



## AN EPIDEMIOLOGICAL STUDY ON SELECTED RISK FACTORS OF STROKE AMONG ADULTS LIVING IN A SLUM OF KOLKATA.

### Community Medicine

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### ABSTRACT

**Introduction:** Stroke is a major cause of permanent disability. Currently, the burden of stroke in terms of mortality, morbidity and disability is increasing across the world including India. The main risk factor of stroke are high blood pressure, tobacco smoking, obesity, high blood cholesterol and diabetes mellitus. Lifestyle factors that increase the risk of stroke include smoking, drinking alcohol, high fat diet.

**Objective:** To identify the socio demographic profile of study population and to find out the proportion of selected risk factors of stroke among the study subjects and to assess different risk factors among them.

**Methodology:** An observational descriptive cross sectional study was undertaken in urban field practice area of a teaching institute of Kolkata. By using the formula  $4pq/l^2$ , total 200 participants were selected by simple random sampling and they were interviewed during house to house visit with WHO STEPS questionnaire for Non Communicable Diseases (NCD).

**Results:** The mean age of the participants was 42.39 years and 33.5% participants were overweight with high BMI. Only 26 % participants were hypertensive and most of them (57.69%) had duration of hypertension more than 1 year. Majority (72.03%) did not have diabetes mellitus. Most (61%) of study participants had done moderate intensity physical activity regularly. Almost 25.5% study participants consume tobacco products and Most of the study 92.8% participants consumed alcohol 1-4 times in past 30 days. Significant association were seen between gender and smoking ( $p=0.005$ ), Gender and alcohol consumption ( $p=0.000$ ), Religion and alcohol consumption ( $p=0.03$ ), Occupation category and alcohol consumption ( $p=0.002$ ), Marital status and hypertension ( $p=0.001$ ).

**Conclusion:** Effective public health intervention required promote regular exercise and healthy eating, avoiding alcohol and tobacco. Periodic screening for hypertension and diabetes and early diagnosis and treatment are key strategy for stroke prevention.

### KEYWORDS

Stroke, STEPS, BMI, Tobacco, Hypertension, Diabetes.

#### INTRODUCTION:

Stroke is acute clinical event of focal or global neurological disturbance related to impairment of cerebral circulation, which lasts longer than 24hours resulting in death with no known cause other than vascular origin. Without blood to supply oxygen and to remove waste products, brain cells quickly begin to die (1)(2). Stroke is the second-leading global cause of death behind heart disease in 2019 and is a major cause of permanent disability (3)(4). Currently, the burden of stroke in terms of mortality, morbidity and disability is increasing across the world (5). In the past several decades in developed countries, a greater reduction in the age standardised stroke incidence has taken place because of good health services and effective strategies for cerebrovascular risk factor prevention. However, the converse has been shown for developing countries (6).

Stroke is one of the leading causes of death and disability in India. The estimated adjusted prevalence rate of stroke range, 84-262/100,000 in rural and 334-424/100,000 in urban areas. The incidence rate is 119-145/100,000 based on the recent population-based studies. There is also a wide variation in proportional mortality rate with the highest being 42% in Kolkata. Stroke is becoming an important cause of premature death and disability in low-income and middle-income countries like India, largely driven by demographic changes and enhanced by the increasing prevalence of the key modifiable risk factors. As a result, developing countries are exposed to a double burden of both communicable and non-communicable diseases.

The main risk factor of stroke is high blood pressure. Others include tobacco smoking, obesity, high blood cholesterol, diabetes mellitus, previous TIA, atrial fibrillation. Lifestyle factors that increase the risk of stroke include smoking, drinking alcohol, high fat diet. Someone

who has already had a stroke, positive family history is at increased risk of developing stroke.

Despite the advent of reperfusion therapies, such as intravenous tissue type plasminogen activator and endovascular therapy, for selected patients with acute ischaemic stroke (7) there is still a proportion of patients with residual disability or cognitive deficits. Therefore, effective prevention, especially primary prevention, remains the best strategy for reducing the burden of stroke (8).

#### METHODOLOGY:

An observational descriptive epidemiological study which is cross sectional in design was undertaken in urban field practice area of Medical College & Hospital, Kolkata (Surendralal Pyne lane, Kolkata). After clearing the Institutional Ethics Committee, the study was done from December 2020 to April 2021 by a pre-designed pre-tested schedule. Adults, aged  $\geq 20$  years and living in Surendralal Pyne lane at least 1 year was the study population. Patients already diagnosed of stroke (both ischemic stroke and haemorrhagic stroke), pregnant mothers and seriously ill patients were excluded from the study.

Sample size was calculated by using the formula,  $4pq/l^2$  where 'p' stands for calculated prevalence and  $q = (100-p)$ . The prevalence of Hypertension in urban population in India is 33.8%. Assuming error of 20% of prevalence, sample size become  $199.78 \approx 200$ . Participants were randomly selected by simple random sampling method with the help of random number table without replacement. If any member was not available at their home at the time of data collection even after 3 approaches (1 approach each on 3 consecutive data collection days), it was taken as non-response and the subject was not included in the study.

A pre-designed, pretested (WHO STEPS questionnaire for Non Communicable Diseases) questionnaire was used in this study. The face validity of each item and content validity of each domain were ascertained by them. Pretesting was done among 20 adults from the study area. The questionnaire included two parts. The first part involved demographic profiles of the respondents. The second part consisted of NCD risk factors like anthropometry, body mass index, blood pressure, postprandial blood sugar etc.

During house visit, after primary self -introduction and explanation regarding the purpose of this visit to all the family members, a written consent was taken from the respondent. Data of socio-demographic status like age, gender, religion, residence, mother tongue, marital status, living arrangement, type of family, education, occupation, per-capita income, type of house etc. and NCD risk factors like anthropometry, body mass index, blood pressure, postprandial blood sugar was collected. The collected data was compiled with the help of Microsoft excel & analyzed by SPSS version-20, in terms of statistical methods like table, mean, standard deviation, chi square, z test.

**Ethical Consideration:**

The study was conducted in accordance with the ethical principles that have their origin in the Declaration of Medical College Kolkata. It was carried out with patients verbal and analytical approval before sample was taken. The study protocol and the subject information and consent form were reviewed and approved by a local ethics committee.

**RESULTS:**

The mean age of the participants was 42.39 years, Median 39 years and the range being 20 – 74 years. Most of the study participants (34.5%) was in the age group of 30 – 39 years and 64% were male. Almost of the participants (88%) are married. Majority of them (63.5%) live in a nuclear family .Majority of the study participants (70%) does not have any drug or treatment history. Around one third study participants (33.5%) fall into Overweight Grading of BMI (Table 1).

**Table 1: Distribution Of Study Participants According To Socio-demographic Variables (n=200).**

Variable	Frequency	Percentage
Age Group (Years):		
20-29	34	17.0
30-39	69	34.5
40-49	41	20.5
50-59	26	13.0
≥ 60	30	15.0
Gender:		
Male	128	64.0
Female	72	36.0
Marital status:		
Married	176	88.0
Un Married	16	8.0
Widowed	8	4.0
Type of Family:		
Nuclear	127	63.5
Joint	73	36.5
Educational status:		
Illiterate	11	5.5
Primary school	21	10.5
Middle school	58	29.0
Secondary school	12	6.0
Higher secondary	59	29.5
Graduate	36	18.0
Post graduate	3	1.5
Occupation category:		
Unemployed	24	12.0
Unskilled	20	10.0
Semiskilled	35	17.5
Skilled	75	37.5
Others	46	23.0
Socio Economic status (Modified BG Prasad)		
Lower	5	2.5
Lower middle	67	33.5
Middle	75	37.5
Upper middle	53	26.5
Family history of stroke:		
Present	16	8.0
Absent	184	92.0

Drug/Treatment history:		
DM	14	7.0
DM, HT	15	7.5
HT	17	8.5
Nil	140	70.0
Others	14	7.0
Grading of BMI		
Grade 1 Obesity	8	4.0
Grade 2 Obesity	2	1.0
Grade 3 Obesity	6	3.0
Normal	54	27.0
Overweight	67	33.5
Pre-Obese	58	29.0
Underweight	5	2.5

Only 26 % study participants were hypertensive and most of them (57.69%) had duration of hypertension more than 1 year. Only half (50%) of diagnosed hypertensives were on medication in last two weeks before interview. Most of the study participants (71.5%) had their blood sugar checked by a doctor or a health worker at least once and majority (72.03%) did not have diabetes mellitus. Among the 40 Diabetic participants (50%) are diagnosed with in last 12 months. on an average day most of the study participants (80%) consumed at least 1-3 servings of fruit and 61% consume vegetables at least 1-3 days in a week. Study participants consumed street food at least 1-3 times in a week. Most (61%) of study participants had done moderate intensity physical activity regularly 5 days in a week. (Table 2)

Almost 25.5% study participants consume tobacco products currently. Daily consumption of tobacco products is (23%) among the study participants. Almost all 51(100%) study participants started to smoke <42 years of age. Majority of study participants 68.6% uses tobacco products for ≥10 years. Majority of study participants 54.9% use 1-5 cigarettes/bidis per day. Almost 12 (57.14%) among 51 (25.5%) used tobacco products in the past. Majority of study participants 83.3% started to use tobacco products ≤42 years of age. Most of the study participants (50%) stopped smoking <5 years ago. 11% of study participants use smokeless tobacco products in past and currently. Among 22 (11%) the following table shows the frequency of consuming smokeless tobacco products. most of the study participants (43.5%) are exposed to passive smoking in the past 7 days in home. (Table 2)

Among the study participants 49.5% have consumed alcohol drink at least once. 45.5% of the study participants have consumed alcohol drink in the past 12 months. 42.9% among 91 (45.5%) study participants had at least one alcohol drink for 3-4 days per week. Among 91 (45.5%) study participants 83 (91.2%) had consumed alcoholic drink in the past 30 days. Most of the study participants (92.8%) consumed one standard drink 1-4 times in past 30 days. Among 91 (45.5%) study participants 83 (91.2%) had consumed alcoholic drink in the past 30 days. 68.7% of study participants among 91 alcoholics have consumed 1-4 standard drink during one drinking occasion. Majority of the study participants (81.9%) had 1-4 times of standard drinks during one drinking occasion. Among 91 (45.5%) study participants 83 (91.2%) had consumed alcoholic drink in the past 30 days. Most of the study participants 36.1% had alcoholic drink rarely with meals. Among 83 (91.2%), all of the (100%) study participants consumed alcoholic drink 1-4 times on an average day (Table 2).

**Table 2: Distribution Of Study Participants According To The Proportion Of Selected Risk Factors Of Stroke Among Them.**

Variable	Frequency	Percentage
<b>Hypertensive status (n=200):</b>		
• Yes	52	26.0
• No	148	74.0
<b>Duration of diagnosis (n=52):</b>		
• Within past 12 months	22	42.31
• More than 12 months	30	57.69
<b>Type of treatment (n=52):</b>		
• Drugs in past 2 weeks	26	50.0
• Advice to reduce salt intake	12	23.08
• Advice or treatment to lose weight	14	26.92
<b>Traditional medicine (n=52):</b>		
• Yes	7	13.46
• No	45	86.54

<b>Blood sugar checked (n=200):</b> • Yes • No	143 57	71.5 28.5
<b>Diabetic Mellitus status (n=143):</b> • Yes • No	40 103	27.97 72.03
<b>Diabetic treatment (n=40):</b> • Insulin • Oral drugs • Special diet	13 16 11	32.5 40.0 27.5
<b>Traditional medicine diabetes (n=40):</b> • Yes • No	7 33	17.5 82.5
<b>Fasting (n=40):</b> • Yes • No	33 7	82.5 17.5
<b>Fruit consumption in a week (n=200):</b> • 1-3 days • 4-7 days	135 65	67.5 32.5
<b>Fruit consumption in a day (n=200):</b> • 1-3 days • 4-7 days	161 39	80.5 19.5
<b>Vegetable consumption (n=200):</b> • 1-3 days • 4-7 days	122 78	61.0 39.0
<b>Cooking oil (n=200):</b> • Vegetable Oil • Butter or ghee • None used	174 10 16	87.0 5.0 8.0
<b>Street food (n=200):</b> • 1-3 times a week • 4-7 times a week • None	103 88 9	51.5 44.0 4.5
<b>Vigorous – intensity activity (n=200):</b> • Yes • No	40 160	20.0 80.0
<b>Moderate – intensity activity (n=200):</b> • Yes • No	122 78	61.0 39.0
<b>Tobacco consumption (n=200):</b> • Yes • No	51 149	25.5 74.5
<b>Duration of tobacco consumption (n=200):</b> • ≤5 years • 6-9 years • ≥10 years	8 8 35	15.7 15.7 68.6
<b>Frequency of tobacco consumption (n=200):</b> • 1-5 cigarettes/bidis per day • 6-10 cigarettes/bidis per day	28 23	54.9 45.1
<b>Smokeless tobacco products (n=200):</b> • Yes • No	22 178	11.0 89.0
<b>Passive smoking in home (n=200):</b> • 1-3 days • 4-7 days • Don't know	66 87 47	33.0 43.5 23.5
<b>Alcohol consumption (n=200):</b> • Yes • No	99 101	49.5 50.5
<b>Frequency of alcohol consumption (n=91):</b> • Daily • 5-6 days per week • 3-4 days per week • 1-3 days per week • Less than once a month	6 6 39 32 8	6.6 6.6 42.9 35.1 8.8

There is a significance association between increasing age and developing hypertension. Chi square between Age and hypertension for the above table is 19.278, df=1, p value <0.001 (p value significant

at <0.05) (Table 3)

**Table 3: Association Between Age Of Study Participants And Hypertension.**

		Hypertension		Total
		No	Yes	
Age (years)	≤ 42	100 (85.5%)	17 (14.5%)	117
	≥ 43	48 (57.6%)	35 (42.5%)	83
Total		148	52	200

Significant association between Gender and tobacco smoke products were found (X<sup>2</sup>=7.984, df=1, p=0.005) (Table 4). Males are found to be taking tobacco smoke products more than female among the study participants. There was a significance association between Gender and alcohol consumption (X<sup>2</sup>=81.502, df=1, p=0.000) (Table 5). Males are found to be consuming more alcohol than female among the study participants. There was a significance association between Religion and alcohol consumption (X<sup>2</sup>=4.723, df=1, p=0.03). Hindus are found to be consuming more alcohol than Muslim among the study participants (Table 6).

Fisher's exact test between Marital status and hypertension is 11.207, df=2, p value 0.001 (p value significant at <0.05). Unmarried study participants seem to have lower chance of developing hypertension. Fisher's exact test between Marital status and smoking is 8.885, df=2, p value 0.01 (p value significant at <0.05). Un-Married study participants consume more tobacco products than married study participants. (Table 7)

Chi square between Occupation category and alcohol consumption is 16.954, df=4, p value 0.002 (p value significant at <0.05). Skilled workers consumed alcohol more than others like students, housewife, retired study participants (X<sup>2</sup>=16.594, df=4, p=0.002). (Table 8)

**Table 4: Association Between Gender Of Study Participants And Tobacco Smoke Products Consumption.**

		Tobacco Smoke products		Total
		No	Yes	
Gender	Female	62 (86.1%)	10 (13.9%)	72
	Male	87 (68.0%)	41 (32.0%)	128
Total		149	51	200

**Table 5: Association Between Gender Of Study Participants And Alcohol Consumption.**

		Alcohol consumption		Total
		No	Yes	
Gender	Female	67 (93.1%)	5 (6.9%)	72
	Male	34 (26.6%)	94 (73.4%)	128
Total		101	99	200

**Table 6: Association Between Religion Of Study Participants And Alcohol Consumption.**

		Alcohol consumption		Total
		No	Yes	
Religion	Hindu	68 (45.9%)	80 (54.1%)	148
	Muslim	33 (63.5%)	19 (36.5%)	52
Total		101	99	200

**Table 7: Association Between Occupation Category Of Study Participants And Alcohol Consumption.**

		Alcohol Consumption		Total
		No	Yes	
Occupation category	Others	33	13	46
	Semiskilled	19	16	35
	Skilled	26	49	75
	Unemployed	11	13	24
	Unskilled	12	8	20
Total		101	99	200

**DISCUSSION:**

The mean age of the participants was 42.39 years, Median 39 years and the range being 20 – 74 years. A study done in Kerala showed the median age of stroke patients was 67 years. Seventy-seven percent of patients were aged 60 years. A study done in Bangladesh showed Majority of the study subject (94%) were above the age of 40 years and the peak incidence was between 51 to 70 years (69%). In Trivandrum, stroke occurred at rate of 7.1 per 1000 per year in people 55 years, and

the rate escalated to 13.3 for the 75 years age-group. The mean age at stroke onset at Trivandrum of 65 years males and 67 years females is within the ranges of 60.8 to 75.3 years for males and 66.6 to 78.0 years for females cited in the Feigin review.

In the present study most of the study participants (64%) were Male. A study in Bangladesh showed 61.7% were female. Another study in Bangladesh showed 74% were male and 26% were female. 67% of participants were unemployed, and 11.5% were overweight/obese (BMI 25 kg/m<sup>2</sup>). In the present most of the study participants (37.5%) are skilled workers and most of the study participants (33.5%) fall into Overweight Grading of BMI.

A study conducted in Bangladesh showed Most of the patients were service holders (28%) which were followed by retired group (21%). Average monthly income of the majority of the family was less than 5000. In the present most of the study participants (37.5%) are skilled workers. Majority of the family has monthly per capita income of Rs 2811.

A study by AM Hossain et al. showed literate group comprised of 63%. Of the literate Group, 31% patients received schooling, 19% patients received college education and only 13% went to university or similar institution. In our study most of the study participants (29.5%) got till higher secondary education.

According to a study in Trivandrum Hypertension was the most frequent and occurred in 450 (83.2%) patients. Seventy of 261 male patients (26.8%) smoked tobacco, whereas none of the female patients smoked. In the present study Majority of the study participants (74%) does not have hypertension. Tobacco consumption either by smoking or chewing was found to be significantly associated with HTN. This was also revealed in the rural survey report by NNMB 2006 and two other studies. Alcohol consumption was not found to be significantly associated with high BP. HTN was also seen to be significantly associated with physical inactivity, as seen in other studies. Similar to the findings of the present study, Gupta et al. and other studies found overweight and central obesity to be significantly associated with HTN.

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