

## Patterns of diabetic patients visit in emergency department in tertiary care hospital

Manjita Bajracharya<sup>1</sup>, Kabita Hada Batajoo<sup>2</sup>, Trishna Shrestha<sup>1</sup>, Sneha Pradhananga<sup>1</sup>

<sup>1</sup>Lecturer, <sup>2</sup>Prof. Department of General Practice and Emergency, KIST Medical College and Teaching Hospital, Lalitpur, Nepal

### ABSTRACT

**Introduction:** Diabetes mellitus is a global health problem with increasing incidence worldwide in an epidemic form including Nepal. This chronic disease leads to many complications, hospital admissions and premature morbidity and mortality. This study aimed to study the cause and number of emergency visits and to evaluate the rate and duration of hospitalisation among diabetic patients who visit the emergency department

**Method:** This was an observational cross-sectional study including 98 diabetic patients of >18 years presenting to emergency department of KIST medical college and teaching hospital between January 2020 to June 2020. The number and reason of emergency visits as well as number and duration of hospitalization was recorded in a semi structured proforma. The data entry was done in Microsoft Excel and analysis was done using the SPSS 24.

**Result:** While 61 cases (62.2%) of this sample utilized the emergency department (ED) services in last 12 months' period, 32.7% reported using ED once and 23.5% used 2-3 times and only 6% of the subjects had visited emergency more than 4 times within 12 months. Heart disease (18.1%) and infections (18.1%) were the most common reason for ED visit. There were 62 (63.3%) admissions from ED, 32.2% patients were hospitalized for 1-3 days, 50% were hospitalized for 3-7 days and 17.8% stayed for 1-2 weeks' duration in the hospital.

**Conclusion:** Majority of the diabetic patients had utilized ED more than once in past 12 months and the most common cause was found to be related to cardiac illness and infections. More than half of the diabetic patients visiting ED were admitted for mostly 3-7 days' duration.

**Keywords:** admission, emergency department, emergency visit, diabetes mellitus

### CORRESPONDENCE

Dr. Manjita Bajracharya

Department of General Practice and Emergency Medicine, KIST Medical College and Teaching Hospital, Lalitpur, Nepal

Email: manji.bajra@gmail.com

## INTRODUCTION

Diabetes mellitus is a prevalent chronic disease estimating up to 40% of adults developing diabetes over their lifetime.(1) It is estimated that over 150 million people are affected by diabetes worldwide and the prevalence is expected to double in the next 25 years.(2) This chronic disease leads to many complications, hospital admissions, premature morbidity and mortality.(3) There has been a rapid increase in emergency department visits in the US and up to 50% of emergency department visits are for non-urgent problems.(4–6)(7) In Australia, hospital admission for any diagnosis of diabetes mellitus increased by 35% between 2000–2001 and 2004–2005. The most common infections in diabetic patients include respiratory, urinary, skin and soft tissue.(8,9) Additional precipitants included noncompliance or sub therapeutic administration of insulin therapy, pancreatitis, cardiac ischemia, cerebrovascular accident, and drugs.(10,11) These other medical conditions may worsen an individual's glycemic control and subsequently trigger a hyperglycemic emergency, thus requiring the patient to return to the ED for further medical management.

The initial treatment and resuscitation of these patients are usually managed by ED physicians. An estimate of the possible numbers of people who may require treatment for chronic diseases should help in planning a response, but such information for local areas is not easily accessible. Because of its complexity, diabetes management requires intense resources and regular access to health care services to prevent long-term complications. The objectives of the study was to determine prevalence and the reason of emergency visit and hospitalisation rate among diabetic patients who visit the emergency department.

## METHOD

An Observational cross-sectional study was carried out among diabetic patients visiting emergency department of KIST medical college. During the study period of six months, 104 diabetics were screened, 98 patients were included in the study. Among them, patients 18 years or above diagnosed with type 1 or type 2 diabetes, RBS or PPBS  $\geq 200$  mg/dl or FBS  $\geq 126$  mg/dl or HbA1C  $\geq 6.5\%$  in previously undiagnosed patients were included. Gestational diabetics were excluded. Variables like one or more emergency visits in the

previous 12 months, reasons for the emergency visit, reasons for hospital admission and duration of admission were studied. Semi-structured proforma was used for data collection. Descriptive statistics were summarized using means and standard deviations with 95% confidence intervals (CI) where appropriate. Rest of the data was analyzed by using spss24.

## RESULT

The study population included 98 patients. Among the cases, mean age of the diabetic patients presenting to ED was  $57.45 \pm 12.7$  years. The majority were male (58.2%). 37.7% of patients were not under any treatment, while 4.1% were under dietary and lifestyle modification, 39.8% were under oral hypoglycemic agents and 18.4% were under both Insulin and OHA. 28.6% of the cases only had diabetes while 32.7% of the sample had one more comorbidity, 29.6% had two comorbidities and 9.1% had three or more comorbidities besides diabetes.

While 61 (62.2%) of this sample asserted that they had utilized the ED services in last 12 months period, 32.7% reported using ED once and 23.5% used 2-3 times and only 6% of the subjects admitted that they had been in the ED more than 4 times within 12 months. Among the ED visits, 50-64 years of age group had more ED visits that accounted for 52.5%, compared to age groups of  $>65$  years with 42.6% and 35-49 years age group with only 4.9%.

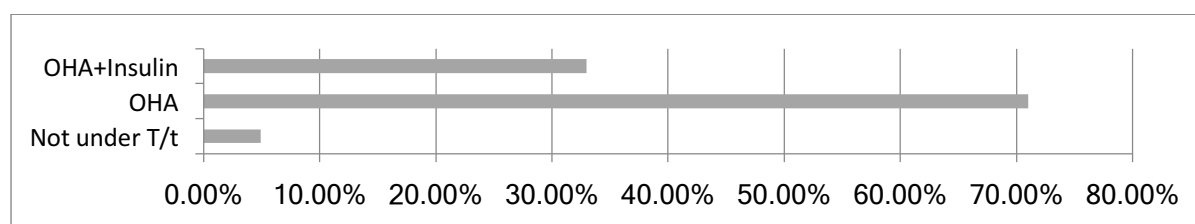
Hypertension and heart disease including cardiac failure (18.1%) and Infections like Urinary tract infections, sepsis, Cellulitis, diabetic foot infections, acute gastroenteritis (18.1%) were the most common reason for ED visit. 16.4% of these patients had vascular complications like CVA, atherosclerosis, DVT, polyneuropathies and strokes. 16.4% presented with renal problems like acute on chronic kidney disease, nephrolithiasis and renal failure. 14.8% of cases had poor glycemic control (diabetic ketoacidosis and hypoglycemia) for the reason to visit ED while, 8.2% presented with respiratory infections like pneumonia, acute exacerbation of COPD; 1.6% with fall and other causes including hypothyroidism, hemorrhoids, rheumatoid arthritis accounted for 6.4%.

**Table 1. Characteristics of patients (N=98 )**

Characteristics	N (%)	Characteristics	N (%)
<b>Age (years), mean SD</b>	<b>57.45±12.7</b>	<b>Number of ED visits in the last 12 months</b>	
		None	37 (37.8%)
		1 time	32 (32.7%)
		2-3 times	23 (23.5%)
		4 or more	6 (6%)
<b>Male</b>	58.2 %	<b>Total ED visits in the last 12 months</b>	61 (62.2%)
<b>Female</b>	41.8%		
<b>Treatment</b>		<b>Age group</b>	
Not under treatment	37 (37.7%)	>65	26 (42.6%)
Dietary	4 (4.1%)	50-64	32 (52.5%)
OHA	39 (39.8%)	35-49	3 (4.9%)
Insulin with OHA	18 (18.4%)	18-34	0
<b>Comorbidities</b>			
None	28 (32.7%)		
1	32 (32.7%)		
2	29 (29.6%)		
3 or more	9 (9.1%)		

**Table 2. Reason for ED visit and hospitalization**

Characteristics	N (%)
Poor glycemic control (hyper/hypoglycemia)	9 (14.8%)
Hypertension or heart problem	11 (18%)
Falls	1 (1.6%)
Vascular/circulation problem	10 (16.4%)
Other infections	11 (18.1%)
Kidney problems or kidney disease	10 (16.4%)
Respiratory infection	5 (8.2%)
Others	4 (6.4%)

**Figure 1. Treatment history in relation to admitted diabetic patients**

## DISCUSSION

Diabetes has become an increasingly prevalent and severe public health problem in a country like Nepal where the health system is struggling to deliver comprehensive, quality treatment and services for diabetes at all levels of health care.<sup>12</sup>

The significance of this study is that it examines emergency service utilization among a sample of 98 diabetic persons with diabetes in tertiary center in Nepal. Mean age of the diabetic patients utilizing ED was 57.4 years with predominance of male population which was similar to the study done on Canadian patients with diabetes presented to ED. Among the ED visits, 50-64 years of age group had more ED visits that accounted for 52.5%, comparative to age groups of >65 years with 42.6% and 35-49 years age group with only 4.9%. This may be because most of our patients belong from urban areas and this particular age group is more conscious towards their health

issues than the elderly group. Our sample population 32.7% reported using ED once and 23.5% used 2-3 times and only 6% of the subjects had been in the ED more than 4 times within 12 months similar to previous comparative studies.<sup>13</sup>

The study also highlighted that there were more ED utilization by patients on oral hypoglycemic agent, insulin and ones who were not under any treatment. It was contradictory to the study by Rowe et al which showed patients on insulin visited emergency more.<sup>14</sup> The reason may be the in adherence of the patients towards OHAs. There was independent association of decreased antidiabetic medication possession ratios with increased comorbidity severity and an emergency room visit.<sup>15</sup> Our study gave similar idea regarding the association of more than one comorbidity with greater ED visit.

Many studies have attempted to identify the variables that predict short-term unplanned recurrent visits to the ED for any reason, including risk factors such as older age, higher triage scores, alcohol abuse, painful conditions, and history of cancer or cardiac or psychiatric disease.<sup>16-18</sup> In our study, hypertension and cardiac disease (18.1%) and Infections (18.1%) like Urinary tract infections, sepsis were the most common reason for ED visit. Vascular complications like atherosclerosis, DVT, polyneuropathies and stroke, renal complications like acute on chronic kidney disease and renal failure, nephrolithiasis and poor glycemic control were less common reason to visit ED. While 8.2% presented with respiratory infections, 1.6% with fall unrelated to hyper or hypoglycemic episode and other causes accounted for 6.4%. These results are in contrast to other studies where the most likely precipitating causes of hyperglycemia were medication or insulin noncompliance, ongoing poor control or under-dosing of medication or insulin, and infection from various sources.<sup>19</sup>

There were 62 (63.3%) admissions from ED into wards and ICU and 36(36.7%) cases were discharged from ED after management which is higher in comparison to the Canadian study between 1994 and 1999(20) and study conducted by Rowe et al.<sup>14</sup> One study by Sykes et al. demonstrated that factors associated with readmission to the critical care unit for recurrent diabetic ketoacidosis within 1 year include older age, female gender, concurrent sepsis, anemia, and increased anion gap on admission. However, this study was ICU-based, rendering the conclusions difficult to generalize to patients seen within the ED who may not be critically ill.<sup>21</sup> One of multicenter ED-based study demonstrates that 17.0% of patients with diabetes presenting with a hyperglycemic emergency had a sentinel visit to the ED. For patients presenting to the ED with a history of diabetes, clinicians should be vigilant in checking blood glucose and provide clear discharge instructions for follow-up and glucose management to prevent further hyperglycemic emergencies from occurring.<sup>19</sup>

## CONCLUSION

Emergency service was utilized by substantial diabetic population (62.2%) in past 12 months, 61% with one or more visits. Most frequent reason for ED utilization being Hypertension, cardiac cause (18%) and infections (26.3%) including respiratory infections of 8.2%, while renal diseases, vascular problems, poor glycemic control and falls accounted for less number of visits.

Diabetics visiting ED has significant hospitalization rate and mostly were admitted for 3-7 days. Hence, patients with diabetes pose a significant burden in ED and are prone to hospital admissions. These visits may be a warning sign to patients and health care providers of worsening disease, and that there may be an opportunity for prevention or intervention if those who are at higher risk of a subsequent ED visit or hospital admission can be identified.

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