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Original Research Article

COMPARISON OF CLINICAL MANIFESTATION AND RISK FACTORS OF STROKE AMONG DIABETIC VS NON-DIABETIC PATIENTS

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ABSTRACT

Background: *Stroke is a leading cause of morbidity and mortality worldwide. Diabetes mellitus is a known risk factor that may influence both the presentation and progression of stroke. Understanding the differences in clinical manifestations and risk factors between diabetic and non-diabetic stroke patients is essential for tailored prevention and management strategies.* ***Objective:*** *To compare the clinical manifestations and associated risk factors of stroke among diabetic and non-diabetic patients.* ***Study Design:*** *Cross-sectional study.* ***Setting:*** *The study was conducted at the department of Medicine, Saidu Group of Teaching Hospital Swat, Pakistan].* ***Duration of Study:*** *August 2024 to January 2025.* ***Methods:*** *The study included 80 patients aged 40 years and above who were diagnosed with stroke, confirmed by clinical examination and neuroimaging. Patients were categorized into two equal groups: diabetics (n = 40) and non-diabetics (n = 40). Data were collected on demographics, risk factors (hypertension, dyslipidemia, smoking, atrial fibrillation, and previous stroke history), and clinical manifestations (motor deficits, aphasia, dysarthria, and altered sensorium). Statistical analysis was conducted using Chi-square tests and independent t-tests, with a p-value <0.05 considered statistically significant.* ***Results:*** *The mean age of diabetic patients was 50.65 ± 7.49 years, while that of non-diabetics was 52.20 ± 6.09 years. Motor deficits were observed in 80% of diabetics and 75% of non-diabetics (p > 0.05). Dysarthria occurred in 55% vs 45% (p > 0.05), aphasia in 22.5% vs 25% (p > 0.05), and altered sensorium in 45% vs 32.5% (p > 0.05), respectively. Hypertension was significantly more prevalent in diabetics (62.5%) compared to non-diabetics (30%) (p = 0.004). Dyslipidemia was more common in diabetics (60%) than in non-diabetics (42.5%) (p > 0.05). Atrial fibrillation and previous stroke history did not differ significantly between groups.* ***Conclusion:*** *While clinical manifestations of stroke were similar between diabetic and non-diabetic patients, hypertension was significantly more prevalent in the diabetic group. These findings highlight the importance of strict blood pressure control in diabetic patients to prevent stroke-related complications.*

Keywords: Stroke, Diabetes, Ischemic Stroke, Hemorrhagic Stroke, Risk Factors

INTRODUCTION

Diabetes mellitus (DM) represents a long-lasting metabolic condition marked by ongoing high blood sugar level. The reason for this may involve both decreased secretion of insulin, resistance to peripheral action of insulin, as well as a combination of both factors. It was reported that roughly 415 million adults aged 20-79 resided with DM in 2015 (1). DM is emerging as a significant global public health difficulty with projections suggesting an increase of an additional 200 million instances by 2040.[1]DM has become a worldwide epidemic. The rise in altering lifestyles as well as developing obesity rates has led to worldwide rise in prevalence of DM. In 2017, worldwide incidence of DM reached 425 million individuals. In 2015, roughly 10% of American population were identified to have diabetes. Among these, 7 million continued to be undiagnosed. As age advances, the likelihood of DM also rises. Approximately 25% of individuals aged 65 and older are impacted by DM (2).

Acute stroke is also known as a cerebrovascular accident; nevertheless, it is essential to understand that the stroke is not an accidental event. A more accurate as well as impactful term for describing it is "brain attack," and this holds an identical significance for "heart attack." Stroke involves a wider array of changes compared to heart disease. Stroke is mainly divided into two types: ischaemic as well as hemorrhagic. Stroke is the second- leading cause fatalities worldwide and significantly contributes to disability. Ischaemic strokes symbolises around 62% of all reported strokes, with intracerebral haemorrhage making up 28% as well as subarachnoid haemorrhage making up 10% (3-5).

Diabetes may result in an array of microvascular as well as macrovascular difficulties, such as stroke. In 2019, there were approximately 12.2 million isolated instances of stroke as well as 101 million common instances of stroke globally (6). Diabetes exists in 28% of individuals who encounter any kind of stroke (7). The rate is higher among people with ischaemic stroke (33%) than in those with hemorrhagic stroke (26%) (7). Individuals experiencing ischaemic stroke associated with diabetes tend to be younger and diagnosed with a higher percentage of comorbidities compared to their counterparts with no diabetes (8-11).

Stroke remains one of leading causes of morbidity as well as mortality worldwide with DM recognized as a significant modifiable risk factor that exacerbates both incidence and severity of cerebrovascular events. Understanding the differences in clinical manifestations along with associated risk profiles between diabetic and non-diabetic stroke cases is crucial for early identification and targeted prevention strategies. This study goals to bridge this knowledge gap by systematically comparing clinical features and risk factors of stroke among DM and non-DM individuals thereby contributing to more precise as well as effective clinical care pathways.

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METHODOLOGY

This cross-sectional study was conducted at the department of Medicine from August 2024 to January 2025 at Saidu Group of Teaching Hospital Swat. We enrolled 80 patients, in which 40 were diabetic and 40 were non-diabetic, they were diagnosed with stroke and admitted to the hospital for treatment. Patients aged 40 years and above who had a confirmed diagnosis of stroke either ischemic or hemorrhagic based on clinical examination and neuroimaging findings specifically CT scans or MRI were selected.

Diabetic patients included in the study had a known history of diabetes having HbA1c ≥ 6.5. Non-diabetic patients were those with no prior history of diabetes and whose HbA1c was < 6.5 during hospitalization.

All patients underwent detailed clinical assessments including medical history, physical and neurological examinations and laboratory investigations. These investigations included measurements of fasting blood glucose, HbA1c lipid profiles and other relevant biomarkers to identify potential risk factors such as hypertension, dyslipidemia, smoking and atrial fibrillation.

Data regarding stroke type and its clinical manifestations were recorded. The clinical manifestations of stroke were classified according to common neurological deficits including motor deficits, aphasia, dysarthria and altered sensorium. Risk factors for stroke were recorded for both groups, which were hypertension, dyslipidemia, smoking and prior stroke history.

Statistical analysis was performed using SPSS 24. Age and BMI were calculated using mean and standard deviation. Gender along with demographic profile, clinical manifestations and risk factors were evaluated using frequency and percentages. Chi Square test was used for assessing the clinical manifestations and risk factors between both groups. P value was set significant at < 0.05.

RESULTS

We included 40 diabetic and 40 non diabetic stroke patients. The mean age of diabetic patients was 50.65±7.49 years while non-diabetic 52.20±6.09 years. Body mass index (BMI) was notably elevated in the diabetic group 27.95±2.01 kg/m² compared to the non-diabetic group 25.42±1.12 kg/m².

Gender distribution showed that there 26 (65%) males in diabetic patients and 25 (62.5%) in non-diabetic group. Females were 14 (35%) and 15 (37.5%) in the diabetic and non-diabetic groups respectively (Table 1).

Figure 1 shows the type of stroke in both groups.

Clinical manifestation showed that motor deficits were 32 (80%) in diabetics and 30 (75%) in non-diabetics. Dysarthria was observed in 22 (55%) diabetics and 18 (45%) non-diabetics while aphasia was 9 (22.5%) and 10 (25%) in the respective groups. Altered sensorium was 18 (45%) in diabetics and 13 (32.5%) in non-diabetics (Table 1).

Regarding the risk factors, hypertension was notably higher in diabetics 25 (62.5%) compared to 12 (30%) non-diabetics (P = 0.004). Dyslipidemia was common in diabetics occurring in 24 (60%) and 17 (42.5%) non-diabetics, but the difference did not reach significant level (P > 0.05). Smoking rates were 12 (30%) in diabetics and 8 (20%) in non-diabetics (P > 0.05) while atrial fibrillation was reported in 8 (20%) and 9 (22.5%) respectively (P > 0.05). Previous stroke history was similar in both groups affecting 7 (17.5%) diabetics and 6 (15%) non-diabetics (P > 0.05) (Table 3).

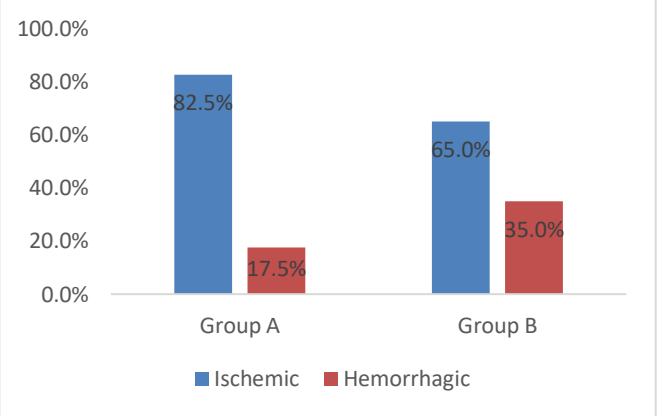

Figure 1: Stroke type

Table 1: Demographics

Demographics		Diabetes status			
		Diabetic		Non-diabetic	
		N	%	N	%
Gender	Male	26	65.0%	25	62.5%
	Female	14	35.0%	15	37.5%
Socioeconomic status	Low (< 20K Rs/Month)	9	22.5%	9	22.5%
	Middle (20 to 50K Rs/Month)	27	67.5%	24	60.0%
	High (> 50K Rs/Month)	4	10.0%	7	17.5%
Education status	Educated	18	45.0%	17	42.5%
	Uneducated	22	55.0%	23	57.5%
Profession	Employed	19	47.5%	21	52.5%
	Unemployed	21	52.5%	19	47.5%

Table 2: Clinical manifestation

Clinical manifestation		Diabetes status				P value
		Diabetic		Non-diabetic		
		N	%	N	%	
Motor Deficit	Yes	32	80.0%	30	75.0%	0.59
	No	8	20.0%	10	25.0%	
Dysarthria	Yes	22	55.0%	18	45.0%	0.37
	No	18	45.0%	22	55.0%	
Aphasia	Yes	9	22.5%	10	25.0%	0.79
	No	31	77.5%	30	75.0%	
Altered Sensorium	Yes	18	45.0%	13	32.5%	0.25
	No	22	55.0%	27	67.5%	

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Table 3: Risk factors

Risk factors		Diabetes status				P value
		Diabetic		Non-diabetic		
		N	%	N	%	
Hypertension	Yes	25	62.5%	12	30.0%	0.004
	No	15	37.5%	28	70.0%	
Dyslipidemia	Yes	24	60.0%	17	42.5%	0.11
	No	16	40.0%	23	57.5%	
Smoking status	Yes	12	30.0%	8	20.0%	0.30
	No	28	70.0%	32	80.0%	
Atrial fibrillation	Yes	8	20.0%	9	22.5%	0.78
	No	32	80.0%	31	77.5%	
History of stroke	Yes	7	17.5%	6	15.0%	0.76
	No	33	82.5%	34	85.0%	

DISCUSSION

In our study we observed that the mean age of diabetic patients (50.65 ± 7.49 years) was slightly lower than the mean age of non-diabetic patients (52.20 ± 6.10 years) which is consistent with the findings of Ali et al who also found no notable age difference between both groups (12). This result aligns with the report by Morsy et al. who observed no notable difference in the ages of both groups.[13] The gender distribution was similar across both groups with a male predominance in both diabetic (65%) and non-diabetic (62.5%) patients. Ali et al showed that male patients were in majority in both groups (12).

We observed that ischemic strokes were more prevalent in dibetics (82.5%) than non-diabetics (65%). This result is consistent with Ali et al who found a higher number of ischemic strokes in diabetic patients (12). In contrast hemorrhagic strokes were more common in the non-diabetic group (35%) compared to the diabetic group (17.5%) which is similar to the findings by Ali et al and S V et al who noted a higher incidence of hemorrhagic strokes in non-diabetics (12, 14).

The clinical manifestations in our study showed that motor deficits were the most common symptom in both groups with 80% of diabetic patients and 75% of non-diabetic patients exhibiting hemiparesis or hemiplegia. This is in line with the findings of Patil et al. who observed motor weakness as the most frequent clinical presentation in both diabetic and non-diabetic stroke patients (15). Dysarthria and altered sensorium were more prevalent in diabetics which supports the findings by Morsy et al who reported a higher prevalence of dysarthria and motor deficits in diabetic stroke patients (13).

The analysis of risk factors revealed that hypertension was notably more prevalent in the diabetic group (62.5%) compared to the non-diabetic group (30%) which is consistent with the observations of S V et al. who identified hypertension as a notably risk factor for stroke in diabetic patients. Similarly, Patil et al also found that hypertension was more common in diabetic patients (15). Dyslipidemia was also more common in diabetics (60%) compared to non-diabetics (42.5%) though the difference was not significant. This finding aligns with the results of Morsy et al who also noted a higher prevalence of dyslipidemia in diabetic stroke patients (13). Atrial fibrillation did not show potential differences between the two groups in our study which is similar to Morsy et al who found no difference in AF between both groups (13). Previous stroke history another important risk factor was similar in both groups in our study which corresponds with the findings of Siddiqui et al who found no difference in prior stroke history between both groups (16).

CONCLUSION

In conclusion, diabetic patients exhibited a higher prevalence of ischemic strokes, motor deficits, dyslipidemia and hypertension compared to non-diabetic patients. We recommend the necessity of targeted prevention and management strategies for stroke in diabetic population.

DECLARATIONS

Data Availability Statement

All data generated or analysed during the study are included in the manuscript.

Ethics approval and consent to participate

Approved by the department Concerned. (IRBEC-MIT_24)

Consent for publication

Approved

Funding

Not applicable

CONFLICT OF INTEREST

The authors declared an absence of conflict of interest.

AUTHOR CONTRIBUTION

MUHAMMAD ILYAS (PGR)
Conception of Study, Development of Research Methodology Design, Data Analysis, Review of manuscript, final approval of manuscript.
OSAMA ISMAIL (House Officer)
Manuscript revisions, critical input.
WAHEED ULLAH (Casualty Medical Officer)
Study Design, Review of Literature.
FARID ULLAH (PGR)
Manuscript drafting.
MUHAMMAD INZAMAM UL HAQ (PGR)
Literature Review.
SANA AKBAR (WMO)
Conception of Study, Final approval of manuscript.

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