DOI: https://doi.org/10.53350/pjmhs22169826

ORIGINAL ARTICLE

Prevalence of Newly Diagnosed Hypertension in Stroke Patients Presented to Tertiary Care Hospitals in Rawalpindi

NAJMA FATIMA[1], MUHAMMAD SALMAN[2], HUSNAIN HASHIM[3], ASMA AMBREEN[4], TAHIR MUKHTAR SAYED[5], SHAHID WAHEED[6]
[1]*Woman Medical Officer, BHU Pothi Makwalan AJK*
[2]*Medical Specialist, Internal Medicine, PIMS Islamabad*
[3]*Consultant Neurologist and Stroke Specialist, Head of Neurology department Fauji Foundation Hospital, Rawalpindi*
[4]*Assistant Professor, Department of Family Medicine, University of Lahore*
[5]*Associate Professor of Medicine, Foundation University Medical College, Rawalpindi*
[6]*Professor, Department of Medicine, Fauji Foundation Medical College, Rawalpindi*
Corresponding author: Tahir Mukhtar Sayed, Email: drtahirmukhtarsayed@gmail.com

ABSTRACT

Background and Aim: Stroke is defined as the sudden onset of neurological deficits caused by vascular supply disruption to brain-specific region, contributing as a major factor for mortality and morbidity worldwide. Globally, approximately two-thirds cases of stroke are caused by hypertension as a major risk factor. The purpose of the current study was to determine the prevalence of stroke patients with newly diagnosed hypertension admitted to tertiary care hospital.

Materials and Methods: This cross-sectional study was carried out on 205 stroke patients admitted to the Department of General Medicine, Benazir Bhutto Hospital and Holy Family Hospital, Rawalpindi from April 2021 to March 2022. Prior to study conduction, ethical approval was taken from the institute research and ethical committee. Written informed consent was obtained from each individual. All the participants underwent physical examination after using antihypertensive medication besides detailed history. Blood pressure was measured using standard mercury Sphygmomanometer. Patient having blood pressure ≥ 140/90 mm Hg was considered as hypertensive after measurement with difference of 10 minutes time span. SPSS version 25 was used for data analysis.

Results: The overall mean age was 59.6 ± 8.5 years. Of the total 205 stroke patients, there were 140 (68.3%) males and 65 (31.7%) females. Out of 205 patients, 60.5% were rural and 39.5% were urban. The literacy rate was 63.9%. Family history of smoking, diabetes mellitus (DM), and hypertension (HTN) among study population were found in 83 (40.5%), 76 (37.1%), and 71 (34.4%) respectively. Based on computed tomography presentations, the prevalence of newly diagnosed hypertension (HTN) was 122 (59.5%). Out of 122 newly diagnosed hypertensive stroke patients, the incidence of ischemic stroke and hemorrhagic was 67 (54.9%) and 55 (45.1%) respectively. The mean value of diastolic and systolic blood pressure was 86.32 ± 12.62 and 125.59 ± 19.97 mm of Hg respectively.

Conclusion: The present study concluded that the prevalence of newly diagnosed hypertension was found higher among stroke cases. Early diagnosis of hypertension by proper screening and effective treatment can reduce the mortality and morbidity caused by stroke and hypertension.

Keywords: Hemorrhage, HTN, Ischemia, Stroke.

INTRODUCTION

Stroke is a neurological deficits due to disruption of vascular supply to the brain-specific regions. Globally, the increasing rate of morbidity and mortality are due to the stroke as a major risk factor. Hypertension is a major risk factor for stroke and the number of stroke events is directly related to the severity of hypertension [1-3]. Currently, approximately 54.5% of strokes are due to hypertension [4]. Mortality due to stroke increases proportionally with an increasing blood pressure [5]. Hypertension doubles the risk of both ischemic and hemorrhagic stroke [6]. Cerebrovascular complications of hypertension are more closely correlated with systolic than diastolic blood pressure [7]. Stroke contributes as second most prevalent factor accounted for 11.8% death cases worldwide followed by heart disease and about five million people die especially in developed countries each year due to stroke [8]. Significant increases were observed in the incidence, morbidity, and mortality of stroke in recent few decades [9].

Hypertensive patients had poor blood pressure control despite the antihypertensive agent's availability [10]. Hypertension may not be diagnosed at an early stage and remain for prolong periods and becomes obvious as serious complications appears [11]. Identification of high risk to the estimated population of stroke is helpful for screening and prevention of healthcare. In developing countries, the prevalence of hypertension is 20% while undiagnosed hypertension was 14.4% [12, 13]. Stroke risk can be controlled up to 38% by adequate prevention of hypertension [14]. Hypertension screening programs and awareness improvement on the national level should focus on early detection and prevention of hypertension due to blood pressure complications. Although numerous studies investigated the frequency of already diagnosed hypertension in stroke patients. But there is scarcity of data regarding the newly diagnosed hypertension among stroke cases. Therefore, the present study aimed to determine the prevalence of newly diagnosed hypertension in stroke patients.

MATERIALS AND METHODS

This cross-sectional study was carried out on 205 stroke patients admitted to the Department of General Medicine, Benazir Bhutto Hospital and Holy Family hospital, Rawalpindi from April 2021 to March 2022. Prior to study conduction, ethical approval was taken from the institute research and ethical committee. Written informed consent was obtained from each individual. All the participants underwent physical examination after using antihypertensive medication besides detailed history. Patient having blood pressure ≥ 140/90 mm Hg was considered as hypertensive after measurement with difference of 10 minutes time span. Detailed history included age, newly diagnosed hypertension, diabetes and smoking history, and presence of hypertension were recorded. Blood pressure was taken as an average of 2 measurements taken after the participants in the supine position in bed without crossing their legs with arms supported at heart level. Blood pressure was measured using a standard and regularly tested aneroid sphygmomanometer. The researcher recorded all the data into the pro-forma. SPSS version 20 was used for data analysis. Categorical variables such as gender, family history of HTN, history of diabetes, smoking, and newly diagnosed hypertension calculated and expressed in terms of frequency and percentage. Numerical variables such as age (years) and blood pressure (mm of Hg) were described as mean and standard deviation. Diabetes and smoking effect was stratified to see the variables effect on newly diagnosed HTN in stroke patients. The post-stratification test was applied using the chi-square test. P-Value ≤ 0.05 was taken as statistically significant.

RESULTS

The overall mean age was 59.6 ± 8.5 years. Of the total 205 stroke patients, there were 140 (68.3%) males and 65 (31.7%) females. Out of 205 patients, 60.5% were rural and 39.5% were urban. The literacy rate was 63.9%. Family history of smoking, diabetes mellitus (DM), and hypertension (HTN) among study population were found in 83 (40.5%), 76 (37.1%), and 71 (34.4%) respectively. Based on computed tomography presentations, the prevalence of newly diagnosed hypertension (HTN) was 122 (59.5%). Out of 122 newly diagnosed hypertensive stroke patients, the incidence of ischemic stroke and hemorrhagic was 67 (54.9%) and 55 (45.1%) respectively. The mean value of diastolic and systolic blood pressure was 86.32 ± 12.62 and 125.59 ± 19.97 mm of Hg respectively. Table-I represent the baseline characteristics of all the participants. Gender's distribution of all the participants are illustrated in Figure-1. Table-II shows the age-wise distribution of all the stroke patients. The prevalence of family history of smoking, DM, and HTN is illustrated in Figure-2. Based on CT findings, different stroke types are depicted in Figure-3. Table-III shows the frequency of newly diagnosed hypertension.

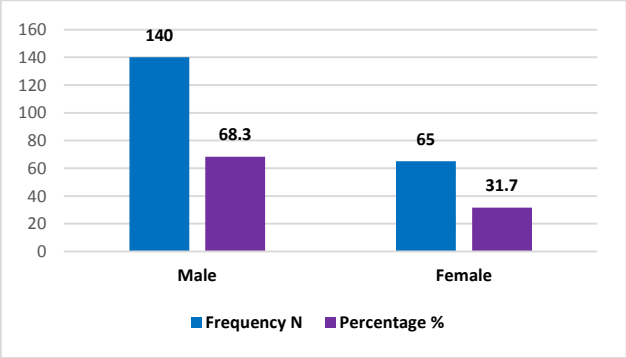

Figure-1: Gender's distribution (n=205)

Table-1: Baseline characteristics of stroke patients (n=205)

Parameters	Value or Frequency N (%)
Age (years) mean ± SD	59.6 ± 8.5
Gender Male Female	 140 (68.3) 65 (31.7)
Urban Rural	81 (39.5) 124 (60.5)
Education Status Illiterate Literate	 131 (63.9) 74 (36.1)
Blood Pressure (mm Hg) mean Diastolic blood pressure Systolic blood pressure	 86.32 ± 12.62 125.59 ± 19.97

Table-2: Age-wise distribution (n=205)

Age Group (Years)	Frequency (N)	Percentage (%)
45 to 55	81	39.5
55 to 65	76	37.1
>65	48	23.4
Total	205	100

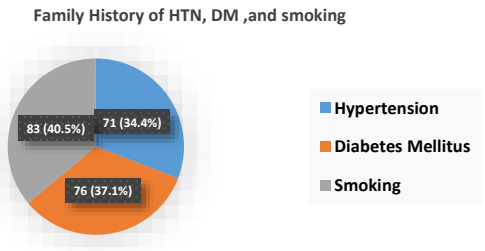

Figure-2: Prevalence of HTN, Smoking and Diabetes based on family history (n=205)

Table-3: frequency of newly diagnosed hypertension

Family History	HTN (n, %)	Smoking n (%)	Diabetes n (%)	P-value
Yes	71 (34.6)	87 (42.4)	71 (34.6)	<0.001
No	134 (65.4)	118 (57.6)	134 (65.4)	<0.001
Total	205 (100)	205 (100)	205 (100)	

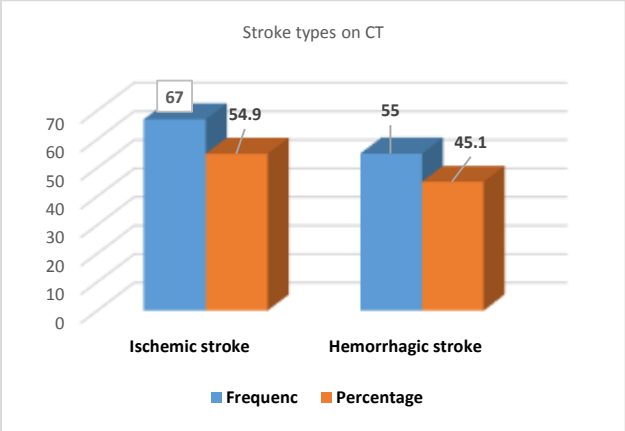

Figure 2: Types of stroke based on CT findings (n=122)

DISCUSSION

The present study focused on prevalence of newly diagnosed hypertension in stroke patients presented to the tertiary care hospital. It has been reported that male population are more susceptible to the newly diagnosed hypertension in stroke patients. The prevalence of hypertension in our study was 59.5% in stroke patients. All the newly diagnosed hypertension patients were ischemic and hemorrhagic stroke patients. Approximately one-third of the study group had family history of hypertension, diabetes mellitus, and smoking. Rapid onset of neurological deficit to the cerebral arterial system rupture with the inclusion of localized findings verified by Computed tomography and neurological examination for 24 hours is defined as stroke by the world health organization [15]. Complete recovery within 24 hours is a symptom of transient stroke. A neurological deficit may complete or worsen after 6 hours by establishing deficits. Out of all the stroke cases, two-thirds of cases account for ischemic stroke. Ischemic stroke can be either embolic or thrombotic [16]. In Pakistan, and ischemic and hemorrhagic type proportions are 70.1% and 29.9% [17, 18].

A previous study reported that ischemic stroke can be caused by several fixed and modified risk factor. Fixed risk factors are age, race and gender while diabetes (36.3%), hypertension (65%). Obesity (18%), dyslipidemia (32.7%) and smoking (32%) are the important modified parameters [19]. Ischemic stroke can be prevented by controlling blood pressure and sugar, lowering antiplatelet and lipid and changes in life style [20]. Incidence of stroke can be reduced by modifiable parameters as fixed risk factors cannot be altered [21]. In USA, stroke is the third leading cause of death per annum. Stroke cause major morbidity proportion, productive life lost in young generations [22].

Hypertension is an important modifiable risk factor causing hemorrhagic and ischemic stroke with approximate 35% attributable risk [23]. SA study found an increase in blood pressure of about 20 mm Hg per death by stroke in middle-aged people. Patient's having a blood pressure higher than 150/190mm, Hg needs to be treated and prevented with proper guidelines, the incidence of stroke increases due to hypertension. Stroke risk can increase by blood pressure variability which may not record all the information. Clinical trials detected the importance of hypertension as a stroke risk factor by effective treatment. Stroke risk decreases 41% by systolic blood pressure reduction with 10 mm Hg [24, 25].

Important modifiable risk parameters such as Hypertension and high blood pressure attributed to a 50% risk of stroke. Stroke risk has a direct proportion to both diastolic and systolic blood

pressure in both gender irrespective of their ages; systolic blood pressure contributed the most. An increase in systolic blood pressure of 10 mmHg and diastolic blood pressure of more than 110 mm Hg increase the risk of stroke by 25%. Stroke risk is 15% more prevalent in individuals having more than 80 mmHg blood pressure. Higher blood pressure caused by drug therapy, high blood pressure resistible treatment, sub-optimal care, and non – compliance of patients [26, 27]. Among the adult population in Pakistan prevalence of 17.9% is caused by hypertension. The estimated number of cases of hypertension in Pakistan is about 10 million [28]. Stroke is diagnosed by neuro-imagining and clinically but Magnetic resonance imaging and computed tomography can characterize subtype stroke. Epidemiological studies observed and concluded the undiagnosed hypertension prevalence ranges from 4.8% to 8% among healthy individual [29, 30].

The current study investigated 205 cases of the stroke to find the frequency of newly diagnosed hypertension. The mean age of 205 stroke patients was 59.6 ± 8.5 years. The minimum and maximum age of individual patients was 45 and 75 years respectively. The exponential increase in stroke patients above 40 years of age was reported in various studies.

Age plays a key role in the risk of stroke. People with age above 45 years had 95% chances of stroke compared to the two-third of cases after 65 years of age. Incidence of stroke is more dominant in men as compared to the females as shown in our study with a male-to-female ratio of 2.5:1. Another study reported a 1.7:1 ratio of male and female giving double cases in male [31]. Older age and smoking are the causes of stroke dominancy in males. Undiagnosed hypertension with 58% prevalence before stroke was diagnosed after stroke. Our findings almost matched the other researcher studies who reported 49% to 58% compared to our findings of 59.5% hypertension [32].

CONCLUSION

The present study concluded that the prevalence of newly diagnosed hypertension was found higher among stroke cases. Early diagnosis of hypertension by proper screening and effective treatment can reduce the mortality and morbidity caused by stroke and hypertension.

REFERENCES

1. Wang W, Jiang B, Sun H, Ru X, Sun D, Wang L, Wang L, Jiang Y, Li Y, Wang Yet al.; NESS-China Investigators. Prevalence, incidence, and mortality of stroke in China: results from a nationwide population-based survey of 480 687 adults.Circulation. 2017; 135:759–771.
2. Dávalos A, Ricart W, Gonzalez-Huix F, Soler S, Marrugat J, Molins A, Suñer R, Genís D. Effect of malnutrition after acute stroke on clinical outcome.Stroke. 1996; 27:1028–1032.
3. Gomes F, Emery PW, Weekes CE. Risk of malnutrition is an independent predictor of mortality, length of hospital stay, and hospitalization costs in stroke patients.J Stroke Cerebrovasc Dis. 2016; 25:799–806.
4. Uday S Bande and Prasanth Huballi Study of Serum Calcium In Essential Hypertension;European Journal of Pharmaceutical And Medical Research 2016,3(6),516-525.
5. Devendra P Singh Rajput and Priti Singh et al.A Study of Serum Calcium And Magnesium Levels In essential hypertension; Innovative Journal of Medical And Health Science 3:3 May-June2013 76-82.
6. Kang MK, Kim TJ, Kim Y, Nam KW, Jeong HY, Kim SK, Lee JS, Ko SB, Yoon BW. Geriatric nutritional risk index predicts poor outcomes in patients with acute ischemic stroke - automated undernutrition screen tool.PLoS One. 2020; 15:e0228738.
7. WHO. Stroke: a global response is needed [Internet]. WHO. [cited 2020 Apr 12]. http://www.who.int/bulletin/volumes/94/9/16-181636/en/.
8. Wang W, Jiang B, Sun H, et al. Prevalence, incidence, and mortality of stroke in China: results from a nationwide population-based survey of 480 687 adults. Circulation. 2017; 135(8): 759- 771.
9. Kamalakannan S, Gudlavalleti ASV, Gudlavalleti VSM, Goenka S, Kuper H. Incidence & prevalence of stroke in India: a systematic review. Indian J Med Res. 2017; 146(2): 175- 185.
10. Takashima N, Arima H, Kita Y, et al. Incidence, management and short-term outcome of stroke in a general population of 1.4 million Japanese - Shiga stroke registry. Circ J. 2017; 81(11): 1636- 1646.
11. Hong K-S, Bang OY, Kang D-W, et al. Stroke statistics in Korea: part i. epidemiology and risk factors: a report from the Korean stroke society and clinical research center for stroke. J Stroke. 2013; 15(1): 2- 20.
12. Chuang S-Y, Cheng H-M, Bai C-H, Yeh W-T, Chen J-R, Pan W-H. Blood pressure, carotid flow pulsatility, and the risk of stroke: a community-based study. Stroke. 2016; 47(9): 2262- 2268
13. Setyopranoto I, Bayuangga HF, Panggabean AS, et al. Prevalence of stroke and associated risk factors in Sleman District of Yogyakarta Special Region, Indonesia [Internet]. Stroke Res Treat. 2019; 2019: 1- 8.
14. Chen N, Li Y, Fang J, Lu Q, He L. Risk factors for malnutrition in stroke patients: a meta-analysis.Clin Nutr. 2019; 38:127–135.
15. Powers WJ, Rabinstein AA, Ackerson T, Adeoye OM, Bambakidis NC, Becker K, Biller J, Brown M, Demaerschalk BM, Hoh Bet al.. Guidelines for the early management of patients with acute ischemic stroke: 2019 update to the 2018 guidelines for the early management of acute ischemic stroke: a guideline for healthcare professionals from the American Heart Association/American Stroke Association.Stroke. 2019; 50:e344–e418.
16. Teh WL, Abdin E, Vaingankar JA, et al. Prevalence of stroke, risk factors, disability and care needs in older adults in Singapore: results from the WiSE study. BMJ Open. 2018; 8(3):e020285.
17. Khatib R, Arevalo YA, Berendsen MA et al. Presentation, evaluation, management, and outcomes of acute stroke in low- and middle-income countries: a systematic review and meta-analysis. Neuroepidemiology. 2018;51:104–12. doi: 10.1159/000491442
18. Rupasinghe CD, Ammar Bokhari S, Lutfi I, Noureen M, Islam F, Khan M, Amin F, Muthanna FMS. Frequency of Stroke and Factors Associated With It Among Old Age Hypertensive Patients in Karachi, Pakistan: A Cross-Sectional Study. Cureus. 2022 Mar 13;14(3):e23123.
19. Bejot Y, Bailly H, Durier J, Giroud M. Epidemiology of stroke in Europe and trends for the 21st century. Presse Med. 2016;45:e391–8. doi: 10.1016/j.lpm.2016.10.003.
20. Benjamin EJ, Virani SS, Callaway CW et al. Heart disease and stroke statistics – 2018 update: a report From the American Heart Association. Circulation. 2018;137:e67–492.
21. Howard VJ, Madsen TE, Kleindorfer DO et al. Sex and race differences in the association of incident ischemic stroke with risk factors. JAMA Neurol. 2019;76:179–86. doi: 10.1001/jamaneurol.2018.3862.
22. Kernan WN, Ovbiagele B, Black HR, et al. Guidelines for the prevention of stroke in patients with stroke and transient ischemic attack: a guideline for healthcare professionals from the American heart association/American stroke association. Stroke. 2014;45:2160–2236.
23. Callaly E, Ni Chroinin D, Hannon N et al. Rates, predictors, and outcomes of early and late recurrence after stroke: the north Dublin population stroke study. Stroke. 2016;47:244–6. doi: 10.1161/STROKEAHA.115.011248.
24. Waje-Andreassen U, Thomassen L, Jusufovic M, et al. Ischaemic stroke at a young age is a serious event–final results of a population-based long-term follow-up in Western Norway. Eur J Neurol. 2013;20:818–823.
25. Cifkova R, Wohlfahrt P, Krajcoviechova A, et al. Blood pressure control and risk profile in poststroke survivors: a comparison with the general population. J Hypertens. 2015;33:2107–2114.
26. Aigner A, Grittner U, Rolfs A, et al. Contribution of established stroke risk factors to the burden of stroke in young adults. Stroke. 2017;48:1744–1751.
27. Mancusi C, Gerdts E, Losi MA, et al. Differential effect of obesity on prevalence of cardiac and carotid target organ damage in hypertension (the Campania Salute Network). Int J Cardiol. 2017; 244:260–264.
28. Saeed S, Waje-Andreassen U, Lonnebakken MT, et al. Covariates of non-dipping and elevated nighttime blood pressure in ischemic stroke patients: the Norwegian Stroke in the Young Study. Blood Press. 2016;25:212–218
29. Lonnebakken MT, Izzo R, Mancusi C, et al. Left ventricular hypertrophy regression during antihypertensive treatment in an outpatient clinic (the Campania Salute Network). J Am Heart Assoc. 2017;6:e004152.
30. Åshild Oftedal, Eva Gerdts, Ulrike Waje-Andreassen, Annette Fromm, Halvor Naess, Anja Linde & Sahrai Saeed (2018) Prevalence and covariates of uncontrolled hypertension in ischemic stroke survivors: the Norwegian stroke in the young study, Blood Pressure, 27:3, 173-180
31. Amarenco P, Lavallee PC, Monteiro Tavares L et al. Five-year risk of stroke after TIA or minor ischemic stroke. N Engl J Med. 2018;378:2182–90. doi: 10.1056/NEJMoa1802712.
32. Pandian JD, Gall SL, Kate MP et al. Prevention of stroke: a global perspective. Lancet. 2018;392:1269–78. doi: 10.1016/S0140-6736(18)31269-8.