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# Risk Factors for Stroke and TIA's in Pakistan: A Community-Based Study

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**OBJECTIVES:** To estimate the frequency of risk factors for stroke and transient ischemic attacks in Pakistan; a multi-city community-based study.

**METHOD:** This cross-sectional community-based study was conducted in various health care facilities including government funded District Head Quarters hospitals, private hospitals and medical centers, and community-based clinics across 27 cities all over Pakistan over a period of three years between 2013 and 2015. Nearly 900 patients were screened during stroke (Falij) screening camps at these facilities and the data regarding past stroke and transient ischemic attack (TIA) symptoms were recorded along with relevant neurological examinations. A 25 item self-administered questionnaire was used to get relevant information.

**RESULTS:** A total of 651 (72.33%) responded to questionnaire from the 900 screened patients. Among the responders, 403 (61.90%) were males and 248 (38.10%) were females with an average age of  $50 \pm 15$  years. Respondents belonged to six different ethnicities, the largest group were of Punjabi origin (49.90%) followed by Urdu speaking (25.10%) belonged to different professions. Paralysis of a complete body side or an arm or a leg was experienced by 155 (23.81%) patients at least once in the life time knowing stroke as the underlying cause, of which 122 (19.0%) patients reported an event of sudden paralysis experienced during the last year. A total of 179 (27.50%) had felt numbness/tingling in limbs or face while they knew those as symptoms of stroke or TIA and 134 (20.58.3%) patients reported a cardiac arrhythmia at least once in a life time. Common risk factors assessment showed that 217 (33.33%) were diagnosed with diabetes, while 315 (48.38%) were hypertensive. Among the respondents, 88 (13.51%) reported in affirmative to smoking status while 60 (9.21%) reported using smokeless tobacco in the form of Pan/Gutka. More than 180 (27.64%) had raised cholesterol, while seizures, chest pain, heart attack, coronary bypass surgery, pain in legs during walking, snoring was reported by 23 (3.53%), 109 (16.74%), 42 (6.45%), 24 (3.68%), 237 (36.40%) and 150 (23.04%) patients respectively.

**CONCLUSION:** In this survey, approximately one out of every 4 persons in the community had suffered symptoms suggestive of stroke or TIA at least once in their lifetime, out of which majority had suffered the symptoms within one year before the interview. Hypertension and diabetes were the two commonest non communicable diseases (cardiovascular) risk factors in these patients, followed by hypercholesterolemia, smoking, and use of smokeless/chewable tobacco.

**KEYWORDS:** Stroke (*falij*), TIA, arrhythmias, paralysis, diabetes, hypertension, smoking, tobacco

## INTRODUCTION:

According to World Health Organization (WHO), stroke is the occurrence of interrupted blood supply to the brain, due to rupture of a blood vessel or blockage of the blood vessel by a clot. This inhibits the supply of oxygen and nutrients to the brain tissues resulting in damage().

In 2010 alone, 16.9 million incidents of stroke were recorded worldwide and more than 102 million disability adjusted life years (DALYs) were lost, the majority of these incidents and lost DALYs were reported in low medium income countries (LMIC)().

With 6.5 million annual deaths stroke was reported as the second leading global cause of death after ischemic heart disease (IHD) which accounts for almost 11.8% deaths worldwide. From 1990 -2013 the absolute number of stroke attributable deaths increased by more than 40 percent (Collaborators, 2015).

Transient ischemic attacks (TIA) has been defined as "brief episodes of neurological dysfunction resulting from focal cerebral ischemia not associated with permanent cerebral infarction. In the past, TIAs were

operationally defined as any focal cerebral ischemic event with symptoms lasting <24 hours" (Easton et al., 2009.).

Research shows that first-time sufferers of TIA or stroke have an increased risk of a second episode, a major reason behind increased mortality and morbidity. Smoking cessation, low fat intake in the diet, reduction in blood pressure, diabetes and cholesterol through drug interventions have been found to reduce the recurrence of stroke and TIA (Sacco et al., 2006).

Epidemiological studies help combat such diseases by creating public awareness regarding the predisposing factors and providing information on how to prevent these risk factors (Kinlay, 2011). Such community-based studies have been previously conducted in Italy, Sweden, Netherlands, Germany and Iran (Azarpazhooh et al., 2010; Kolominsky-Rabas et al., 1998; Lauria et al., 1995). The results of these studies show the significance of them understanding the situation

For successful management evidence-based recommendations for basic lifestyle modifications along with medical interventions should be identified to prevent or reduce the occurrence of strokes and TIA. The aim of our study is to explore the various symptoms of stroke and TIA in the Pakistani community in order to specify the preventive measures.

**Study Design:** Cross-sectional, observational study

**Place and Duration of Study:**

Screenings were performed during stroke (falij) camps conducted at various government and private hospitals in 27 different cities across three provinces of Pakistan over a period of one year. The study was mostly conducted at DHQs; in cities where DHQs were not available, other health care facilities were engaged. A 25 item self-administered questionnaire was filled for all the reporting patients at the camps.

**Methodology:**

**Inclusion Criteria:**

Adults both males and females, with a history of stroke or TIA above the age of 18 years, willing to participate in the study were selected.

A handbill was designed for the general public for identification and recruitment of subjects based upon a set of selected symptoms such as weakness of a complete body side, numbness or tingling in the limbs, sudden attack of paralysis of the complete body or on one side and arrhythmias.

A total of nine hundred patients aged between 27 and 94 years were screened during stroke (Falij) screening camps at health centers and the data regarding stroke and TIA symptoms were recorded; relevant neurological examination was performed by trained medical professionals. The results were then tabulated

and analyzed using statistical methods. The association between the defined variables were established using the Chi-square test.

**Results:**

A total of 651 (72.33%) out of the 900 subjects responded to the questionnaire. Among the respondents, 403 (61.90%) were males and 248 (38.10%) females with an average age of 50 ± 15 years. Belonging to six different ethnicities the largest number was of Punjabi (49.90%) origin followed by Urdu speaking (25.10%) and Pathan (9.40%). More than 90% were right-handed and the patients belonged to thirty-five different professions. Education profile of the participants showed 28% illiterate, 43% primary schooling, 13.60% graduates and 4.9% did not answer. A total of 90.60% of the participants were married (Table 1).

The study participants were asked about different symptoms including the weakness of one complete side of the body, numbness, and tingling, and a sudden attack of paralysis that resolved within 24 hours. From the information collected we concluded that the paralysis of a complete body side or an arm or a leg was experienced by 155 (23.81%) patients at least once in the lifetime and were aware of the condition being caused by stroke. Furthermore, 179 (27.50%) had felt numbness/tingling in limbs or face while 122 (18.74%) patients reported the event of sudden paralysis experienced during the last year that resolved spontaneously (Table 2).

The patients were further questioned regarding if they had any pre-existing conditions such as previous strokes, diabetes, dyslipidemias, hypertension, etc. It was found that a total of 48.38% of patients were hypertensive 33.33% were diabetic and 27.64% had dyslipidemia. About 14% reported as active tobacco smokers while almost ten percent reported using smokeless tobacco in the form of Pan/ Gutka. Other events including seizures, chest pain, heart attack, coronary bypass surgery, pain in legs during walking, snoring were reported by 23 (3.53%), 109 (16.74%), 42 (6.45%), 24 (3.68%), 237 (36.40%), and 150 (23.04%) patients respectively (Table 3). Similarly, patients with reported weakness of one complete body side showed almost same statistics (Table 3). Around one-third of the subjects were taking medication for diabetes and hypertension.

**Discussion:**

Though this study provides a unique insight into the community awareness of stroke and transient ischemic attacks it represents only a small percentage of the population.

However the answers from this carefully designed questionnaire helped us understand the awareness among the general population about Stroke and TIA. This is an essential first step to recognize the

prevalence of stroke and ischemic conditions in the Pakistani community. This would further help in designing better investigational tools necessary to continue such epidemiological studies on a larger scale and to understand the depth of the problem. Awareness of the underlying causes and the risks associated with certain lifestyle characteristics is crucial to the treatment strategy of such diseases.

Looking at the findings of our study, it is evident that gender plays a vital role in the existence of cardiovascular events as also the previous studies conducted globally have shown gender, an important predisposing factor (Appelros, Stegmayr, & Terent, 2009). Though keeping in view the societal trend, women are less likely to show up at such screening camps, this may be argued that more men get through the screening owing to the very reason that men are more likely to develop cardiovascular conditions. Another debatable factor is the ethnicity; as half of the participants with a history of stroke (once in a lifetime or recurrent) belonged to Punjabi origin. However, the reason for the majority of the subjects belonging to the Punjabi origin is because a large number of camps were conducted in the province of Punjab. While globally certain races are found to be more prone to strokes and ischemic diseases, ethnicity cannot be rendered as a sole epidemiological factor (Fustinoni & Biller, 2000). When the educational background and occupations are factored, it is observed that 28% were illiterate whereas 43.2% obtained primary schooling. Many were unskilled workers (10.7%) while only about 17.3% of the affected population had the university education. This highlights the fact that the population that must be targeted in the efforts to decrease the prevalence of stroke and transient ischemic attacks belonging to lower socio economic status. Generally, the educated class of the community is thought to be more health conscious and relatively aware of the risks associated with unhealthy lifestyle and dietary habits. However, this was not found to be true as only 28% of the participants were found to be illiterate; more than 60% of the participants presented qualifications ranging from primary schooling to post-graduation.

It is important to mention that the participants selected for the study presented multiple symptoms including paralysis of one side or complete body, numbness or tingling in limbs and arrhythmias.

One of the parameters we investigated was if the affected individuals were smokers, regular consumers of pan or gutka (product of chewable tobacco) and we found that 14% of individuals smoked while 9% consumed pan or gutka, which makes almost 23% of the interviewed population. The patients were further questioned if they had any pre-existing conditions such as previous episodes of stroke, diabetes, dyslipidemias, hypertension, etc. as these morbidities are the known risk factors and it was found that a total

of 49.8% of patients were hypertensive 34.0% were diabetic and 29.0% had dyslipidemias. Of those affected by these morbidities, only about one-third were taking the appropriate medications which are more likely to have further alleviated the risk of a stroke or TIA event.

Community-based studies show cardiovascular events such as stroke and TIA require not only therapeutic management after onset but also preventive strategies to reduce second episodes and first-time attacks in individuals with pre-disposing factors. Continuous mass education and public health awareness programs must be conducted to sensitize people regarding the seriousness of certain lifestyle. It is necessary to highlight that healthcare professionals must be trained routinely for effective diagnosis, treatment, and management of patients coming in with cardiovascular complaints that may lead to ischemic events.

#### **STUDY LIMITATIONS:**

As a community based research, the major study limitation includes the limited generalizability to other communities in the country. Also Expectations and delivery of outcome is a major challenge due to limited sensitivity towards TIA and stroke.

#### **CONCLUSION:**

In this survey, approximately one in every four persons in the community had suffered symptoms suggestive of stroke or TIA at least once in their lifetime, and the majority had suffered the symptoms within a year before the interview. Hypertension and diabetes were the two most common cardiovascular risk factors in these patients, followed by hypercholesterolemia, smoking, and use of smokeless/ chewable tobacco.

**Table 1: Demographics**

	<b>Response</b>	<b>n</b>	<b>Percentage</b>
Gender	Male	403	61.90
	Female	248	38.10
Ethnicity	Pathan	61	9.40
	Punjabi	324	49.90
	Balochi	5	0.80
	Sindhi	28	4.30
	Afghan	12	1.80
	Urdu	163	25.10
	Hindko	26	4.00
	Not answered	32	4.70
Handedness	Right	595	91.40
	Left	56	8.60
Education	Illiterate	182	28.00
	Schooling	281	43.20
	Matric	3	0.50
	Intermediate	39	6.00
	Graduate	89	13.60
	Master	21	3.20
	MBBS	3	0.50
	Hafiz	1	0.20
No answer	32	4.80	
Profession	Unskilled worker	69	10.60
	Petty Trader	16	2.45
	Skilled Worker	32	4.92
	Non-Executive Staff	9	1.40
	Small Shopkeeper/ Businessmen	16	2.45
	Lower/Middle: executive, officer	15	2.30
	Self-employed/ Employed professional	53	8.14
	Medium Businessmen	5	0.77

**Table 2: Symptoms of Stroke and TIA**

	Response	n	Percentage
Weakness or paralysis of a complete body side or an arm or leg	Yes	155	23.81
	No	485	74.50
	Don't know	11	1.69
Sudden feeling of numbness, tingling or loss of feeling in either arm, hand, leg, foot or face in the last 12 months	Yes	179	27.50
	No	451	69.27
	Don't know	21	3.23
Sudden attacks of paralysis or loss of use of either arm, hand, leg or foot in last 12 months	Yes	122	18.74
	No	519	79.72
	Don't know	10	1.54

**Table 3: Risk Factor Assessment**

	Response	n	Percentage
STROKE	Yes	144	22.11
	No	507	77.88
TRANSIENT ISCHEMIC ATTACK	Yes	70	10.75
	No	581	89.24
IRREGULAR HEART RHYTHM	Yes	134	20.58
	No	517	79.41
DIABETIC	Yes	217	33.33
	No	434	66.66
MEDICATIONS FOR DIABETES	Yes	204	31.33
	No	447	68.66
HYPERTENSIVE	Yes	315	48.38
	No	336	51.61
BP CHECKED	Yes	288	44.23
	No	363	55.76
BP LOWERING MEDICATIONS	Yes	216	33.17
	No	435	66.82
SMOKE	Yes	88	13.51
	No	563	86.48
EAT PAN/ GUTKA	Yes	60	9.21
	No	591	90.78
DYSLIPIDEMIA	Yes	180	27.64
	No	471	72.35
SEIZURES	Yes	23	3.53
	No	628	96.46
CHEST PAIN	Yes	109	16.74
	No	542	83.25
MI (HEART ATTACK)	Yes	42	6.45
	No	609	93.54
CORONARY BYPASS SURGERY	Yes	24	3.68
	No	627	96.31
PAIN IN LEGS ON WALKING	Yes	237	36.40
	No	414	63.59
SNORE	Yes	150	23.04
	No	501	76.95

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Abdul Malik; concept, data collection, data analysis, manuscript writing, manuscript review  
Farrukh Malik; data collection, data analysis, manuscript writing, manuscript review  
Ismail Khatri; data analysis, manuscript writing, manuscript review  
Sadaf Nasir; data analysis, manuscript writing, manuscript review