Epidemiological profile for type 2 diabetic patients in Babylon City: Across sectional study

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KEYWORDS	ABSTRACT
Epidemiological Profile, T2DM, Cross-sectional study	Background: Diabetes Mellitus (DM) is a multifaceted and enduring metabolic disorder that has become a prominent global health concern. The global impact of this issue is significant, affecting a large population and presenting substantial health risks, thereby placing a considerable strain on healthcare systems. Type 2 diabetes is a significant public health problem responsible for several macro and microvascular complications. This study aimed to describe the epidemiological profile of type 2 diabetic patients how attending to the specialized center for endocrinology and diabetes in Babylon City. Methodology: A sectional study was conducted between 25th of September 2023 to the 18th of April 2024 to determine the epidemiological characteristics of patients with type 2 diabetes who was attending to the Specialized Center for Endocrinology and Diabetes in Marjan Teaching Hospital, it's a referral center for diabetes and other endocrinology diseases and received diabetes patients of different ages and both sexes from the different health facilities as Public Hospitals, PHC, and Private Clinics. Result: - The study included 751 patients; 58.7% were females, and 41.3% were male. 30.8% were in the age group (60-69) years with an average age of 54.2±14.0 for all involved age (18-90) years. The majority, 47.1%, had diabetes duration of less than 10 years. On admission, 87.6 % of patients suffer from a chronic disease other than diabetes, 30.1 % were overweight, and 48.4 % were obese, with the non-significant difference between percentages using the person chi-square test (χ^2-test) at 0.05 level (P= 0.970). On the other hand, 98.8 % of patients had at least one complication on admission: 81.9% had peripheral neuritis, 85 % had eye fatigue, 84.2 % had severe hypoglycemia, 41.3% had high blood pressure, 35.2% had a diabetic foot and lowest percentage 10.1% had brain strokes. Conclusion: - The patients with type 2 diabetes mellitus have an extremely high risk of disease complications.

1. Introduction

Diabetes mellitus is a serious worldwide health issue, and its prevalence is rapidly growing and affecting a large population and presenting substantial health risks, thereby placing a considerable strain on healthcare systems (1). It is a spectrum of metabolic illnesses defined by perpetually increased blood glucose levels, Undiagnosed diabetes can lead to a variety of problems, including retinopathy, nephropathy, neuropathy, and other vascular abnormalities (2). The severity of symptoms can vary depending on the duration and type of diabetes (3). The global population of adults diagnosed with diabetes in 2019 was estimated to be around 463 million; the number is anticipated to increase significantly, as projections suggest that by 2045, approximately 700 million individuals may be impacted if prompt action is not taken. The increase in diabetes cases can be attributed to a combination of factors, such as sedentary lifestyles, unhealthy dietary habits, escalating obesity rates, and a global ageing population (4). World Health Organization (WHO) estimated that the prevalence of DM will reach 380 million people worldwide in 2025. The Eastern Mediterranean and the Middle East regions have the highest prevalence of diabetes and mortality rates caused by DM, which will reach 3.9 million people in 2030 (5). Type 2 diabetes, also known as non-insulin-dependent diabetes, is the predominant type of diabetes, constituting approximately 90-95% of all cases of diabetes. Insulin resistance or insufficient insulin production in the body leads to the inability to maintain normal blood glucose levels. Type 2 diabetes is frequently linked to lifestyle factors such as obesity, sedentary behaviour, and an unhealthy diet; with this type, the body doesn't

make enough insulin and/or your body's cells don't normally respond to the insulin (insulin resistance), This is the most common type of diabetes. It mainly affects adults, but children can also have it (6). Meanwhile, T2DM risk increases with age, obesity, a lack of physical activity, hypertension, dyslipidemia, and a family history of diabetes among first-degree relatives (more than type diabetes), and women with a history of gestational diabetes (GDM); in the early stages of hyperglycemia, T2DM may develop gradually with masked symptoms of hyperglycemia, and it typically goes untreated for years (Mana et al., 2022). Therefore, the primary prevention of T2D is a priority, as it can improve the well-being of individuals and mitigate social and economic burdens (7). A good diet and regular exercise can help some patients with type 2 diabetes; if changing one's lifestyle is not enough to lower blood sugar levels, medication may be required. The drugs lower blood sugar levels through a variety of different methods, and eating the right foods can help control blood sugar and aid in weight loss(8).

2. Methodology

Study design and sample size: A descriptive cross-sectional survey was carried out from 1st September 2023 to 18th April 2024. The response rate for the pre-validated questionnaire-based survey, which was conducted through direct interviews with each participant, was 98%. A simple random sampling technique was applied to choose 751 T2DM patients who are attending the specialized centre for Endocrinology and Diabetes in Babylon City - Iraq, to be involved in this study.

Study instruments: The interview was based on a well-structured questionnaire form that was pre-tested on a pilot study and subsequently updated by the literature review to ensure reliable information according to WHO criteria after presenting it to experts. The questionnaire consists of two parts: the first part contains some demographic characteristics, and the second consists of the epidemiological profile for type 2 diabetics.

Statistical analysis: Data were analyzed by IBM SPSS-29 (IBM Statistical Packages for Social Sciences- version 29, Chicago, IL, USA). Data were presented in simple measures of frequency, percentage, mean, and standard deviation. The significance was tested using the Pearson Chi-square test ($\square$2-test), and statistical significance was considered whenever the P-value was equal to or less than 0.05.

3. Results and discussion

During the study period, 751 patients with type 2 diabetes participated; all of these patients visited the specialized Centre for Endocrinology and Diabetes in Babylon City. Most of the patients were 441 (58.7%) female and 310 (41.3%) male. According to age groups, 231 (30.8%) were in (60-69) years, and the lowest percentage, 8 (1.1%), were in the age group < 20 years, with mean ± SD equal to 54.2±14.0 for all involved age groups (18-90). BMI mean± SD was 30.15±5.99 kg/m2, 30.1% were overweight (25 ≤ BMI < 30 kg/m2), and 48.4 % were obese (BMI ≥ 30 kg/m2) with non-significant association (p= 0.06) at a p-value (≥0.05) as shown in table 1.

Table 1: Demographic and clinical characteristics.

Variables	Category	Total No.=751	%	
Age (years)	< 20years	8	1.1	
	20-29	52	6.9	
	30-39	54	7.2	
	40-49	117	15.6	
	50-59	194	25.8	
	60-69	231	30.8	
	≥ 70years	95	12.6	
	Mean±SD (Range)	**54.2±14.0 (18-90)**		
Gender	Male	310	41.3	
	Female	441	58.7	
Variables	**Category**	**No**	**%**	**P.v**
BMI (Kg/m2)	Underweight (<18.5)	16	2.1	**0.06**

	Normal (18.5-24.9)	145	19.3	
	Overweight (25-29.9)	226	30.1	
	Obese	364	48.4	
BMI (Kg/m2) Mean ± SD		**30.15±5.99 (16.2-50.8)**		
Weight (Kg) Mean ± SD		79.6±15.2 (39-135)		
Mean ± SD Height (cm)		162.7±9.2 (129-192)		

Table 2 illustrates the medical history of study participants, in regarding to the duration of diabetes disease, the Mean±SD (Range) was 10.8±7.9 (1- 43) years, <10years were 354 (47.1%) and the lowest percentage=>20 were130 (17.3%). Regarding the committed to insulin treatment, 488(59.7%) of patients were uncommitted. While, 377(50.2%) were very committed to the Adherent to the diet. For a family history of diabetes was reported in 71.1 % of the cases, where formed (29.3%) having a first-degree relative with diabetes.

Table 2: Medical history of study participants

Variables	Category	Total N.=751	%	P.v
Duration of having the disease (Years)	<10years	354	47.1	0.5
	10-19	267	35.6	
	=>20years	130	17.3	
	Mean ± SD	**10.8±7.9 (1-43)**		
Committed to insulin treatment	Very committed	171	22.8	0.1
	Fairly committed	132	17.6	
	Uncommitted	448	59.7	
Adherent to the diet	Very committed	377	50.2	0.5
	Fairly committed	74	9.9	
	Uncommitted	300	39.9	
Variables	**Category**	**N=534 (71.1%)**	**%**	**P.v**
Genetic history of diabetes	First degree	155	29.3	0.03
	Second degree	56	10.5	
	Both	**323**	**69.2**	

Table 3: Shows the distribution of study sample according chronic disease other than diabetes, out of 662 patients the 63.1% had acute arthritis disease, and the lowest percentage 1.8% had cancer.

Table 3: Chronic disease other than diabetes of study sample**.**

Chronic Disease	Total N= 662(88.1%)	%	P.v
Hypertension	457	60.9	
Heart diseases	236	31.4	
Acute arthritis	474	63.1	
Asthma (bronchitis)	129	17.2	
Irritable Bowel Syndrome (**IBS**)	310	41.3	
kidney stones	82	10.9	
Chronic kidney disease	150	20	0.4
Thyroid disorder	66	8.8	
Stomach ulcers	65	8.7	
Osteoporosis	259	34.5	
Cancer	12	1.8	
Blood allergy	71	9.5	
Chronic prostatitis	36	4.8	
Polycystic ovary syndrome	24	3.2	
Acute pneumonia	**25**	**3.3**	

Figure1: illustrate the complication of diabetes diseases, 81.9 % had Peripheral neuritis (numbness in the extremities), and the lowest percentage 10.1% had a brain strokes
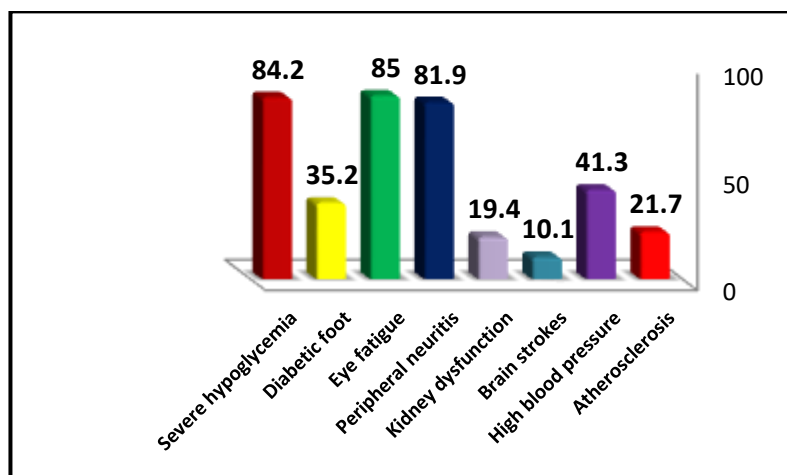
Figure 1: Complication of diabetes diseases of patients.

* Significant correlation P.value = 0.02

Discussion: -

Recently, the World Health Organization estimated that the prevalence of DM will reach 380 million people worldwide in 2025; the Eastern Mediterranean and the Middle East regions have the highest prevalence of diabetes and mortality rates caused by DM, which will reach 3.9 million people in 2030 [5]. 751 patients with type 2 diabetes participated in this study; all of these patients visited the specialized Centre for Endocrinology and Diabetes in Babylon City at least once.

In Table 1, the majority of the patients were 441 (58.7%) female and 310 (41.3%) male; several studies indicate that females were more susceptible to type 2 diabetes than men [9]. According to age groups, 231 (30.8%) were in (60-69) years, and the lowest percentage, 8 (1.1%), were in the age group < 20 years, with mean ± SD equal to 54.2±14.0 for all involved age groups (18-90). BMI mean± SD was 30.15±5.99 kg/m2, 30.1% were overweight (25 ≤ BMI < 30 kg/m2), and 48.4 % were obese (BMI ≥ 30 kg/m2) with non-significant association (p= 0.06) at a p-value (≥0.05) as shown in table 1) this results compatible with a systematic review in Northern Africa by Bos, M., & Agyemang, C. [10], and consistent with the well-established fact that obesity and overweight are predictive factors of type 2 diabetes [11]. The oxidative stress produced on by abdominal adiposity, which increases the activation of the renin-angiotensin-aldosterone system (RAAS) and insulin resistance, which elevates blood glucose levels, reveals the relationship between obesity and diabetes.This could explains why they suffer from complications associated with diabetes as in figure 1.

Depending to study results, the patients had an elevated risk of diabetic complications, including a variety of complications that raise the patients' risk of cardiovascular diseases; those patients may be in advanced stages of their disease, this results indicated in the Figure 1 that shows that 81.9% Peripheral neuritis, 85 % had Eye fatigue, 84.2 % had severe hypoglycemia, 41.3 % had High blood pressure 35.2% had a diabetic foot and lowest percentage 10.1% had brain strokes. Other study found a frequency exceeding the third (37.7 %) of patients with hypertension, especially in elderly type 2 diabetic patients [12]. The causal relationship between diabetes and hypertension is bidirectional, as diabetes promotes the occurrence of hypertension through various complex mechanisms, including activation of the renin-angiotensin-aldosterone system (RAAS) as well as insulin resistance. At the same time, hypertension is also recognized as a risk factor for the onset of T2DM [13]. The complications from diabetes can be classified as microvascular or macrovascular. Microvascular complications include nervous system damage (neuropathy), renal system damage (nephropathy) and eye damage (retinopathy). Macrovascular complications include cardiovascular disease, stroke, and peripheral vascular disease. In regard to the medical history of patients, and the duration of diabetes disease, the Mean±SD (Range) was 10.8±7.9 (1- 43) years, < 10 years were 354 (47.1%) and the

lowest percentage=>20 were130 (17.3%). Interestingly, 488(59.7%) of patients were uncommitted regarding the commitment to insulin treatment. Meanwhile, 377(50.2%) were very committed to adhering to the diet. Meanwhile, a family history of diabetes was reported in 71.1 % of the cases, where formed (29.3 %) had a first-degree relative with diabetes, 10.5 % had a second-degree relative with diabetes, and more than half of those (69.2 %) both (First & Second) degree (table 2).

Because the insulin-producing pancreatic β-cells progressively deteriorate, many people must receive insulin through subcutaneous injection. Meanwhile, current therapies do not have consistent results regarding preventing chronic complications. Leveraging the approval of real-time continuous glucose monitors and sophisticated algorithms that partially automate insulin infusion pumps has improved glycemic control, decreasing the burden of diabetes management. However, these advances are facing physiologic can lead to chronic disorders, table 3 shows the distribution of the study sample according to chronic disease other than diabetes, with 88.1% of patients suffering from chronic disease. Out of 662 patients, 63.1% had acute arthritis disease, 60.9% had Hypertension, followed by 41.3% had Irritable Bowel Syndrome (IBS) and the lowest percentage, 1.8%, had cancer. These result nearly agreed with a study in Moroccan by Abda, N., Bouazzaoui & M. A., Dahmani [9].

4. Conclusion and future scope

The patients had an extremely high risk of disease complications, according to our study. Primary care clinics might not have enough staff members or supplies on hand to properly screen for and keep an eye on these issues. In order to guarantee complete and ideal management of diabetes patients, including diabetic control and early diagnosis and treatment of its consequences, it is imperative that secondary care referral centers be strengthened.

Declaration:-

Declaration of conflicting interests: The Authors declare that there is no conflict of interest.

Ethical Approval and Consent to participate: The Research Ethics Committee of the Council of the College of Health and Medical Technologies in Kufa granted all necessary clearances and ethical approvals, then Babylon Health Directorate, and then the Human Development Training Center-Unit of Research, which provided the researcher with official permission directed to Marjan Teaching Hospital, then hospital Permission granted permission to Specialized Center for Endocrinology and Diabetes where study settings were conducted.

Authors' contributions:

Safa Salman Challoob Al- sultani Contributed to completing the practical part and the discussion section. **Maytham Salim AL-Nasrawii** contributed by writing the introduction section and discussing the research and the abstract. **Dr. Mohammad** contributed to the completion of the statistical analysis of the data and wrote the research methods and references.

Reference

[1] Pasquel, F. J., Lansang, M. C., Dhatariya, K., & Umpierrez, G. E. (2021). Management of diabetes and hyperglycaemia in the hospital. The Lancet Diabetes & Endocrinology, 9(3), 174–188.

[2] Kangra, K., & Singh, J. (2023). Comparative analysis of predictive machine learning algorithms for diabetes mellitus. Bulletin of Electrical Engineering and Informatics, 12(3), 1728–1737.

[3] Rossi, M. C., Nicolucci, A., Ozzello, A., Gentile, S., Aglialoro, A., Chiambretti, A., … Lucisano, G. (2019). Impact of severe and symptomatic hypoglycemia on quality of life and fear of hypoglycemia in type 1 and type 2 diabetes. Results of the Hypos-1 observational study. Nutrition, Metabolism and Cardiovascular Diseases, 29(7), 736–743.

[4] Xie, F., Chan, J. C. N., & Ma, R. C. W. (2018). Precision medicine in diabetes prevention, classification and management. Journal of Diabetes Investigation, 9(5), 998–1015.

[5] Jafarvand, E., Ataey, A., & Edalati, S. (2021). Epidemiology and death trends due to diabetes in Iran. Internal Medicine Today, 27(2), 198–213.

[6] Yun, J.-S., & Ko, S.-H. (2021). Current trends in epidemiology of cardiovascular disease and cardiovascular risk management in type 2 diabetes. Metabolism, 123, 154838.

[7] Tinajero, M. G., & Malik, V. S. (2021). An update on the epidemiology of type 2 diabetes: a global perspective. Endocrinology and Metabolism Clinics, 50(3), 337–355.

[8] Dhingra, G., Tanwar, S., Tanwar, K., Goyal, S., & Chaturvedi, V. (2022). HERBAL TREATMENT OF MICROVASCULAR AND MACROVASCULAR COMPLICATIONS OF DIABETES: A REVIEW.

[9] Abda, N., Bouazzaoui, M. A., Dahmani, H., Fourtassi, M., & Bentata, Y. (2024). Epidemiological profile of type 2 diabetic patients followed at a secondary care referral center: Data from a Moroccan cohort study. Scientific African, 23, e02017.

[10] Bos, M., & Agyemang, C. (2013). Prevalence and complications of diabetes mellitus in Northern Africa, a systematic review. BMC public health, 13, 1-7.

[11] Maggio, C. A., & Pi-Sunyer, F. X. (2003). Obesity and type 2 diabetes. Endocrinology and Metabolism Clinics, 32(4), 805-822.

[12] Diyane, K., El Ansari, N., El Mghari, G., Anzid, K., & Cherkaoui, M. (2013). Caractéristiques de l'association diabète type 2 et hypertension artérielle chez le sujet âgé de 65 ans et plus. Pan African Medical Journal, 14(1).

[13] Akhtar, M., Taha, N. M., Nauman, A., Mujeeb, I. B., & Al-Nabet, A. D. M. (2020). Diabetic kidney disease: past and present. Advances in anatomic pathology, 27(2), 87-97.