

ASSOCIATION BETWEEN HYPERGLYCEMIA AND FUNCTIONAL OUTCOME IN PATIENTS WITH ISCHEMIC STROKE: A PROSPECTIVE COHORT STUDY

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ABSTRACT

Background: Ischemic stroke is a major cause of mortality and long-term disability. Diabetes mellitus is an important modifiable vascular risk factor and may adversely influence neurological recovery after stroke. Early identification of diabetic patients at risk of poor outcome can help in better monitoring, treatment planning, and rehabilitation. **Aim:** To assess the association between diabetes mellitus and short-term functional outcome among patients with ischemic stroke. **Materials and Methods:** This prospective cohort study was conducted in the Department of Neurology, Siddhartha Medical College, over a period of two years from January 2024 to December 2024. A total of 100 patients with ischemic stroke were enrolled and divided into two groups: 50 diabetic patients as the exposed group and 50 non-diabetic patients as the unexposed group. Baseline demographic details, duration of stroke symptoms, fasting blood glucose, postprandial blood glucose, and HbA1c were recorded. Functional outcome was assessed using the modified Rankin Scale at admission and at 30-day follow-up. Short-term poor functional outcome was defined as mRS score ≥ 3 at day 30. Data were analyzed using SPSS version 20. **Results:** The mean age was 52.10 ± 13.92 years in the exposed group and 44.80 ± 12.75 years in the unexposed group. The mean mRS score at admission was significantly higher in diabetic patients than in non-diabetic patients, 2.62 ± 1.55 versus 0.78 ± 0.86 . At 30-day follow-up, the mean mRS score remained higher in diabetic patients, 2.86 ± 1.70 versus 0.90 ± 1.08 . Poor short-term functional outcome was observed in 35, 70.0%, diabetic patients and 8, 16.0%, non-diabetic patients. The relative risk of poor outcome among diabetic patients was 4.38, indicating a significantly higher risk compared with non-diabetic patients. **Conclusion:** Diabetes mellitus was significantly associated with poor short-term functional outcome in patients with ischemic stroke. Diabetic patients had higher disability scores at admission and at 30-day follow-up and showed more than four times higher risk of poor functional outcome compared with non-diabetic patients.

INTRODUCTION

Stroke is one of the leading causes of mortality and long-term disability worldwide. It is a major neurological emergency and often results in persistent functional impairment, dependence in activities of daily living, and increased socioeconomic burden on patients, families, and healthcare systems.^[1] In India, the burden of stroke is substantial and continues to rise due to

demographic transition, ageing population, urbanization, and increasing prevalence of vascular risk factors.^[2,3]

Ischemic stroke constitutes a major proportion of stroke cases and is commonly associated with modifiable risk factors such as hypertension, diabetes mellitus, dyslipidemia, obesity, smoking, and sedentary lifestyle. Among these, diabetes mellitus is particularly important because it contributes both to the occurrence of stroke and to poor recovery after stroke.^[4,5] India has a high and

increasing burden of diabetes mellitus, making diabetes-related vascular complications an important public health concern.^[4]

Diabetes mellitus increases the risk of ischemic stroke through multiple mechanisms, including endothelial dysfunction, accelerated atherosclerosis, increased platelet activation, oxidative stress, chronic inflammation, and impaired cerebral microvascular circulation.^[5,6] These mechanisms can lead to more severe ischemic injury, larger infarct burden, delayed neurological recovery, and increased risk of recurrent vascular events.

Hyperglycemia during the acute phase of ischemic stroke is also clinically significant. It may occur in patients with known diabetes mellitus or as stress hyperglycemia in patients without previously diagnosed diabetes. Acute hyperglycemia may aggravate ischemic brain injury by increasing anaerobic metabolism, lactic acidosis, blood–brain barrier disruption, oxidative stress, and inflammatory damage. These changes may worsen neuronal injury and contribute to poor neurological and functional outcome.^[6,7]

Several studies have shown that patients with diabetes mellitus or admission hyperglycemia have more severe neurological deficits and poorer functional recovery after acute ischemic stroke compared with normoglycemic or non-diabetic patients.^[7,8] Indian studies have also reported that elevated blood glucose at admission is associated with increased stroke severity and worse short-term neurological outcome.^[8,9]

Assessment of functional outcome after stroke is commonly performed using the modified Rankin Scale, which evaluates the degree of disability and dependence in daily activities. Poor short-term functional outcome after ischemic stroke has important implications for patient counselling, rehabilitation planning, treatment prioritization, and follow-up care.^[10]

Although the association between diabetes mellitus, hyperglycemia, and poor stroke outcome has been studied previously, there is still a need for institution-based clinical data from Indian tertiary care settings. Hence, the present study was undertaken at Siddhartha Medical College to assess the association between diabetes mellitus and short-term functional outcome among patients with ischemic stroke by comparing diabetic and non-diabetic patients using the modified Rankin Scale at admission and at 30-day follow-up.

Aim

To assess the association between diabetes mellitus and short-term functional outcome among patients with ischemic stroke.

Objectives

1. To compare the modified Rankin Scale score at admission and at 30-day follow-up between diabetic and non-diabetic patients with ischemic stroke.
2. To determine the relative risk of short-term poor functional outcome among diabetic ischemic

stroke patients compared with non-diabetic ischemic stroke patients.

MATERIALS AND METHODS

Study Design and Setting

This prospective cohort study was conducted in the Department of Neurology, Siddhartha Medical College, over a period of two years, from January 2024 to December 2024. Ethical approval was obtained from the Institutional Ethics Committee before the initiation of the study. Written informed consent was obtained from all participants or their legally acceptable representatives before enrolment.

Study Population

The study included patients diagnosed with ischemic stroke who were admitted to the Department of Neurology during the study period and fulfilled the eligibility criteria. A total of 100 patients were enrolled using a non-probability consecutive sampling technique.

Patients were divided into two groups based on the presence or absence of diabetes mellitus. Patients with diabetes mellitus were included in the exposed group, while patients without diabetes mellitus were included in the unexposed group. Each group consisted of 50 patients.

Inclusion Criteria

Patients aged 18 years and above with a clinical and/or radiological diagnosis of ischemic stroke were included in the study. Patients presenting within the specified acute period of stroke onset and willing to participate in the study were enrolled after obtaining informed consent.

Exclusion Criteria

Patients with hemorrhagic stroke, transient ischemic attack, previous disabling stroke, severe systemic illness affecting functional recovery, incomplete clinical data, or loss to 30-day follow-up were excluded from the study.

Data Collection

Baseline demographic details including age and gender were recorded for all patients. Duration of stroke symptoms before admission was documented in hours. History of diabetes mellitus was obtained from the patient, attendants, previous medical records, or ongoing antidiabetic treatment history. Fasting blood glucose and two-hour postprandial blood glucose levels were measured on the first day of admission. HbA1c was measured at baseline to assess glycemic status. Based on diabetic status, patients were classified into exposed and unexposed groups.

Assessment of Functional Outcome

Functional status was assessed using the modified Rankin Scale at the time of admission. All patients were managed according to the standard treatment protocol of the department. After discharge, patients were followed up until the 30th post-stroke day.

At 30-day follow-up, functional outcome was reassessed using the modified Rankin Scale. Short-

term poor functional outcome was defined as modified Rankin Scale score ≥ 3 at day 30.

Study Variables

The main exposure variable was the presence of diabetes mellitus. The primary outcome variable was short-term poor functional outcome at 30 days after ischemic stroke. Other variables included age, gender, duration of stroke symptoms before admission, fasting blood glucose, postprandial blood glucose, HbA1c, and modified Rankin Scale score at admission and day 30.

Statistical Analysis

Data were entered and analyzed using SPSS version 20. Qualitative variables such as gender and poor outcome were expressed as frequency and percentage. Quantitative variables such as age, duration of stroke symptoms, and modified Rankin Scale score were expressed as mean and standard deviation.

The mean modified Rankin Scale scores of diabetic and non-diabetic patients were compared between the two groups. The relative risk was calculated to determine the risk of short-term poor functional

outcome among diabetic patients compared with non-diabetic patients. Stratification was performed according to age and gender. The chi-square test was applied for categorical variables. A p-value of less than 0.05 was considered statistically significant.

RESULTS

A total of 100 patients with ischemic stroke were included in the study. Among them, 50 patients with diabetes mellitus were included in the exposed group, while 50 non-diabetic patients were included in the unexposed group.

The mean age of patients in the exposed group was 52.10 ± 13.92 years, while the mean age of patients in the unexposed group was 44.80 ± 12.75 years. In the exposed group, 26 patients were male and 24 were female. In the unexposed group, 21 patients were male and 29 were female. The mean duration of stroke symptoms before admission was 7.48 ± 2.50 hours in the exposed group and 7.56 ± 2.62 hours in the unexposed group.

Table 1: Patient Demographics

Variable	Exposed Group	Unexposed Group
Patient Age, years		
N	50	50
Mean	52.10	44.80
Standard deviation	13.92	12.75
Minimum	24	22
Maximum	72	66
Patient Gender		
Male	26, 52.0%	21, 42.0%
Female	24, 48.0%	29, 58.0%
Duration of Stroke, hours		
N	50	50
Mean	7.48	7.56
Standard deviation	2.50	2.62
Minimum	4	4
Maximum	12	12

The exposed group had a higher mean age compared with the unexposed group. Male patients were slightly more common in the exposed group, whereas female patients were more common in the unexposed group. The mean duration of stroke symptoms before admission was almost similar in both groups, indicating that both groups were comparable with respect to time of presentation.

At day 0, the mean modified Rankin Scale score was higher in the exposed group than in the unexposed group. The mean mRS score was $2.62 \pm$

1.55 in the exposed group and 0.78 ± 0.86 in the unexposed group. This difference was statistically significant, with a p-value of less than 0.001.

At day 30, the mean modified Rankin Scale score remained higher in the exposed group compared with the unexposed group. The mean mRS score was 2.86 ± 1.70 in the exposed group and 0.90 ± 1.08 in the unexposed group. This difference was also statistically significant, with a p-value of less than 0.001.

Table 2: Descriptive Statistics for mRS Score at Day 0 and Day 30

mRS Score	Exposed Group	Unexposed Group	p-value
Day 0			
N	50	50	
Mean	2.62	0.78	<0.001, Significant
Standard deviation	1.55	0.86	
Minimum	0	0	
Maximum	5	3	
Day 30			
N	50	50	
Mean	2.86	0.90	<0.001, Significant
Standard deviation	1.70	1.08	
Minimum	0	0	
Maximum	5	4	

The mean mRS score was significantly higher among diabetic patients at both admission and 30-day follow-up. This indicates that diabetic patients had greater functional disability at presentation and continued to have worse short-term functional outcome compared with non-diabetic patients. Short-term poor outcome was observed in 35 patients in the exposed group and 8 patients in the unexposed group. Thus, 70.0% of diabetic patients

had poor short-term outcome compared with 16.0% of non-diabetic patients. The relative risk of poor outcome in the exposed group was 4.38, indicating that patients with diabetes mellitus had approximately 4.4 times higher risk of short-term poor functional outcome compared with non-diabetic patients. This association was statistically significant, with a p-value of less than 0.001.

Table 3: Overall Short-Term Poor Outcome

Poor Outcome	Exposed Group	Unexposed Group	Relative Risk	95% Confidence Interval	p-value
Yes	35, 70.0%	8, 16.0%	4.38	2.26–8.47	<0.001
No	15, 30.0%	42, 84.0%			
Total	50, 100%	50, 100%			

Poor short-term outcome was considerably more frequent among diabetic patients compared with non-diabetic patients. The relative risk of 4.38 shows that diabetic ischemic stroke patients had more than four times higher risk of poor functional outcome at 30 days. The association was statistically significant.

On age-wise stratification, the relative risk of poor outcome was 13.50 in the 24–35-year age group,

3.50 in the 36–45-year age group, 8.33 in the 46–55-year age group, and 1.80 in patients older than 55 years. The association between diabetes mellitus and poor short-term outcome was statistically significant in the 24–35-year, 36–45-year, and 46–55-year age groups. In patients older than 55 years, the risk of poor outcome was higher among diabetic patients; however, the association was not statistically significant.

Table 4: Short-Term Poor Outcome Stratified by Age

Age Group	Poor Outcome	Exposed Group	Unexposed Group	Relative Risk	95% Confidence Interval	p-value
24–35 years	Yes	6, 75.0%	1, 5.6%	13.50	1.93–94.54	<0.001
	No	2, 25.0%	17, 94.4%			
	Total	8	18			
36–45 years	Yes	7, 70.0%	2, 20.0%	3.50	0.95–12.90	0.025
	No	3, 30.0%	8, 80.0%			
	Total	10	10			
46–55 years	Yes	10, 83.3%	1, 10.0%	8.33	1.28–54.42	<0.001
	No	2, 16.7%	9, 90.0%			
	Total	12	10			
>55 years	Yes	12, 60.0%	4, 33.3%	1.80	0.75–4.32	0.144
	No	8, 40.0%	8, 66.7%			
	Total	20	12			

Age-wise analysis showed that diabetic patients had a higher risk of poor outcome across all age groups. The highest relative risk was observed in the 24–35-year age group, followed by the 46–55-year age group. The association was statistically significant in patients aged 24–35 years, 36–45 years, and 46–55 years. Among patients older than 55 years, the risk remained higher in diabetic patients, but the association was not statistically significant.

On gender-wise stratification, diabetic male patients had a relative risk of 3.39 for poor outcome compared with non-diabetic male patients. Diabetic female patients had a relative risk of 5.64 for poor outcome compared with non-diabetic female patients. The association between diabetes mellitus and short-term poor outcome was statistically significant in both male and female patients.

Table 5: Short-Term Poor Outcome Stratified by Gender

Gender	Poor Outcome	Exposed Group	Unexposed Group	Relative Risk	95% Confidence Interval	p-value
Male	Yes	21, 80.8%	5, 23.8%	3.39	1.54–7.46	<0.001
	No	5, 19.2%	16, 76.2%			
	Total	26	21			
Female	Yes	14, 58.3%	3, 10.3%	5.64	1.83–17.34	<0.001
	No	10, 41.7%	26, 89.7%			
	Total	24	29			

Gender-wise stratification showed that diabetes mellitus was associated with poor short-term outcome in both males and females. The relative

risk was higher among females, while the absolute frequency of poor outcome was higher among males

in the exposed group. The association was statistically significant in both genders.

Overall Interpretation of Results

The findings of the study demonstrate that ischemic stroke patients with diabetes mellitus had significantly higher disability scores at admission and at 30-day follow-up compared with non-diabetic patients. Poor short-term outcome was observed in 70.0% of diabetic patients compared with 16.0% of non-diabetic patients. The relative risk of poor outcome was 4.38, showing that diabetes mellitus was strongly associated with poor short-term functional outcome after ischemic stroke.

Age-wise and gender-wise stratification further supported this association. Diabetic patients had a higher risk of poor outcome across all age groups and in both genders. Overall, diabetes mellitus appears to be an important predictor of increased disability and poor short-term prognosis in patients with ischemic stroke.

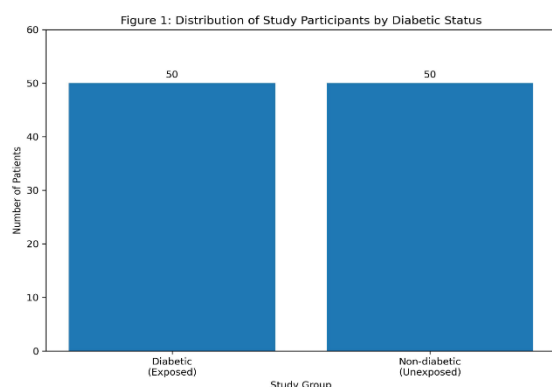


Figure 1: Distribution of study participants according to diabetic status

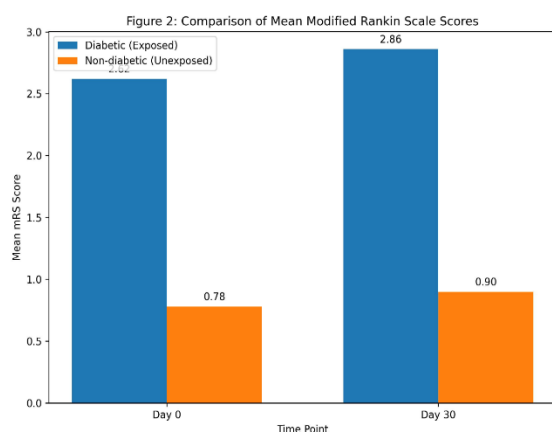


Figure 2: Comparison of mean mRS scores between diabetic and non-diabetic ischemic stroke patients at admission and day 30.

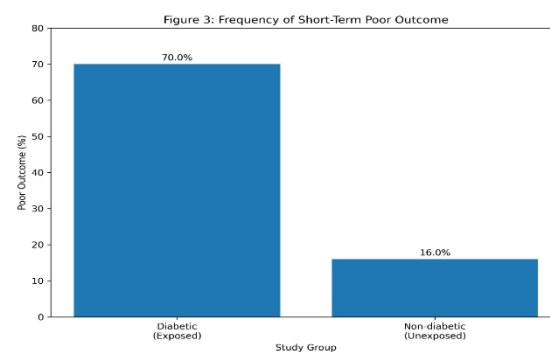


Figure 3: Frequency of short-term poor functional outcome among diabetic and non-diabetic ischemic stroke patients.

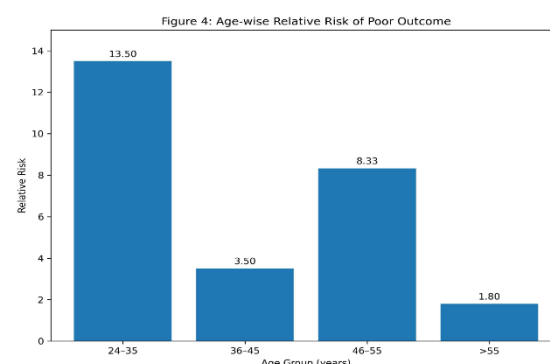


Figure 4: Age-wise relative risk of poor functional outcome among diabetic ischemic stroke patients compared with non-diabetic patients.

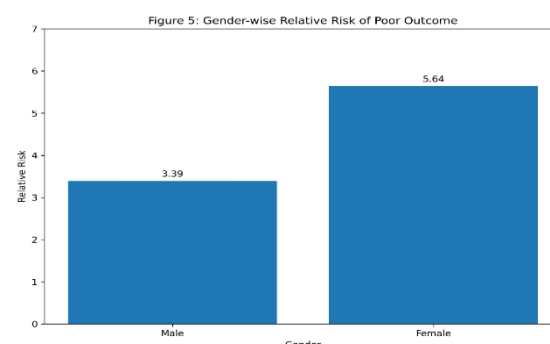


Figure 5: Gender-wise relative risk of poor functional outcome among diabetic ischemic stroke patients compared with non-diabetic patients.

DISCUSSION

Stroke is an important cause of mortality and long-term disability, and the outcome after ischemic stroke is influenced by several modifiable and non-modifiable risk factors. Among these, diabetes mellitus and hyperglycemia are clinically important because they are associated not only with increased risk of ischemic stroke but also with greater stroke severity, delayed neurological recovery, and poor functional outcome. In the present study, the association between diabetes mellitus and short-term functional outcome was assessed among patients with ischemic stroke using the modified Rankin Scale at admission and at 30-day follow-up.

In the present study, a total of 100 patients with ischemic stroke were included, with 50 diabetic patients in the exposed group and 50 non-diabetic patients in the unexposed group. The mean age of patients in the exposed group was 52.10 ± 13.92 years, while the mean age of patients in the unexposed group was 44.80 ± 12.75 years. This indicates that diabetic ischemic stroke patients were relatively older compared with non-diabetic patients. This finding is expected because the prevalence of diabetes mellitus and vascular complications increases with age. Similar observations were reported by Marulaiah et al., who observed that the mean age of stroke patients was 61.18 years and that more than half of the patients were in the 51–70-year age group.^[12]

In the present study, males constituted 52.0% of the diabetic group and 42.0% of the non-diabetic group. The male predominance observed in the diabetic group is comparable with previous studies. Marulaiah et al. reported that 62.1% of patients were males and 37.9% were females in their study on acute ischemic stroke.^[12] Gangraram et al. also reported male predominance, with 61% males and 39% females among ischemic stroke patients.^[13] This male predominance may be related to a higher frequency of conventional vascular risk factors such as smoking, alcohol use, ischemic heart disease, and peripheral vascular disease among males.

The present study showed that diabetic patients had significantly higher disability scores at admission compared with non-diabetic patients. The mean mRS score at day 0 was 2.62 ± 1.55 in the exposed group and 0.78 ± 0.86 in the unexposed group. This difference was statistically significant. This indicates that diabetic patients presented with greater functional disability during the acute phase of ischemic stroke. This finding is consistent with previous studies that have shown an association between hyperglycemia, diabetes mellitus, and increased stroke severity.^[11-13]

At 30-day follow-up, diabetic patients continued to have worse functional outcome compared with non-diabetic patients. The mean mRS score at day 30 was 2.86 ± 1.70 in the exposed group and 0.90 ± 1.08 in the unexposed group. Poor short-term functional outcome was observed in 35 out of 50 diabetic patients and 8 out of 50 non-diabetic patients. Thus, 70.0% of diabetic patients had poor outcome compared with 16.0% of non-diabetic patients. The relative risk of poor outcome was 4.38, indicating that diabetic ischemic stroke patients had more than four times higher risk of poor short-term functional outcome compared with non-diabetic patients.

The findings of the present study are comparable with the observational study by Das et al., in which 100 ischemic stroke patients were divided into 50 patients with admission hyperglycemia and 50 patients without hyperglycemia. They reported that 30-day mortality was higher in the hyperglycemic group than in the euglycemic group, 28% versus

12%, indicating a 2.3-fold increase in mortality among patients with admission hyperglycemia.^[11] They also observed that severe disability at 30 days was higher among survivors in the hyperglycemic group compared with the control group. The present study similarly showed that diabetic patients had a higher frequency of poor functional outcome at 30 days, supporting the adverse prognostic role of abnormal glycemic status in acute ischemic stroke. Marulaiah et al., in a South Indian tertiary care hospital-based longitudinal study, reported that hyperglycemia at presentation was seen in 56.1% of acute ischemic stroke patients. They found that 52% of patients had poor functional outcome at 90 days, and patients with hyperglycemia had significantly worse outcome compared with normoglycemic patients. Among hyperglycemic subgroups, poor outcome was highest among patients with stress hyperglycemia, followed by newly detected diabetes and known diabetes.^[12] Although the present study classified patients according to diabetic status rather than stress hyperglycemia or newly detected diabetes, the overall direction of association is similar. Both studies demonstrate that abnormal glycemic status is associated with poor functional recovery after ischemic stroke.

Gangraram et al., in a tertiary care hospital study from Nellore, India, reported hyperglycemia at presentation in 54% of acute ischemic stroke patients. They observed poor outcome in 43% of patients at 90 days, with worse functional impairment among hyperglycemic patients compared with normoglycemic patients.^[13] They further reported that patients with stress hyperglycemia and newly detected diabetes had particularly poor outcomes. The present study differs in follow-up duration, as outcome was assessed at 30 days rather than 90 days. However, the present study also supports the same clinical concept that diabetic or hyperglycemic status is associated with greater short-term disability after ischemic stroke.

The systematic overview by Capes et al. showed that stress hyperglycemia was associated with increased mortality after stroke, particularly among patients without known diabetes. They reported that among non-diabetic patients, stress hyperglycemia was associated with a three-fold increased risk of mortality after stroke, with a pooled relative risk of 3.07. In diabetic patients, the association between stress hyperglycemia and short-term mortality was weaker and not statistically significant.^[14] This observation is important while interpreting the present study. Our study evaluated known diabetes mellitus rather than stress hyperglycemia. Therefore, direct comparison with Capes et al. should be made carefully. However, both studies indicate that disturbed glucose metabolism during stroke is clinically relevant and may predict poor outcome. Stead et al. reported that hyperglycemia was an independent predictor of poor outcome particularly among non-diabetic patients presenting with acute

ischemic stroke. They observed that non-diabetic patients with elevated glucose were more likely to have poor functional outcome, whereas among patients with known diabetes, the impact of hyperglycemia on outcome was less clear.^[15] This partially differs from the present study, where diabetic patients had significantly worse 30-day mRS outcome than non-diabetic patients. This difference may be due to variation in study design, patient selection, definition of exposure, timing of glucose measurement, stroke severity, and outcome assessment. The present study classified patients based on diabetes mellitus, whereas Stead et al. focused more specifically on hyperglycemia in non-diabetic stroke patients.

Baird et al. demonstrated that persistent post-stroke hyperglycemia was independently associated with infarct expansion and worse clinical outcome.^[16] This supports the biological plausibility of the present findings. Hyperglycemia may aggravate ischemic brain injury by increasing anaerobic glycolysis, lactate accumulation, intracellular acidosis, oxidative stress, glutamate-mediated excitotoxicity, blood-brain barrier disruption, and cerebral edema. These mechanisms may enlarge the ischemic penumbra and worsen functional recovery. Lindsberg and Roine also emphasized that elevated blood glucose is common in the acute phase of stroke and may contribute to poor clinical outcome.^[17] Earlier studies by Melamed and Toni et al. also described reactive or stress hyperglycemia in acute stroke patients and suggested that it may influence outcome after ischemic stroke.^[18,19] These studies support the concept that acute glycemic disturbance, whether due to known diabetes mellitus, newly diagnosed diabetes, or stress hyperglycemia, should be considered an important prognostic factor in ischemic stroke.

In the present study, age-wise stratification showed that diabetic patients had higher risk of poor outcome across all age groups. The relative risk was 13.50 in the 24–35-year age group, 3.50 in the 36–45-year age group, 8.33 in the 46–55-year age group, and 1.80 in patients older than 55 years. The association was statistically significant in the 24–35-year, 36–45-year, and 46–55-year age groups. Although risk was also higher in patients older than 55 years, the association was not statistically significant. This may be because older patients are more likely to have multiple competing risk factors such as hypertension, dyslipidemia, cardiac disease, and age-related vascular changes, which may independently influence stroke outcome.

Gender-wise stratification showed that diabetes mellitus was significantly associated with poor short-term outcome in both males and females. Among males, the relative risk of poor outcome was 3.39, while among females it was 5.64. This indicates that diabetes mellitus increased the risk of poor outcome in both genders. The higher relative risk among females may reflect differences in metabolic control, vascular risk burden, hormonal

influences, or delayed healthcare-seeking behaviour; however, this observation requires confirmation in larger studies.

The present study has important clinical implications. Since diabetes mellitus is a modifiable vascular risk factor, early identification of diabetic status in ischemic stroke patients is essential. Measurement of fasting blood glucose, postprandial blood glucose, and HbA1c at baseline can help identify patients at higher risk of poor functional recovery. Such patients may require closer neurological monitoring, strict management of vascular risk factors, early rehabilitation, structured discharge planning, and regular follow-up.

However, the findings should be interpreted with certain limitations. This was a single-centre study with a relatively limited sample size. The study compared diabetic and non-diabetic patients but did not separately classify patients into controlled diabetes, uncontrolled diabetes, newly diagnosed diabetes, and stress hyperglycemia. Important predictors such as baseline NIHSS score, infarct size, infarct location, thrombolysis status, lipid profile, blood pressure variability, and treatment adherence were not included in the analysis. Future multicentric studies with larger sample size and detailed glycemic subgroup classification are recommended.

Overall, the present study demonstrates that diabetes mellitus is significantly associated with poor short-term functional outcome in patients with ischemic stroke. Diabetic patients had significantly higher mRS scores at admission and at 30-day follow-up compared with non-diabetic patients. Poor outcome was observed in 70.0% of diabetic patients compared with 16.0% of non-diabetic patients, and the relative risk of poor outcome was 4.38. These findings are consistent with previous studies showing that diabetes mellitus, admission hyperglycemia, and stress hyperglycemia are associated with worse neurological and functional outcome after ischemic stroke.

CONCLUSION

The present study showed that diabetes mellitus was significantly associated with poor short-term functional outcome in patients with ischemic stroke. Diabetic patients had higher mRS scores at admission and at 30-day follow-up compared with non-diabetic patients. Poor outcome was observed in 70.0% of diabetic patients compared with 16.0% of non-diabetic patients, with a relative risk of 4.38. These findings suggest that diabetes mellitus is an important predictor of poor short-term prognosis after ischemic stroke.

Limitations

This was a single-centre study with a limited sample size. The study did not separately analyze controlled diabetes, uncontrolled diabetes, newly diagnosed diabetes, and stress hyperglycemia. Important

clinical variables such as baseline NIHSS score, infarct size, infarct location, thrombolysis status, lipid profile, blood pressure variability, and treatment adherence were not included in the analysis. Further multicentric studies with larger sample size and detailed glycemic categorization are recommended.

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