AWARENESS ON RISK FACTORS AND WARNING SIGNS OF STROKE AMONG INDIVIDUALS WITH HYPERTENSION

Veena Jasmine Pinto[1], Peter George[2]

[1]*Assistant Professor, Department of General Medicine, Father Muller Medical College, Mangaluru, South India.*
[2]*Professor, Department of General Medicine, Father Muller Medical College, Mangaluru, South India.*

ABSTRACT

BACKGROUND
Incidence of stroke and its associated mortality is rising in India. Awareness of the risk factors and warning signs of stroke ensures early diagnosis and prompt interventions with better outcome. We have tried to identify the awareness of risk factors and warning signs of stroke in individuals with hypertension.

Aims- 1 To assess the awareness on risk factors of stroke among individuals with hypertension. 2 To assess the knowledge on warning signs of stroke among individuals with hypertension.

MATERIALS AND METHODS
This descriptive cross sectional study was conducted at a tertiary care hospital in Southern India. Total of 200 individuals with hypertension were randomly selected and a closed-ended questionnaire was administered in a face-to-face interview. The data collected were tabulated and analysed using SPSS version-23.

RESULTS
Among the 200 hypertensive subjects, there were 113 males (56.5%) and 87 females (43.5%). In this study, 85% identified > 4 risk factors and 59.5% recognised > 4 warning signs of stroke. Hypertension was the most frequently recognised risk factor (94%) followed by lack of exercise (82.5%), smoking (81.5%), Diabetes Mellitus (75%) and stress (73%). Facial deviation was identified as a stroke warning sign by 96% of subjects. Subjects with younger age, higher educational level and higher income had a statistical significant (p- value <0.05) awareness on risk factors and warning signs of stroke.

CONCLUSION
The awareness of risk factors and warning signs of stroke was found to be good among subjects with hypertension. Health care providers have an important role in educating the public on various aspects of stroke prevention.

KEYWORDS
Stroke, Awareness, Hypertension, Risk Factors, Warning Signs, Southern India.

BACKGROUND
Stroke is amongst the three leading causes of death and the most frequent cause for disability in adults.[1] The incidence of stroke and associated mortality are higher in India as compared to the Western world.[2-4] Early warning signs of stroke such as weakness or numbness of face or limb on one side, difficulty in talking, vision alteration, dizziness and sudden headache are easily recognisable. Individuals with hypertension, diabetes mellitus, ischaemic heart disease, dyslipidaemia or smoking are at high risk for developing stroke. Knowledge on risk factors and warning signs of stroke among such high-risk individuals may help them seek early medical attention with good clinical outcomes. Among risk factors for stroke, hypertension has the highest relative risk of 2-5 to develop stroke.

In India, the awareness of risk factors and warning signs of stroke in general population is found to be poor.[5, 6] Studies from India have assessed stroke awareness among hypertensive patients with one from Southern India.[7] In this study, we have assessed the awareness on risk factors and warning signs of stroke among individuals with hypertension.

Aims and Objectives
1. To assess the awareness on risk factors of stroke among individuals with hypertension.
2. To assess the knowledge on warning signs of stroke among individuals with hypertension.

MATERIALS AND METHODS
This is a descriptive cross sectional study, conducted over 2 months from 1st September 2016, among individuals with hypertension. After obtaining the Institutional Ethics Committee approval, individuals with hypertension were randomly selected from the out-patient and in-patient services of a Tertiary Care Hospital in Mangaluru, Southern India.

The questionnaire used was adapted from Borhani Haghighi et al.[8] This was earlier modified and validated for an Indian study in general population.[6] Individuals who fulfilled the selection criteria were included to the study after obtaining a written informed consent. The investigators then

administered the questionnaire to the subjects through a face-to-face interview. The required description of every question was made for their clear understanding. The responses were captured in a blinded response sheet. The questionnaire consisted of 40 questions, which were divided in three sections-
1. Demographic profile with 8 questions,
2. Risk factors of stroke with 19 questions and
3. Warning signs of stroke with 13 questions. The second and third sections contained structured questions with 'yes' or 'no' responses.

Inclusion Criteria
1. Individuals diagnosed to have hypertension.
2. Individuals on treatment for hypertension.

Exclusion Criteria
1. Individuals with previous stroke/TIA.
2. Individuals with family members having stroke.
3. Health care professionals.

Descriptive and comparative statistical analysis were done using SPSS version-23. The demographic profile, awareness of risk factors and warning signs of stroke were analysed using frequencies and percentages. To identify the relationship between demographic characteristics and stroke awareness; Chi-square test and Fisher's exact test were used. A p- value of < 0.05 was considered to be significant.

RESULTS
This study was done on 200 subjects having hypertension; there were 113 males (56.5%) and 87 females (43.5%).

Characteristics		Numbers (n)	Percentage (%)
Age groups	< 45 years	5	2.5
	45 -65 years	151	75.5
	> 65 years	44	22.0
Gender	Female	87	43.5
	Male	113	56.5
Location	Urban	102	51.0
	Rural	98	49.0
Education	No formal education	7	3.5
	Primary education	59	29.5
	Secondary education	84	42.0
	Degree & above	50	25.0
Income (INR)	No income	56	28.0
	<10000	43	21.5
	10000 -20000	74	37.0
	>20000	27	13.5
Duration of Hyper-Tension (years)	Up to 3	42	21.0
	3 -5	66	33.0
	Above 5	92	46.0
Table 1. Demographic Profile of the Subjects			

The demographic characteristics of the subjects are listed in Table-1. Among the subjects, 75.5% (n: 151) were in the age group of 45 to 65 years. Also, 51% (n: 102) of our subjects were from urban dwellings. Interestingly, 67% (n: 134) of subjects completed their secondary education or above; and a mere 3.5% were uneducated. Subjects with duration of hypertension > 5 years were 46% (n: 92) and between 3 to 5 years were 33% (n: 66).

Awareness on risk factors of stroke is represented in Table-2 as frequencies and percentages. In this study, 85% (n: 170) identified > 4 risk factors and 15% (n: 30) identified 3-4 risk factors. Most frequently identified risk factors for stroke were hypertension (94%), lack of exercise (82.5%), smoking (81.5%), Diabetes Mellitus (75%) and stress (73%).

Risk Factor	Frequency (n)	Percentage (%)
Hypertension	188	94.0
Systolic BP	44	22.0
Diastolic BP	16	8.0
BP control for prevention	175	87.5
Arrhythmia	33	16.5
Exercise	165	82.5
Obesity	101	50.5
Smoking	163	81.5
Hypercholesterolaemia	113	56.5
Diabetes Mellitus	150	75.0
Dietary habits	118	59.0
Family history	92	46.0
Hypertriglyceridaemia	79	39.5
Prior MI	38	19.0
DM control for prevention	158	79.0
Stress	146	73.0
Unpreventable	85	42.5
Number of Risk Factors Identified	**Frequency**	**Percentage**
3 – 4	30	15
> 4	170	85
Table 2. Frequency and Percentage of Correct Response to Questions on Stroke Risk Factors		

Awareness on other risk factors such as dietary habits, high cholesterol, obesity and family history were 59%, 56.5%, 50.5% and 46% respectively. Knowledge about previous MI (19%) and arrhythmia (16.5%) as risk factors for stroke were found to be poor. Control of hypertension and diabetes mellitus for prevention of stroke were identified by 87.5% and 79% of subjects. Interestingly, 42.5% of the subjects found stroke to be unpreventable disease.

Warning sign	Frequency	Percentage
Body pain	115	57.5%
One-sided weakness	146	73.0%
Paraesthesia	87	43.5%
Chest pain	75	37.5%
Abdominal discomfort	32	16.0%
Difficulty in talking	161	80.5%
Facial deviation	192	96.0%
Vertigo	92	46.0%
Altered vision	86	43.0%
Ataxia	85	42.5%
Dyspnoea	69	34.5%
Headache	69	34.5%
Altered consciousness	129	64.5%
Number of warning signs identified	**Frequency**	**Percentage**
1 -2	12	6.0
3 -4	69	34.5
>4	119	59.5
Table 3. Frequency and Percentage of Responses to Questions on Stroke Warning Signs		

Awareness on warning signs of stroke is shown in Table-3. Subjects identifying > 4 warning signs of stroke were 59.5%; and 6% were aware of only 1 or 2 warning signs. Facial deviation was identified by 96% as most frequent warning sign; followed by difficulty in talking (80.5%), one-sided limb weakness (73%) and altered consciousness (64%). Awareness on warning signs such as paraesthesia (43.5%), vertigo (46%), ataxia (42.5%) and headache (34.5%) were found to be poor.

Demographic Characteristics		Number of Stroke Risk Factors Identified				p- value
		3 – 4		> 4		
		Frequency	%	Frequency	%	
Age	< 45 years	0	0	5	100	
	45 – 65 years	18	11.9	133	88.1	0.027
	> 65 years	12	27.3	32	72.7	
Sex	Female	15	17.2	72	82.8	0.436
	Male	15	13.3	98	86.7	
Location	Urban	13	12.7	89	87.3	0.362
	Rural	17	17.3	81	82.7	
Education	No formal education	4	57.1	3	42.9	
	Primary	20	33.9	39	66.1	0.000
	Secondary	6	7.1	78	92.9	
	Degree & above	0	0	50	100	
Income (Rs)	No income	10	17.9	46	82.1	
	<10000	15	34.9	28	65.1	
	10000 - 20000	5	6.8	69	93.2	0.000
	>20000	0	0	27	100	
Hypertension duration	< 3	7	16.7	35	83.3	
	3 – 5	10	15.2	56	84.8	0.929
	>5	13	14.1	79	85.9	

Table 4. Association between Demographic Characteristics and Stroke Risk Factor Awareness

Analysis of the association between demographic characteristics and stroke awareness is shown in Table -4 and Table-5. Subjects belonging to younger age (p 0.027), higher level of education (p 0.000) and higher income (p 0.000) were found to have statistical significant awareness on risk factors as compared to peers.

Demographic Characteristics		Number of Warning Signs Identified						P value
		1 – 2		3 – 4		>4		
		Frequency	%	Frequency	%	Frequency	%	
Age	< 45 years	0	0	2	40.0	3	60.0	
	45 – 65 years	6	4.0	44	29.1	101	66.9	0.002
	> 65 years	6	13.6	23	52.3	15	34.1	
Sex	Female	5	5.7	26	29.9	56	64.4	0.454
	Male	7	6.2	43	38.1	63	55.8	
Location	Urban	3	2.9	32	31.4	67	65.7	0.075
	Rural	9	9.2	37	37.8	52	53.1	
Education	No formal education	2	28.6	3	42.9	2	28.6	
	Primary	5	8.5	39	66.1	15	25.4	0.000
	Secondary	5	6.0	23	27.4	56	66.7	
	Degree & above	0	0	4	8.0	46	92.0	
Income (Rs)	No income	3	5.4	19	33.9	34	60.7	
	<10000	2	4.7	24	55.8	17	39.5	
	10000 – 20000	7	9.5	25	33.8	42	56.8	0.001
	> 20000	0	0	1	3.8	26	100	
Duration of Hypertension	< 3	0	0	10	23.8	32	76.2	
	3 – 5	6	9.1	20	30.3	40	60.6	0.039
	> 5	6	6.5	39	42.4	47	51.1	

Table 5. Association between Demographic Characteristics and Stroke Warning Sign Awareness

The awareness on warning sign of stroke (Table-5) showed statistically significant association with younger age (p 0.002), higher level of education (p 0.000) and higher income (p 0.001). Subjects with shorter duration of hypertension (p 0.039) were found to have statistically significant awareness on warning signs than risk factors of stroke.

DISCUSSION
Studies across India have shown an alarming rise in the incidence of stroke.[9-11] Inadequate control of modifiable risk factors such as hypertension, diabetes mellitus, dyslipidaemia and smoking were found to be the major cause for this rise.[12,13] Awareness on the risk factors of stroke and its optimal management is essential in prevention.

This study was done among individuals with hypertension attending to the out-patient and in-patient services of a tertiary care hospital in Southern India. Their awareness on risk factors and warning signs of stroke were good as compared to similar studies from other geographical areas. Most of such studies were population based and very few were done on subjects who were at higher risk of developing stroke. These studies were based on telephonic interviews from larger population. In the current study, the questionnaire was administered with reasoning by a face-to-face interaction.

We observed 85% of subjects to identify >4 risk factors of stroke. All subjects were able to identify at least one of the risk factors. Similar awareness on risk factors of stroke was observed in hospital based studies done in New Delhi[14] and Lisbon.[15] Subjects who did not identify even one risk factor ranged from 6% to 45% in various studies from across the world.[16-20]

The risk factor identified by most in the present study was hypertension (94%); followed by lack of exercise (82.5%), smoking (81.5%), diabetes mellitus (75%) and stress (73%). This observation was consistent with other studies.[5,6,8,14-16,19-22] Smoking was the most common risk factor identified in studies from Iran[8] and Australia.[18] Unhealthy dietary practice was most commonly recognised as a risk factor in a study from Iraq.[17] Myocardial infarction and/or arrhythmia were poorly identified as risk factors for stroke in the present study. Similar observations were noted in studies from Northwest India,[5] Iran,[8] Pakistan,[16] Australia,[18] Oman[19] and Ohio.[22] Diabetes mellitus is the second most established risk factor for stroke, but this awareness was found to be poor in various studies.[5,15,18,22]

The awareness on well-controlled hypertension and diabetes can prevent stroke was known to 87% and 79% of subjects. An interesting observation made was that 42.5% of the subjects believed stroke to be an unpreventable disease. In a study from Iran, 89.4% and 35.1% of subjects felt control of hypertension and diabetes can prevent stroke; and 14.8% felt stroke as unpreventable.[8]

In the present study, 59.5% of subjects identified >4 warning signs; and 6% were aware of only 1 or 2 warning signs of stroke. Few studies showed higher[8,14] and few showed poor awareness on stroke warning signs.[5,7,16,17,19,22] The most frequent warning sign identified in this study was facial deviation (96%); followed by difficulty in talking (80.5%) and one-sided weakness (73%). One-sided weakness was identified as a common warning sign of stroke in similar studies.[5,8,15,17,19,] Our study did not show any significant association between stroke awareness and gender. Few studies had reported gender bias in stroke awareness.[5,16-18,21,22]

Analysis of our data revealed that younger age, higher level of education and higher income had better awareness on stroke risk factors and warning signs. Similar observations were made in earlier studies.[5, 8, 14, 15-17, 22]

Duration of hypertension had a bearing on awareness of stroke. Present study showed newly detected hypertensives to have more awareness, contrary to similar studies.[17,18,21,22]

The present study showed a good level of awareness on risk factor and warning signs of stroke in comparison to similar studies. Reason for this could be the higher level of education in the study population. Also, this study used a questionnaire with closed-ended questions, which might have overestimated the awareness level. Subjects being hypertensives might have had more visits to healthcare facilities. Their better exposure to preventive aspects of hypertension and stroke as an important complication might have increased their overall awareness.

Interventions at healthcare facilities with stroke units can potentially revert or reduce the stroke morbidity and/or mortality. It is essential that individuals with significant risk factors for stroke to be aware of its symptomatology and seek stroke care at the earliest.[23,24]

CONCLUSION
The awareness of risk factors and warning signs of stroke was found to be adequate among patients with hypertension. Stroke is preventable by optimal control of risk factors and early recognition of warning signs. Health care providers need to play an important role in educating patients at high risk for developing stroke. Similar studies can identify the gap in stroke awareness among high-risk patients and could provide useful inputs to stroke prevention programs.

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