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PROPER DIABETIC SELF-CARE PRACTICES AND AFFECTING FACTORS AMONG TYPE TWO DIABETES MELLITUS PATIENTS ATTENDING DIABETIC CENTRE IN TAIF CITY, 2019

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Abstract:

Introduction: *Diabetes is a long-term condition that can be managed but not cured. The medications can help to alleviate symptoms and delay the disease's progression and complications. Effective diabetes self-management has long been recognized as critical to maintaining good glycaemic control and avoiding diabetic complications.* ***Methodology:*** *This was a cross-sectional study conducted to investigate self-care practice activities among patients with T2DM attending diabetic centers in Taif city, Saudi Arabia.* ***Results:*** *A total of 330 patients were included in this study; most of them (65.5%) were males and with a mean age (52 ± 15). The mean duration of DM is (10 ± 9), mean Hb1AC was (8 ± 2.3), and the mean fasting blood sugar was (146 ± 44). The highest mean overall score was recorded among soldiers (4.44 ± 1.73) and students (3.77 ± 2.58), while the lowest score was found among those working in business (2.38 ± 0.97), and this association was statistically significant (P=0.000).* ***Conclusion:*** *This study reflected relatively poor diabetic self-care practice among patients with T2DM in Taif, Saudi Arabia. Regarding the overall SDSCA score, male participants, younger participants, Saudi participants, undergraduate/ postgraduate students, those with family support for taking diabetic medication, those with no chronic conditions, no diabetic complications, and those who use diet treatment only were reported to have the best general self-care management.*

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INTRODUCTION:

Diabetes is a global burden on healthcare systems and services and one of the most important sustainable development challenges. Despite the fact that diabetes is a highly preventable non-communicable disease (NCD), it remains an incurable disease and responsible for millions of deaths and complications annually. It costs the countries and international organizations, directly and indirectly, huge financial burdens that can be avoided. [1]

The estimated prevalence of diabetes is 4.4% in 2030 worldwide. Globally, the total number of people with diabetes is projected to rise to 366 million in 2030. [2] In Saudi Arabia, **AlNozha *et al***. reported that about 24% of adult Saudis are diabetics. WHO profile country shows its causes 4.6% of all the deaths. [3, 4]

Diabetes Mellitus is a metabolic disorder characterized by elevated blood glucose levels, which leads over time to severe damage to the heart, blood vessels, eyes, kidneys, and nerves. [5] Around 90% of all cases of diabetes are type 2 diabetes, and it is the most common type of diabetes. [1] In type 2 diabetes, which is defined as [insulin] resistance, hyperglycemia results from inadequate insulin production and the inability of the body to respond fully to insulin. [1] Diabetes mellitus complications are acute, chronic, microvascular, and macrovascular. Risk factors for them can be modifiable or not modifiable. Moreover, complications are can much less in people with well-controlled blood sugar levels. [6]

The World Health Organization (WHO) defined adherence as "the extent to which a person's behavior – taking medication, following a diet, and/or executing lifestyle changes, corresponds with agreed recommendations from a health care provider." [7] Adherence to Self-care and a healthy lifestyle is considered a cornerstone of diabetes care. An accurate assessment of self-care activities for the diabetics such as regular physical exercise has been effective in reducing the onset of diabetes type 2. [8] Good adherence to treatment, including suggested physical activity, dietary modifications, foot care, and ophthalmological check-ups, for those already suffering the disease has been shown to be effective in facilitating better glucose control and reducing complications and disability, moreover improving life expectancy and patients' quality of life. [9]

Diabetes self-care is a complicated process; it needs compliance of medication regimens, following a healthy diet to control glucose levels, blood glucose monitoring, regular exercise, and attending medical visits regularly. [10]

Lack of knowledge and awareness about risk factors, complications, and management for diabetes obstruct preventive efforts such as the adoption of positive lifestyle changes. Further, education is important to adopt a healthy lifestyle in Saudi Arabia; a high school education or lower have lack physical activity and poor dietary habits more than a university educational level. [11]

In Saudi Arabia, and up to the researcher's knowledge, assessment of diabetic self-care practices and their effecting factors are not yet studied in Taif city to see the most appropriate strategies and recommendations to control diabetes through lifestyle modification. These researches are needed to understand changing demographics and barriers toward diabetic self-care practices, which differ across different cultures and societies.

Reviewing the literature for similar studies carried out locally, regionally, or internationally yielded the following studies summarized in this chapter.

A cross-sectional study was conducted in Riyadh, Saudi Arabia reported that foot care was the most common diabetes self-care management, while exercise was the least. [12] **Alanzi** reported that mobile health (mHealth) obstacles were expertise and human shortage, funding and infrastructure investments, legal, privacy standardization, and health care organizational barriers. [13]

Al Johani *et al.* [14] reported that only 15% of diabetic patients had good glycaemic control [HbA1c≤ 7 mmol/L] in Al-Madinah city, Saudi Arabia. Most reported that they had their treatment as prescribed, but many demonstrated low adherence to other self-management behaviors. Low-income and male patients were less likely to practice self-care behaviors. Few were given basic advice to undertake self-care activities, but most were given more detailed information.

Another study was conducted in Taif revealed that compliance with medication (94.7%) was the highest observed level of practice. While blood glucose testing (22.4%) was the lowest level of practice was detected. Their practice regarding specific diabetic diet, foot care, and practicing physical exercise was 41.7%, 53.4%, and 41.2%, respectively. [15]

In Saudi Arabia, diabetes mellitus still one of the highest prevalence diseases. To reach success in

diabetes management on a national scale, it is highly important to scientifically evaluate the most appropriate and cost-effective diabetes management techniques such as adherence to diabetic self-care practices and provide evidence-based conclusions to the decision-makers. Need participation of patients and community in their health care.

Aim:
To explore self-care practice activities among people with diabetes mellitus attending diabetic centers in Taif, Saudi Arabia.

Objectives:
- To assess the diabetic self-care practices among patients with diabetes mellitus at diabetic center in Taif, 2019.
- To identify associated factors of adherence to diabetic self-care practices among patients with diabetes mellitus at diabetic center in Taif, 2019.

METHODS:

Study Design
Cross-sectional study.

Study area/setting
Taif is a city in the Mecca Province of southwest Saudi Arabia. It is the unofficial summer capital. The diabetic center under the supervision of the directorate of health affairs in Taif, Ministry of Health (MOH). [16]

Study Population
The study population is Arabic-speaking adult patients, male and female, diagnosed with diabetes mellitus (DM) at the diabetic center, MOH in Taif.

Eligibility
- **Inclusion Criteria**
  - 18 years old or older.
  - Arabic-speaking Male or female patients.
  - Diagnosed with type 2 Diabetes mellitus (T2DM).
- **Exclusion Criteria**
  - Pregnant or lactating women.
  - Physical disability affecting self-care.
  - Mental disability that could affect his/her decisions.

Data Collection Tools:
Eligibility Checklist
This checklist was filled in the diabetic center for each patient to classify them as eligible and ineligible for the study. The contents of this form are Inclusion and exclusion criteria.

The Study Questionnaire
The study questionnaire consists of 3 main sections: sociodemographic data, some health-related data, and the Arabic version of the Summary of Diabetes Self-care Activities (A-SDSCA). [17] Furthermore, a blood sample was drawn to obtain a recent HbA1C and/or FBG level.

Sociodemographic variables
Sociodemographic data included: Age in years. Gender, whether male or female. Nationality; Saudi or non-Saudi. Marital status; single, married, widow or divorce. Educational Level was categorized as Illiterate, elementary, Intermediate/secondary, university. Housing ownership either private, governmental, or rent. Job type as civil servant, military, self-employed, student, retired, or unemployed Income will be categorized based on family monthly income in Saudi riyals (SR) (≤5000, 5001-10000, 10001-15000, 15001-20000, 20001, and more).

Health-related variables
Duration of diabetes showed a positive relationship with the incidence of medical complications and was presented as a continuous variable. [18] Participants were also asked to state if they had diabetes mellitus complications, such as cardiac, eye, and kidney health problems.

Type of treatment was asked, whether patient use oral hypoglycaemic medication, insulin, or both, satisfaction with treatment, having information from the treating physician about diabetes, and history of family support in the treatment of diabetes. Respondents also were asked if they have hypertension, dyslipidemia, and smoker or not. Using any type of herbal medicine or alternative medicine for the management of diabetes was asked.

The Arabic version of the Summary of Diabetes Self-care Activities (A-SDSCA)
The SDSCA questionnaire was developed by **Toobert *et al.*** [17] and translated to Arabic by **AlJohani *et al.*** [19]. Measure the diabetes self-care practices of participants. The main section of the A-SDSCA instrument consists of four self-care sub-scales: diet (two items), exercise (two items), blood glucose testing (two items), and foot care (two items). The instrument used an 8-point Likert scale (0-7), representing the number of days per week. Scores were calculated separately for each of the regimen areas. The SDSCA assessed personal levels of adherence to self-care activities and did not categorize the respondent into adherent or non-adherent. The SDSCA is probably the most widely

used instrument for measuring diabetes self-management in adults.

Blood glucose level
HbA1C level was obtained from the participant's medical record if the test was done in the last three months. However, due to data limitation in the study locations, FBG was recorded as an alternative.

Sample Size
Considering that the level of confidence is 95% with a power of 80%, the total number of diabetic patients registered at the diabetic center in Taif city is estimated to be about 5213 patients. In this study, the researcher assumed that 70% of diabetic patients are not adherent to any self-care approach. [20-22] The estimated sample size was 304 using the Epi-Info version (3.3.2). The number was increased to 330 to compensate for any dropouts that might occur.

Sampling technique
Systematic random sampling technique was used by selecting every second diabetic patient attending the clinics during the study period at Diabetic center, Ministry of Health in Taif city.

Statistical Analysis
All continuous variables, including self-care practices score, age, and HbA1C was presented in mean and standard deviation. Descriptive statistics were performed in the form of frequencies and percentages for categorical variables. The student's t-test and Chi-square test were used. Linear regression analysis was used to identify factors associated with diabetes mellitus-self management behaviors. A statistically significant p-value was considered if less than 0.05. Data analysis was conducted using a statistical package for the social sciences version 25 (SPSS, 25) software.

Pilot study
It was conducted on 33 diabetic patients. It helped in the adaptation and modification of the study tool (the first part). The pilot study was carried out with the application of the full methodology and analysis of results. The method, feasibility, and duration were assessed. Necessary changes were made and described

Ethical Considerations:
Ethical approval from the research committee (institutional review board) at the Directorate of Health Affairs of Taif and acceptance letter from diabetic center managers in the study were taken before starting data collection.

After the patients fill the eligibility criteria, the study objectives and design were described to the participant. If the patient agreed to be recruited in the study, written informed consent was taken from that person. The confidentiality of the participants was considered throughout the study. The participants were free to exit the study whenever they wish. There was no conflict of interest for the authors or the scientific funding chair.

Limitations of the Study
The study has a number of strengths, However there is a limitation, that the exploratory cross-sectional study design did not allow cause and effect temporality between explanatory variables and self-management outcomes to be examined.

RESULTS:

Table (1) presents the participants' sociodemographic characteristics and SDSCA overall score. A total of 330 patients diagnosed with T2DM were included in this study, 65.5% were males, and 34.5% were females. The males recorded a higher overall mean score (3.21 ± 1.56) than the females (3.14 ± 1.71). Moreover, 40.7% of the male population and 33.3% of the females recorded a score higher than ≥ 3.5. This association regarding the population's gender and the overall score was not significant (P=0.188). Less than half of the participants (40.6%) and (41.8%) aged from (36-55) and ≥ 56, respectively, while the participants aging from (18-35) accounted for 17.6%, with a mean age of (52 ± 15). The highest mean score (3.59 ± 1.96) was recorded among the participants aging (18-35), and 44% of the participants aging from (36-55) recorded a score more than ≥ 3.5. This association regarding the population's age and the overall score was not significant (P=0.182). Most of the participants (83.6%) were Saudi, the highest mean overall score was recorded among the Saudi participants (3.24 ± 1.69), and 40.9% recorded a score ≥ of 3.5. This association was significant (P=0.020). Nearly 32.4% of this population were not working, 21.5% had governmental work, 20.3% were retired, 13.6% had business work, 7.3% were students, and 4.8% were soldiers. The highest mean score was recorded among soldiers (4.44 ± 1.73) and students (3.77 ± 2.58), while the lowest score was found among those working in business (2.38 ± 0.97). Nearly half of the participants working in the governmental section (50.7%) and the soldiers (50%) recorded ≥ 3.5, and this association was statistically significant (P=0.000). Regarding the educational level, 37.3% were had intermediate or high education, 23.9% were undergraduate or postgraduate students, 22.1% had primary education, and 16.7% were uneducated. The undergraduate or postgraduate students recorded the

highest mean score (3.78 ± 1.86), while the uneducated had the lowest score (2.02 ± 1). This association was statistically significant (P=0.000). The mean duration of DM was (10 ± 9). More than half of the participants (59.4%) were completely satisfied with controlling blood sugar, 35.2% were quite satisfied, and only 0.9% were completely dissatisfied. The highest mean score was found among the completely satisfied participants (3.69 ± 1.67), followed by the completely dissatisfied (3 ± 0), and then the quite satisfied (2.63 ± 0). This association was statistically significant (P=0.000). Most participants (71.2%) received family support for taking diabetic medication, and they recorded higher mean scores (3.44 ± 1.72). The majority of the participants (84.8%) reported that they received physician health education on diabetic medication, with the highest mean score (3.28 ± 1.68). This association was statistically significant (P=0.000). Most of the participants do not use herbs or alternative medication for diabetes, and they were reported to have the best practices of self-care (3.7 ± 1.35); however, this association was not significant (P=0.172). The mean HbA1C was found to be (8.0 ± 2.3), and the fasting blood sugar was (146 ± 44). More than half of the participants (57%) had hypertension, 53.3% had hypercholesterolemia, and 19.4% did not have any chronic diseases. Those who did not have any chronic diseases recorded the highest mean score (3.92 ± 2.26), followed by participants with hypercholesterolemia (3.14 ± 1.24). This association was statistically significant (P=0.000). Almost 38.5% did not have any complications, 33.6% had diabetic retinopathy, 20% had peripheral nerve disorder, and 14.9% had atherosclerosis. Participants with no complications had the highest mean score (3.63 ± 1.83), followed by those with peripheral nerve disorder (2.99 ± 1.41). This association was statistically significant (P=0.000). More than half of the participants (57.9%) used oral anti-diabetic drugs, 46.4% used diet treatment only, and 11.8% used insulin. The highest overall mean score was found among those who used diet only (4.14 ± 1.58), followed by those who use insulin (3.26 ± 1.29), and those who use an oral anti-diabetic drug (3.25 ± 1.41). This association was statistically significant (P=0.000).

Table (2) shows the participants' sociodemographic characteristics in association with the scores of diet and exercise practices. The participants' gender was significantly associated with the scores of diet and exercise practices (P=0.000). Males recorded higher mean scores regarding the diet practice (3.06 ± 2.32) and the exercise (4.09 ± 2.05) than the females with (3.82 ± 2.53) for diet and (2.91 ± 2.33) for exercise. Age also was significantly associated with the scores of diet and exercise practices (P=0.000). Participants aging from (18-35) years recorded the highest mean score regarding diet practice (3.92 ± 2.28), and those aging from (36-55) years had the highest score regarding exercise practice (4.65 ± 1.98), while those aging from (36-55) years had the lowest scores (2.6 ± 1.74). There is a significant association between the occupation and diet and exercise practices (P=0.003). Students recorded the highest mean score regarding diet practice (4.5 ± 2.77), while soldiers had the highest scores of exercise practice (5.81 ± 1.75). However, those who work in the business section had the lowest diet score (2.18 ± 2.37), and those who do not work had the lowest exercise score (2.86 ± 2.31). We demonstrated a significant association between the educational level and diet and exercise scores (P=0.000). The uneducated and participants' with primary education recorded the highest mean diet scores (3.95 ± 1.94) and (3.82 ± 2.68), respectively. While those with intermediate or high education (4.56 ± 1.81) and the undergraduates or the postgraduates (4.07 ± 2.16) recorded the highest exercise scores. The satisfaction with the treatment in controlling blood sugar level was significantly associated with diet and exercise scores. The completely satisfied participants had the highest diet scores (3.77 ± 2.58), while the neutral ones recorded the lowest diet scores (0.15 ± 0.24). The neutral (5.5 ± 1.46) and quite dissatisfied (5 ± 0) had the highest exercise scores, while the completely dissatisfied had the lowest exercise score (0 ± 0). The smoking status was significantly associated with the diet and exercise score (P=0.000). The non-smokers and occasionally smokers had the highest diet scores (3.73 ± 2.39) and (3.5 ± 0), respectively. While the ex-smokers had the lowest diet scores (2 ± 2.39). The occasionally (5.5 ± 0) regularly (4.33 ± 1.7), and ex-smokers (4.21 ± 1.91) had the highest exercise scores, while the non-smokers recorded the lowest exercise scores (3.32 ± 2.37). Physicians' health education on diabetic medication was significantly associated with the diet and exercise scores (P=0.000). Chronic diseases were in significant association with the diet and exercise scores (P=0.000). Those who do not have any chronic diseases had the highest diet score (3.96 ± 2.73) and exercise score (4.71 ± 2.54). The diabetic complications had a significant association with the diet and exercise scores (P=0.000). Participants who did not have any diabetic complications had the highest diet and exercise score (3.52 ± 2.74) and (4.19 ± 2.46), respectively. Those with atherosclerosis had the lowest diet score (2.6 ± 1.89). The used treatments were in significant association with the diet and exercise scores (P=0.000).

Participants who used diet only had the highest diet score (4.64 ± 2.19) and exercise score (4.55 ± 2.32), while those who use insulin had the lowest diet score (2.68 ± 1.16).

P=0.000), satisfaction with the treatment in controlling blood sugar level (P=0.000), smoking status (P=0.005), physicians health education on diabetic medication (P=0.003), the associated chronic diseases (P=0.000), and used treatment (P=0.000) are all significantly associated with the blood sugar test and foot care practices.

Participants aging from (18-35) years recorded the highest mean score regarding blood sugar test practice (3.78 ± 2.2), and those aging from ≥ 56 years had the lowest score (2.86 ± 2.06). Participants aging from (36-55) years recorded the highest foot care score (3.11 ± 2.68), and those aging from ≥ 56 years had the lowest score (2.14 ± 2.28). Regarding the occupation, soldiers recorded the highest mean blood sugar test scores (4.31 ± 2.89) and foot care (4.44 ± 2.24). Participants who work in business recorded the lowest mean blood sugar test scores (2.02 ± 1.66) and foot care (1.79 ± 1.75). Participants with intermediate or high education recorded the highest blood sugar test scores (3.46 ± 2.51), while those with primary education recorded the lowest scores (2.75 ± 2.03). The undergraduate/ postgraduate students had the highest foot care scores (4.14 ± 2.57), while the uneducated participants had the lowest score (0.74 ± 1.27). The completely dissatisfied participants with

Table (3) shows the participants' sociodemographic characteristics in association with the scores of blood sugar tests and foot care. The participants' age (P=0.000), occupation (P=0.000), educational level (

the treatment in controlling blood sugar level recorded the highest blood sugar test score (7 ± 0) and foot care (4 ± 0). The occasionally smokers had the highest blood sugar test scores (3.09 ± 2.37), while the regular smokers had the lowest score (2.83 ± 2.27). The ex-smokers had the highest foot care scores (4.05 ± 2.47), while the occasional smokers had the lowest score (0 ± 0). The participants who received physician medical education on diabetic medication had the highest blood sugar test scores (3.17 ± 2.35) and foot care (2.75 ± 2.61). The participants with other chronic associated diseases had the highest blood sugar test scores (3.79 ± 2.23), while those with hypertension had the lowest score (2.99 ± 2.11). Participants with no chronic conditions had the highest foot care scores (3.62 ± 3.03), while those with other chronic associated diseases had the lowest score (1.15 ± 1.25). Participants with no diabetic complications had the highest blood sugar test scores (3.5 ± 2.59) and foot care score (3.31 ± 2.81). Participants who use diet only as a treatment had the highest blood sugar test scores (4.04 ± 2.16) and foot care score (3.34 ± 2.59). Those who use insulin had the highest blood sugar test score (4.09 ± 2.24) and foot care score (3.1 ± 1.44).

Table (1): Sociodemographic data and diabetic history and association with SDSCA overall score (n=330).

Parameter		Frequency (%)	SDSCA Overall score (Mean ± SD)	SDSCA Overall score < 3.5	Overall score ≥ 3.5	P-value
Sex	Male	216 (65.5%)	3.21 ± 1.56	128 (59.3%)	88 (40.7%)	0.188
	Female	114 (34.5%)	3.14 ± 1.71	76 (66.7%)	38 (33.3%)	
Age, y	18 -	58 (17.6%)	3.59 ± 1.96	37 (63.8%)	21 (36.2%)	0.182
	36 -	134 (40.6%)	3.35 ± 1.52	75 (56%)	59 (44%)	
	≥ 56	138 (41.8%)	2.86 ± 1.48	92 (66.7%)	46 (33.3%)	
	Mean ± SD (Min – Max)	52 ± 15 (21-79)	Pearson correlation	-0.171		0.002
Nationality	Saudi	276 (83.6%)	3.24 ± 1.69	163 (59.1%)	113 (40.9%)	0.020
	Non-Saudi	54 (16.4%)	2.88 ± 1.11	41 (75.9%)	13 (24.1%)	
Occupation	Business	45 (13.6%)	2.38 ± 0.97	42 (93.3%)	3 (6.7%)	0.000
	Student	24 (7.3%)	3.77 ± 2.58	16 (66.7%)	8 (33.3%)	
	Soldier	16 (4.8%)	4.44 ± 1.73	8 (50%)	8 (50%)	
	Governmental work	71 (21.5%)	3.29 ± 1.53	35 (49.3%)	36 (50.7%)	
	I do not work	107 (32.4%)	3 ± 1.52	64 (59.8%)	43 (40.2%)	
	Retired	67 (20.3%)	3.39 ± 1.45	39 (58.2%)	28 (41.8%)	
Educational level	Uneducated	55 (16.7%)	2.02 ± 1	49 (89.1%)	6 (10.9%)	0.000
	Primary	73 (22.1%)	3.12 ± 1.46	43 (58.9%)	30 (41.1%)	
	Intermediate / High School	123 (37.3%)	3.36 ± 1.49	71 (57.7%)	52 (42.3%)	
	Undergraduate / Postgraduate	79 (23.9%)	3.78 ± 1.86	41 (51.9%)	38 (48.1%)	
Duration of DM	Mean ± SD	10 ± 9	Pearson correlation	-0.750		0.175
Satisfaction with the treatment in controlling blood sugar level	Completely satisfied	196 (59.4%)	3.69 ± 1.67	98 (50%)	98 (50%)	0.000
	Quite satisfied	116 (35.2%)	2.44 ± 1.25	88 (75.9%)	28 (24.1%)	
	Neutral	13 (3.9%)	2.37 ± 0.57	13 (100%)	0 (0%)	
	Quite dissatisfied	2 (0.6%)	2.63 ± 0	2 (100%)	0 (0%)	
	Completely dissatisfied	3 (0.9%)	3 ± 0	3 (100%)	0 (0%)	
Family support for taking diabetic medication	No	95 (28.8%)	2.56 ± 1.08	82 (86.3%)	13 (13.7%)	0.000
	Yes	235 (71.2%)	3.44 ± 1.72	122 (51.9%)	113 (48.1%)	
Smoking status	No	210 (63.6%)	3.17 ± 1.68	126 (60%)	84 (40%)	0.406
	Occasionally	2 (0.6%)	3.13 ± 0	2 (100%)	0 (0%)	
	Yes, regularly	72 (21.8%)	3.15 ± 1.63	49 (68.1%)	23	

					(31.9%)	
	Ex-smoker/stopped smoking	46 (13.9%)	3.34 ± 1.26	27 (58.7%)	19 (41.3%)	
Physician health education on diabetic medication	No	30 (9.1%)	2.58 ± 1.3	26 (86.7%)	4 (13.3%)	0.000
	Sometimes	20 (6.1%)	2.76 ± 0.28	20 (100%)	0 (0%)	
	Yes	280 (84.8%)	3.28 ± 1.68	158 (56.4%)	122 (43.6%)	
Using herbs or alternative medicine for diabetes	No	291 (88.2%)	3.12 ± 1.63	176 (60.5%)	115 (39.5%)	0.172
	Yes	39 (11.8%)	3.7 ± 1.35	28 (71.8%)	11 (28.2%)	
HbA1C	Mean ± SD	8.0 ± 2.3	Pearson correlation	-0.439		0.000
Fasting blood sugar	Mean ± SD	146 ± 44	Pearson correlation	-0.280		0.000
Chronic illnesses	None	64 (19.4%)	3.92 ± 2.26	27 (42.2%)	37 (57.8%)	0.000
	Hypertension	188 (57%)	2.96 ± 1.36	132 (70.2%)	56 (29.8%)	
	Hypercholesterolemia	176 (53.3%)	3.14 ± 1.24	115 (65.3%)	61 (34.7%)	
	Other	39 (11.8%)	2.79 ± 0.96	24 (61.5%)	15 (38.5%)	
Complications	None	127 (38.5%)	3.63 ± 1.83	64 (50.4%)	63 (49.6%)	0.000
	Peripheral nerve disorder	66 (20%)	2.99 ± 1.41	35 (53%)	31 (47%)	
	Atherosclerosis	64 (19.4%)	2.86 ± 1.18	46 (71.9%)	18 (28.1%)	
	Diabetic retinopathy	111 (33.6%)	3.16 ± 1.39	64 (57.7%)	47 (42.3%)	
	Impaired kidney function	46 (13.9%)	2.59 ± 0.83	43 (93.5%)	3 (6.5%)	
	Other	86 (26.1%)	2.66 ± 1.43	64 (74.4%)	22 (25.6%)	
Used treatment	Diet only	153 (46.4%)	4.14 ± 1.58	50 (32.7%)	103 (67.3%)	0.000
	Insulin	39 (11.8%)	3.26 ± 1.29	26 (66.7%)	13 (33.3%)	
	Oral anti-diabetic drug	191 (57.9%)	3.25 ± 1.41	121 (63.4%)	70 (36.6%)	
	Both	95 (28.8%)	2.65 ± 1.41	58 (61.1%)	37 (38.9%)	

Table (2): Diet and exercise subscales in association with demographics and diabetic history (n=330).

Parameter		Diet score (Mean ± SD)	Diet score < 3.5	Diet score ≥ 3.5	P-value	Exercise score (Mean ± SD)	Exercise score < 3.5	Exercise score ≥ 3.5	P-value
Sex	Male	3.06 ± 2.32	118 (54.6%)	98 (45.4%)	0.269	4.09 ± 2.05	67 (31%)	149 (69%)	0.000
	Female	3.82 ± 2.53	55 (48.2%)	59 (51.8%)		2.91 ± 2.33	67 (58.8%)	47 (41.2%)	
Age, y	18 -	3.92 ± 2.28	24 (41.4%)	34 (58.6%)	0.033	3.84 ± 1.98	20 (34.5%)	38 (65.5%)	0.000
	36 -	2.6 ± 2.49	81 (60.4%)	53 (39.6%)		4.65 ± 1.74	26 (19.4%)	108 (80.6%)	
	≥ 56	3.77 ± 2.23	68 (49.3%)	70 (50.7%)		2.67 ± 2.3	88 (63.8%)	50 (36.2%)	
Nationality	Saudi	3.43 ± 2.47	137 (49.6%)	139 (50.4%)	0.022	3.66 ± 2.35	113 (40.9%)	163 (59.1%)	0.779
	Non-Saudi	2.8 ± 2.1	36 (66.7%)	18 (33.3%)		3.78 ± 1.36	21 (38.9%)	33 (61.1%)	
Occupation	Business	2.18 ± 2.37	33 (73.3%)	12 (26.7%)	0.000	3.54 ± 1.23	16 (35.6%)	29 (64.4%)	0.003
	Student	4.5 ± 2.77	8 (33.3%)	16 (66.7%)		4 ± 2.59	8 (33.3%)	16 (66.7%)	
	Soldier	3.19 ± 2.85	6 (37.5%)	10 (62.5%)		5.81 ± 1.75	4 (25%)	12 (75%)	
	Governmental work	2.44 ± 1.85	47 (66.2%)	24 (33.8%)		4.23 ± 2.07	18 (25.4%)	53 (74.6%)	
	I do not work	3.96 ± 2.39	46 (43%)	61 (57%)		2.86 ± 2.31	58 (54.2%)	49 (45.8%)	
	Retired	3.61 ± 2.26	33 (49.3%)	34 (50.7%)		3.88 ± 2.18	30 (44.8%)	37 (55.2%)	
Educational level	Uneducated	3.95 ± 1.94	29 (52.7%)	26 (47.3%)	0.015	1.15 ± 1.67	49 (89.1%)	6 (10.9%)	0.000
	Primary	3.82 ± 2.68	29 (39.7%)	44 (60.3%)		3.68 ± 1.86	25 (34.2%)	48 (65.8%)	
	Intermediate / High School	2.63 ± 2.25	77 (62.6%)	46 (37.4%)		4.56 ± 1.81	26 (21.1%)	97 (78.9%)	
	Undergraduate / Postgraduate	3.5 ± 2.5	38 (48.1%)	41 (51.9%)		4.07 ± 2.16	34 (43%)	45 (57%)	
Duration of DM		Pearson correlation	-0.15		0.783	Pearson correlation	-0.295		0.000
Satisfaction with the treatment in controlling blood sugar level	Completely satisfied	3.77 ± 2.58	89 (45.4%)	107 (54.6%)	0.000	4.24 ± 2.26	67 (34.2%)	129 (65.8%)	0.000
	Quite satisfied	3.01 ± 1.92	66 (56.9%)	50 (43.1%)		2.6 ± 1.67	64 (55.2%)	52 (44.8%)	
	Neutral	0.15 ± 0.24	13 (100%)	0 (0%)		5.5 ± 1.46	0 (0%)	13 (100%)	
	Quite dissatisfied	2 ± 0	2 (100%)	0 (0%)		5 ± 0	0 (0%)	2 (100%)	
	Completely dissatisfied	1 ± 0	3 (100%)	0 (0%)		0 ± 0	3 (100%)	0 (0%)	
Family	No	2.77 ± 2.25	60 (63.2%)	35 (36.8%)	0.013	3.42 ± 1.7	40	55	0.724

support for taking diabetic medication							(42.1%)	(57.9%)	
	Yes	3.55 ± 2.45	113 (48.1%)	122 (51.9%)		3.79 ± 2.39	94 (40%)	141 (60%)	
Smoking status	No	3.73 ± 2.39	107 (51%)	103 (49%)	0.134	3.32 ± 2.37	103 (49%)	107 (51%)	0.000
	Occasionally	3.5 ± 0	0 (0%)	2 (100%)		5.5 ± 0	0 (0%)	2 (100%)	
	Yes, regularly	2.99 ± 2.24	36 (50%)	36 (50%)		4.33 ± 1.7	23 (31.9%)	49 (68.1%)	
	Ex-smoker/stopped smoking	2 ± 2.39	30 (65.2%)	16 (34.8%)		4.21 ± 1.91	8 (17.4%)	38 (82.6%)	
Physician health education on diabetic medication	No	3 ± 1.94	22 (73.3%)	8 (26.7%)	0.011	2.4 ± 1.18	28 (93.3%)	2 (6.7%)	0.000
	Sometimes	1.95 ± 1.94	14 (70%)	6 (30%)		4.6 ± 1.65	4 (20%)	16 (80%)	
	Yes	3.46 ± 2.47	137 (48.9%)	143 (51.1%)		3.75 ± 2.29	102 (36.4%)	178 (63.6%)	
Using herbs or alternative medicine for diabetes	No	3.33 ± 2.45	151 (51.9%)	140 (48.1%)	0.596	3.6 ± 2.28	118 (40.5%)	173 (59.5%)	0.955
	Yes	3.26 ± 2.21	22 (56.4%)	17 (43.6%)		4.24 ± 1.63	16 (41%)	23 (59%)	
HbA1C		Pearson correlation	-0.311		0.000	Pearson correlation	-0.329		0.000
Fasting blood sugar		Pearson correlation	-0.330		0.000	Pearson correlation	-0.160		0.004
chronic	None	3.96 ± 2.73	29 (45.3%)	35 (54.7%)	0.059	4.71 ± 2.54	17 (26.6%)	47 (73.4%)	0.000
	Hypertension	3.22 ± 2.26	100 (53.2%)	88 (46.8%)		3.17 ± 1.99	101 (53.7%)	87 (46.3%)	
	Hypercholesterolemia	3.04 ± 2.31	99 (56.3%)	77 (43.8%)		3.86 ± 1.92	68 (38.6%)	108 (61.4%)	
	Other	3.72 ± 2.31	19 (48.7%)	20 (51.3%)		2.5 ± 1.82	19 (48.7%)	20 (51.3%)	
complication	None	3.52 ± 2.74	63 (49.6%)	64 (50.4%)	0.000	4.19 ± 2.46	46 (36.2%)	81 (63.8%)	0.000
	Peripheral nerve disorder	2.92 ± 2	32 (48.5%)	34 (51.5%)		3.52 ± 1.87	22 (33.3%)	44 (66.7%)	
	Atherosclerosis	2.6 ± 1.89	40 (62.5%)	24 (37.5%)		3.57 ± 1.43	26 (40.6%)	38 (59.4%)	
	Diabetic retinopathy	3.48 ± 2.31	44 (39.6%)	67 (60.4%)		3.83 ± 2.14	35 (31.5%)	76 (68.5%)	
	Impaired kidney function	2.39 ± 1.54	35 (76.1%)	11 (23.9%)		3.11 ± 1.01	30 (65.2%)	16 (34.8%)	
	Other	3.73 ± 1.61	48 (55.8%)	38 (44.2%)		2.15 ± 1.78	64 (74.4%)	22 (25.6%)	
Used treatment	Diet only	4.64 ± 2.19	41 (26.8%)	112 (73.2%)	0.000	4.55 ± 2.32	47 (30.7%)	106 (69.3%)	0.000
	Insulin	2.68 ± 1.16	25 (64.1%)	14 (35.9%)		3.17 ± 1.8	25 (64.1%)	14 (35.9%)	
	Oral antidiabetic drug	3.27 ± 2.66	101 (52.9%)	90 (47.1%)		4.1 ± 2.17	69	122	

							(36.1%)	(63.9%)	
	Both	3.06 ± 1.69	58 (61.1%)	37 (38.9%)		2.56 ± 1.77	49 (51.6%)	46 (48.4%)	

Table (3): Blood sugar test and foot care subscales in association with demographics and diabetic history (n=330).

Parameter		Blood sugar test score (Mean ± SD)	Blood sugar test score < 3.5	Blood sugar test score ≥ 3.5	P-value	Foot care score (Mean ± SD)	Foot care score < 3.5	Foot care score ≥ 3.5	P-value
Sex	Male	3.01 ± 2.35	141 (65.3%)	75 (34.7%)	0.244	2.69 ± 2.36	120 (55.6%)	96 (44.4%)	0.239
	Female	3.23 ± 2.17	67 (58.8%)	47 (41.2%)		2.57 ± 2.78	71 (62.3%)	43 (37.7%)	
Age, y	18 -	3.78 ± 2.2	31 (53.4%)	27 (46.6%)	0.226	2.79 ± 2.42	42 (72.4%)	16 (27.6%)	0.000
	36 -	3.02 ± 2.51	89 (66.4%)	45 (33.6%)		3.11 ± 2.68	58 (43.3%)	76 (56.7%)	
	≥ 56	2.86 ± 2.06	88 (63.8%)	50 (36.2%)		2.14 ± 2.28	91 (65.9%)	47 (34.1%)	
Nationality	Saudi	3.31 ± 2.37	158 (57.2%)	118 (42.8%)	0.000	2.58 ± 2.58	157 (56.9%)	119 (43.1%)	0.408
	Non-Saudi	1.97 ± 1.37	50 (92.6%)	4 (7.4%)		2.99 ± 2.1	34 (63%)	20 (37%)	
Occupation	Business	2.02 ± 1.66	37 (82.2%)	8 (17.8%)	0.028	1.79 ± 1.75	34 (75.6%)	11 (24.4%)	0.000
	Student	3.25 ± 2.95	16 (66.7%)	8 (33.3%)		3.33 ± 2.94	12 (50%)	12 (50%)	
	Soldier	4.31 ± 2.89	6 (37.5%)	10 (62.5%)		4.44 ± 2.24	2 (12.5%)	14 (87.5%)	
	Governmental work	3.22 ± 2.45	44 (62%)	27 (38%)		3.28 ± 2.6	34 (47.9%)	37 (52.1%)	
	I do not work	2.95 ± 2.16	66 (61.7%)	41 (38.3%)		2.23 ± 2.6	67 (62.6%)	40 (37.4%)	
	Retired	3.54 ± 2.03	39 (58.2%)	28 (41.8%)		2.54 ± 2.22	42 (62.7%)	25 (37.3%)	
Educational level	Uneducated	2.26 ± 1.83	45 (81.8%)	10 (18.2%)	0.001	0.74 ± 1.27	49 (89.1%)	6 (10.9%)	0.000
	Primary	2.75 ± 2.03	45 (61.6%)	28 (38.4%)		2.23 ± 2.14	44 (60.3%)	29 (39.7%)	
	Intermediate / High School	3.46 ± 2.51	63 (51.2%)	60 (48.8%)		2.8 ± 2.47	70 (56.9%)	53 (43.1%)	
	Undergraduate / Postgraduate	3.39 ± 2.29	55 (69.6%)	24 (30.4%)		4.14 ± 2.57	28 (35.4%)	51 (64.6%)	
Duration of DM		Pearson correlation	0.033		0.555	Pearson correlation	0.054		0.332
Satisfaction with the treatment in controlling blood sugar	Completely satisfied	3.35 ± 2.4	118 (60.2%)	78 (39.8%)	0.076	3.4 ± 2.58	86 (43.9%)	110 (56.1%)	0.000
	Quite satisfied	2.71 ± 1.99	79 (68.1%)	37 (31.9%)		1.43 ± 1.97	96 (82.8%)	20 (17.2%)	
	Neutral	1.85 ± 1.89	9	4		1.96 ± 1.59	7	6	

level			(69.2%)	(30.8%)			(53.8%)	(46.2%)	
	Quite dissatisfied	1.5 ± 0	2 (100%)	0 (0%)		2 ± 0	2 (100%)	0 (0%)	
	Completely dissatisfied	7 ± 0	0 (0%)	3 (100%)		4 ± 0	0 (0%)	3 (100%)	
Family support for taking diabetic medication	No	2.01 ± 1.6	83 (87.4%)	12 (12.6%)	0.000	2.03 ± 2.39	62 (65.3%)	33 (34.7%)	0.084
	Yes	3.53 ± 2.38	125 (53.2%)	110 (46.8%)		2.9 ± 2.52	129 (54.9%)	106 (45.1%)	
Smoking status	No	3.17 ± 2.3	128 (61%)	82 (39%)	0.160	2.44 ± 2.57	129 (61.4%)	81 (38.6%)	0.005
	Occasionally	3.5 ± 0	0 (0%)	2 (100%)		0 ± 0	2 (100%)	0 (0%)	
	Yes, regularly	2.83 ± 2.27	50 (69.4%)	22 (30.6%)		2.43 ± 2.03	44 (61.1%)	28 (38.9%)	
	Ex-smoker/stopped smoking	3.09 ± 2.37	30 (65.2%)	16 (34.8%)		4.05 ± 2.47	16 (34.8%)	30 (65.2%)	
Physician health education on diabetic medication	No	2.63 ± 2.17	26 (86.7%)	4 (13.3%)	0.019	2.27 ± 1.72	26 (86.7%)	4 (13.3%)	0.003
	Sometimes	2.7 ± 1.32	12 (60%)	8 (40%)		1.8 ± 1.75	10 (50%)	10 (50%)	
	Yes	3.17 ± 2.35	170 (60.7%)	110 (39.3%)		2.75 ± 2.61	155 (55.4%)	125 (44.6%)	
Using herbs or alternative medicine for diabetes	No	2.99 ± 2.28	181 (62.2%)	110 (37.8%)	0.393	2.54 ± 2.53	166 (57%)	125 (43%)	0.402
	Yes	3.85 ± 2.24	27 (69.2%)	12 (30.8%)		3.45 ± 2.23	25 (64.1%)	14 (35.9%)	
HbA1C		Pearson correlation	-0.297		0.000	Pearson correlation	-0.264		0.000
Fasting blood sugar		Pearson correlation	-0.125		0.023	Pearson correlation	-0.145		0.008
chronic	None	3.41 ± 2.75	41 (64.1%)	23 (35.9%)	0.000	3.62 ± 3.03	27 (42.2%)	37 (57.8%)	0.000
	Hypertension	2.99 ± 2.11	117 (62.2%)	71 (37.8%)		2.47 ± 2.38	116 (61.7%)	72 (38.3%)	
	Hypercholesterolemia	3.18 ± 2.29	101 (57.4%)	75 (42.6%)		2.48 ± 2.02	97 (55.1%)	79 (44.9%)	
	Other	3.79 ± 2.23	16 (41%)	23 (59%)		1.15 ± 1.25	39 (100%)	0 (0%)	
complication	None	3.5 ± 2.59	76 (59.8%)	51 (40.2%)	0.566	3.31 ± 2.81	53 (41.7%)	74 (58.3%)	0.000
	Peripheral nerve disorder	2.96 ± 2.24	42 (63.6%)	24 (36.4%)		2.57 ± 2.25	45 (68.2%)	21 (31.8%)	
	Atherosclerosis	2.9 ± 1.99	38 (59.4%)	26 (40.6%)		2.37 ± 1.72	45 (70.3%)	19 (29.7%)	
	Diabetic retinopathy	2.41 ± 1.92	76 (68.5%)	35 (31.5%)		2.92 ± 2.19	53 (47.7%)	58 (52.3%)	
	Impaired kidney function	2.71 ± 1.22	33 (71.7%)	13 (28.3%)		2.15 ± 1.86	39 (84.8%)	7 (15.2%)	
	Other	3.28 ± 2.13	52 (60.5%)	34 (39.5%)		1.46 ± 1.67	79 (91.9%)	7 (8.1%)	

Used treatment	Diet only	4.04 ± 2.16	62 (40.5%)	91 (59.5%)	0.000	3.34 ± 2.59	69 (45.1%)	84 (54.9%)	0.000
	Insulin	4.09 ± 2.24	23 (59%)	16 (41%)		3.1 ± 1.44	25 (64.1%)	14 (35.9%)	
	Oral antidiabetic drug	2.95 ± 2.18	127 (66.5%)	64 (33.5%)		2.7 ± 2.46	109 (57.1%)	82 (42.9%)	
	Both	2.9 ± 2.19	59 (62.1%)	36 (37.9%)		2.08 ± 2.32	64 (67.4%)	31 (32.6%)	

DISCUSSION:

The long-term complications of DM are critical health problems. Diabetes is linked to the development of diabetes-specific microvascular pathology in the peripheral nerves retina and glomeruli in all forms of DM. [23] Home blood glucose monitoring and glucose checking in the urine are considered important for long-term glycaemic regulation, delaying, if not preventing, long-term complications. [24] This study investigates self-care practice activities among people with diabetes mellitus attending diabetic centers in Taif, Saudi Arabia.

Regarding the overall SDSCA score, the males recorded a higher overall mean score (3.21 ± 1.56) than the females (3.14 ± 1.71). Younger participants were reported to have a higher mean overall score than the older ones. The Saudi participants recorded a higher mean score (3.24 ± 1.69) than the non-Saudi (2.88 ± 1.11), and this was statistically significant (P=0.020). In contrast, **Zimbudzi *et al.*** [25] reported that the females had a higher mean score (38.2 ± 10.3) and no difference in the different age groups.

We also found that the highest mean overall SDSCA score was among soldiers and undergraduate or postgraduate students. Participants who received family support for taking diabetic medication and those who received physician health education on diabetic medication had the best practices regarding diabetes self-care management. According to **Midhet *et al.*** [26] findings' which conducted a retrospective case-control study in Al-Qassim, Saudi Arabia, health education is mostly provided in PHCCs and is less common in government hospitals. They also found that increased knowledge of diabetes risk factors will be facilitated by health education and advertising initiatives aimed at the less informed segments of the population. Furthermore, diabetes patients are likely than non-diabetic patients attending healthcare centers to obtain health education. In both developed and developing countries, the efficacy of health education by PHCCs has been demonstrated. [27]

The highest mean overall score was also reported among those who did not have any chronic diseases (3.92 ± 2.26), Participants with no complications (3.63 ± 1.83), and who used diet treatment only (4.14 ± 1.58). A study was carried out in Al-Madinah to estimate the prevalence of self-management behaviors among type 2 diabetic patients. The Arabic version of the Summary of Diabetes Self-care Activities questionnaire was utilized in that study. Only 15% of diabetic patients had good glycaemic control [HbA1c≤ 7 mmol/L] . Most reported that they had their treatment as prescribed, but many demonstrated low adherence to other self-management behaviors. Low-income and male patients were less likely to practice self-care behaviors. Few were given basic advice to undertake self-care activities, but most were given more detailed information. [14] Another study was conducted by **Abu Sabbah *et al.*** [15] in Taif and revealed that compliance with medication (94.7%) was the highest observed level of practice. While blood glucose testing (22.4%) was the lowest level of practice was detected. Their practice regarding specific diabetic diet, foot care, and practicing physical exercise was 41.7%, 53.4%, and 41.2%, respectively.

Diet is considered the cornerstone of every diabetes mellitus management plan's self-care portion, according to the American Diabetic Association. [28] Physical activity is also important in the management of diabetic patients because it enhances insulin action in both types of diabetes. [29] In the diet and exercise sections, gender was significantly associated with the mean scores (P=0.000), as the males had higher mean scores in both sections than the females. However, **Abu Sabbah *et al.*** [15] found that females had better practice in the diet section (40.42 ± 56.84), while males (35.64± 44.16) had better practice in the exercise section. Conservative social and cultural patterns in the Arab world are likely to work against the efforts of people with type 2 diabetes mellitus to maintain a healthy diet. [19]

Age was also significantly associated with the scores of diet and exercise practices in this study (P=0.000);

younger participants (18-35) years had higher diet scores, while the older ones (36-55) had higher exercise scores. While **Abu Sabbah *et al.*** [15] reported that older participants had higher scores in both sections. **Al-Qahtani *et al.*** [30] conducted a similar study in Najran, Saudi Arabia, and reported that older participants with T2DM (50-64) years had more adequate self-care behaviors (71.5%).

The present study found a significant association between the occupation and educational level and diet and exercise sections (P=0.003) and (P=0.000), respectively. Students, illiterate, and participants with primary education had the highest exercise scores, while soldiers and participants with intermediate or high education had the highest exercise score. Besides, those who work in the business section had the lowest diet score (2.18 ± 2.37), and those who do not work had the lowest exercise score (2.86 ± 2.31). Another study conducted among the Saudi population found that workers in the private sector had the best diet and exercise scores. [15] **Amer *et al.*** [31] Participation in diabetic health education sessions and a high educational level were the most significant predictors of high self-efficacy in our research (over nine years). Both are considered crucial for comprehending all facets of the disease, including symptoms, medical treatment, and the importance of following lifestyle guidelines.

The current study reported a significant association between the smoking status (P=0.000) and physicians' health education on diabetic medication (P=0.000) and diet and exercise practices. The non-smokers and those who received physician education had the best practices. Similarly, **Abu Sabbah *et al.*** [15] also found that the non-smokers recorded the highest mean diet and exercise scores. This could be interpreted by the fact that the non- and ex-smokers have better dietary habits and lifestyles than smokers. [32]

There was a significant relationship between the associated chronic diseases (P=0.000), complications (P=0.000) and the used treatment (P=0.000), and diet as well as exercise scores. Those who do not have any chronic diseases or complications and who used diet treatment only had the best practice scores. This could be explained as patients with DM and comorbid chronic conditions have a lower level of life quality than those without comorbid chronic diseases. [33] **AlShareef *et al*.** [34] examined different factors that could impact diabetes mellitus (DM) outcomes, including self-management behaviors and glycaemic control. The results showed positive associations between self-management behaviors (glucose management and healthcare use) and diabetes knowledge, self-management behaviors (dietary control), and fasting blood glucose levels. However, no significant association was documented between self-management behaviors and HgA1c levels.

Regarding the blood sugar test and foot care sections, they were significantly associated with the participants' age (P=0.000), occupation (P=0.000), and educational level (P=0.000). Younger participants (18-35) had the best practice regarding blood sugar tests, while older ones (36-55) had the best practice of foot care. This could be attributed to the fact that elderly diabetic patients are more likely to have a foot ulcer. [35] Participants with intermediate or high education in this study recorded the highest blood sugar test scores, and the undergraduate/ postgraduate students had the best foot care score. **Abu Sabbah *et al.*** [15] reported that university students had the best blood sugar test and foot care practices. Although all new diabetics admitted to the hospital are regularly educated on this subject, poor blood sugar testing and foot care practice levels were generally found among many sub-grouped participants in this study.

Satisfaction with the treatment in controlling blood sugar level (P=0.000), smoking status (P=0.005), physicians health education on diabetic medication (P=0.003), the associated chronic diseases (P=0.000), and used treatment (P=0.000) were all significantly associated with the blood sugar test and foot care practices. The completely dissatisfied participants, the occasional smokers, the participants who received physician medical education on diabetic medication, those with other chronic associated diseases, those with no diabetic complications, and those who used the diet treatment only have the best blood sugar test practices. Home blood sugar testing practice was found to be poor in other Saudi studies. [15, 36] **Al Slamah *et al.*** published a systematic review investigating the self-management of type 2 diabetes in Gulf Cooperation Council (GCC) countries. They concluded a significant improvement in physical activity levels as reported in half of the studies. Self-management interventions may have a positive influence on HbA1 levels. [36]

Recently in Iraq, **Mikhael *et al.*** [37] assessed diabetes self-management behaviors, identified their barriers among T2DM patients, and revealed that most patients insufficiently practiced physical activity and healthy eating recommendations. Besides, most of them reported irregular self-monitoring of blood glucose. However, most of them properly adhered to

the anti-diabetic medications. Generally, they lack proper knowledge about the importance of self-management practices of foot care and managing diabetes during sick days and how such practices should be done. On the other hand, most patients had positive attitudes toward diabetes self-management practices. In India, ***Kakade et al.*** carried out a cross-sectional study to evaluate knowledge and attitude towards self-care activities among type 2 diabetic patients. They reported that attitude towards self-care activities was not significantly associated with glycaemic control. Following a controlled and observing strict glucose management were significantly associated with achieving glycaemic control among self-care practices. [38]

Regarding the foot care section in this study, the completely dissatisfied patients with the treatment control blood sugar level, ex-smokers, participants who received physician medical education, those with no chronic diseases, no chronic diseases, and who use insulin treatment have the best foot care practice. **Saad *et al.*** [12] reported that the commonest reported diabetes self-management activity was foot care, followed by self-medication management. The non-smokers had the highest foot care practice score in another Saudi study. [15] The majority of diabetic patients do not conduct basic foot care tests regularly because they are unaware of the protocols or how to perform them. Every diabetic patient should be advised about the causes, existence, and outcome of diabetic foot disease and preventive self-foot care steps on an individual basis. They must believe in what they do, and health care professionals should inspire them to continue. [39] A systematic review was done by **Coyle *et al.*** [40] to identify the range of self-management activities for diabetics to control their disease. They found that compliance to regular self-care was varied among diet, foot care, and physical activity.

The current study was conducted in a single district, which does not reflect the entire population of Saudi Arabia. Apart from that, the evaluation of self-care habits was largely focused on the participants' self-reporting. As a result, data may be skewed due to over-reporting or under-reporting.

CONCLUSION:

This study reflected relatively poor diabetic self-care practice among patients with T2DM in Taif, Saudi Arabia. Regarding the overall SDSCA score, male participants, younger participants, Saudi participants, undergraduate/ postgraduate students, those with family support for taking diabetic medication, those with no chronic conditions, no diabetic complications, and those who use diet treatment only were reported to have the best general self-care management. Male participants had better practices regarding exercise practice and foot care, while females had better diet and blood sugar test practices. In terms of the diet and exercise practices, Students had the best diet and exercise practices. Participants who received physician education on diabetic medication had better blood sugar testing and foot care.

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