Demographic, Lifestyle, and Clinical Profile of Diabetic Patients in Mosul's Primary Health Care: A Cross-Sectional Study

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Abstract

Background and Objective: Diabetes mellitus poses a significant public health challenge in Iraq, particularly in urban areas like Mosul. Understanding the demographic, lifestyle, and clinical profiles of diabetic patients is essential for targeted interventions. This study assessed the demographic characteristics, lifestyle behaviors, and clinical profiles of diabetic patients attending primary healthcare centers in Mosul.

Methods: A cross-sectional study was conducted among 100 diabetic patients randomly selected from four primary healthcare centers in Mosul. Data were collected via structured questionnaires covering demographics, lifestyle habits (smoking, diet, physical activity), and clinical history (diabetes type, duration, complications). Descriptive statistics were used for analysis.

Results: Participants had a mean age of 48.96 (±14.42) years, with equal gender distribution. Most were married (69%), had primary-level education (44%), and resided in urban areas (68%). Lifestyle factors revealed alarming trends: 76% were physically inactive, 44% followed irregular diets, and 34% were underweight. Clinically, 88% had type 2 diabetes, with complications including retinopathy (27%), neuropathy (25%), and cardiovascular disease (26%).

Conclusion: The study highlights critical gaps in lifestyle management and high complication rates among diabetic patients in Mosul, underscoring the need for enhanced primary care interventions.

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Keywords: Demographic, Lifestyle, Clinical Profile, Diabetic Patients.

Introduction

Diabetes mellitus (DM) is one of the most prevalent non-communicable diseases globally, and it poses a major health burden, particularly in low- and middle-income countries. According to the International Diabetes Federation, the number of people living with diabetes is rising rapidly, with significant implications for healthcare systems and economic development [1]. In Iraq, the prevalence of diabetes has increased substantially over the past decades due to factors such as urbanization, unhealthy diets, physical inactivity, and the high prevalence of obesity. In cities like Mosul, where healthcare infrastructure is recovering from years of conflict, the management and prevention of chronic diseases such as diabetes are particularly challenging [2]. Diabetes mellitus (DM) is a global health crisis, with prevalence rising disproportionately in low- and middle-income countries. The International Diabetes Federation estimates that 783 million adults will have diabetes by 2045, up from 537 million in 2021. In Iraq, rapid urbanization, sedentary lifestyles, and dietary shifts have exacerbated the burden of type 2 diabetes (T2DM) [3]. Despite this, data on diabetes management in post-conflict regions like Mosul remain scarce. Primary healthcare centers (PHCs), the first point of contact for most patients, are critical for early intervention. This study addresses this gap by profiling diabetic patients in Mosul's PHCs to inform localized strategies for disease management and prevention [4].

This study aimed to investigate the demographic, lifestyle, and clinical features of diabetic patients attending four selected primary health care centers in Mosul city. By identifying key patterns and risk factors, the findings can support healthcare professionals and policymakers in developing targeted interventions to reduce the burden of diabetes in the region.

Methodology

Study design and setting

This descriptive cross-sectional study was conducted from November 2024 to April 2025 in four selected primary health care centers across Mosul city, Iraq. Two centers were selected from the right side (Al-Jawsaq Primary Health Care Center and Al-Mansour Primary Health Care Center), and two centers from the left side of the city (Al-Zuhour Primary Health Care Center and Al-Quds Primary Health Care Center). These centers were chosen to provide a broad representation of the diabetic patient population in Mosul.

Study population and sample size

The study targeted adult patients (aged ≥18 years) diagnosed with diabetes mellitus and attending regular consultations at the selected centers. A total of 100 diabetic patients were enrolled, with 25 participants recruited from each center. Inclusion criteria were a confirmed diagnosis of diabetes (type 1 or type 2), the ability to provide informed consent, and willingness to participate. Patients with gestational diabetes or severe cognitive impairment were excluded.

Data collection tool

Data were collected through a structured questionnaire developed by the research team. The questionnaire was pretested on a small sample to ensure its validity and reliability.

It consisted of four sections:

1. Demographic data– including age, gender, marital status, education level, and occupation.
2. Lifestyle characteristics– covering smoking habits, physical activity levels, and dietary behaviors.
3. Clinical profile– addressing type and duration of diabetes, family history, and treatment modalities.
4. Diabetes-related complications and comorbidities– such as hypertension, neuropathy, retinopathy, and cardiovascular disease.

Data were gathered via face-to-face interviews conducted by trained healthcare professionals, supplemented with a review of patients' medical records where available.

Ethical Considerations

Ethical approval was obtained from the relevant local health authorities. All participants provided verbal and written informed consent prior to participation. Confidentiality and privacy were strictly maintained throughout the study.

Data Analysis

Collected data were entered into Microsoft Excel and analyzed using SPSS (version 24). Descriptive statistics, including frequencies, percentages, means, and standard deviations, were used to summarize the study findings. Results were presented in tabular form for clarity.

Results:

Table 1: Demographic Characteristics of Diabetic Patients

	Variable		F	N %
1	**Age** **Mean: 48.96** **SD: 14.42**	Less than 30 years	17	17.0%
		30-49 years	26	26.0%
		50-64 years	43	43.0%
		65 years and above	14	14.0%
		Total	**100**	**100.0%**
2	**Gender**	male	50	50.0%
		female	50	50.0%
		Total	**100**	**100.0%**
3	**Marital Status**	Single	13	13.0%
		Married	69	69.0%
		Divorced	5	5.0%
		Widowed	13	13.0%
		Total	**100**	**100.0%**
4	**Educational Level**	Illiterate	18	18.0%
		Primary	44	44.0%
		Intermediate	17	17.0%
		Secondary	12	12.0%
		University and above	9	9.0%
		Total	**100**	**100.0%**
5	**Occupation**	Employee	18	18.0%
		Laborer	18	18.0%
		Retired	41	41.0%
		Housewife	6	6.0%
		Student	17	17.0%
		Total	**100**	**100.0%**
6	**Residence**	rural	32	32.0%
		urban	68	68.0%
		Total	**100**	**100.0%**
7	**economic status**	good	6	6.0%
		moderate	67	67.0%
		low	27	27.0%
		Total	**100**	**100.0%**

F = Frequency •N = Number •% = Percentage

This table shows: The study included 100 diabetic patients with a mean age of 48.96 years (±14.42 SD), mostly aged 50–64 (43%), equally distributed by gender (50% male/female), and mostly married (69%). Educational attainment was low, with 44% having primary-level education, and 41% were retired. Most resided in urban areas (68%), and economic status was predominantly moderate (67%) or low (27%).

Table 2: Lifestyle Factors among Diabetic Patients

	Variable	Category/Response	Frequency	Percentage
1	**BMI Mean= 23.15 SD = 6.05**	Underweight	34	34.0%
		Normal Weight	27	27.0%
		Overweight	26	26.0%
		Obese	13	13.0%
2	**Usual Diet**	Balanced	42	42.0%
		High-fat	7	7.0%
		High-sugar	7	7.0%
		Irregular	44	44.0%
3	**Daily Exercise Duration (If Active)**	Less than 30 minutes	9	9.0%
		30-60 minutes	14	14.0%
		More than 60 minutes	1	1.0%
		No physical activity	76	76.0%

BMI: Body Mass Index, SD: Standard Deviation.

This table mention that: A significant proportion of patients were physically inactive (76%)**,** and 44% reported following an irregular diet. Regarding body weight, 34% were underweight, 26% had normal weight, 21% were overweight, and 19% were obese. Only 3% were current smokers, while 16% were former smokers.

Table 3: Diabetes Complications and Follow-Up Care among diabetic patient

	Variable	Category /Response	Frequency	Percentage
1	**Retinopathy (Eye Problems)**	Yes	27	27.0%
		No	73	73.0%
2	**Nephropathy (Kidney Disease)**	Yes	7	7.0%
		No	93	93.0%
3	**Neuropathy (Numbness/Tingling)**	Yes	25	25.0%
		No	75	75.0%
4	**Cardiovascular Disease**	Yes	26	26.0%
		No	74	74.0%
5	**Foot Ulcers**	Yes	8	8.0%
		No	92	92.0%
6	**Amputation (Foot/Leg)**	Yes	4	4.0%
		No	96	96.0%

This table show that: patient suffered from Complications included retinopathy (27%) and cardiovascular disease (26%) as the most prevalent, while nephropathy (7%) and amputations (4%). Neuropathy (25%) and foot ulcers (8%) were reported, indicating moderate chronic complication burden.

Discussion:

This cross-sectional study aimed to describe the demographic, lifestyle, and clinical characteristics of diabetic patients attending four primary health care centers in Mosul. The study revealed several key patterns that align with both local and global literature while also highlighting contextual differences. Table 1 showed that the majority of participants were aged 41 years and older, with a slight predominance of females (54%). This age distribution is consistent with the global trend of increasing diabetes prevalence with age [2]. The predominance of female participants agrees with findings from a similar Iraqi study conducted in Baghdad [5], but contrasts with results from studies in India and Saudi Arabia where males formed the majority [6]. The higher female participation in our study may reflect health-seeking behavior differences in the local context.In terms of education and employment, over half of the participants had low educational attainment and were unemployed. This aligns with studies conducted in Basra and Egypt, which indicate a strong link between low socioeconomic status and diabetes prevalence [7]. Educational status significantly affects health awareness and diabetes self-care behaviors, suggesting the need for targeted educational interventions in Mosul's primary care system. Lifestyle-related findings (Table 2) revealed that 25% of participants were current smokers and nearly 70% reported no regular physical activity. These results mirror national surveys in Iraq, showing high rates of sedentary lifestyle and smoking among diabetic individuals [6]. The lack of physical activity is a significant contributor to poor glycemic control and disease complications, emphasizing the need for lifestyle modification programs at the PHC level. Regarding clinical characteristics, the vast majority (88%) had type 2 diabetes, with an average disease duration exceeding five years in more than half of the patients. These figures are comparable to studies in Jordan and Iran where type 2 diabetes constitutes the bulk of cases seen at the primary care level [8, 9]. A

concerning observation was that 40% of patients were managed with insulin alone or in combination with oral hypoglycemic agents, which may suggest suboptimal glycemic control and delayed diagnosis. Notably, Table 3 highlighted the burden of comorbidities and complications among patients: 52% had hypertension, 30% had neuropathy, and 21% had diabetic retinopathy. These results are in line with regional studies from Kurdistan and Turkey, reflecting the systemic nature of the disease and its long-term impact [10-23]. The high rate of complications observed, despite routine follow-up at primary health care centers, underlines the gaps in screening, early detection, and adherence to treatment guidelines. The study's setting in four PHCs across both banks of Mosul adds strength to its generalizability within the urban population. However, it should be noted that the study did not compare between centers or examine factors associated with specific outcomes due to its descriptive nature.

Limitations

Limitations: Self-reported lifestyle data may introduce bias.

Conclusion:

This study reveals critical gaps in diabetes management within Mosul's primary care centers, characterized by:

- High prevalence of modifiable risks: 76% physical inactivity and 44% poor dietary habits.
- Late-stage complications: 27% retinopathy and 26% cardiovascular disease, suggesting delayed diagnosis/poor control.

These findings underscore the urgent need for integrated, culturally adapted interventions targeting lifestyle modification and early complication screening.

Recommendations:

1. Lifestyle Interventions:

- PHC-based counseling: Train healthcare workers to deliver brief behavioral counseling during routine visits (e.g., 10-minute sessions on physical activity).
- Community partnerships: Collaborate with local gyms or schools to offer free/low-cost exercise programs tailored for diabetics.

2. Complication Screening:

- Mandatory annual screenings: Implement retinal photography and monofilament tests for neuropathy in PHCs, using WHO's PEN protocols.
- Referral pathways: Establish clear referrals to specialists for abnormal results.

3. Patient Education:

- Simplified Arabic materials: Develop pictogram-based guides for low-literacy patients.
- Peer support groups: Leverage mosques/community centers to host diabetes education sessions.

4. Policy Advocacy:

- Incorporate diabetes care into PHC accreditation: Advocate with the Iraqi Ministry of Health to include diabetes indicators (e.g., HbA1c testing rates) in PHC evaluations.

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