Participants in this study were recruited from people receiving the online questionnaire which included Saudi and non-Saudi individuals over the age of 18 diagnosed with T2D, living in Saudi Arabia during the study period.

Inclusion and Exclusion Criteria
In our study, we included diabetic patients in Saudi Arabia older than 18 years, males and females; any patients with another type of diabetes under 18 years old were excluded.

Sample Size
The sample size was calculated by (Raosoft, Inc., Seattle, WA, USA) at 384 individuals using the following formula and applying means and standard deviation. Considering the standard deviation (=1.96) for a 95% Confidence interval and the maximum acceptable error (=0.05). Therefore, the calculated minimum sample size required for this study is n= (1.96)^2X 0.50X 0.50/ (0.50)^2= 384 participants.

$$n = \frac{Z^2 p(1 - p)}{d^2} \qquad (1)$$

Method for Data Collection and Instrument (Data Collection Technique and Tools)
A questionnaire was constructed based on our objectives and a previous study.

The questionnaire was driven from Ntaate C *et al.*, paper [14]. and we got permission to use the questionnaire. It was available in both English and Arabic. The data was gathered using an online questionnaire in the Arabic language designed using Google Forms and distributed via social media to diabetic patients in Saudi Arabia.

Scoring System
Data was obtained using a validated guided self-administered questionnaire that included informed consent, 7 demographic factors, 12 knowledge items, and 9 attitude measures.

The questionnaire consisted of four sections:

The first section contains informed consent, and the second section asks about demographic factors of age, sex, marital status, place of residence, level of education, employment position, and whether any other family members had diabetes. The third section assessed the knowledge level of different types of diet in the Management of diabetes. which consisted of 12 questions each question had one correct answer which was given one point, any other answers were given zero points, with a maximum score of 12. Using blooms cut-off points, Knowledge scores have been classified into three categories: high level (scores between 10 and 12); moderate level (scores between 7 and 9); and low level (scores between 0 and 6) This section also measures the level of knowledge regarding possible causes and outcomes of diabetes, which meals should be avoided and the importance of medication, exercise and how to prepare food in the Management of this disease.

The fourth section, which had 9 questions, evaluated participants' attitudes. The first three questions each had three possible answers: yes, no, or I don't know with a maximum score of 3 points for the following six questions a Likert scale was used with five possible responses: strongly agree, agree, neutral, disagree, and strongly disagree. Scores of 5,4,3,2, and 1 were given in that order. The maximum score possible was 30 points for the last 6 questions and the results were divided into three levels: Positive attitude was given a score range of 20 to 30; neutral attitude was given a score range of 10 to 19; and negative attitude was given a score range of 0-9.

Analyzes and Entry Method
SPSS software (version 25, SPSS Inc., Chicago, IL) was used for data analysis. Descriptive statistics were obtained to summarize data. Comparing the result with other studies was

made by Student's t-test or Mann-Whitney test, and the Chi-squared test was obtained for the association between categorical variables. A P-value of less than 0.05 was considered statistically significant, and the Confidence interval (CI) was set at 95%.

RESULTS AND DISCUSSION

The majority of respondents fall within the age range of 21-30, accounting for 27.4% of the total. This is followed by the age groups of 31-40 (19.3%), 41-50 (19.8%), and 51-60 (18.0%). The age group with the lowest representation is those above 60 years old, comprising 9.4% of the sample. Moving on to gender, the data reveals a nearly equal distribution, with 55.6% female respondents and 44.4% male respondents. Regarding location, the highest number of respondents are from the Western Region (41.2%), followed by the Eastern Province (23.7%). The Southern area, the Northern area, and the Central Region account for 13.3%, 10.1%, and 11.6% respectively. Next, let's examine the education level of the respondents. The data shows that the majority have a Bachelor's degree (47.4%), followed by secondary education (23.5%) and diploma holders (13.3%). Postgraduates constitute 10.4% of the sample, while uneducated and primary-educated individuals make up a smaller portion, each accounting for 1.2%. Middle-educated respondents represent 3.0% of the total. Moving on to occupation, the largest group consists of employees in the non-health sector, accounting for 29.9% of the sample. This is followed by students (17.8%), retired individuals (15.6%), and employees in the health sector (10.9%). Those who do not work make up 19.3% of the respondents, while individuals engaged in free business, as well as those with other occupations, represent smaller proportions (3.0% and 3.7% respectively). Regarding marital status, the data shows that the majority of respondents are married (63.2%), followed by single individuals (31.9%). Divorced and widowed individuals make up smaller portions, accounting for 3.5% and 1.5% respectively. Lastly, the majority (92.1%) reported living with family, friends, or other people, while a smaller proportion (7.9%) indicated living alone **(Table 1)**.

Table 1. Sociodemographic characteristics of participants (n=405)

	Parameter	No.	Percent
	18 - 20	25	6.2
	21- 30	111	27.4
	31- 40	78	19.3
Age	41- 50	80	19.8
	51- 60	73	18.0
	more than 60	38	9.4
Gender	Male	180	44.4
	Female	225	55.6
Location	Southern area	54	13.3
	Eastern Province	96	23.7
	The northern area	41	10.1
	Western Region	167	41.2
	Central Region	47	11.6
	uneducated	5	1.2
	primary	5	1.2
	middle	12	3.0
Education Level	secondary	95	23.5
	Bachelor's	192	47.4
	diploma	54	13.3
	Postgraduate	42	10.4
	free business	12	3.0
	student	72	17.8
	Retired	63	15.6
Occupation	An employee in the health sector	44	10.9
	An employee in the non-health sector	121	29.9
	I do not work	78	19.3
	Other	15	3.7
	Married	256	63.2
Marital Status	Single	129	31.9
	Divorced	14	3.5
	Widowed	6	1.5
Living condition	You live alone	32	7.9
	Being with family, friends, and other people	373	92.1

As shown in **Table 2**, based on the provided data, it appears that there is a significant number of people in the family with type 2 diabetes, with 68.9% of respondents confirming this. When it comes to the effect of drinking unsweetened fruit juice on blood sugar, the data indicates that 51.9% of respondents believe it increases blood sugar, while 13.8% believe it reduces blood sugar. However, a significant portion of respondents (34.3%) believe that unsweetened fruit juice does not affect blood sugar. In terms of managing low blood sugar, the data suggests that there are different opinions on what to consume. Among the respondents, 21.5% believe that eating 3 pieces of chocolate is a suitable option, while 27.2% suggest drinking a cup of full-fat cow's milk. Additionally, 34.3% of respondents recommend having a cup of soft drink, and 17.0% suggest drinking half a cup of orange juice. Regarding acceptable food choices for diabetics, the data suggests that there are different opinions on what constitutes acceptable food. Among the respondents, 34.8% believe that any food for diabetics is acceptable, while 19.5% suggest opting for any food labeled as sugar-free. Additionally, 22.5% of respondents believe that any food containing less than 20 calories per serving is acceptable, and 23.2% suggest consuming any unsweetened food. In terms of fat content, the data indicates that corn seeds are believed to have a high percentage of fat by 52.1% of respondents. On the other hand, 31.9% believe that low-fat milk contains a high percentage of fat, while only 12.6% believe that honey does.

When it comes to starches (carbohydrates), the data suggests that grilled potatoes are believed to be high in starches by 56.5% of respondents. Additionally, 18.3% believe that chocolate is high in starches, while 17.0% believe the same for peanut butter. Regarding the diet for diabetics, the data suggests that a majority of respondents (50.1%) believe in following a healthy diet. However, it is worth noting that there are differing opinions, with 33.3% suggesting a high-protein diet and 5.2% suggesting a high-starch (carbohydrate) diet.

Table 2. Knowledge of participants of diet of T2DM patients (n=405).

| Parameter		No.	Percent
Are there people in the family with type 2 diabetes?	Yes	279	68.9
	no	126	31.1
What effect does drinking unsweetened fruit juice have on your blood sugar?	Increases blood sugar	210	51.9
	Reduces blood sugar	56	13.8
	It has no effect on blood sugar	139	34.3
Which of these things should you avoid when feeling low blood sugar?	Eat 3 pieces of chocolate	87	21.5
	Drink a cup of full-fat cow's milk	110	27.2
	Have a cup of soft drink	139	34.3
	Drink half a cup of orange juice	69	17.0
Which of the following is an acceptable food for diabetics?	Any food for diabetics	141	34.8
	Any food labeled as sugar-free	79	19.5
	Any food that contains less than 20 calories per serving	91	22.5
	Any unsweetened food	94	23.2
Which contains a high percentage of fat?	Honey	51	12.6
	corn seeds	211	52.1
	low-fat milk	129	31.9
	orange juice	14	3.5
Which is high in starches (carbohydrates)?	grilled chicken	33	8.1
	Chocolate	74	18.3
	Grilled potatoes	229	56.5
	Peanut Butter	69	17.0
The diet for diabetics is:	Following a healthy diet is followed by most people	203	50.1
	A high-protein diet for most people	135	33.3
	Most people follow a high-starch (carbohydrate) diet	21	5.2
	The dietary lifestyle of the majority of society	46	11.4
	Neurological diseases	29	7.2
	Eye diseases	25	6.2
	Heart disease	291	71.9
	Kidney disease	60	14.8

According to the survey results, a majority of respondents (61.5%) agreed that eating too much sugar and foods containing sugar is the main cause of diabetes. On the other hand, 21.5% disagreed with this statement, while 17.0% were unsure. In terms of regulating blood sugar, the survey revealed that a significant majority (73.3%) considered medications (medical drugs) to be more important than following a diet and exercising, with only 16.3% of respondents expressing disagreement and 10.4% being unsure. The importance of the way food is cooked (prepared) was also addressed in the survey. A large majority (75.3%) agreed that the cooking method is as important as the food itself, while 8.9% disagreed, and 15.8% were unsure. Regarding the diet for diabetics, the results showed that 51.9% of respondents agreed that it consists of foods specially prepared for them. On the other hand, 38.8% disagreed, and 9.4% were unsure. The survey also touched upon the importance of maintaining a healthy and ideal weight in regulating and treating diabetes. A majority of respondents (74.8%) agreed that it is indeed important, while 18.0% disagreed, and 7.2% were unsure. In terms of providing dietary instructions to illiterate individuals with diabetes, the vast majority (91.9%) agreed that such instructions should be written, while 3.7% disagreed, and 4.4% were unsure. Additionally, it was suggested that there should be someone at home who can explain these instructions to the illiterate individual. The survey results also indicated that a significant majority (65.4%) did not consider drinking alcohol while taking diabetes medications to be a serious problem, while 9.6% disagreed, and 24.9% were unsure. Lastly, the importance of diet and exercise in comparison to taking medications (prescription drugs) was addressed. The majority of respondents (75.6%) believed that diet and exercise were equally important, if not more so, than taking medications. Conversely, 15.6% disagreed, and 8.9% were unsure **(Table 3)**.

Table 3. Attitude of participants towards diet of T2DM patients (n=405).

|	Yes	No	Don't know
Eating too much sugar and foods containing sugar is the main cause of diabetes	249 61.5%	87 21.5%	69 17.0%
To regulate blood sugar, medications (medical drugs) are much more important than following a diet and exercising.	66 16.3%	297 73.3%	42 10.4%
The way food is cooked (prepared) is as important as the food I eat	305 75.3%	36 8.9%	64 15.8%
The diet for diabetics consists of foods specially prepared for them	210 51.9%	157 38.8%	38 9.4%
Maintaining a healthy and ideal weight is not important in regulating and treating diabetes.	73 18.0%	303 74.8%	29 7.2%

Dietary instructions must be written even if the diabetic is illiterate, and there must be someone at home who can explain this to him.	372 91.9%	15 3.7%	18 4.4%
Drinking alcohol while taking diabetes medications is not considered a serious problem	39 9.6%	265 65.4%	101 24.9%
Diet and exercise are not as important as taking medications (prescription drugs).	63 15.6%	306 75.6%	36 8.9%

As in **Figure 1**, it is evident that a significant proportion of individuals possess poor knowledge of diet, accounting for 69.9% of the total. Meanwhile, 25.2% exhibit a moderate level of understanding, while only 4.9% possess good knowledge.
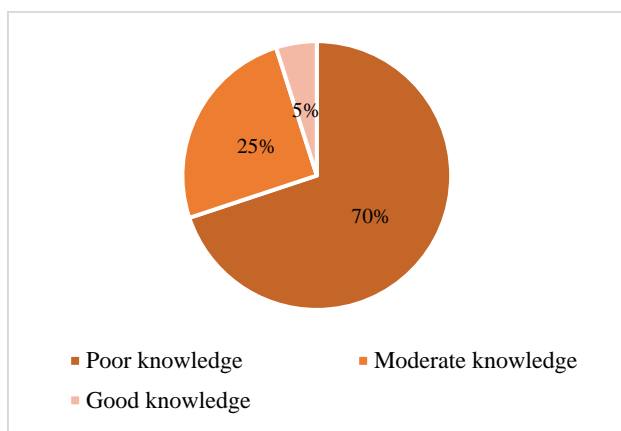
Figure 1. Participants' knowledge scores of diet in T2DM

As illustrated in **Figure 2**, 58% of participants expressed a positive attitude towards diet, 36% a neutral attitude, and 5.9% a negative attitude.
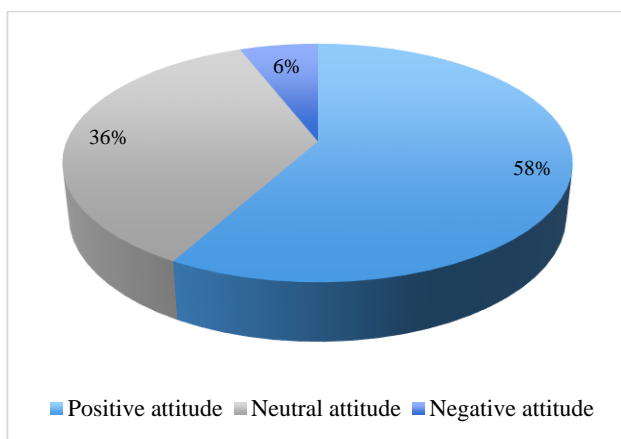
Figure 2. Participants' attitude scores towards diet in T2DM

Table 4 indicates that knowledge scores varied across different age groups, with the highest scores observed among participants aged 21-30 and the lowest scores among those aged 18-20 and over 60. There was no significant relationship between knowledge scores and marital status, with married participants having higher scores than single, divorced, or widowed participants. Gender was not found to be associated with knowledge scores, with female participants having higher scores than male participants. Location was another factor that was not found to be related to knowledge scores, with participants from the Western region having the highest scores and those from the Northern area having the lowest scores. Education level was not associated with knowledge scores, with participants with higher levels of education having higher scores.

Table 4. Participants' knowledge scores in association with their sociodemographic characters (n=405).

		Knowledge score				
		Poor knowledge	Moderate knowledge	Good knowledge	Total (N=405)	P value
Age	18 -20	19 4.7%	6 1.5%	0 0.0%	25 6.2%	0.406
	21 -30	74 18.3%	29 7.2%	8 2.0%	111 27.4%	
	31 - 40	54 13.3%	20 4.9%	4 1.0%	78 19.3%	
	41- 50	52 12.8%	23 5.7%	5 1.2%	80 19.8%	
	51 -60	59 14.6%	14 3.5%	0 0.0%	73 18.0%	
	more than 60	25 6.2%	10 2.5%	3 0.7%	38 9.4%	
Marital status	Single	90 22.2%	34 8.4%	5 1.2%	129 31.9%	0.454
	Married	175 43.2%	67 16.5%	14 3.5%	256 63.2%	
	Divorced	12 3.0%	1 0.2%	1 0.2%	14 3.5%	
	widow	6 1.5%	0 0.0%	0 0.0%	6 1.5%	
Gender	Male	132 32.6%	40 9.9%	8 2.0%	180 44.4%	0.398
	Female	151 37.3%	62 15.3%	12 3.0%	225 55.6%	
Location	Southern area	36 8.9%	14 3.5%	4 1.0%	54 13.3%	0.142
	Eastern Province	64 15.8%	24 5.9%	8 2.0%	96 23.7%	

						P value
	The northern area	34	7	0	41	
		8.4%	1.7%	0.0%	10.1%	
	Western Region	115	48	4	167	
		28.4%	11.9%	1.0%	41.2%	
	Central Region	34	9	4	47	
		8.4%	2.2%	1.0%	11.6%	
Education Level	uneducated	4	1	0	5	
		1.0%	0.2%	0.0%	1.2%	
	Primary	4	0	1	5	
		1.0%	0.0%	0.2%	1.2%	
	middle	6	4	2	12	
		1.5%	1.0%	0.5%	3.0%	
	Secondary	69	23	3	95	0.605
		17.0%	5.7%	0.7%	23.5%	
	Bachelor degree	135	49	8	192	
		33.3%	12.1%	2.0%	47.4%	
	Diploma	37	14	3	54	
		9.1%	3.5%	0.7%	13.3%	
	Postgraduate	28	11	3	42	
		6.9%	2.7%	0.7%	10.4%	
Occupation	free business	8	3	1	12	
		2.0%	0.7%	0.2%	3.0%	
	student	44	25	3	72	
		10.9%	6.2%	0.7%	17.8%	
	Retired	43	18	2	63	
		10.6%	4.4%	0.5%	15.6%	
	An employee in the health sector	29	11	4	44	0.420
		7.2%	2.7%	1.0%	10.9%	
	An employee in the non-health sector	87	27	7	121	
		21.5%	6.7%	1.7%	29.9%	
	I do not work	61	14	3	78	
		15.1%	3.5%	0.7%	19.3%	
	Other	11	4	0	15	
		2.7%	1.0%	0.0%	3.7%	
Living condition	You live alone	18	10	4	32	0.065
		4.4%	2.5%	1.0%	7.9%	
	Available with family, friends, and other people	265	92	16	373	
		65.4%	22.7%	4.0%	92.1%	

Table 5 indicates that the majority of respondents had a positive attitude, with the highest percentage in the 21-30 age group and the lowest in the uneducated education level. Marital status did not have a significant impact on attitude scores, with no significant difference between single, married, divorced, or widowed individuals. Similarly, gender did not have a significant impact on attitude scores, with no significant difference between males and females. The location of respondents did show some variation, with the highest positive attitude scores in the Western Region and the

lowest in the Northern Area. Finally, occupation did not have a significant impact on attitude scores, with no significant difference between free business, student, retired, health sector employee, non-health sector employee, and unemployed individuals.

Table 5. Participants' attitude scores in association with their sociodemographic characters (n=405).

		Attitude score			Total (N=405)	P value
		Positive attitude	Neutral attitude	Negative attitude		
Age	18 -20	16	9	0	25	
		4.0%	2.2%	0.0%	6.2%	
	21 -30	54	45	12	111	
		13.3%	11.1%	3.0%	27.4%	
	31 - 40	43	30	5	78	0.065
		10.6%	7.4%	1.2%	19.3%	
	41- 50	48	28	4	80	
		11.9%	6.9%	1.0%	19.8%	
	51 -60	47	26	0	73	
		11.6%	6.4%	0.0%	18.0%	
	more than 60	27	8	3	38	
		6.7%	2.0%	0.7%	9.4%	
Marital status	Single	68	51	10	129	
		16.8%	12.6%	2.5%	31.9%	
	Married	153	89	14	256	0.583
		37.8%	22.0%	3.5%	63.2%	
	Divorced	9	5	0	14	
		2.2%	1.2%	0.0%	3.5%	
	widow	5	1	0	6	
		1.2%	0.2%	0.0%	1.5%	
Gender	Male	100	71	9	180	
		24.7%	17.5%	2.2%	44.4%	0.397
	Female	135	75	15	225	
		33.3%	18.5%	3.7%	55.6%	
Location	Southern area	36	15	3	54	
		8.9%	3.7%	0.7%	13.3%	
	Eastern Province	60	31	5	96	
		14.8%	7.7%	1.2%	23.7%	
	The northern area	17	22	2	41	0.237
		4.2%	5.4%	0.5%	10.1%	
	Western Region	92	65	10	167	
		22.7%	16.0%	2.5%	41.2%	
	Central Region	30	13	4	47	
		7.4%	3.2%	1.0%	11.6%	

Education Level	uneducated	4	1	0	5	0.859
		1.0%	0.2%	0.0%	1.2%	
	Primary	2	3	0	5	
		0.5%	0.7%	0.0%	1.2%	
	middle	8	4	0	12	
		2.0%	1.0%	0.0%	3.0%	
	Secondary	60	30	5	95	
		14.8%	7.4%	1.2%	23.5%	
	Bachelor degree	105	72	15	192	
		25.9%	17.8%	3.7%	47.4%	
	Diploma	31	20	3	54	
		7.7%	4.9%	0.7%	13.3%	
	Postgraduate	25	16	1	42	
		6.2%	4.0%	0.2%	10.4%	
Occupation	free business	8	4	0	12	0.069
		2.0%	1.0%	0.0%	3.0%	
	student	34	30	8	72	
		8.4%	7.4%	2.0%	17.8%	
	Retired	44	17	2	63	
		10.9%	4.2%	0.5%	15.6%	
	An employee in the health sector	23	19	2	44	
		5.7%	4.7%	0.5%	10.9%	
	An employee in the non-health sector	61	51	9	121	
		15.1%	12.6%	2.2%	29.9%	
	I do not work	55	21	2	78	
		13.6%	5.2%	0.5%	19.3%	
	Other	10	4	1	15	
		2.5%	1.0%	0.2%	3.7%	
Living condition	You live alone	20	11	1	32	0.738
		4.9%	2.7%	0.2%	7.9%	
	Available with family, friends, and other people	215	135	23	373	
		53.1%	33.3%	5.7%	92.1%	

Dietary attitudes and knowledge assessment among Type 2 DM patients in Saudi Arabia is a topic of significant importance and relevance in the field of healthcare. Type 2 diabetes mellitus (T2DM) is a chronic metabolic disorder characterized by high blood sugar levels resulting from insulin resistance or inadequate insulin production. It is a global health concern, and Saudi Arabia is no exception, as it has witnessed a significant increase in the prevalence of T2DM in recent years [13].

Saudi Arabia, being a country with a rich culinary tradition, faces unique challenges in managing T2DM. Traditional Saudi Arabian cuisine often includes high levels of carbohydrates, unhealthy fats, and sugary beverages, which can exacerbate the condition and lead to complications if not properly managed. Therefore, it becomes crucial to assess the

dietary attitudes and knowledge among T2DM patients in Saudi Arabia to understand their current practices and identify areas for improvement [13, 14].

One key aspect of dietary attitudes is the individual's perception of their diet and its impact on their health. Many T2DM patients may not fully comprehend the relationship between their dietary choices and their condition. This lack of awareness can result in poor dietary habits and inadequate control of blood sugar levels. Therefore, conducting a comprehensive assessment of their knowledge regarding the disease and its dietary management is essential [3].

Furthermore, cultural and social factors play a significant role in shaping dietary attitudes in Saudi Arabia. Traditional customs and societal norms may influence the food choices of T2DM patients, making it challenging for them to adopt healthier eating habits. Understanding these cultural influences and tailoring dietary interventions accordingly is crucial for the successful management of T2DM in Saudi Arabia [7].

In addition to cultural factors, socioeconomic status also plays a role in dietary attitudes and knowledge among T2DM patients. Access to healthy food options, affordability, and education levels can all impact dietary choices. It is important to assess these factors to ensure that dietary interventions are feasible and sustainable for all individuals, regardless of their socioeconomic background [3, 7].

In the current study, a significant proportion of individuals possess poor knowledge of diet, accounting for 69.9% of the total. Meanwhile, 25.2% exhibit a moderate level of understanding, while only 4.9% possess good knowledge.

According to an Iranian study [15], type 2 diabetics' understanding of food control was mediocre. When comparing the findings of our investigation to the Iranian study, we found that our patients' DK was equally subpar. According to El-Qudah's study [16], those with diabetes had insufficient DK. The author also suggested establishing health education initiatives on diabetes mellitus, with a focus on training individuals in self-monitoring. Our investigation's findings concur with those of the study. Another study [17]. found insufficient DK; patients' understanding of the diabetic diet was particularly low (43.42%). In contrast to our study, which found that 71.43% of diabetic patients had poor DK, another study was conducted in Nigeria [18]. indicated that over 50% of patients had poor DK. Contrary to the findings of a study by Sheard *et al.* [19]. another study's findings likewise revealed that type 2 diabetics had poor DK regarding carbohydrates (33.33%), but good DK regarding lipids and fats (50%) and proteins (50%) [4]. Joshi and Joshi [20]. suggested that the main course for type 2 diabetes should consist of potatoes, basmati rice, pasta, and brown bread or whole wheat bread. According to the study by Savoca and Miller [21], patients' dietary habits and food choices may be

influenced by their level of understanding of the recommended diabetes diet.

Regarding attitude, 58% of our study participants expressed a positive attitude towards diet, 36% a neutral attitude, and 5.9% a negative attitude. In recent years, there have been several studies conducted to explore the attitudes of patients with Type 2 Diabetes Mellitus (T2DM) towards dietary habits in Saudi Arabia. One of the key findings from these studies is that there is a significant knowledge gap among T2DM patients regarding proper dietary management. Many patients were found to have limited awareness of the recommended dietary guidelines for T2DM and the impact of dietary choices on their condition. This lack of knowledge often leads to poor dietary choices, such as consuming excessive amounts of carbohydrates and sugary foods, which can exacerbate diabetes symptoms [7, 14].

Understanding the dietary attitudes of Type 2 DM patients is important because it provides insights into their beliefs, preferences, and motivations related to food choices. It helps us identify potential barriers to dietary adherence and develop tailored strategies to overcome them. For example, some patients may have a negative attitude towards certain foods or food groups due to misconceptions or personal biases. By addressing these attitudes and providing accurate information, we can help patients make informed decisions and adopt healthier dietary habits [5].

Moreover, the assessment of dietary attitudes and knowledge among T2DM patients should not be limited to their perspectives. It is equally important to consider the role of healthcare professionals in providing accurate and up-to-date information to patients. Healthcare providers can play a vital role in educating patients about T2DM management, including dietary guidelines and lifestyle modifications. Therefore, assessing the knowledge and attitudes of healthcare professionals regarding T2DM dietary management is crucial to ensure that accurate information is disseminated to patients [14].

CONCLUSION

In conclusion, the study shows that participants exhibited poor knowledge and attitude toward diet among T2DM patients. Knowledge and attitude scores were not statistically significant with any of the sociodemographic characters. Assessment of dietary attitudes and knowledge among Type 2 DM patients in Saudi Arabia is essential for the effective management of the disease. It involves understanding the individual's perception of their diet, cultural and social influences on dietary choices, socioeconomic factors, and the role of healthcare professionals in providing accurate information. By conducting a comprehensive assessment, healthcare providers can develop targeted interventions and educational programs to improve dietary practices and ultimately enhance the overall health outcomes of T2DM patients in Saudi Arabia.

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