

Original Research Article

Relationship between stroke and compliance of antihypertensive medication

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ABSTRACT

Background: Stroke is a leading cause of death and long-term disability globally, with hypertension being a key modifiable risk factor. Effective management of hypertension through medication compliance is crucial for reducing the risk of both initial and recurrent strokes. However, non-compliance with antihypertensive medication is a common challenge, particularly in resource-constrained countries like Bangladesh, where awareness and access to healthcare can be limited. This study aimed to investigate the relationship between antihypertensive medication compliance and the incidence of stroke, as well as the risk of stroke recurrence, in hypertensive patients admitted to Dhaka Medical College Hospital.

Methods: A descriptive cross-sectional study was conducted between March and August 2010, involving 100 stroke patients diagnosed clinically and confirmed by CT scan. Data on patients' hypertension status, medication adherence, and stroke history were collected through interviews and medical record reviews. Statistical analysis was conducted using SPSS software (Version 12) to explore the relationship between compliance and stroke occurrence.

Results: From 100 stroke patients, 65% were previously diagnosed with hypertension. Among these patients, 18 (27.7%) were compliant and 47 (72.3%) were non-compliant with their prescribed antihypertensive medication. The recurrence of stroke was significantly higher in non-compliant patients, with 66.67% experiencing a second stroke, compared to 33.33% among compliant patients.

Conclusion: There is a significant association between non-compliance with antihypertensive medication and both the onset and recurrence of stroke. Enhancing patient adherence to antihypertensive therapy through education and healthcare interventions is vital to reducing stroke-related morbidity and mortality.

Keywords: Stroke, Hypertension, Antihypertensive compliance, Medication adherence, Stroke recurrence

INTRODUCTION

Stroke is the second largest cause of death globally and the main cause of long-term disability.¹ As a result, it is a growing public health concern that contributes

significantly to adult morbidity and death, posing a general medical, economical, and rehabilitation issue. The burden of stroke is expected to rise significantly in the future because to aging pollution.² According to the World Health Organization (WHO), 15 million people experience a stroke each year. Of these, 5 million die and another 5

million become permanently disabled.³ Stroke has a particularly strong impact on Asia, not only because more than half of the world's population resides there, but also because stroke is the most common vascular illness in many parts of Asia.⁴ Therefore, the global burden of stroke must be defined for both developed and developing nations. In 1990, the global burden of disease (GBD) study recorded 9.4 million fatalities in India, of which 61,900 were from "Stroke," and the disability adjusted life years (DALYs) lost amounted to roughly 28.5 million over six times that of malaria.⁵

According to WHO, by 2030, 80% of strokes will occur in low- and middle-income countries, and stroke will account for 7.9% of all death in low-income countries, trailing only ischemic heart disease and HIV/AIDS.⁵ The global incidence of stroke has been estimated to be 2/1000 population each year, with approximately 4/1000 among adults aged 45 to 84 years. At least 50% of neurological disorder in a general hospital is of this type and causes 10% of deaths worldwide.⁶

Stroke is a clinical diagnosis. It is defined clinically "A neurological deficit of sudden onset, with focal rather than global neurological dysfunction, with symptoms lasting for more than 24 hours or resulting in death before 24 hours and in which after adequate investigation symptoms are presumed to be non-traumatic origin.⁶ There are two main types of stroke-ischemic and haemorrhagic. Cerebral infarction accounts for the vast majority of strokes.⁷ Community-based incidence studies, such as the Oxford shire community stroke project (OCSP), have found that about 80% of first ever strokes were due to cerebral infarction, 10% to primary intracerebral haemorrhage (PICH), 5% to subarachnoid haemorrhage (SAH), and 5% of uncertain type.⁸

Understanding of its epidemiology is essential in order to find new interventions; plan health care policies, and set national targets. Epidemiological and statistical studies have identified a number of factors that increase the risk of heart disease and stroke. In addition, clinical trials and prevention research studies have demonstrated effective strategies to prevent and control these risk factors and thereby reduce illnesses, disabilities, and deaths caused by heart disease and stroke.⁹ In Bangladesh, adequate data is lacking of the incidence and mortality from stroke. Nevertheless, the gravity of the situation can easily be assessed by the high incidence of hospitalization admission for similar illness.

The prevention and control of cardiovascular disease especially ischaemic heart disease and stroke are an important health care issue particularly in developing countries like ours. But these diseases are low in the list of priorities in these countries where reproductive and communicable disease dominates the health care. The economic impact due to cardiovascular diseases and stroke still remains largely unrecognized.⁷ Unawareness of the problem at all levels and consequent lack of will to address

the issue may likely put serious implication on the disease burden in near future. We cannot claim cure of the disease but we can prevent to some extent by early detection and treatment of the risk factors.¹⁰ In the context of limited facilities in our country, attempt for prevention of stroke is very much essential.

This study was aims to assess the relationship between compliance with antihypertensive medication and the occurrence and recurrence of stroke among hypertensive patients.

METHODS

Study place

This Descriptive cross-sectional study was done at Department of Medicine and Neurology Dhaka Medical College Hospital, Dhaka.

Study duration

The study period was from March 2010 to August 2010.

Sample size

Total 100 patients admitted into Medicine and Neurology department of, Dhaka Medical College Hospital, over the study period diagnosed as stroke were selected for the study. Diagnoses were established by clinical features and subsequently by CT scan of the brain.

Inclusion criteria

It includes patients of any age and sex who will fulfill the definition of stroke. CT scan features confirming the presence of lesion.

Exclusion criteria

Patients unwilling to take part in the study. Severely debilitated patients. If CT scan of brain could not be done were excluded from the study.

Data collection

All data was collected in individual case record form. This was done by detailed history from patient or his/ her relatives; including any risk factors both modifiable and non-modifiable, detailed drug history, complete physical examination & necessary investigations.

Ethical approval

This research is approved by the Institutional Ethics committee. The aims and objective of the study along with its procedure, risk and benefits will be explained to the patients in easily understandable local language and then informed consent will be taken from each patient. It will

be assured that all records would be kept confidential and the procedure will be helpful for both the physician and patients in making rational approach regarding management of the case.

Statistical analysis

After collection of data, it was coded & checked manually & then entered into computer. Data analysis was done according to the aims & objectives of the study by using SPSS (statistical Program for Social Science) software program Version 12.

RESULTS

The maximum number of patients (38%) in this study was in between 51-60 years followed by 29% between the age of 61-70 years. There was a significant fall in the incidence of stroke in the 7th decade in comparison to that of 6th decade and continue to fall above the age of 70 years. Young stroke (21-40 years) comprises 9 % of total stroke patients. In this series, the incidence of stroke shows male preponderance with 58% was male and 42% was female (Table 1).

Figure 1: Age and sex distribution.

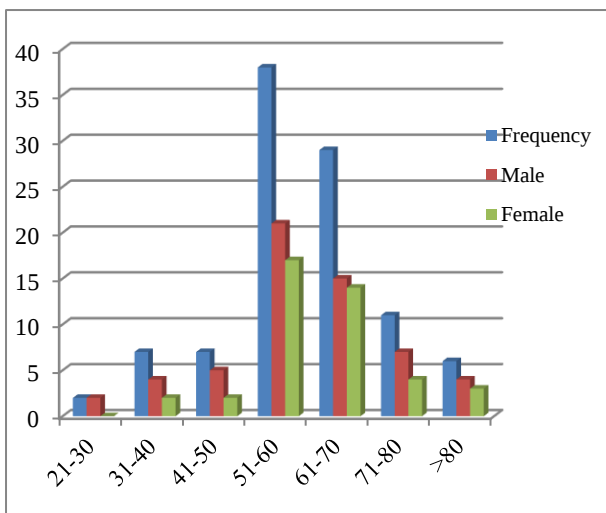


Figure 1 shows the sex distribution in each age group. The highest patient in the age group 51-60 and the lowest patients in age group 21-30. Male patients slightly larger than female patients in all age group.

A large percentage (65%) of selected stroke patients was previously diagnosed as hypertensive and prescribed for antihypertensive medication. 12% patients were unaware about their hypertensive status and were diagnosed as hypertensive after admission. Remaining patients (23%) remained normotensive as before (Table 2).

Table 3 shows that, out of 100 selected stroke patients, 65 patients were previously diagnosed as hypertensive and prescribed to antihypertensive drugs, majority (72.3%) of

them were non-compliant to antihypertensive medication, where only 27.7% of them were taking their antihypertensive regularly.

Table 1: Patients demographic characteristics (n=100).

Characteristics	Distribution	Frequency	%
Age (in year)	21-30	2	2.0
	31-40	7	7.0
	41-50	7	7.0
	51-60	38	38.0
	61-70	29	29.0
	71-80	11	11.0
	>80	6	6.0
Sex	Male	58	58.0
	Female	42	42.0

Table 2: Association of stroke patients with hypertension (n=100).

Hypertension	Frequency	%	P value
Known hypertensive	65	65.0	<0.001
Newly diagnosed hypertensive	12	12.0	
Normotensive	23	23.0	

Table 3: Compliance among previously known hypertensive stroke patients (n=65).

Group	Frequency	%	P value
Compliant	18	27.7	<0.001
Non-compliant	47	72.3	

Table 4: Association of recurrent stroke with antihypertensive compliance (n=65).

Recurrent stroke	Frequency	Compliant frequency with %	Non-compliant frequency with %
Present	12	4 (33.33)	8 (66.67)
Absent	53	14 (26.42)	39 (73.58)

Out of 65 known hypertensive patients, 12 had a history of stroke previously. 8 (66.67%) of them were antihypertensive non-compliant. 53 patients experienced first attack of stroke, of them, 39 (73.58%) were non-compliant (Table 4).

DISCUSSION

This descriptive cross-sectional study conducted in Dhaka Medical College Hospital to see the relationship between stroke and compliance of antihypertensive medication. This study was done to obtain reliable and valid data to provide the actual picture of a small proportion of our society about the primary prevention of one of the most

important modifiable risk factors of stroke, hypertension. Stroke frequency rises exponentially with increasing age.¹¹ In this study (Table 1), majority of the study subject (91%) were above the age of 40 years and the peak incidence was between 51 to 70 years (67%). Bell et al, studied 50 patients with CVD.¹² Most of the incidence of stroke was between the ages of 50 to 69 years. Similar studies in our country by Chowdhury et al and Arif et al, also found the same age incidence between 5th to 7th decades in our country.^{11,14} It also coincides with some previous studies done by Kannel et al, Chapman et al, Dalal et al.¹⁵⁻¹⁷

This study also shows significant fall in the incidence of stroke in the 7th decade in comparison to that of 6th decade and continue to fall in percentage above the age of 70 years. This strongly contradicts the study conducted by WHO task force in 1989 and a study by Aho et al, where the peak incidence of stroke was at or above the age of 85 years.¹⁸ In industrialized countries about a quarter of stroke happen below the age of 65 years, a further quarter between the age of 65-75 years and the rest above 75 years.¹¹ This discrepancy with the present study may be due to that, at present time a small portion of the population of our country survives up to that age.

Men suffer more than women from stroke and it affects male 1.7 times more than female.¹⁹ In this study, 58% were male and 42% were female i.e., male incidence were 16% higher than female. And ratio is 1.38:1. The present study also defers with a previous study of Mannan and Alamgir et al, which showed male: female ratio 4:1 with higher male preponderance.²⁰ The present ratio might reflect the positive attitude of the society towards women. Gender variation was not very much significant with slight male predominance and consistent with other studies.

In this study (Table 2), a large percentage (65%) of selected stroke patients was previously diagnosed as hypertensive and prescribed for antihypertensive medication. Hayee et al has found, among his studied patient 52.11% were hypertensive.²¹ Manann and Alamgir et al also found in their study that 58% of the stroke patients were hypertensive.²⁰ Study among the NIDDM with stroke in BIRDEM by Latif et al, found 50.3% of the patients were hypertensive.²² Arbox et al, found in their study, among the 1473 ischaemic stroke patient, 52% patients were hypertensive.²³

Similar studies in some Asian countries also correlate with the present other studies.²⁴ Wong et al, studied 3670 hospital admitted stroke patients in several South East Asian countries and found 2332 (64%) of them hypertensive.²⁵ In a prospective study in Shenghai, China by Ross et al, hypertension was the most important risk factor for stroke.²⁶ In WHO collaborated study in a Japanese center on control of stroke in the community, association of hypertension with stroke was 75%.¹⁸ So, all the above studies agree, that hypertension is the most important risk factor for stroke. The study also showed that (Table 2), 12% patients were unaware about their

hypertensive status and were diagnosed as hypertensive after admission. Remaining patients (23%) remained normotensive as before. A study by Mannan and Alamgir et al, of stroke patients who were hypertensive found that 80.7% of the stroke patients were not aware that they were hypertensive, which is quite higher than the present study.²¹

Increase awareness about hypertension may be the cause of decrease rate of newly diagnosed cases. But the present study is almost similar to the study of Chawdhury et al, who studied 74 hypertensive patients who suffered stroke and had shown that 34% of the patients were not aware that they were hypertensive and 60.7% were on irregular treatment.²⁷ So, effective control of hypertension is essential. The high percentage of irregularly treated patients in all the studies seems to be due to negligence of the patients and lack of adequate knowledge of motivation for continuous treatment of hypertension.

Among the 65 stroke patients, who were previously diagnosed as hypertensive and prescribed for antihypertensive medication, majority (72.3%) of them were non-compliant, where only 27.7% of them were taking antihypertensive regularly (Table 3). The study of Chawdhury et al, who studied 74 hypertensive patients who suffered stroke and had shown that, 60.7% of stroke patients were on irregular treatment.²⁷

In a study by Nazir et al, out of 89 patients, 25.8% were having controlled hypertension, 48.3% were compliant and 51.7% were not compliant to antihypertensive drugs.²⁸ Study done by Almas et al, showed that 57% of hypertensive patients were compliant and 43% were non-compliant to antihypertensive therapy.²⁹ In another study by Hashmi et al, adherence to antihypertensive therapy was 77% in the studied Pakistani population So there is a strong relationship between antihypertensive non-compliance and development of stroke in the diagnosed hypertensive patients.³⁰

Table 4 demonstrates the critical link between compliance with antihypertensive medication and stroke recurrence. Among the 12 patients with recurrent strokes, 66.67% were non-compliant, corroborating previous research which shows that poor adherence to antihypertensive medication significantly increases the risk of stroke recurrence.³¹ Conversely, even compliant patients experienced stroke recurrence (33.33%), indicating that while adherence reduces risk, other factors such as residual hypertension, lifestyle habits, or comorbidities may still contribute to recurrence.³²

Small study population and to minimize and overcome problems by obtaining the information from both family and patients especially in stroke patients who had problems or were unable to communicate verbally with the interviewers. Moreover, interpretations regarding association of antihypertensive compliance need case control study.

CONCLUSION

Stroke is one of the foremost causes of morbidity, mortality and a socioeconomic challenge, more so in Bangladesh where health support system including the rehabilitation system is not within the reach of ordinary people. One of the most important modifiable risk factors is hypertension. In this study an intimate relationship between antihypertensive non-compliance and development of stroke has been identified. So, screening programme in community to identify those non-compliant people and educate them about good control of hypertension by taking drugs regularly and make them aware about primary prevention should be initiated in this regard. This way, we can reduce morbidity and mortality among stroke patients and alleviate the burden of stroke.

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