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Diabetes Related Morbidity. Causes of Diabetes Related Hospital Admissions: A Cross Sectional Study

Abdul Sattar Jabbar Yousif[1]; Abdul Fattah Ali[2]; Alhasan Mujtaba Al-Mudhaffer[3*]
[1]FICMS (Internal Medicine Specialist), Al-Fayhaa Teaching Hospital, Basra, Iraq.
[2]CABMS (Internal Medicine Specialist), Al-Fayhaa Teaching Hospital, Basra, Iraq.
[3*]Ph.D. Clinical Pharmacy, BCPS, Al-Fayhaa Teaching Hospital, Basra, Iraq.
[3*]user11126@gmail.com

Abstract
Diabetic patients have a high morbidity and mortality related directly or indirectly to their hyperglycemia. The increase in prevalence of diabetes combined with the aforementioned fact puts an increasing burden on the healthcare system and its budget. Strategies to estimate global and local diabetes complications might offer insights to better allocate budget and resources in the future.
Method: *This is a cross sectional study performed in a teaching hospital from December 2020- to January 2021. Hospitalized patients in medical and critical care units are collected to estimate the incidence of diabetes related morbidity. Two hundred and twenty patients were admitted in this period, two thirds of the admissions were classified as diabetes related.* ***Conclusion:*** *Diabetes carries a higher burden in our cohort compared to global rates and strategies to minimize their complications is urgent and necessary.*

Key-words: Healthcare System, Diabetes Complications, Cardiac Care Unit (CCU).

1. Introduction

Diabetes mellitus is a key factor affecting population global health and health expenditure (1–3). The burden of diabetes is also increasing over years so far and in the future(4–7). A significant portion of the health expenditure is dedicated for diabetes or diabetes related morbidity. Morbidity might be cardiovascular, nephrological or infectious among others.

Improving primary care might decrease diabetes hospitalization. These interventions might include immunization, periodic screening, medication adjustment and continuous education.

This study aims to investigate the prevalence of diabetes and diabetes related hospital admissions in a teaching hospital in Basra-Iraq.

2. Methodology

This is a cross sectional study that was performed for hospitalizations in Al-Fayhaa Teaching Hospital in Basra for the period of Dec 2020 and Jan 2021. Patients were categorized according to the ward they were admitted to. Therefore, we included Cardiac Care Unit (CCU) and General internal medicine ward. Medical records were retrospectively examined to extract relevant data according to predefined list. Further classification put patients into three groups namely those with medical history of diabetes, unrecognized diabetes or new hyperglycemia and patients with no diabetes. Reference values of blood glucose were used in this classification.

In addition to basic characteristics of patients, smoking, cause of hospitalization, hospital stay, and duration of diabetes (if ever) were recorded as well as type of treatment. Co-morbidities like CVD were included.

Collected data were fed into SPSS version 20 spreadsheet after they were coded and variables defined. Continuous variables were displayed as mean and SD while categorical ones were shown as frequency and percentages. Corresponding statistical tests were used to identify statistical significance where a P value of less than 0.05 was considered to be statistically significant.

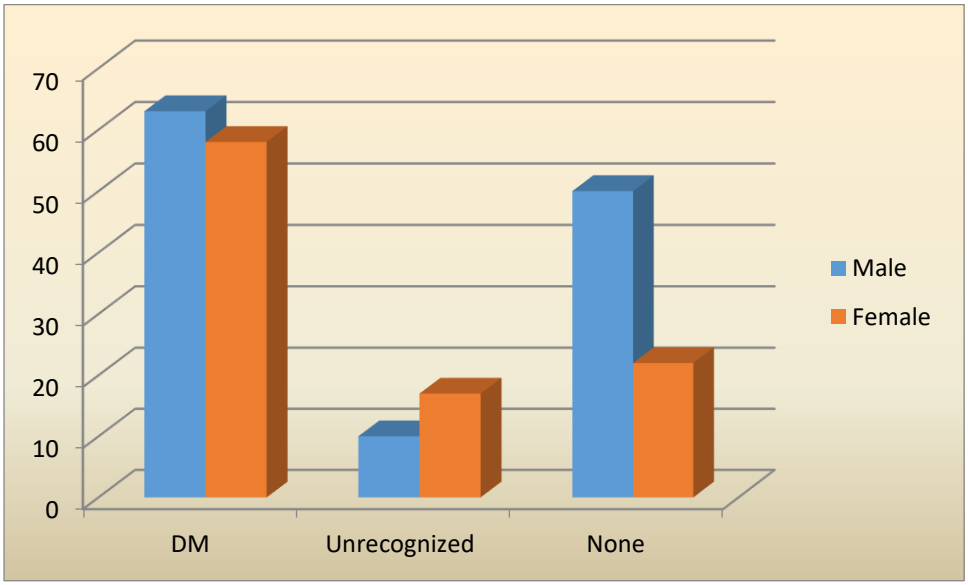
3. Results

Results included collected records of 220 patients of whom 123 (55.9%) were males and 97 (44.1%) were females (Figure 1). Retrieved records of the general medical ward constituted 33.2% (73 patients) while those retrieved from the CCU were 66.9% (147 patients). One hundred twenty one patients (55%) were found to be known diabetics. Unrecognized or new diabetes was found in 27 (12.3%) and the remaining 72 (32.7%) did not show any history or recognition of diabetes. The basic characteristics are displayed in Table 1 Below.

Table 1 - Basic Characteristics of the Sample

Characteristics		DM	Unrecognized	None	Total	P value
Age		61.1 ± 13.7	62.5 ± 17.4	61.9 ± 15.1	61.6± 14.6	0.873
Sex	Male	63 (52.1%)	10 (37.0%)	50 (69.4%)	123 (55.9%)	0.007
	Female	58 (47.9%)	17 (63.0%)	22 (30.6%)	97 (44.1%)	
Smoking	None	75 (62.0%)	20 (74.1%)	35 (48.6%)	130 (59.1%)	0.150
	Current	28 (23.1%)	3 (11.1%)	22 (30.6%)	53 (24.1%)	
	Ex-smoker	18 (14.9%)	4 (14.8%)	15 (20.8%)	37 (16.8%)	
Hospital stay		6.7 ± 2.3%	6.1 ± 2.9	4.2 ± 2.0	5.8 ± 2.6	0.0001
CAD		40 (33.1%)	6 (22.2%)	14 (19.4%)	60 (27.3%)	0.100
CVA		33 (27.3%)	1 (3.7%)	21 (29.2%)	55 (25.0%)	0.023
HT		107 (88.4%)	20 (74.1%)	56 (77.8%)	183 (83.2%)	0.064
Hyperlipidemia		86 (71.1%)	6 (22.2%)	8 (11.1%)	100 (45.5%)	0.0001
BA		4 (3.3%)	3 (11.1%)	5 (6.9%)	12 (5.5%)	0.216
Ward	Medical	46 (38.0%)	12 (44.4%)	15 (20.8%)	73 (33.2%)	0.021
	CCU	75 (62.0%)	15 (55.6%)	57 (79.2%)	147 (66.9%)	
	total	121 (50)	27 (11)	72 (39)	220	

Figure 1 - Gender Distribution



Age of patients whose records were examined did not show significant statistical difference among the three groups of diagnosis of DM. similarly, distribution of smoking habit did not show significant statistical difference. However, hospital stay was significantly longer in overt diabetes than in unrecognized and shorter in non-diabetic patients. From the examined co-morbidities (CAD, CVA, HT, Hyperlipidemia and BA); diabetic patients were more likely to have significantly higher rates of CVA and hyperlipidemia.

Table 2 – A - Categories of Reasons for Admission. Frequency (Percentage)

	Medical history of DM	New or unrecognized DM	None	Total
CVD	95 (77.7)	19 (70.4)	61 (84.7)	174 (79.1)
Respiratory	10 (8.3)	6 (22.2)	10 (13.9)	26 (11.8)
DM/control	15 (12.4)	2 (7.4)	1 (1.4)	18 (8.2)
GE	1 (0.8)	0 (0.0)	0 (0.0)	1 (0.5)

CVD is by far the commonest cause of admission. It is the commonest cause in all of the three categories of labeling patients. Respiratory causes come next and followed by reasons related to diabetes itself. GE was found once.

Table 2 - B - Specific Diagnosis

		Medical history of DM	New or unrecognized DM	None	Total
Acute coronary syndrome	Frequency	30 (24.8)	8 (29.6)	14 (19.4)	52 (23.6)
HF	Frequency	20 (16.5)	2 (7.4)	3 (4.2)	25 (11.4)
Pneumonia	Frequency	7	5	7	19
	%	5.8%	18.5%	9.7%	8.6%
CVA	Frequency	46	9	44	99
	%	38.0%	33.3%	61.1%	45.0%
COAD	Frequency	4	1	4	9
	%	3.3%	3.7%	5.6%	4.1%
DM	Frequency	13	2	0	15
	%	10.7%	7.4%	0.0%	6.8%
GE	Frequency	1	0	0	1
	%	0.8%	0.0%	0.0%	0.5%

Related to the systemic classification of causes of admission, specific diagnosis at the discharge notes was in the majority of cases related to cardiac causes. Acute coronary syndrome and HF were found in the highest ranks. Pneumonia fell third and CVA fourth. Less frequently, causes related to diabetes itself were reported.

4. Discussion

Diabetes mellitus may be the most influential chronic disease on patients overall quality of life. These patients usually have higher morbidity and mortality. A significant proportion of hospital admission may be attributed to diabetes or diabetes related complications. Even if the hospital admission is not related to diabetes, diabetes per se is associated with increased length of hospital stay and increased use of medical resources (8–10).

Global estimates of diabetes admission was estimated to be around 12-25%, our cohort have a higher prevalence of diabetes admission. Diabetic patients comprised 50% of our daily patient admission. Compared to studies from nearby countries, we still have a higher burden of the disease(8,11–17).

A recent study in Kuwait have found that almost half of the diabetic patients suffered cardiac complication (ACS, CVA and HF) compared to others (infections or uncontrolled diabetes). Our sample shows that almost three quarters of our diabetics have cardiovascular disease. This discrepancy came mostly from an increased incidence of CVA in our cohort (18).

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