

A Descriptive Study to Assess the Risk of Stroke among Patients with Hypertension and Type 2 Diabetes Mellitus at a Selected Hospital, Bangalore

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ABSTRACT

Objective: Stroke is a major public health problem, both in developed and developing countries. Stroke is becoming an important cause of early death and disability in India due to increasing prevalence of the major key modifiable risk factors like type 2 diabetes mellitus and hypertension. Hence there is an urgent need for recognition of stroke risk factors and its warning signs. With this intention the present study aimed to assess the risk of stroke among patients with hypertension and type 2 diabetes mellitus.

Methods: A non-experimental, descriptive survey method was adopted. Samples were selected by using quota sampling technique and 60 hypertensive and type 2 diabetes mellitus patients who met the inclusion criteria were selected for the study. Data were collected by an interview technique using a modified stroke risk assessment tool by the National Stroke Association, USA.

Results: Out of 60 samples 48.3% of them were in high-risk category, 28.3% were in caution and 23.3% in low-risk category. There was a significant association found in relation to socio demographic variables such as education qualification, type of family, type of diet, weight and complications of hypertension ($P < 0.05$).

Discussion: The findings of the study suggested that there is an increased risk of stroke in hypertension and type 2 diabetes patients which can be aggravated by other risk factors and comorbid conditions. Hence modifying these risk factors by changing lifestyle can help in prevention of stroke.

Key words: Stroke, risk assessment, hypertension and type 2 diabetes mellitus, comorbid conditions

INTRODUCTION

Stroke is one of the leading causes of global mortality. According to the Global Health Observatory (GHO), stroke is the second most common cause of death in the last decade (2000-2011) with a rising number one trend¹. National Stroke Association states that, each year nearly 8 lakh people experience a new or recurrent stroke. A stroke happens every 40 seconds. Every 4 minutes someone dies from stroke. Up to 80% of strokes can be prevented at the earliest². WHO (World Health Organization) estimation suggests that by the year 2050, 80% stroke cases in the world would occur in low- and middle-income countries mainly in India and China³. The most effective way to decrease the burden of stroke is prevention. Awareness and control of modifiable risk factors can contribute to reduce the incidence and burden of stroke.

Cerebrovascular accident is a global health problem and a leading cause of mortality and morbidity worldwide⁴. Hypertension and Type 2 diabetes mellitus are among the most common chronic non communicable diseases and multifactorial disorders affecting both developed and developing countries, including India. India contributes a lion's share in the diabetic and

hypertensive population⁵. Among patients with diabetes mellitus and hypertension several factors contribute in varying degrees to the cerebrovascular risk including hyperglycemia, vascular risk factors such as hypertension, dyslipidemia, genetic, demographic and lifestyle factors. Studies have shown that people with diabetes and hypertension have approximately twice the risk of ischemic stroke compared with those without diabetes and hypertension⁶.

India has witnessed a tremendous increase in morbidity and mortality of stroke over the past few decades. The prime deciding factor is initiation of treatment within the time window, which requires early recognition of stroke symptoms⁷. Prevention of stroke through control or avoiding risk factors and early detection of risk factors is the best option considering the Indian scenario⁸.

Bangalore being a hub for Hypertension and type 2 diabetes mellitus, there is an urgent need for recognition of stroke risk factors, its warning signs which helps in bringing stroke awareness and its prevention. Therefore, keeping this in view, the present study was undertaken to assess the risk factors of stroke and bring awareness among patients with hypertension and type 2 diabetes mellitus.

MATERIALS AND METHODS

This was a descriptive survey conducted among patients with hypertension and type 2 diabetes mellitus admitted at Kempegowda Institute of Medical Sciences Hospital and Research Centre, Bangalore. Quota sampling technique was used for selection of subjects in this study. According to age group category i.e., 30-45 yrs, 46-60 yrs and 61-75 yrs, in each category 20 patients with hypertension and type 2 diabetes mellitus were randomly selected as a study participant. The research approach was quantitative and the data were collected using a modified stroke risk assessment score tool by the National Stroke Association (USA) among type 2 diabetes mellitus and hypertension patients.

The modified stroke risk assessment score tool consists of 10 items such as blood pressure, ECG changes, smoking, cholesterol levels, diabetes (Hb1c levels), BMI, exercise, stroke in family, alcoholism, drug abuse, hormone replacement therapy and oral contraceptive use as assessed.

Scoring of the Items

There were 10 items to assess the risk of stroke among type 2 diabetes mellitus and hypertension patients. Each item has three categories i.e., high risk, cautious and low risk category with score 3, 2 and 1 respectively.

- High risk category: If a patient scores in high-risk category i.e., score of 3 in more than 4 components (score of 12 and above).
- Caution: If a patient scores between 10-14 in caution category i.e., score of 2 in 5-7 components.
- Low risk: If a person scores 8-10 in low-risk category i.e., score 1 in 8-10 components.

Ethical Consideration

Institutions Human Ethics committee clearance and permission was obtained prior to the study and the samples were informed that the participation will be on voluntary basis and they can withdraw from the study at any time. Confidentiality of information obtained was maintained. Prior written informed consent was taken from all the samples.

Data Collection

Data were collected at the patient's bedside. Comfortable seating arrangement and adequate privacy was provided. The investigator collected data from 60 samples. Number of samples selected per day was 3-4. It took 10-15 minutes to collect the data from each patient. The study was conducted according to the convenience and choice of patients.

Statistical analysis

Descriptive and inferential statistics were used to analyze the data. SPSS IBM 20 was used for analysis.

RESULTS

Table 1: Socio demographic characteristics of the respondents (n=60)

Characteristics	Category	Frequency(No.)	Percentage(%)
Age in years	30 - 45	20	33.3
	46 - 60	20	33.3
	61 - 75	20	33.3
Gender	Male	43	71.70
	Female	17	28.30
Religion	Hindu	51	85.0
	Muslim	8	13.30
	Christian	1	1.70
Educational qualification	No formal education	18	30.00
	Primary education	16	26.70
	Secondary higher education	22	36.70
	Graduate and above	4	6.70
Type of family	Nuclear family	16	26.7
	Joint family	10	16.7
	Extended family	34	56.7
Place of residence	Urban	21	35.0
	Rural	39	65.0
Occupational status	Employed /business	6	10.00
	Unemployed	32	53.30
	Semi-skilled worker	22	36.70
Marital status	Single	3	5.0
	Married	50	83.3
	Widow/ widower	7	11.7

Table 2: Percentage distribution of respondents by their risk category (n=60)

Clinical Variable	Risk Category	Frequency(No.)	Percentage (%)
Blood pressure (BP)	Low risk (BP >140 /90 mm of hg)	11	18.3
	Caution (BP 120-139/80-89 mm of hg)	20	33.3
	High risk (BP >140 /90 mm of hg)	29	48.3
ECG changes	Low risk (regular heart beat)	34	56.7
	Caution (I don't know)	10	16.7
	High risk (irregular heart beat)	16	26.7
Smoking	Low risk (nonsmoker)	52	86.7
	Caution (trying to quit)	4	6.8
	High risk (smoker)	4	6.8
Cholesterol	Low risk (< 200 mg/dl)	19	31.6
	Caution (200 - 239 mg / dl)	21	35.0
	High risk (>240mg /dl or unknown)	20	33.3
Diabetes	Low risk (Hb a1c < 5.6 %)	16	26.7
	Caution (Hb a1c 5.7 - 6.4 %)	14	23.3
	High risk (Hb a1c > 6.5 %)	30	50.0
BMI	Low risk (18.5 - 24.5 BMI, healthy weight)	26	43.3
	Caution (25 - 29.5 BMI, overweight)	22	36.7
	High risk (> 30 BMI, obese)	12	20.0
Exercise	Low risk (regular exercises)	7	11.7
	Caution (some exercises)	21	35.0
	High risk (don't exercise)	32	53.3
Stroke family	Low risk (no)	21	35.0
	Caution (not sure)	21	35.0
	High risk (yes)	18	30.0
Alcoholism	Low risk (nonalcoholic)	45	75.0
	Caution (occasional drinker)	11	18.3
	High risk regular alcoholic)	4	6.7
Drug abuse/oral contraceptives/ hormone replacement therapy	Low risk (never)	57	95.0
	Caution (occasional)	3	5.0
	High risk (yes regular)	0	0.0

Table 3: Percentage distribution of respondents by overall risk score (n=60)

Level of Risk	Respondents	
	Frequency (No.)	Percentage (%)
High Risk	29	48.3
Caution	17	28.3
Low Risk	14	23.3

Table 1 depicts the distribution of respondents by their socio demographic characteristics. Since the sampling was done by quota sampling, 33.33% of the respondents belong equally to all 3 categories of age group. Majority of 43 (71.70%) were males and 51 (85.0%)

respondents were Hindus. Regarding education 22 (36.7%) respondents completed their secondary higher education and only 4 (6.7%) were graduates. Majority of 50 (83.3%) respondents were married and 34 (56.7%) were belonging to extended family. It was interesting to note that even though the study was done in an urban hospital majority of 39 (65.0%) respondents

were from rural and only 21 (35.0%) respondents were residing in urban.

Table 2 and 3 shows the distribution of respondents by their clinical variables and the level of stroke risk based on their scores. Overall, 29 (48.3%) respondents were high risk for stroke, 17 (28.3%) respondents were in caution and the rest 14 (23.3%) respondents had low risk of stroke.

Table 4: Percentage distribution of level of risk among the hypertensive and diabetes patients (n=60)

Diagnosis	Level of risk						Total
	High risk		Caution		Low risk		
	No	%	No	%	No	%	
Type 2 diabetes mellitus only	5	20.8	9	37.5	10	41.6	24
Hypertension only	7	46.6	5	33.3	3	20.0	15
Type 2 Diabetes and hypertension	17	80.9	3	21	1	4.76	21

Table 5: Association between stroke risk with selected sociodemographic variables (n=60)

Characteristics	Category	Level of Risk			Chi square	Table value
		High risk	Caution	Low risk		
Age	30 - 45 years	8	7	5	2.367	P (0.05) = 9.49 ^{NS}
	46 - 60 years	9	5	6		
	61 - 75 years	12	5	3		
Sex	Male	19	13	11	1.062	P (0.05) = 5.99 ^{NS}
	Female	10	4	3		
Religion	Hindu	24	15	12	3.618	P (0.05) = 9.49 ^{NS}
	Muslim	5	1	2		
Education	No formal education	14	0	4	16.92	P (0.05) = 12.59 *
	Primary education	8	7	1		
	Secondary higher education	6	8	8		
	Graduate and above	1	2	1		
Occupation	Employed /business	2	2	2	3.762	P (0.05) = 9.49 ^{NS}
	Unemployed	19	8	5		
	Semi-skilled worker	8	7	7		
Marital status	Single	1	2	0	5.349	P (0.05) = 9.49 ^{NS}
	Married	23	15	12		
Family	Nuclear family	9	6	1	10.37	P (0.05) = 9.49*
	Joint family	1	4	5		
	Extended family	19	7	8		
Residence	Urban	10	6	5	0.007	P (0.05) = 5.99 ^{NS}
	Rural	19	11	9		
Weight	61 - 70kgs	8	8	13	21.70	P (0.05) = 12.59 *
	71 - 80kgs	13	9	1		
	81 - 90kgs	7	0	0		

Table 4 shows that stroke risk is highly common among patients diagnosed with both type 2 diabetes mellitus and hypertension compared to patients diagnosed only with diabetes mellitus or hypertension.

Table 5 depicts the analysis of association between the selected variable and the overall stroke risk score of patients with type 2 diabetes mellitus and hypertension patients. The chi-square (χ^2) value was computed to find the association between the assessment of stroke risk scores of patients with type 2 diabetes mellitus and

hypertension with selected demographic variable. Among the selected socio-demographical variables such as education qualification, type of family, type of diet, weight and complications of hypertension significant association was found with stroke risk score ($P < 0.05$).

DISCUSSION

There is a rise in stroke incidence in most Asian countries which highlights the need for standard guidelines for conducting stroke epidemiological studies and a sound epidemiological data from Asian countries

to understand the disease better and plan policy-level interventions to decrease the burden. Asian region must be identified as a priority region for stroke-related interventions and preventive strategies by global healthcare authorities and organisations¹⁰.

The most effective way to decrease the burden of stroke is prevention. Awareness and control of modifiable risk factors can contribute to reduce the incidence and burden of stroke. Non modifiable risk factors include age, gender, race, and hereditary. While modifiable risk factors like hypertension, diabetes mellitus, asymptomatic carotid stenosis, heart diseases, Atrial fibrillation, heavy alcohol consumption, hypercoagulability, hyperlipidemia, obesity, oral contraceptive use, physical inactivity, sickle cell disease, smoking can be altered through lifestyle changes and medical treatment, thus reducing the risk of stroke¹.

Effective risk factor intervention, proper awareness and proper government policies offers a real hope of reducing stroke morbidity and mortality. Due to increase in burden of stroke in coming years and limited availability of stroke care in India, it would be better to study on early identification of risk factors and preventive measures that will reduce the incidence of stroke¹⁵.

CONCLUSION

Stroke is a worldwide health problem. It makes an important contribution to morbidity and disability in developed as well as developing countries. The WHO reported that nearly three-quarters of all registered stroke patients had associated disease, mostly in the cardiovascular system, hypertension or of diabetes²³. The control of stroke that was once considered an inevitable accompaniment to aging is now being approached through primary prevention. It has generated the hope that stroke can be tackled by community health action.

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Contributions of the Authors

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