Original Article

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Barriers to diet and exercise among patients with type 2 diabetes mellitus in Basrah hospitals

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ABSTRACT

Background: Type 2 diabetes mellitus (T2DM) is growing health concern globally, particularly in the Middle East. To encourage individuals to adopt a healthy lifestyle essential for managing diabetes, it is imperative to thoroughly understand the barriers, especially those that can be modified, encountered by patients following nutritional and exercise medical advice. **Aim**: The primary objective of this study was to investigate the barriers related to nutrition and exercise among patients with T2DM in hospitals located in Basrah. **Methods**: This cross-sectional study included 194 adults with history of T2DM who were visiting the outpatient departments of internal medicine in four selected hospitals in Basrah. Data was collected using a specially prepared questionnaire administered through direct interviews with the diabetic patients by the investigators. The questionnaire encompassed general information about the participant and barriers to diet and exercise among patients with T2DM. **Results**: Most of the participants were aged 40 years and older (82.5%). Approximately 46.9% of the participants adhered to their doctor's dietary recommendations. Only 20.6% of the diabetic patients engaged in physical exercise. Among non-adherent patients with T2DM, the most frequently reported barriers to nutrition included a lack of preference for the recommended diet (86.4%), lack of motivation (57.2%), and lack of knowledge (52.4%). The most commonly cited barriers to exercise were lack of energy (87.0%), lack of willpower (81.8%), lack of skill (77.9%), and fear of injury (73.3%). **Conclusion**: The study revealed that the compliance of diabetic patients to dietary and exercise recommendations was low. Therefore, it is crucial for health professionals to proactively address the mentioned barriers, and policymakers should design active nutritional practice guidelines for patients with T2DM.

Keywords: barriers, diet, exercise, type 2 diabetes, Basrah

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INTRODUCTION

Type 2 diabetes mellitus (T2DM) is an escalating global health concern, particularly in the Middle East, including Iraq.[1] In 2017, the global prevalence of diabetes was valued at about 8.8%, impacting 425 million adults, as reported by the International Diabetes Federation (IDF). The Middle East and North Africa (MENA) region

exhibits the second highest diabetes rate, with a prevalence of 9.2% among IDF regions. Projections indicate that between 2017 and 2045, the prevalence of diabetes in the MENA region will rise by 110%, potentially reaching 629 million worldwide by 2045.[2] In 2012, diabetes was directly responsible for an estimated 1.5 million deaths. Furthermore, uncontrolled diabetes, due to increasing cardiovascular diseases, contributed to 2.2 million deaths in 2014, with the majority occurring in individuals under 70 years of age.[3] By 2030, diabetes is expected to rank as the seventh leading cause of death, according to the World Health Organization's estimates.[4] In Iraq, diabetes prevalence is reported to range from 8.5% to 13.9%. The country has set targets for preventing and controlling non-communicable diseases (NCDs), such as DM, hypertension, and breast cancer.[5]

Key factors contributing to the prevalence of T2DM in Middle Eastern nations include physical inactivity, poor dietary habits, obesity, lack of health awareness, health beliefs, and lifestyle choices. Effective diabetes care is crucial to mitigate morbidity and healthcare costs, as diabetic patients tend to use greater resources in the emergency and in-patient settings compared to their non-diabetic counterparts.[6] Iraq has endured ongoing conflict and instability, significantly impacting the health of its population. While outbreaks of communicable diseases continue, non-communicable chronic diseases, particularly T2DM, now pose the largest threat to Iraq's healthcare services.

Despite the rising prevalence of diabetes, individuals diagnosed with the condition have often experienced inadequate control, with an average HbA1c level of 8.4% and only 24% of Iraqi patients achieving the goal of HbA1c > 7%.[7,8] This situation presents a cause for concern as poor glycemic control is associated with diabetes-related complications, which impose a considerable financial load on the healthcare system. It is widely acknowledged that nutritional therapy serves as the backbone of diabetes management; however, it is rarely considered a primary focus. Limited research has been conducted on the role of nutritional status-related parameters on the glycemic status of Iraqi diabetics.[7] Diabetes nutrition essentially entails consuming moderate portions of a healthy diet and adhering to regular meal times.[9] Exercise is typically one of the top treatment plans recommended for patients newly diagnosed with diabetes. It constitutes a vital element of all diabetes and obesity prevention initiatives, as well as lifestyle intervention programs, alongside nutrition and behavior adjustments.[10]

To encourage individuals to implement a healthy lifestyle, it is imperative to comprehensively understand the barriers, especially those that are modifiable, encountered by those following nutritional and exercise medical instructions. Physicians can facilitate behavior change by identifying these compliance barriers.[11] In Iraq, the dominant barriers to achieving good glycemic control reported by patients with T2DM in Kirkuk included a lack of knowledge about treatment, the side effects of the disease or medications, and social factors like unemployment and limited access to healthcare.[12] Opportunities for fitness and access to exercise facilities remain inadequate in Iraq, particularly for females, where physical activity is often perceived as shameful.[13] The primary objective was to investigate the barriers to diet and exercise among patients with T2DM in Basrah hospitals.

MATERIALS AND METHODS

A cross-sectional study was conducted between January and April, 2024. Prior to the commencement of the study, approval was obtained from the Basrah Directorate of Health. The study included 194 adults with a history of T2DM who visited the outpatient department (OPD) of internal medicine across four purposively selected hospitals in Basrah, which included

- Basrah Teaching Hospital and Al-Sadr Teaching Hospital—two hospitals representing urban areas, and
- Qurna Teaching Hospital and Mudaina Teaching Hospital—two hospitals representing urban areas.

These OPDs provide consultation services for a variety of medical cases, operating for five days per week (Sunday, Monday, Tuesday, Wednesday, Thursday), from 8.30 am to 2:00 pm. Individuals were considered eligible for participations if (i) they were at least 18 years old and (ii) diagnosed with T2DM. The first 5–10 patients fulfilling the inclusion criteria were enrolled in the study.

A specially designed questionnaire was utilized for data collection. The components of the questionnaire were selected and modified by the supervisor based on a published study.[11] Data was collected through direct

interview with the diabetic patients conducted by the surveyors.

The questionnaire comprised three parts: (1) general, socio-economic, and health information about the participant, including age, sex, education, occupation, marital status, place of residence, family income, duration of DM, and compliance with physical exercise; (2) barriers to diet among individuals with T2DM; and (3) barriers to exercise among patients with T2DM. Importantly, compliance with physical exercise was defined as anyone reporting five or more sessions of moderate or vigorous activity per week. Compliance with dietary recommendations was defined as following the recommended dietary advice at least six days a week.

Investigators asked participants who were noncompliant with dietary advice to establish barriers to dietary compliance; multiple barriers could be reported, as shown in Table 2. Similarly, participants who were noncompliant to exercise advice were also asked to mention barriers to being active, as presented in Table 3. The data was analyzed by the Statistical Package for Social Sciences (SPSS) version 26. Chi square and Fischer's exact tests were employed to assess the relationship between two categorical variables.

RESULTS

The study included 194 respondents, of whom 74 (38.1%) were males and 120 (61.9%) were females. The majority belonged to the age group of 40 years and older (82.5%). About two-thirds of respondents (60.8%) had six or fewer years of education, while 21.1% had between seven and 12 years of education. Most respondents were married (78.9%), while 21.1% were either single, widowed, or divorced. About half of the respondents (51.5%) were housewives, 26.8% were governmental employees, and 7.7% were self-employed. More than half of the respondents (58.8%) had household income of less than 500 Iraqi dinar(IQD), while 36.6% had an income between 500 to 1 million IQD.

About 59.3% of the study population were residents of rural areas, whereas the residents of urban areas formed 40.2%. More than one-third of the study population (39.2%) had been diagnosed with diabetes for less than five years, and 36.6% had been living with diabetes for five to 10 years. Those with a history of diabetes exceeding 10 years represented 24.2%. Only 20.6% of the diabetics in the study engaged in physical exercise as per their doctor's recommendations. Less than half of the participants (46.9%) adhered to their doctor's dietary recommendations. When examining the association between dietary compliance and socio-demographic and health information characteristics of the participants, no significant differences were noted between those adherent and non-adherent to nutritional advices, except regarding place of residence and duration of DM. A statistically significant association was observed among age, sex, education level, occupation, family income, duration of diabetes, and compliance with exercise; however, no differences were noted in exercise compliance regarding place of residence and marital status, as illustrated in Table 1.

Most participants who did not adhere to dietary recommendations indicated a preference against the recommended diet (86.4%). Additionally, a
lack of motivation and lack of knowledge were reported by 57.2% and 52.4% of the noncompliant diabetics, respectively. Furthermore, 42.7% of patients cited a lack of skills to prepare or select healthy food options. Those who claimed that their work commitments hindered their ability to buy and/or cook healthy food options constituted 33.0%, while 27.1% noted that healthy diets are expensive, as outlined in Table 2.

Participants who were noncompliant with exercise reported that lack of energy (87.0%) and lack of willpower (81.8%) were the primary barriers to physical activity. Other barriers included lack of skill (77.9%), fear of injury (73.3%), community impact (67.5%), lack of time (61.0%), and lack of resources (49.3%), presented in Table 3

Table 1: Socio-demographic characteristics and health information of the study population (n=194)

Variable	Total No. (%)	Diet No. (%)			Exercise No. (%)		
		Compliant	Noncompliant	P-value	Compliant	Noncompliant	P-value
Age (years) <20 20-29 30-39 ≥40	 4 (2.1) 16 (8.2) 14 (7.2) 160 (82.5)	 2 (2.2) 9 (9.9) 10 (11.0) 70 (76.9)	 2 (1.9) 7 (6.8) 4 (3.9) 90 (87.4)	0.193	 1 (2.5) 4 (10) 8 (20) 27 (67.5)	 3 (1.9) 12 (7.8) 6 (3.9) 133 (86.4)	0.006
Sex Male Female	 74 (38.1) 120 (61.9)	 38 (41.8) 53 (58.2)	 36 (35) 67 (65)	0.33	 28 (70) 12 (30)	 46 (29.9) 108 (70.1)	0.00
Education (years) ≤ 6 7-12 ≥ 13	 118 (60.8) 41 (21.1) 35 (18.0)	 50 (54.9) 23 (25.3) 18 (19.8)	 68(66) 18(17.5) 17 (16.5)	0.266	 13 (32.5) 14 (35) 13 (32.5)	 105 (68.2) 27 (17.5) 22 (14.3)	0.00
Marital status Married Others (single, widow, divorced)	 153 (78.9) 41 (21.1)	 73 (80.2) 18 (19.8)	 80 (77.7) 23 (22.3)	0.664	 32 (80) 8 (20)	 121 (78.6) 33 (21.4)	0.518
Occupation Governmental employee Self employed Unemployed Housewife Students	 52 (26.8) 15 (7.7) 21 (10.8) 100 (51.5) 6 (3.1)	 30 (33) 7 (7.7) 10 (11) 42 (46.2) 2 (2.2)	 22 (21.4) 8 (7.8) 58 (56.3) 11 (10.7) 4 (3.9)	0.428	 17 (42.5) 6 (15) 5 (12.5) 10 (25) 2 (5)	 35 (22.7) 9 (5.8) 16 (10.4) 90 (58.4) 4 (2.6)	0.001
Place of residence Urban Rural	 78 (40.2) 116 59.8	 28 (30.8) 63 (69.2)	 50 (48.5) 53 (51.5)	0.012	 19 (47.5) 21 (52.5)	 59 (38.3) 95 (61.7)	0.19
Family income (IQD) Less than 500.000 500.000-1million 1-2million More than 2 million	 114 (58.8) 71 (36.6) 8 (4.1) 1 (0.5)	 56 (61.5) 31 (34.1) 4 (4.4) 0 (0)	 58 (56.3) 40 (38.8) 4 (3.9) 1(1)	0.815	 17 (42.5) 19 (47.5) 4 (10) 0 (0)	 97 (63) 52 (33.8) 4 (2.6) 1 (0.6)	0.023
Duration of diabetes mellitus < 5 years 5-10 years > 10 years	 76 (39.2) 71 (36.6) 47 (24.2)	 49 (53.8) 33 (36.3) 9 (9.9)	 27 (26.2) 38 (36.9) 38 (36.9)	0.00	 23 (57.5) 11 (27.5) 6 (15)	 53 (34.4) 60 (39) 41 (26.6)	0.028

Table 2: Barriers to nutritional compliance among the participants.

Barrier	No.	%
I don't have knowledge on healthy options for diabetic patients	54	52.4
Nobody motivates me to eat a healthy diet	59	57.2
I don't like to eat my recommended diet	87	84.4
I have no knowledge on how to cook/buy a diet healthy for diabetic patients	44	42.7
I can't easily buy healthy food	28	27.1
I am full with responsibilities and having no time to buy/cook a healthy diet	34	33.0

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Table 3: Barriers to exercise among the respondents.

Barrier	No.	%
Lack of time	94	61.0
Social influence	104	67.5
Lack of energy	134	87.0
Lack of willpower	126	81.8
Fear of injury	113	73.3
Lack of skill	120	77.9
Lack of resources	76	49.3

DISCUSSION

This descriptive study aimed to identify the barriers to recommended diet and exercise among T2DM patients in Basrah. The study included 194 patients with T2DM from four Basrah hospitals. The findings revealed that less than half of the participants (46.9%) adhered to their doctor's dietary recommendations; in Kirkuk, only 2.1% of patients with inadequate glycemic control engaged in dietary and lifestyle modifications.[12] A similar study in Nepal found that 59% of patients complied with dietary recommendations,[11] while two previous studies conducted in Ethiopia reported compliance rates of 37.5% and 25.7% among their subjects.[14,15] Furthermore, only 2.5% of study participants in Ismailia governorate, Egypt[16] demonstrated compliance. These discrepancies may be attributed to variations in settings, socioeconomic standards, and meal choices across different countries.

In the current study, only 20.6% of patients with T2DM adhered to physical exercise recommendations provided by their doctors. This figure was significantly lower than the compliance rates observed in Nepal, where 54% of individuals followed exercise guidelines. Additionally, research conducted in Argentina indicated that 52.3% of respondents reported a low level of physical activity engagement.[17] The discrepancies in methodologies used to evaluate the physical activity level complicate comparisons across various studies. When investigating the association between dietary compliance and socio-demographic and health information characteristics of the participants, statistically significant differences were found between dietary compliance and place of residence and duration of DM, which aligns with findings reported in Ethiopia.[15] In the current study, a statistically significant association was also identified among age, sex, education level, occupation, family income, duration of diabetes, and compliance with exercise, which aligns with most previous studies where age and female sex are associated with lower levels of physical activity.[17,18]

Concerning barriers to dietary adherence, most of the noncompliant participants (84.4%) expressed a preference against consuming the recommended diet. In Iraqi culture, diet plays an important role in social occasions, and there exists substantial social pressure to partake in food, especially during religious and social occasions, which makes compliance to diet challenging. The lack of motivation and lack of knowledge were cited as the second and third barriers by 57.2% and 52.4% of the noncompliant diabetics in Basrah, respectively. A lack of dietary knowledge had also been identified as a primary barrier to adherence to recommended diets in Nepal, Ethiopia, and Egypt.[11,14,16] This finding may be linked to the fact that over half of the participants possess a low level of education (60.8%). The lowest percentage, about 27.1% of the noncompliant diabetics in Basrah, stated that healthy diets are expensive. Budget limitations were found to be the second perceived barrier in Ethiopia (71.3%) and Egypt (61%), and the primary barrier in Mosul by 47% of participants.[14,16,19]

In terms of barriers to physical exercise, the most prevalent obstacles in Basrah included a lack of energy

(87.0%), lack of willpower (81.8%), lack of skill (77.9%), and fear of injury (73.3%). Those barriers have also been found to be highly common in Nepal and Argentina.[11,17] Patients facing these challenged should be motivated to start some form of physical activity, as it has been shown that feelings of fatigue can unexpectedly improve with exercise.[11] Regarding additional barriers, our results indicated that social influences constituted a barrier for 67.5% of patients. Similarly, in Oman, the lack of social support was among the most frequently reported barriers, in a population culturally similar to that of Basrah.[20] In Basrah, financial incomes was cited as a barrier by 49.3% of T2DM respondents, which may correlate with the fact that 58.8% of the patients reported a household income of less than 500,000 IQD.

CONCLUSIONS

The present study revealed that fewer than half of the participants (46.9%) adhered to their doctor's dietary recommendations. Merely 20.6% of the diabetics in this study engaged in physical exercise as per their doctor's recommendations.

Recommendations

It is essential for physicians monitoring the condition of diabetic patients, particularly those who are periodically monitored, to promote a culture of healthy eating and physical exercise as foundational elements for managing diabetes, rather than solely relying on treatments. Health institutions must facilitate adherence to dietary and exercise regiments for diabetics by establishing support programs that lower the costs of certain healthy foods and sports club memberships for this demographic.

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