FREQUENCY OF RISK FACTORS OF STROKE IN PATIENTS PRESENTING TO PUBLIC SECTOR HOSPITALS OF LAHORE

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Abstract:
Stroke also called as Cerebrovascular accident is a syndrome of rapid onset of cerebral deficit (usually focal) lasting >24 h or leading to death, with no cause apparent other than a vascular one. It is currently the third leading cause of death worldwide. It is also the first leading cause of disability globally.
***Objective:** To find out the frequency of various risk factors of stroke in patients presenting to Medical and Neurology wards of various public sector hospitals of Lahore.*
***Study Design**: Analytical Cross sectional study.*
***Study Place**: Medical and Neurology wards of public sector hospitals of Lahore.*
***Study Duration**: 4 months (May 2014 to August 2014).*
***Subjects and Methods**:*
A Cross-sectional study was conducted in various public sector hospitals of Lahore. A total of hundred subjects were recruited in the study. Selection was made on laid down criteria, after taking informed consent. Interviews were conducted through a pretested questionnaire. Data was collected, compiled and analyzed through SPSS.
Keywords: *Stroke, transient ischemic attack, hypertension, diabetes, hypercholesterolemia, cardiovascular disease, obesity, smoking, unhealthy diet, physical inactivity.*

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INTRODUCTION:

According to WHO stroke (cerebrovascular accident) can be defined as "a syndrome of rapid onset of cerebral deficit (usually focal) lasting >24 h or leading to death, with no cause apparent other than a vascular one" [1]. This differentiates a stroke from a mini stroke or TIA(Transient Ischemic Attack), which lasts less than 24h.Stroke is also called as cerebrovascular insult (CVI) or brain attack.A stroke can be Ischemic (which may be due to any thrombo-embolic or cardio-embolic event, carotid artery atherosclerosis, arterial stenosis, arterial dissections, various types of arteritis, venous sinus thrombosis, and hyper-coagulable states) or it can be of the hemorrhagic type in which the actual rupture of a blood vessel is taking place. There are two types of hemorrhagic strokes; intracerebral (within the brain) hemorrhage or subarachnoid hemorrhage. Two types of weakened blood vessels usually cause hemorrhagic stroke: aneurysms and arteriovenous malformations (AVMs) however the most common cause of hemorrhagic stroke is uncontrolled hypertension (high blood pressure).[2]Stroke is a medical emergency and can result in permanent defecit.

About 15 million people suffer from stroke each year worldwide [3]. It is currently the third leading cause of death worldwide. It is also the first leading cause of disability globally [4].

According to WHO estimates for the year 2020, stroke will remain the second leading cause of death worldwide [5,6]. Estimated annual incidence of stroke in Pakistan is 250/100,000 which is projected to an estimate of 350,000 new cases every year [7]. According to a World Health Organization (WHO) report from 2002, the total mortality from stroke in Pakistan is more than 75,000 [8]. A handful of Pakistani hospital based studies, in settings using advanced investigative approaches such as CT- scan, have revealed 31-40% cases of stroke due to cerebral hemorrhage, and 60-90% due to ischemia [9,10]. Mortality data from 2007 indicate that stroke accounted for ≈1 of every 18 deaths in the United States. On average, every 40 seconds, someone in the United States has a stroke [11].

Risk factors for stroke can be modifiable and not modifiable [12]. Non modifiable factors or risk markers include Age, gender, race, ethnicity, and heredity [11]. Modifiable factors are hypertension [13], cardiac disease; the most important of which is atrial fibrillation [14] increased BMI [15] diabetes [11] TIA [16] cigarette smoking [17] hyperlipidemia, alcohol consumption,use of illicit drugs, migraine, oral contraceptives, hypercoaguable states,lifestyle factors like reduced physical activity and unhealthy diet.[11]Age is the one of the most important risk factors for stroke. For each successive 10 years after age 55, stroke rate becomes more than double. Incidence of stroke is 1.25 time higher in men than in women. Family history, both paternal and maternal leads to increased stroke risk [11]. Hypertension (high blood pressure) increases the risk of stroke by 35-50% [18]. Among Hawaiian Japanese men in the Honolulu Heart Program, those with diabetes had twice the risk of thromboembolic stroke of persons without diabetes that was independent of other risk factors [19]. Cigarette smoking increases risk (RR) of ischemic stroke nearly two times [20]. In a study done on Korean men there was a positive association across the whole range of BMI and ischemic stroke, with a confounder-adjusted hazard of 11% for 1 kg/m^2 higher BMI [15]. Multiple Risk Factor Intervention Trial demonstrated risk ratio of 1.8 for those with serum cholesterol 240 to 279 mg/dL and 2.6 for those with cholesterol levels ≥280 mg/Dl [21]. The Framingham Heart Study noted a dramatic increase in stroke risk associated with atrial fibrillation with advancing age, from 1.5% for those 50 to 59 years of age to 23.5% for those 80 to 89 years of age [14].

Despite the advent of treatment, the best approach to minimize the risk of stroke remains prevention. Hence there is need to study the frequency of major modifiable and non modifiable risk factors of stroke for the purpose of highlighting individuals prone to stroke. Although some factors like age, gender and family history cannot be modified, their presence helps identify those at greatest risk, enabling prompt prevention and treatment of those risk factors that can be modified; saving many individuals from one of the leading causes of death while reducing its outcomes like paralysis and coma.

OPERATIONAL DEFINITIONS:

Stroke: A syndrome of rapid onset of cerebral deficit (usually focal) lasting >24 h or leading to death, with no cause apparent other than a vascular one.[1]

Hypertension: A chronic medical condition in which the blood pressure in the arteries is elevated. High blood pressure is said to be present if it is often at or above 140/90 mmHg.[22]

Diabetes: Fasting blood glucose >126mg/dL or Random blood glucose > 200mg/dL [23]

Obesity: it is defined as Waist circumference greater than 88cm(35 inches) in females and greater than 102cm(40 inches) in males measured by standard plastic tape a point halfway between lowest end of

ribs and upper end of hipbone that is iliac crest , at the end of gentle expiration [24]

Hypercholesterolemia: It is defined a blood cholesterol level above 240mg/dL [25]

Cigarette smoker: US Centers for Disease Control and Prevention have developed and updated the following definitions: Former Smokers – Adults who have smoked at least 100 cigarettes in their lifetime, but say they currently do not smoke. Current Smokers – Adults who have smoked 100 cigarettes in their lifetime and currently smoke cigarettes every day (daily) or some days (nondaily).

Lack of ideal physical activity: Lack of minimum of 150min of moderate physical activity(for example fast walking) or minimum of 75 min of vigorous intensity physical activity (for example running) a week [27].

Unhealthy diet: Diet which is unhealthy according to Healthy Diet Score (as defined by American Heart Association's strategic impact goal through 2020)that is: it not meeting at least 4 out of 5 components of healthy diet. (ideal is score of 4_5 that is 4–5 components of diet are met; e.g., >4.5 cups/day of fruits and vegetables) [27]

Family history: Includes both paternal and maternal history of stroke that either one or both of the parents have had stroke [11].

OBJECTIVE:
To find out the frequency of various risk factors among stroke patients presenting to medical and neurology wards of various public sector hospitals of Lahore.

MATERIALS AND METHODS:
- **Study Design:**
  - Analytical Cross sectional study
- **Study Universe:**
  - Population of Punjab
- **Study Population:**
  - Lahore
- **Study Area:**
  - Medical and Neurological wards of various public sector hospitals of Lahore.
- **Study Duration:**
  - Three months
- **Sample Size:**
  - 100
- **Sampling Technique:**
  - Non-probability convenience sampling

- **Sampling Selection:**
  - ➢ Inclusion Criteria
    - o Males and females (>25years)
    - o Diagnosis confirmed with CT scan.

  - ➢ Exclusion Criteria

    - o People having previous focal lesions in brain will not be included.
    - o People having non cerebrovascular causes for their symptoms mimicking stroke will not be included ; for example:
      - Seizure.
      - Systemic infection.
      - Brain tumor.
      - Toxic metabolic disorder like hypoglycemia and hyponatremia.
      - Positional vertigo.
      - Conversion disorder.

- **Social And Ethical Consideration:**
  - We will observe cultural ethics.
  - Written informed consent will be taken from individuals before interview.
  - Information about name, address etc. will not be disclosed and will be kept confidential.

DATA COLLECTION PROCEDURE:
Name, age, sex,religion,address, ethnicity, marital status, occupation,education level and monthly income will be obtained by self-report at the baseline visit. Education will be categorized as "intermediate and onwards", "formal" and "informal". Individual monthly income will be reported as: "Less than Rs10,000", "10,000-<50,000", "Greater than Rs50,000)". Occupation will be self reported as: "professional","unemployed/retired", "self employed".

Participants will self-report a history of clinical cardiovascular disease(atrial fibrillation,valvular heart disease, heart attack), hypertension, hypercholesterolemia, diabetes mellitus, previous history of stroke/TIA, cigarette smoking, family history of stroke. Obesity as defined by waist circumference measured by a standard plastic tape at a site halfway between lowest end of ribs and upper end of hipbone that is iliac crest with at the end of gentle expiration, and hips at the greater trochanters. Diet will be assessed using Healthy Diet Score defined by American Heart Association's strategic impact goal through 2020. Physical activity assessed by questioning about weekly moderate or vigorous physical activity.

We will use the same methods to determine and validate studies by different researchers.Data will be collected by all batch members by visiting medical and neurology wards of various public sector hospitals and asking questions from stroke patients or their guardians after informed consent.

- **Study Variables:**
  - Non-Modifiable
    1.Age
    2.Gender
    3.Family History
  - Modifiable
    4.Hypertension
    5.Cardiac Diseases(atrial fibrillation, valvular heart diseases, heart attack/myocardial infarction)
    6.Diabetes
    7.Obesity
    8.Hypercholesterolemia
    9.Cigarette smoking
    10.Physical inactivity(lack of ideal physical activity)
    11. Unhealthy diet
- **SamplingTool:**
   A questionnaire will be given.

DATA ANALYSIS PROCEDURE:
- Data analysis will be done by using SPSS version 16.Initial analysis will include frequency distribution and calculation of descriptive statistics e.g. mean, median, mode and standard deviation.

PRETESTING:
- Before carrying out the actual exercise of data collection, the questionnaire would be pre-tested on some subjects on experimental basis in order to observe:
  - Any deficiency in questionnaire.
  - The social and ethical acceptability of the questions.

OUTCOME AND UTILIZATOION:
The data will be disseminated through research paper publications in national and international papers, conferences, seminars and meetings. This project will help the administration, policy makers, health planners to initiate programs according to the needs and demands to improve the health status of the community. It will help in defining and setting goals for cardiovascular health and promotion and this may act as model for other developing nations of the world.It will create awareness in public about their health issues and will highlight the individuals prone to suffer from stroke so that early preventive measures can be taken.

It will open the new horizons to the research scientists and epidemiologists to explore leading cause of disability and death worldwide.

ADMINISTRATIVE PLAN AND IMPACT

Responsibility	Responsible
Selection of Problem	Department of Community Medicine, King Edward Medical University, Lahore
Protocol Development	All Batch Members
Data Collection	All Batch Members
Data Compilation	All Batch Members
Data Analysis	All Batch Members
Report Writing	All Batch Members

SCHEDULE/PHASING:

Task	WEEK											
	1st	2nd	3rd	4th	5th	6th	7th	8th	9th	10th	11th	12th
Prepare Protocol	██	██										
Data Collection			██	██	██	██						
Data Analysis							██	██	██			
Report Writing										██	██	
Presentation												██

Data Analysis and Interpretation

Table No. 1:Distribution of respondents by Gender

Gender	Frequency	Percentage
Male	64	64%
Female	36	36%
Total	100	100%

With regard to gender composition of sample respondents as to the finding of study indicated in the above table 1, while 64% of them are male and the rest of them 36% are female.

Table No. 2:Distribution of Respondents by Age

Age	Frequency	Percentage
>55	82	82%
<55	18	18%
Total	100	100%

As it can be seen from table 2 above, age composition of total 100 respondents, while the age of 82% of the respondents are >55 and the age of 18% of the respondents are <55 years.

Table No. 3; Distribution of respondents by Family history of Stroke

Family History	Frequency	Percentage
Yes	33	33%
No	67	67%
Total	100	100%

As can be inferred from the table 3, the 33% of the respondents have family history of stroke and the 67% of the respondents have not family history of stroke. The above data revealed that family history of stroke has less influence on the patient.

Table No. 4: Distribution of respondents by types of Stroke

Types	Frequency	Percentage
Ischemic Stroke	74	74%
Hemorrhagic Stroke	26	26%
Total	100	100%

As it has been indicated from table 4 that 74% of the respondents have Ischemic stroke and 26% of the respondents have Hemorrhagic stroke. It can be observed that Ischemic stroke is more prevalent among the patients.

Table No. 5: Distribution of respondents by hypertension

Hypertension	Frequency	Percentage
Yes	82	82%
No	18	18%
Total	100	100%

The above table 5 revealed that 82% of the respondents have hypertension and 18% of the respondents have not hypertension.

Table No. 6: Distribution of respondents by diabetes

Diabetes	Frequency	Percentage
Yes	39	39%
No	61	61%
Total	100	100%

The above data depicted that 39% of the respondents have diabetes and 61% of the respondents have not diabetes. In this present study, most of the respondents are non-diabetic.

Table No. 7: Distribution of respondents by Hypercholesterolemia

Hypercholesterolemia	Frequency	Percentage
Yes	41	41%
No	59	59%
Total	100	100%

The above table 7 showed that 41% of the respondents have Hypercholesterolemia and 59% of the respondents have not Hypercholesterolemia. Most of the respondents have hypercholesterolemia.

Table No. 8: Distribution of respondents by smoking

Smoking	Frequency	Percentage
Yes	36	36%
Non	64	64%
Total	100	100%

As it has been shown in the table 8 above that 36% of the respondents are regular smokers and 64% of the respondents are non-smokers.

Table No. 9:Distribution of respondents by obese and non-obese

Obese and Non-obese	Frequency	Percentage
Obese	29	29%
Non-Obese	71	71%
Total	100	100%

As it has been indicted in the table 9 above, the 29% of the respondents have obesity and 71% of the respondents are non-obese. Most of the respondents are non-obese.

Table No. 10: Distribution of respondents by physically active and Inactive

Physically active and Non-active	Frequency	Percentage
Physically active	71	71%
Physically Inactive	29	29%
Total	100	100%

As it has been indicated in the table 10, 71% of the respondents are physically active and 29% of the respondents are physically inactive. Most of the respondents are physically active.

Table No. 11: Distribution of respondents by Healthy Diet and Unhealthy dietary intake

Dietary Condition	Frequency	Percentage
Healthy Diet	44	44%
Unhealthy dietary Intake	56	56%
Total	100	100%

As it is can be seen from table 11 above, 44% of the respondents have healthy diet and 56% of the respondents have unhealthy dietary intake. Most of the respondents have unhealthy dietary intake.

Table No. 12: Distribution of respondents by cardiovascular diseases

Cardiovascular Diseases	Frequency	Percentage
Valvular Diseases	7	7%
Atrial Fibrillation	8	8%
Myocardial Infraction	24	24%
Patients have not CVS Diseases	67	67%
Total	100	100%

As it has been shown in the table 12, 7% of the respondents have valvular diseases, 8% of the respondents have atrial fibrillation, 24% of the respondents have myocardial infraction and 67% of the patients have not CVS diseases.

Table No. 13: Distribution of respondents by previous history of stroke

Previous History	Frequency	Percentage
Yes	15	15%
No	85	85%
Total	100	100%

As it can be observed from table 13, 15% of the respondents have previous history of stroke and 85% of the respondents have not previous history of respondents. Most of the respondents have not previous history of stroke.

Table No. 14: Distribution of respondents by Transient Ischemic attacks n Past

Transient Attacks in Past	Frequency	Percentage
Yes	20	20%
No	80	80%
Total	100	100%

The above table 14 revealed that, 20% of the respondents have Transient Attacks in past and 80% of the respondents have no Transient Attacks in past.

SUMMARY OF FINDINGS:
Based on data analysis, the following major findings have been drawn:
➢ Out of 100 patients of stroke, 64% of patients were males and 36% were females.
➢ 82% were above 55 years of age and 18% were below 55 years of age.
➢ 33% were found to have Family History of Stroke while 67% didn't have any Family History.
➢ 74% were found to have Ischemic stroke and 26% had Hemorrhagic type of stroke.
➢ Hypertension was found in 82% of patients and 18% were non hypertensive.
➢ Diabetes was found in 39% of patients while 61% were non-diabetic.
➢ Hypercholesterolemia was found in 41% of patients while 59% were non-hypercholesterolemic.
➢ Cigarette smoking was found in 36% of the patients while 64% were non-smokers.
➢ Obesity was found in 29% of patients while 71% were non-obese.
➢ 71% were physically inactive while 29% were physically active.
➢ 56% were found to have Unhealthy dietary Intake while 44% had Healthy Diet.
➢ 33% were found to have following Cardiovascular Diseases (Valvular diseases 7%, Atrial Fibrillation 8%, Myocardial Infarction 24%), while 67% didn't have any CVS disease. 15% were found to have previous Stroke history while 85% didn't have any previous Stroke history.
➢ 20% were found to have Transient Ischemic Attacks in past while 80% didn't have any TIAs in past.

CONCLUSION:
In our study it was found that stroke was more prevalent in males as compared to females. Most of the patients were above 55years of age. Ischemic type of stroke was more common than hemorrhagic type. In the descending order most frequent risk factors were hypertension, physical inactivity, unhealthy diet, hypercholesterolemia, diabetes, cigarette smoking, cardiovascular diseases, family history of stroke, obesity, history of transient ischemic attack and previous history of stroke.

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