Original Article

Point Prevalence of Type 2 Diabetes Mellitus Patients among Different Specialties at MTI Khyber Teaching Hospital in Peshawar

Suleman Elahi Malik[1], Iqbal Haider[2*], Romesa Akhtar Khattak[2], Sidra Bibi[2], Hammad Naeem[2], Marhaba Iqbal[2]

ABSTRACT

OBJECTIVE: The main goal of this research study was to analyze the profile and prevalence of type 2 diabetic patients admitted to the MTI Khyber Teaching Hospital, Peshawar.

METHODOLOGY: A hospital-based point prevalence cross-sectional descriptive study was carried out as a pilot project in November 2022 at MTI Khyber Teaching Hospital, Peshawar, Pakistan. Patients satisfying the inclusion and exclusion criteria enrolled in the study, and a non-probability consecutive sampling technique was used.

RESULTS: A total of 850 patients were admitted during the study period; out of them, 24.7% had type II diabetes mellitus (T2DM). The mean length of hospital stay was significantly high among T2DM patients ($p < 0.01$). Moreover, there were statistically significant differences $\chi2(2) = 94.67$, $p < 0.01$, in the mode of admission among the T2DM patients, with fewer cases shifted from other units compared to ER and OPD. The antidiabetic regimen prescribed during the hospitalization included an oral antidiabetic regimen (36.9%), oral plus twice-daily insulin regimen (19.63%), and basal-bolus insulin (15.07%). CCU and ophthalmology ward had the highest proportion of admissions of T2DM patients (40% each). Patients were admitted for various indications; 11.0% were admitted due to diabetic foot ulcer, 9.5% for elective surgery, 9.55% had acute coronary syndrome (ACS), and 9.0% had diabetic kidney disease.

CONCLUSION: Patients admitted exhibited a high prevalence of T2DM. We highlighted some of the substantial characteristics of these patients attending various specialties.

KEYWORDS: Point Prevalence, Type 2 Diabetes Mellitus, Indications, Admission Rate, Treatment Regimen.

INTRODUCTION

Type 2 diabetes mellitus (T2DM) is a significant public health concern on a global scale, and it is becoming more common, especially in developing nations[1]. T2DM and its complications pose a significant impact on a person's life as well as on society at large. Before urbanization, diet changes, and the adoption of a more sedentary lifestyle by most people, diabetes was thought to be a disease in economically developed countries. T2DM accounts for approximately 90–95% of all diabetes [2,3] in developed nations and an even higher proportion in developing nations[4]. However, its prevalence has increased in most developing countries, including Pakistan[3].

According to an estimate by the International Diabetes Federation's (IDF 2021) survey, around 537 million people have DM, and 33 million are Pakistani[5]. With this vast prevalence of DM, there is an expected increased burden of such patients in various specialties at healthcare facilities. Still, studies elaborating on the patient flow from emergency to inpatient wards are scarce[6]. A survey of 18,856 eligible participants from Pakistan revealed a substantially higher prevalence of T2DM (16.98%) and prediabetes (10.91%). Basit et al. discovered even higher rates in a separate investigation, with a prevalence of T2DM of 26.3% and prediabetes of 14.4%.[7]

A study conducted in Toronto showed that the highest numbers of admissions in DM patients were due to soft tissue infections followed by urinary tract infections and stroke[8]; this can be lessened by educating the patient regarding foot care and wound care for soft tissue infections, improved hydration and hygiene for urinary tract infections, and DM control[9]. This study mainly aims to analyze the proportion and profile of T2DM patients admitted to MTI Khyber Teaching Hospital, their distribution in different specialties, and length of hospital stay. We can formulate plans for staff education and training according to the disease burden in other specialties so better, and immediate care can be given to the patients.

METHODOLOGY

This cross-sectional study was conducted at MTI

[1]*Endocrinology Division, Department of Medical Specialties, MTI Khyber Teaching Hospital, Peshawar, KPK-Pakistan.*
[*2]*Department of Medicine, MTI Khyber Teaching Hospital, Peshawar, KPK-Pakistan.*
***Correspondence:** driqbalhaiderkth@gmail.com*
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Khyber Teaching Hospital, Peshawar, in November 2022, in which we enrolled all the diabetic patients admitted and followed till discharge, which is extended up to 4 weeks. The sample included consenting patients of both genders, aged between 18 and 80 years; all non-consenting patients were excluded.

Based on self-reporting and physician diagnosis, participants were categorized as having known type 2 diabetes (T2DM) if they received dietary or exercise recommendations, oral diabetes medicines, or injectables, such as insulin.

The study was commenced after obtaining approval from the ethical committee (Ref# 776/DME/KMC; Dated: 24 October 2022). The data regarding the patient's baseline characteristics, indications for admission, attending ward, and treatment were recorded using a well-designed questionnaire. The SPSS (version 22.0) was used for statistical analysis. All the quantitative variables were presented as mean ± standard deviation. Frequencies and percentages were calculated for quantitative variables. Fisher exact test and independent sample T-test were used to compare data. A p-value ≤ 0.05 was considered significant.

RESULTS

Eight hundred fifty patients were admitted during the study; 24.7% had type 2 diabetes mellitus (T2DM). The mean length of hospital stay was significantly high among T2DM patients ($p < 0.01$). The most increased admissions were in the medical ward during the study period (**Table I**).

There are statistically significant differences $\chi^2(2) = 94.67$, $p < 0.01$, in the mode of admission among the T2DM patients, with lesser cases shifted from other units (n=5) compared to ER (n=115) and OPD (n=86).

The antidiabetic regimen prescribed during the hospitalization included oral antidiabetic regimen (36.9%), oral plus twice-daily insulin regimen (19.63%), and basal-bolus insulin (15.07%). While 9.59% were on no treatment, insulin sliding scale, oral plus basal insulin, and regular only were other less common therapeutic regimens (**Figure I**).

The CCU and ophthalmology ward had the highest proportion of admissions of T2DM patients (40% each), followed by cardiology (37%) (**Figure II**).

Table I: Patient Characteristics

Variables		T2DM		Total (n=850)	p-value
		Yes (n=219)	No (n=640)		
Age (Years); Mean ± SD		56.49±12.49	40.02±18.51	44.10±18.62	0.001*
Duration T2DM (Years); Mean ± SD		9.01±7.25	-	9.01±7.25	-
HbA1c (%); Mean ± SD		8.82±2.13	-	8.82±2.13	-
Length of Stay (Days); Mean ± SD		8.11±4.14	6.83±5.17	7.14±4.97	0.001*
Ward	Cardiology	10(4.8)	17(2.7)	27(3.2)	0.001*
	CCU	6(2.9)	9(1.4)	15(1.8)	
	Derma	1(0.5)	12(1.9)	13(1.5)	
	ENT	2(1)	13(2)	15(1.8)	
	Ophthalmology	4(1.9)	6(0.9)	10(1.2)	
	Gastroenterology	-	5(0.8)	5(0.6)	
	Gynecology	10(4.8)	89(13.9)	99(11.6)	
	HDU	2(1)	5(0.8)	7(0.8)	
	Medical	93(44.3)	170(26.6)	263(30.9)	
	MICU	3(1.4)	7(1.1)	10(1.2)	
	Nephrology	9(4.3)	26(4.1)	35(4.1)	
	Neurosurgery	3(1.4)	14(2.2)	17(2)	
	Orthopedics	5(2.4)	44(6.9)	49(5.8)	
	Psychiatry	-	21(3.3)	21(2.5)	
	Pulmonology	6(2.9)	25(3.9)	31(3.6)	
	SICU	0	9(1.4)	9(1.1)	
	Surgical	54(25.7)	155(24.2)	209(24.6)	
	Urology	2(1)	13(2)	15(1.8)	
Mode of Admission	ER	115(55.8)	265(41.7)	380(45.2)	0.001*
	OPD	86(41.7)	367(57.8)	453(53.9)	
	Shifted From Other Unit	5(2.4)	3(0.5)	8(1)	

**p<0.05 is considered statistically significant*

Figure I: Antidiabetic Regimen

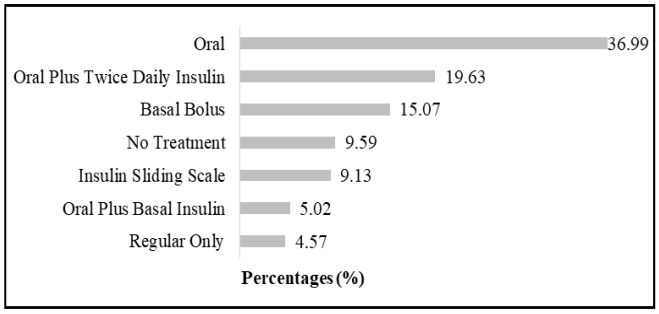


Figure II: Distribution of Type 2 diabetes mellitus in different specialties

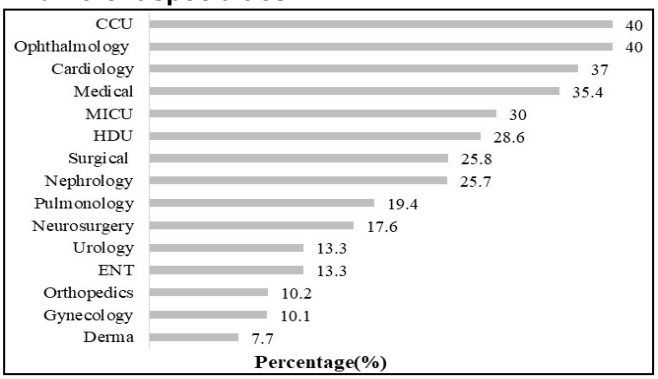
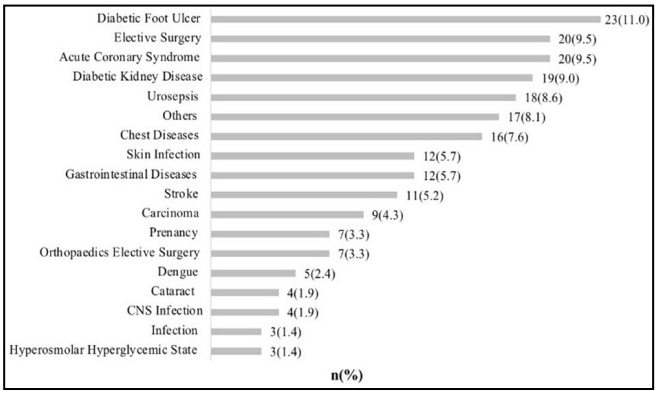


Figure III:
Indications for Admission among T2DM patients



DISCUSSION

In the current study, we evaluated the frequency of T2DM patients' admission to various specialties, modes of admission, indications, and treatment administered. The overall prevalence of T2DM was 24.7%, and it was found that CCU and the ophthalmology ward had the highest admission rate, followed by cardiology. A local study reported that 14.92% of 6824 patients had T2DM, which is comparatively low[10]. Cardiovascular disorders, renal failure or shutdown, neurological manifestation, retinopathy, and visual impairment are common in T2DM patients[11]. As seen in Sankara Nethralaya (4%), Peru (26.3%), Jordan (17.7%), Turkey (16.2%), and Yemen (76.5%), several studies have found varied prevalence of visual impairment among T2DM. Studies on visual impairment in T2DM patients in Africa revealed that 78.25% were in South Africa, 17.1% were in Zambia, 18.4% were in Ghana, and 24.1% were in Nigeria[12–15].

Additionally, observational studies conducted in Cameron and Tunisia found that visual problems were present in 22.2% and 22.6% of DM patients, respectively[16,17]. Consequently, it makes sense that the ophthalmology department has the highest admission rate for diabetic patients. Diagnosing diabetes in critically sick patients admitted to ICUs is relatively common. Although diabetes is frequently a concurrent illness, it can occasionally result in ICU hospitalizations. Diabetes is a complex illness that can include immune system dysfunction and metabolic dysregulations, making patient care challenging and possibly worsening the primary illness[18,19]. One of the leading causes of death and disability in adults with diabetes is cardiovascular disease (CVD)[20,21]. Historically, adults with diabetes have a greater incidence of CVD prevalence than adults without diabetes[22]. The risk of CVD rises steadily with growing fasting plasma glucose levels, even before levels are high enough to be diagnosed with diabetes. According to a study conducted in Egypt, 48.1% of patients were admitted to the ward, and 51.9% were placed in the ICU[23].

The kind and severity of diabetes will determine how it is treated. When weight loss, a diabetic diet, and exercise fail to manage the increased blood sugar levels, oral medicines treat type 2 diabetes[24]. Insulin medicines are taken into consideration if oral drugs are still insufficient. The antidiabetic regimen prescribed during the hospitalization included oral antidiabetic regimen (36.9%), oral plus twice-daily insulin regimen (19.63%), and basal-bolus insulin (15.07%). According to Elsayed et al., 32.7% of people with diabetes were treated with insulin, 34.6% with oral antidiabetics, and 32.7% switched from oral antidiabetic drugs (OAD) to insulin[23]. Basal-bolus insulin regimen was utilized by 67.3% of patients, insulin infusion was used by 30.8%, and just 1.9% received continuous infusions of glucose at a rate of 25%[23]. For many inpatients, notably those with symptomatic hyperglycemia, poor glycemic control before admission, and those who fail to maintain glucose control with basal insulin with DPP4-i, the basal-bolus insulin therapy regimen is an effective treatment[25]. Compared to patients receiving sliding-scale insulin regimens, those receiving basal-bolus insulin had lower fasting blood and mean glucose levels[26].

Patients were admitted for various indications; 11.0% were admitted due to diabetic foot ulcer, 9.5% presented for elective surgery at the study centre, 9.55% had ACS, and 9.0% had diabetic kidney disease. According to Al-adsani et al., cardiovascular system disorders such as acute coronary syndrome, heart failure, and cerebrovascular accidents

accounted for 53.6% of hospitalizations in patients with diabetes, highlighting the long-term repercussions of diabetes[27]. In terms of the reasons for admission, Negra et al. suggested that 73.9% of their enrolled patients were admitted for diabetes-related complications, where acute complications accounted for 26.4%, with DKA being the most common reason, followed by uncontrolled hyperglycemia and hypoglycemia[28]. Another study showed that among older diabetes, chronic complications were the leading cause of hospitalization[29]. However, different research in Ethiopia indicated that the most frequent cause of hospital admission was diabetic ketoacidosis, responsible for the admission of 33.7% of patients, followed by infections and CVDs[30].

Future research is necessary to ascertain if better blood glucose control in the long and medium term lessens the influence of diabetes on hospitalization outcomes, even though DM is an established risk factor for cardiovascular disease. However, we did not include the in-hospital complications or results, such as mortality, which is one of the significant shortcomings of this study. Also, we did not recruit the same patient's repeated admissions.

CONCLUSION

In conclusion, patients admitted to MTI Khyber Teaching Hospital exhibited a high prevalence of T2DM. We highlighted some of the characteristics of these patients attending various Specialties. The highest admission proportion was observed in the CCU and ophthalmology ward. Chronic complications of diabetes, such as diabetic foot ulcer, diabetic kidney disease, and acute coronary syndrome, were the most common reasons for hospitalization in diabetic-related admissions. The most prescribed during the hospitalization was an oral antidiabetic regimen, followed by an oral plus twice-daily insulin regimen. This study attempted to demonstrate the point prevalence (admission rate) in the different hospital wards. Hence, a large-scale study with a prolonged duration and geographically diverse population is recommended to represent Pakistan appropriately.

Ethical permission: Khyber Medical College Peshawar ERC letter No. 776/DME/KMC.

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Data Sharing Statement: The corresponding author can provide the data proving the findings of this study on request. Privacy or ethical restrictions bound us from sharing the data publically.

AUTHOR CONTRIBUTIONS

Malik SE: Drafting
Haider I: Concept, drafting, supervision
Khattak RA: Drafting
Bibi S: Drafting
Naeem H: Drafting
Iqbal M: Drafting

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