# ASSOCIATION OF HEMORRHAGIC STROKE PATIENTS WITH HYPERTENSION, DIABETES MELLITUS AND SMOKING IN NAWABSHAH, SINDH, PAKISTAN

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**Abstract:**
*Cerebrovascular disease (CVD) or stroke is defined as a quick failure of human brain tasks, leading to the focal neurological deficit secondary to interruption of blood delivery to the brain.*
*Due to lack of authentic data of stroke in Pakistan it is very difficult to estimate the valid prevalence. The descriptive case series study was conducted at Peoples University of Medical and Health Sciences Hospital, Nawabshah. The "Rao-soft" (Software) was used to calculate sample size, by using proportion at 97.5% of confidential interval and 2.5% of margin of error and it was collected by non Probability Convenience Sampling. Occurence of Intra-cerebral Hemorrhage was found 4.8%, from a total sample i.e. n=100. Out of 100 Hypertensive patients, males were 68 and females were 32 with a ratio of 2:1 approximately, with a mean age of 41 years. In conclusion, Hemorrhagic Stroke commonly found in association with Hypertension, Diabetes Mellitus and Cigarettes Smoking in this study, which might increase the mortality. The aim of this study was to evaluate the association of Hypertension, Diabetes Mellitus and Smoking in hemorrhagic stroke patients reported at PUMHSW Hospital Nawabshah.*
Keywords: *Intra-cerebral Hemorrhage, Stroke, Hypertension, Diabetes Mellitus*

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## INTRODUCTION:

Cerebrovascular disease (CVD) or stroke is defined as a quickfailure of human brain tasks, leading to the focal neurological deficit secondary tointerruption of blood delivery to the brain.[1]Since decades, strokes were categorized on clinical and medical groundsfrom past to present, asinfarctions which may be due to thrombotic or embolic phenomena orhemorrhagic strokes due to rupture of the blood vessels because of different etiologies and the medical criterion for differentiatingamong the different potentialshad been investigated. On the other hand, stroke is frequentlycomplex to establish on the basis of medicaljustification and the pathologic beginning for this life threatening situation.[2] Previously, WHO reported that stroke mortality in Asia (south) was about 5.5 millions in year 2002 and responsible for 1/5 deaths, when the data was compared with western countries, where the rate of stroke was decreasing, Pakistan and neighbor countries showed increase in stroke incidence, forecasted more in future.[3] Due to lack of authentic data of stroke in Pakistan it is very difficult to estimate the valid prevalence. As reported through past studies there is 0.025% yearly, with possible add of 0.35 million cases annually.[4]The burden of stroke is increasing, because Diabetes mellitusincreasing day by day in Pakistan. Rank wise, it is on 4th number worldwide. It was estimated htat the rise up of stroke will be more in 2020 in the fore coming years.[5]The aim of this was to evaluate the association of Hypertension, Diabetes Mellitus and Smoking in hemorrhagic stroke patients, reported at Peoples University of Medical and Health Sciences, Hospital Nawabshah.

## PATIENTS AND METHODS:

The descriptive case seriesstudy was conducted at the Department of Medicine, Peoples University of Medical and Health Sciences Hospital Nawabshah in the period of June2015 to May 2016. A total 100 patients were diagnosed with hemorrhagic stroke during the period of study. Sample was collected bynon probabilityconvenience sampling. After CT scan demonstration of intracranial hemorrhage with or without ventricular extension. All male and female subjects of known cases of Hypertensive, Diabetic and Smoker with hemorrhagic stroke were included in our study having agemore than 20 years up to 70years.Subjects having External cause such as head injury, bleed from aneurism/arterio-venous malformation or tumor were excluded from our research afterBrain MRI/MRA. A total 100 cases of hemorrhagic stroke patients admitted in different medical wards of Peoples Medical University Hospital Nawabshah, who fulfilled the inclusion criteriawere analyzed through computed Tomography Scan of brain. Written permission was taken from patient or next of kin. Patients were enrolled after taking medical history andclinical examination. All necessary investigations were sent tothe laboratory for analyses. History of risk factors like hypertension, diabetes mellitus and smoking was recorded from the patients or their health prfessional. Physical examination like blood pressure was recorded and through fundoscopy, the hypertension and diabetic retinopathy was analysed. In systemic examination, emphasis was given on nervous system. The CT scan was detailed by one radiologist. All baseline investigations were carried out, along with fasting and random blood sugar levels.

Data was analyzed with the help of SPSS version 20.0 software. Frequency and percentage was computed for qualitative variables like gender, smoking and diabetes mellitus. Mean and Standard deviation was computed for different variables like age, blood pressure, fasting and random blood sugar level.

## RESULTS:

The number of stroke patients included in our study were n=100 (100%); out of them n=68 (68%) were males, while 32 (32%) were females with the ratio of 2:1.All patients were married including widows, which were n=6 (6%). The majority of present study population belonged to rural areas n=77 (77%) and n=23 (23%) were urban residents. According tothe occupation,n=23 (23%) were farmers, n=24 (24%) laborer, n=2 (2%) drivers, n=21 (21%) house wife, n=(4) 4% government servants and n=26 (26%) had no history of current occupation. According to the socioeconomic status, n=91 (91%) belongedto lower class, n=6(6%) middle class, n=3(3%) were belonged to upper class. From the education profile, n=87 (87%) were educated, while,n=13 (13%) were uneducated. Out of these, n=58 (58%) belonged to primary level education, n=25(25%) belonged to matriculation level, n=4 (4%) were at graduate level and n=13 (13%) were uneducated. The BMI found normal in n=60(60%), however, n=37 (37%) wereover weight and 3% were obese(Figure 1).The calculated Mean age with SD was 41±7.106years,of stroke patients with hemorrhage. There was a higher ratio of male patients in comparison to female patients. The mean cholesterol level was 230.50±74.33 mg/dl (Table 1).In the laboratory analysis most of the patients n=55 (55%) had raised cholesterol levels while the remaining n=45 (45) had normal cholesterol levels. Within these 100 (100%) stroke patients, n=33 (33%) had an intracerebral hemorrhage with ventricular extension while the rest had a hemorrhage without ventricular extension n=

67 (67%). The most common clinical presentation was a focal neurological deficit/hemi paresis in n=62(62%), unconsciousness in n=17(17%), headache, vomiting, unconsciousness in n=15(15%), headache in n=6(6%). In Brain CT scans, the site of bleed was cerebral region, mostly basal ganglia n=85(85%), while the rest had the Pons and cerebellum to be involved n=15(15%). Most of the patients were non-compliant to anti-hypertensive and oral hypoglycemic or did not have diabetic diet control(Figure 2).The systolic and diastolic blood pressure was raised in all the patients, but at the time of admission only n=72 (72%) were with known case of hypertension, while the rest had a vague history. The remaining patients with no known history of

hypertension, were also checked for the signs of hypertension after Fundoscopy which showed the different stages of hypertension. In our study the males n= 44 (44%) were higher with known hypertension as compared to females n=28 (28%). Patients usually presented with stage 2 hypertension or malignant hypertension.Most of the patients had uncontrolled blood sugars both fasting and random blood sugars .The history of diabetes mellitus was present in nearly n=59 (59%) patients. In n=59 (59%), there was the co-morbidity or correlation of Diabetes Mellitus with two risk factors at statistical significant, p-value (p-0.000)). Out of the 100 (100%), there were n=36 (36%) smokers with p value-0.000.(Table 2).
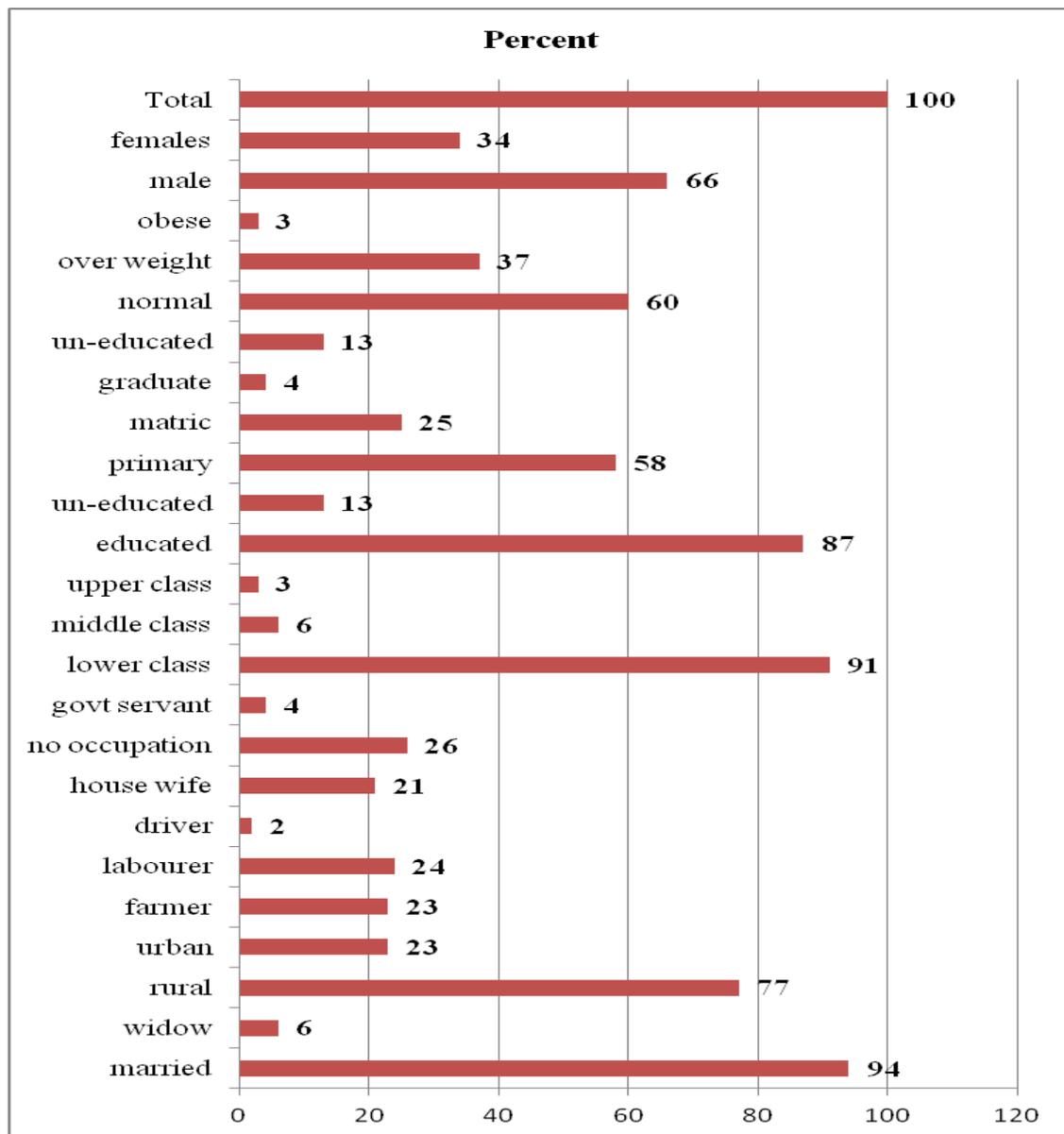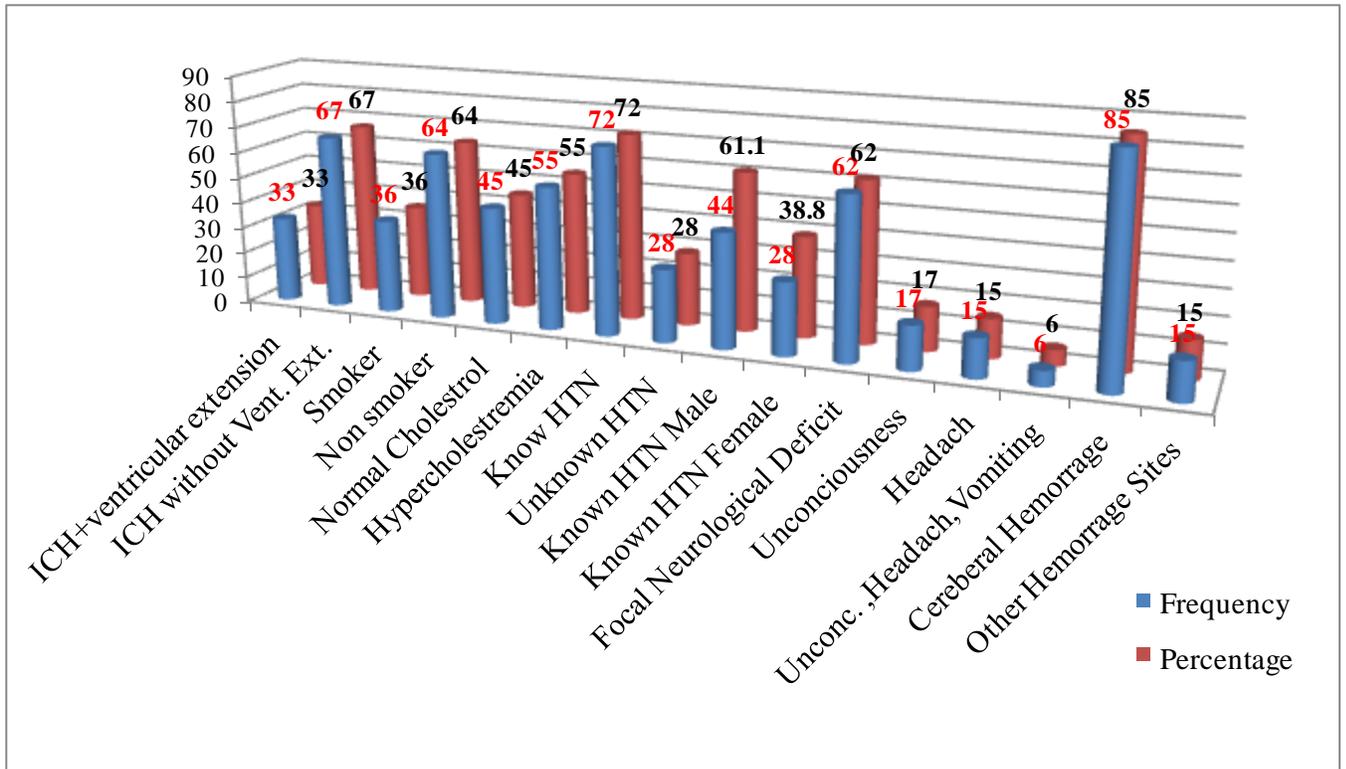


**Fig. 1:Demographic Statistics of Qualitative Variables (N=100).**

**Fig. 2: Frequency Distribution of the Complications of Stroke patients (N=100).**
ICH= Intra-cerebral hemorrhage.VENT=Ventricular. EXT=Extension. HTN=Hypertension

**Table 1:Demographic variables among patients (N=100)**

| Variables | N=100 Mean ± SD |
|---|---|
| Age in years | 41.45 ± 7.106 |
| Fasting blood sugar in mg/dl | 109.68 ± 9.416 |
| Random blood sugar in mg/dl | 215.56 ± 35.812 |
| Blood pressure systolic in mmHg | 177.2 ± 16.335 |
| Blood pressure diastolic in mmHg | 105.90 ± 12.956 |
| Serum Cholesterol in mg/dl | 230.50±74.33 |

Table 2: Age and Gender wise Distribution of Hypertension, Diabetes and Smoking (N=100).

| Hypertension | | | |
|---|---|---|---|
| Variables | Yes | No | P-Value |
| Total Volunteers | 72 | 28 | |
| Total Males (68) | 44 | 24 | 0.000 |
| Total Females (32) | 28 | 04 | |
| Age groups | Diabetes Mellitus | | |
| 20-40yrs | 24 | 15 | |
| 41-70yrs | 15 | 26 | 0.680 |
| Male | 59 | 9 | |
| Female | 0 | 32 | 0.000 |
| Age groups | Smoking | | |
| 20-40yrs | 14 | 25 | |
| 41-70yrs | 22 | 39 | 0.986 |
| Male | 36 | 32 | |
| Female | 0 | 32 | 0.000 |

## DISCUSSION:

This present study was done in the Medicine Department; PIMHSW HospitalNawabshah, a tertiary care hospital located in Sindh Pakistan, where still education profileof population related to health is very poor. A relative risk of 1.6 stroke due to intracranial hemorrhage, observed in patients suffering from diabetes mellitus that was concluded from multiple prospective studies through Meta-analysis.[6]Pakistan is under development country, majority of population belonged to poor socioeconomic status, prevalence of smoking and stroke was different in age, sex and racial groups; it was different in males and females (17.3-25.3% versus 9.9-41.4%).[7] In present study there was a higher ratio of male patients in comparison to female patients of stroke. The majority of the present study population were married and belongs to lower socioeconomic class, out of them 91% belonged to rural set up, 77% had low education profile, 13% found uneducated and 58% were on primary level education, majority were from lower economic class group farmers 23% and labors 24% as shown in (Figure 1).Hemorrhagic Stroke most commonly occurs in association with hypertension. Each increase of 10 and 20 mmHg in systolic and diastolic hypertension doubles the mortality rate. There is five times more raised hazard of stroke due to Hyperhomocysteinaemia, atrial fibrillation. Cardiac ischemia, OCP (Oral contraception pills) and HRT (Hormone replacement therapy)and infectious diseases.[8]In the present study,lower class population was identified as higher risky population for the development of stroke as already reported by MantJ. et al. As the hypertension was a main risk factor of this study, as previously reported that hypertension twice increases mortality risk due to stroke.Diabetes was commonly seen in the present study which is doubling the risk of developing stroke. Most of the patients had uncontrolled blood sugars both fasting and random blood sugars. The history of diabetes mellitus was present in nearly 59% (n=59) of the patients. The mean cholesterol level was 230.50±74.33mg/dl (Table1). Smoking was also identified as common risk factor in our study because there is 50% increased risk of developing stroke in smokers. In our study, males n=44 (44%) were higher with known hypertension as compared to females n=28 (28%). Patients usually presented with stage 2 hypertension or malignant hypertension(Table 2).The systolic and diastolic blood pressure was raised in all the patients, but at the time of admission only n=72 (72%) were with known case of hypertension, while the rest gave a vague history (Figure 2). In newly performed researches, various factors like hypertension, dyslipidemias, vascular abnormalities, coagulopathies, vasculopathies, microbial diseases and cigarette smoking identified as causative risks for hemorrhagic stroke (non-traumatic).[9]High blood pressure was a risk factor for cerebral hemorrhage in our study, and stroke was related to duration of hypertension. 150 million peoples were suffering from diabetes mellitus globally and this will increase >300million by the year 2025.Diabetes mellitus and smoking had been identified as important modifiable hazard for hemorrhagic stroke.[10]In Pakistan, there is a high percentage of the prevalence of smoking in population.In the laboratory analysis most of the patients n=55 had raised cholesterol levels while the remaining n=45 had normal cholesterol levels due to smoking as well(Figure 2).In our study, high blood pressure, Diabetes and smoking were observed

dominant in male subjects.The smokers in this study were 36 male (p value- 0.000) and it had statistically strong relationship to hemorrhagic stroke. Diabetes mellitus was also identified as a major risk element in 59 subjects (Table 2).On the basis of  availability and observed data our study finding were reliable with the other studies, by focusing on smoking, diabetes mellitus and hypertension in parallel to other modifiable risk factors the morbidity as well as mortality might be effectively improved.

## CONCLUSION:

Hemorrhagic Stroke commonly found in association with Hypertension, Diabetes Mellitus and Cigarettes Smoking and other common risk factors also identified e.gHypercholesterolemia which can increase the mortality. Patients were not aware of hypertension, so one may worse the other condition as diabetes may affect hypertension, smoking may affect hypertension and vice versa. Improper diagnosis and inadequate management found also as the important contributions to risk factors for stroke. Thus an early identification and proper rational management by specialists along with awareness of both patients and specialists would be an important step in control of risk factors for the reduction of complications and mortality of Hemorrhagic stroke.

**Conflicts of Interest:** There are no potential conflicts of interest.

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**DISCLAIMER:** NONE

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