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Frequency of Hyperglycemia in Acute Stroke Patients at Tertiary Care Hospital, Bannu, KPK, Pakistan

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Abstract

Objective: To find the frequency of hyperglycemia in acute stroke patients, District Headquarter Teaching Hospital, Bannu

Material & Methods: Prospective Cross-sectional study conducted on acute stroke patients at District Headquarter Teaching Hospital, Bannu for frequency of hyperglycemia. Socio-demographic data was collected using structure questionnaire. Blood sample for FBS and RBS were collected in BD vacutainer™ bottle having sodium fluoride anti-coagulant. Blood glucose estimation was done using MicrLab-300 at Pathology lab of DHQ Teaching Hospital, Bannu.

Result: Total 121 subjects were selected for study in which males 66.1% while females were 33.9%. Patients living in rural area were 73.6% while urban duelers were 26.4%, married individuals were 95.9 % while unmarried were 4.1%. Educated individuals were 64.3% while un-educated were 53.7%, mean age was 60.26 + 7.52. Hyperglycemic patients having mean FBS was 131 + 46.68 while RBS was 202 + 97.36. Hypertension was present in 85.1 %, mental disability was in 16.5%, physical disability was in 89.3% and Swallowing difficulty was found in 44.6 % acute stroke patients. Hyperglycemia was present in 28.92 % (35/121) patients in which males were 85.71% and female were 14.29% while 71.08% were free of hyperglycemia. The result was statistically significant with p-value < 0.004 at 95% CI.

Conclusion: It has been concluded that hyperglycemia may be risk factor for patients that leads to acute stroke along with hyper tension and other complications.

Key words: Acute stroke, Hyperglycemia, FBS, RBS, Hypertension

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Introduction

Hyperglycemia is disorder characterized by high blood glucose (sugar) level due to decreased insulin secretion by the body, abnormal insulin action or both[1], either fasting blood glucose level or random blood glucose level, that leads to many complication including diabetic neuropathy, nephropathy, retinopathy, vascular sclerotic disease and if uncontrolled, acute stroke[2] and subsequent stroke results in increase hospitalization and irreversible casualty in form of death of patients or physical disability. [3] Acute stroke is defined as rapid and acute onset of focal neurological findings in vascular territory having cerebro-vascular disease. Acute stroke (brain attack) usually occurs due to depleted oxygen supply, most often to brain tissue resulting in brain dysfunction and death of brain tissue that arise multiple complication even death of individuals4. Loss of speech, extreme weakness with the presence of paralysis on either or both body sides are well demonstrated symptoms of acute stroke, high blood pressure and increase glucose level complicate acute stroke leading to death.[5]

The most common risk factors for acute stroke are hypertension, obesity, genetics, smoking, decreased physical activity, elevated cholesterol levels, and diabetes mellitus, including uncontrolled hyperglycemia.[6] Some factors like heart arrhythmias and valvular disease including structural defects, are also included in leading causes of stroke.[7] In United states of America stroke is leading 5th cause of death of which approximately 60% of cases occurs

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outside the hospitals, every 40 seconds, an individual's suffers a stroke and every 04 minutes a death due to acute stroke occurs and if death not happens physical disability may be the fate of suffered patient. [8,9] Stroke was the second commonest cause of death accounting 11.8% of all deaths after ischemic heart disease which was 14.8% of all deaths, while it was third most common cause of physical disability, causing manifestations of 4.1% of all causes while ischemic heart disease accounts for physical disabilities as 6.1% of all.[10]

Speaking and understanding difficulties, mental and physical disabilities, difficulty swallowing, vision difficulty including one or both eyes blindness, acute paralytic attack on either or both sides, most severe on the left side, face muscle taintless with blending of head on one side, uncontrolled backache and headache, dizziness with mouth paralysis and loss of balance, subjective arm and leg weakness, and extreme tiredness are typical signs and symptoms of acute stroke.[11] Increase sugar level increase the risk of intravascular hemorrhage leading to heart ischemia and heart infarct with decrease blood and oxygen supply to brain tissue causing acute damage to brain.[12]

Materials and Methods

Study design: Prospective cross-sectional study done on patients referred to DHQ Teaching Hospital, Bannu from December, 2018 to December, 2019. All individuals with typical sign symptoms of acute stroke and were registered in OPD for admission in ICU at District Head Quarter Teaching Hospital, Bannu.

Inclusion Criteria: All the patients of both genders, of any age having acute stroke and were admitted at intensive care unit DHQ hospital Bannu were included in current study.

Exclusion criteria: Non-willing, patients with chronic malignant disease were excluded from study.

Socio-demographic data was collected using structure questionnaire. 03 ml fasting blood and random blood sample was collected using the standard methods from anticubital veins using sterile syringe and was added to BD tube containing sodium fluoride.

The collected blood was centrifuged in order to obtain plasma and was separated. Measurement of blood glucose was done using Micro-Lab 300 chemistry analyzer, Fasting blood glucose level more than 110 mg/dl and random blood glucose level more than 180 mg/dl was considered hyperglycemia.

All the obtained data and results of glucose estimation analyzed using SPSS version 25, tables and graphs was used to present the data; chi square test was used to measure the significant with p value < 0.05

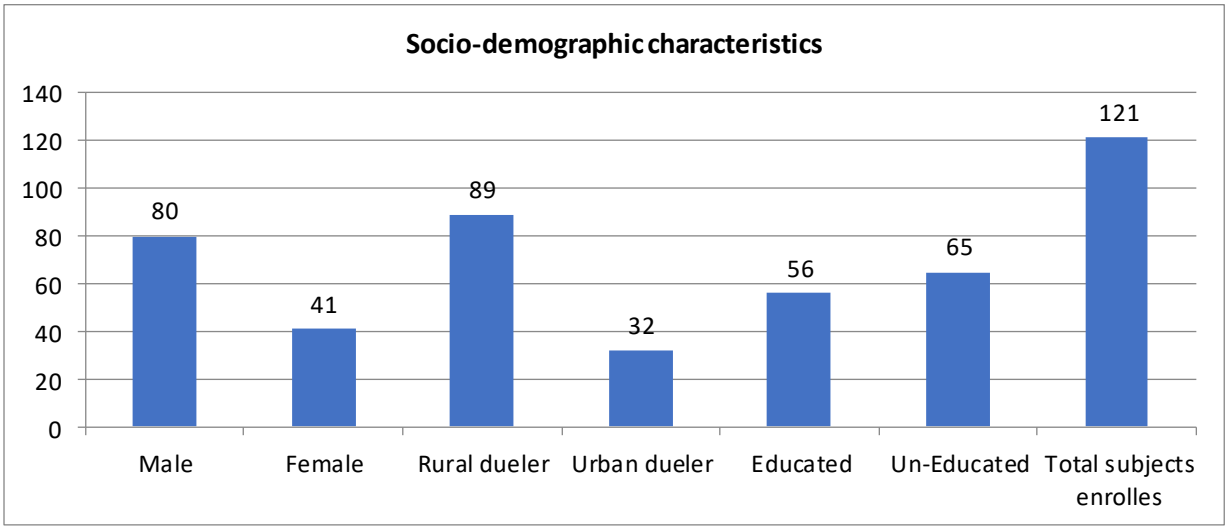
Results

For the current study a total 121 subjects were randomly selected for the purpose to estimate frequency of hyperglycemia in patients presenting acute stroke at district Bannu.

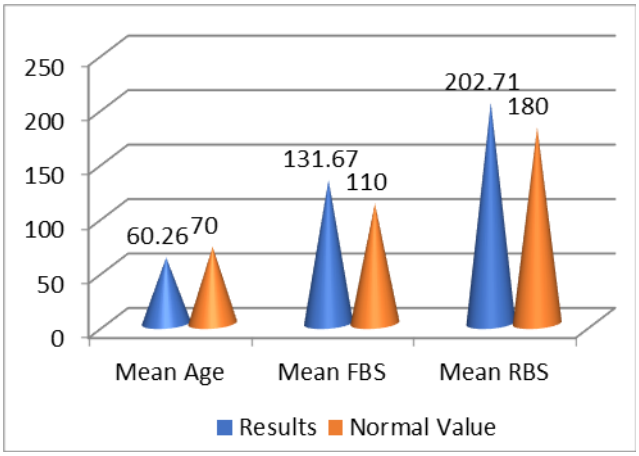
Among total 121 subjects, Male was 80 (66.1%) while females was41 (33.9). Patients living in rural area was 89 (73.6) while 32 (26.4 %) urban duelers. Married individuals was 116 (95.9 %) while unmarried was 05 (4.1%). Educated individuals was 56 (64.3%) while un-educated was 65 (53.7). As shown in below fig:

The mean age of patient was 60.26 $\pm$ 7.52 while, mean Fasting Blood Sugar was 131$\pm$ 46.68 while mean random blood sugar was 202$\pm$ 97.36 as shown in figure:

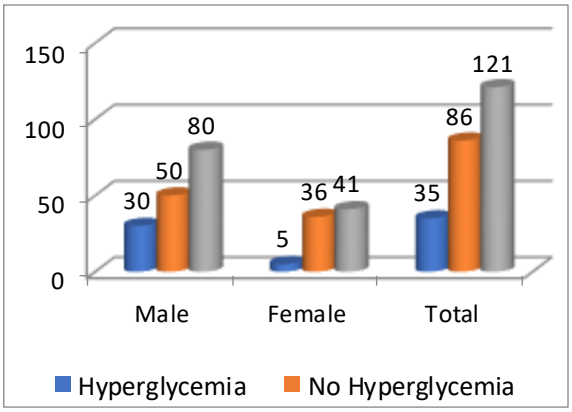
Among 121 patient's hyperglycemia was present in 28.92 % (35/121) patients in which males were 30/35 (85.71%) and female 09/35 (14.29%), while 71.08% (86/121) patients do not show any hyperglycemia. The result was statistically



significant with p-value < 0.004 at 95% CI.



Mean age and mean Blood sugar of acute stroke patients



Complications in Stroke and HG patients

There were multiple complications present in stroke patients along with hyperglycemia like hypertension was 85.1 %, mental disability was 16.5%, physical disability was 89.3% and Swallowing difficulty was noted 44.6 %. As shown below

Complications	Present	Not-present
Hypertension	85.1 %	14.9%
Mental Disability	16.5%	83.5 %
Physical disability	89.3%	11.7%
Swallowing difficulty	44.6%	55.4%

Discussion

The current study was aimed to find the frequency of hyperglycemia in acute stroke patients at District Headquarter Teaching Hospital, Bannu. Among total 121 subjects, Male was 80 (66.1%) while females was 41 (33.9). Hyperglycemia in our study was present in 35/121 (28.92 %) patients in which males were 30/35 (85.71) and female 09/35 (14.29) present hyperglycemia. While 86/121 (71.08%) patients do not show any hyperglycemia. The result was statistically significant with p-value < 0.004 at 95% CI. Understanding the role of hyperglycemia in acute stroke different studies has been conducted so far, according to Kagansky & Knobler, 2001 hyperglycemia has been associated with acute stroke and high blood glucose level are common in early phase of acute phase[13], in our study the hyperglycemia was also found in 28.92 % individuals which suggest a positive correlation between stroke and hyperglycemia, same results was suggested by Lindsberg & Roine,2004 and their findings revealed increase glucose level in acute stroke further more hyperglycemia induced ischemic stroke is leading cause of disability.[14] In another study by McCormick *et al.,* 2008 revealed that diabetes mellitus and hyperglycemia has been associated with coronary artery disease that leads to acute stroke.[15] In another study by Kruyt *et al.,* 2007 hyperglycemia has been found the net factor for acute stroke as the participants were prevalent for hyperglycemia prior to stroke attack[16]. Approximately same results was narrated by Martini & Kent, 2007, their study was in correlation with our study as the findings was hyperglycemia has been found associated with acute stroke further moreover hyperglycemia complicate the acute ischemic stroke.[17] In study of Toni *et al.,* 1992 increase blood glucose level was observed in patients with acute stroke complications and hence increase the ischemia, the same results was also found in the study of Cox & Lorains, 1986 whose findings were 16% of all acute stroke patients has been identified with hyperglycemia[18, 19], all these studies are in correlations to our study.

Gender and age along with diabetes are risk factors for acute stroke as elderly people of age more than 60 years having hyperglycemia are at greater risk, in our study majority of people that are of age more than 60 years (mean age was 60.26±7.52) having stroke were hyperglycemic and hypertensive, reveals that acute hypertension and hyperglycemia worsen the stroke, in the study of Jørgensen et al., 1994 among total 20% patients has been found with increase blood glucose level and 48% has been hypertensive at the time of stroke[19], these results correlates with our study as in our study 28% people have hyperglycemia while 81% individuals were hypertensive. In study of Matz *et al.,* 2006 give a comprehensive picture of stroke patients and revealed that majority of patients has been found with glucose metabolism disorder as some were prediabetic and some were diagnosed acute hyperglycemic particularly in elder people.[20] Pakistan has been found with higher burden of stroke, different studies have been conducted like study of Khealani *et al.,* 2008 revealed that stroke has greater impact on our community, also their findings suggested that people more than 60 years of age have been found more prevalent stroke while having hypertension and hyperglycemia[21], almost same findings were present in the study of Hashmi *et al.,* 2013 also

treatment prognosis was noted poor.[22] In another study by Farooq *et al.,* 2009 stated that hyperglycemia was more common in acute stroke patients[23]. In our study notable clinical findings in form of complications that worsen acute stroke were hypertension, mental and physical disabilities and swallowing difficulty.

Conclusion

- Hyperglycemia was more prominent in People with more than 60 years of age, poor economic status, married individuals in acute stroke presenting people.
- Notable clinical manifestations in stroke patients having hyperglycemia were hypertension, mental disability, physical disability and Swallowing difficulty

Recommendations

- Monitoring of hyperglycemia if suspected
- Stroke related public awareness program adaptation
- Availability of free of cost blood sugar testing and fee health care personal consultations

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