

# Frequency of Undiagnosed Diabetes Mellitus in Patients Presenting with Acute Stroke in a Medical Emergency

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## ABSTRACT

**Objective:** The goal of this study was to assess the prevalence of undiagnosed DM in individuals who came with an acute stroke in a medical emergency.

**Methods:** This descriptive cross-section study was carried out at the Shifa International Hospital's Department of Medicine in Islamabad, Pakistan from 24-11-2020 to 23-05-2021. A total number of 150 patients of either gender presenting with acute stroke were included. Venous blood samples from all patients were sent to hospital laboratory for determination of HbA1c levels. Diabetes (DM) was labeled if HbA1c > 6.0%.

**Results:** The mean age was 54.04±10.25 years. The mean duration of stroke was 14.92±7.99 days. There were 92 (60.67%) males and 58 (39.33%) female patients. 61 (40.67%) out of 150 patients were smokers. Undiagnosed diabetes mellitus was found in 42 (28.00%) patients.

**Conclusion:** The frequency of newly diagnosed diabetes is high among patients with ischemic stroke. So, it is recommended that every patient who present with ischemic stroke, should be sorted out for diabetes mellitus. However, it is also required that every setup should have their surveillance in order to know the frequency of the problem.

**Keywords:** undiagnosed diabetes mellitus, acute stroke, diabetes mellitus (DM),

## INTRODUCTION

Stroke is a frequent public health issue and a chronic disorder that significantly affects people and is the third most frequent cause of death in industrialized nations. Approximately 1.6 crore strokes occur worldwide every year, with an annual mortality rate of 50 lacs people.<sup>1</sup> Asia, which is home to more than 60% of the world's population and many of its "emerging" nations, has a particularly acute stroke issue. Except for a few nations like Japan, Asia has a higher stroke death rate than Western countries.<sup>2</sup> To ascertain the real incidence of stroke in Pakistan, no extensive epidemiological data are available.<sup>3</sup>

Each cell in the human body uses glucose, a kind of sugar, as its source of energy. The body makes constant efforts to maintain optimal blood glucose levels. If the patient's HbA1c >6.0%, diabetes mellitus (DM) is assumed to be present.<sup>4</sup> Even in the absence of a prior diagnosis of DM, a significant fraction of individuals may acquire hyperglycemia following acute stress, such as a stroke or myocardial infarction. The risk of in-hospital death for 4 weeks after an ischemic stroke rises through prolonged stress hyperglycemia, particularly in patients who are non-DM.<sup>5</sup>

Greater knowledge of how hyperglycemia may negatively affect the outcome of individual patients with acute stroke might help to direct the treatment of acute stroke and the avoidance of its negative effects.<sup>6</sup> According to observational epidemiology, diabetes poses a risk for all phases of the stroke process, from accidental cerebrovascular illness discovered during neuroimaging through an incident acute stroke and its longer-term recovery. Patients who had previously undiagnosed DM or non-DM are routinely not examined for RBS levels, which may have negative outcomes for strokes worsened by hyperglycemia at the time of stroke and also deteriorate the cerebrovascular system.

The goal of this research is to assess the prevalence of undiagnosed DM in individuals who come with an acute stroke in a medical emergency.

## METHODS

A total of 150 patients admitted with acute stroke were included. Patients' selection criteria was age between 35 to 75 years, and either gender. Patients with recurrent stroke, and unconscious patients or non-lacunar stroke were excluded from the study. Demographic information including age, gender, duration of a stroke, h/o smoking (>5 pack year), and hypertension (BP of > 140/90mmHg) was also noted.

The standard treatment was applied and a blood sample was taken for routine investigations. All samples were sent to the laboratory of the hospital for assessment of HbA1c along with

routine investigations. DM was labeled if HbA1c > 6.0%. Before enrolling any patients in the study, their permission was obtained. by ensuring the confidentiality of their data and identity.

Data analysis was conducted through SPSS v23. Age, the duration of the stroke, and the HbA1c level were quantitative factors that were provided as mean and standard deviation. The qualitative variables like gender, smoking, hypertension and undiagnosed DM were provided in frequency and percentage.

## RESULTS

The mean age of patients included in this study was 54.04±10.25 years. The mean duration of stroke was 14.92±7.99 days. There were 92 (60.67%) males and 58 (39.33%) female patients. 61 (40.67%) out of 150 patients were smokers. Hypertension was found in 102 (68.00%) patients.

On the frequency of undiagnosed diabetes mellitus, it was found in 42 (28.00%) and it was not found in 108 (72.00%) patients (Figure 1).

There was no association between age and undiagnosed diabetes mellitus. Their difference was statistically insignificant with a p-value of 0.57. There was no association of gender with undiagnosed DM. Undiagnosed DM was found in 25 male and 17 female patients (statistically insignificant p-value of 0.858). There was also no significant association of mean duration of a stroke, smoking, and hypertension with undiagnosed diabetes mellitus (Table 1).

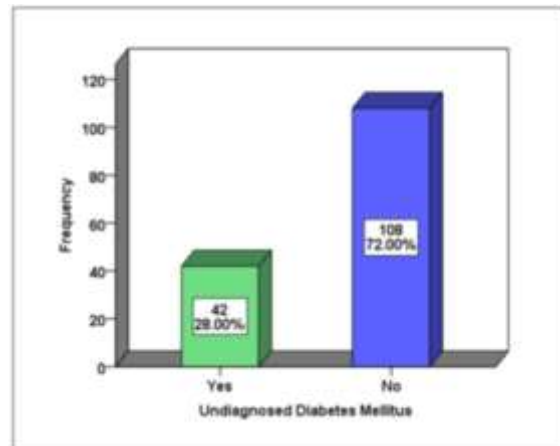


Figure 1: Frequency of undiagnosed diabetes mellitus.

Table 1: Demographic characteristics of stroke patients

Characteristics	Total patients	No Undiagnosed DM	Undiagnosed DM	p-value
Number, (n)	N=150	N=108	N=42	
Age (years)	54.04 ± 10.25	54.38±9.75	53.38 ±9.91	0.57
Mean Duration of stroke (days)	14.92 ± 7.99	15.03 ± 8.14	14.54±9.61	0.75
Gender (Male/Female)	92(60.67%)/58(39.33%)	66 (61.1%) 42 (38.9%)	25 (59.5%) / 17 (40.5%)	0.85
Hypertension, n (%)	102 (68%)	77 (71.3%)	25 (59.5%)	0.16
Smoker	61(40.67%)	44 (40.7%)	17 (40.5%)	0.96

**DISCUSSION**

One of Pakistan's most critical health issues is the rising incidence of DM. When the possibility of DM causing a stroke is included in this clinical scenario, the risk is increased even more. More than 90% of people with type 2 DM have an underlying problem called insulin resistance. Patients with type 2 DM are more likely to develop atherosclerosis and are more likely to have atherogenic risk factors, such as hypertension, obesity, and abnormal blood lipids, which increase the risk of stroke.<sup>7</sup> Between 1995 and 2025, it is expected that the proportion of people in developing countries who have diabetes would increase by 42%.<sup>8</sup> In 1995, Pakistan had a population of 132 million people, 5.54 million of whom had DM, with a prevalence of 4.19 percent.

According to the current research study, 28 percent of individuals who had ischemic strokes had undetected diabetes. This illustrates the need for proactive screening for stroke patients with undiagnosed DM, there are substantial implications for DM screening in the residential area due to metabolic management of DM being a significant risk factor for stroke.<sup>9</sup> The high incidence of stroke in the northeast of England may be partially explained by our discovery of a high mortality rate with a high prevalence of undiagnosed DM.<sup>10, 11</sup>

In Pakistani patients who had an ischemic stroke, Samiullah et al. conducted a cohort study, in that 35.2% of the participants had diabetes; however, they did not note the prevalence of newly diagnosed diabetes in this investigation. In different research by Jia et al., individuals with ischemic stroke had a DM prevalence of 45.8%.<sup>12</sup>

In a study of 246 patients who visited the Mayo Hospital in Lahore with acute ischemic stroke, Sulehria et al. found that 30.89% of patients had undetected DM.<sup>13</sup>

A study by Zahra et al., containing 250 patients of acute ischaemic stroke who presented in Jinnah Postgraduate Medical Centre Karachi reported undiagnosed DM in 20% of the patients.<sup>14</sup>

This research has several limitations, such as the need to test HbA1C in each diabetic patient to validate the diagnosis of diabetes. The duration of diabetes may also be determined by testing the urine for microalbuminuria. third, an eye test would have shown how long diabetes had existed before this incident and would have further proven its existence. However, the outcomes are similar to several international investigations. This statistic of 1 new diabetes patient for every 4 stroke patients is very worrying given the inadequate infrastructural facilities. morbidity would increase the financial burden on any nation. apart from the

treatment doctors should do counseling sessions to help individuals realize this disease.

**CONCLUSION**

Undiagnosed diabetes is prevalent in ischemic stroke patients. Therefore, it is recommended that DM be ruled out in every patient who presents with an ischemic stroke.

**REFERENCES**

1. Kunadian V, Zaman A, Qiu WJEjohf. Revascularization among patients with severe left ventricular dysfunction: a meta-analysis of observational studies. 2011;13(7):773-84.
2. Navarro JC, Venketasubramanian NJCDE. Stroke Burden and Services in the Philippines. 2021;11(2):52-4.
3. Khan MI, Khan JI, Ahmed SI, Ali SJPJoNS. The epidemiology of stroke in a developing country (Pakistan). 2019;13(3):30-44.
4. Mergenthaler P, Lindauer U, Dienel GA, Meisel AJTin. Sugar for the brain: the role of glucose in physiological and pathological brain function. 2013;36(10):587-97.
5. Razzaque S, Ghauri MIJJoNS. Stress-induced hyperglycemia in stroke patients. 2015;10(2):9-12.
6. Zewde YZ, Mengesha AT, Gebreyes YF, Naess HJBn. The frequency and impact of admission hyperglycemia on short term outcome of acute stroke patients admitted to Tikur Anbessa Specialized hospital, Addis Ababa, Ethiopia: a cross-sectional study. 2019;19(1):1-8.
7. Suwannaphant K, Laohasiriwong W, Puttanapong N, Saengsuwan J, Phajan TJJoc, JCDR dr. Association between socioeconomic status and diabetes mellitus: the National Socioeconomics Survey, 2010 and 2012. 2017;11(7):LC18.
8. Strong K, Mathers C, Bonita RJTLN. Preventing stroke: saving lives around the world. 2007;6(2):182-7.
9. Alloubani A, Saleh A, Abdelhafiz IJD, Research MSC, Reviews. Hypertension and diabetes mellitus as a predictive risk factors for stroke. 2018;12(4):577-84.
10. Thomson R, Gani A, Dobson R, Herd B, Murphy J, James O, et al., editors. The Tees stroke register: stroke incidence in an area of high stroke mortality. 8th European Stroke Conference; 1999: Newcastle University.
11. Lanska DJ, Kuller LHJS. The geography of stroke mortality in the United States and the concept of a stroke belt. 1995;26(7):1145-9.
12. Jia Q, Zheng H, Zhao X, Wang C, Liu G, Wang Y, et al. Abnormal glucose regulation in patients with acute stroke across China: prevalence and baseline patient characteristics. 2012;43(3):650-7.
13. Sulehria SB, Memon MM, Bashir AJPJMHS. To determine the frequency of newly diagnosed diabetes mellitus in patients of acute stroke presenting in tertiary care hospital. 2015;9:34-6.
14. Zahra F, Kidwai SS, Siddiqi SA, Khan RM. Frequency of newly diagnosed diabetes mellitus in acute ischaemic stroke patients. J Coll Physicians Surg Pak. 2012;22(4):226-9.