Original Article

DOI: https://doi.org/10.62143/8fgt1x31

Awareness Regarding Stroke among Patients with Hypertension Attending a Tertiary Hospital

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ABSTRACT

Introduction: Stroke is a global burden especially in developing countries with hypertension being one of the preventable key risk factors. Patients' awareness of stroke is crucial for its prevention and early and effective management. The objective of this study was to find out the awareness of stroke among patients with hypertension in a tertiary hospital in Nepal.

Methods: A descriptive cross-sectional study was conducted in the Outpatient Department of Manmohan Cardiothoracic Vascular and Transplant Centre, Kathmandu. A total of 106 patients diagnosed with hypertension were selected using a non-probability convenience sampling technique. Data was collected from April to May 2024 with face-to-face interviews using a researcher-developed semi-structured interview questionnaire. Data were analyzed with Statistical Package for Social Science version 16 with descriptive statistics for frequency, mean, percentage, and standard deviation and inferential statistics Chi-square and Fischer exact test to measure the association between stroke awareness and selected variables.

Results: The study findings revealed that out of 106 hypertensive patients, 40.6% had a good level, 49.1% had a fair level, and 9.4% had a poor level of awareness of stroke. Level of awareness were statistically significant with place of residence, educational status, regular medicine intake, and regular follow-up schedule.

Conclusion: This study concludes that patients with hypertension have a fair level of awareness of stroke. Thus, stroke awareness programs incorporating lifestyle modifications, blood pressure control, regular medications, and follow-ups, should be conducted to control hypertension and decrease the stroke burden among patients with hypertension.

Keywords: Awareness, hypertensive patient, stroke

INTRODUCTION

Stroke is the second leading cause of death, responsible for approximately 11% of deaths of which more than three-fourths occur in low and middle-income countries.[1] There is a remarkable increase in stroke incidence and mortality rates from 1990 to 2019, with a 70% rise in stroke incidence and a 43% rise in stroke-related deaths.[2] South Asians have a twofold higher risk of getting a stroke than Europeans due to the higher prevalence of hypertension.[3] Age, sex, and race/ethnicity are non-modifiable risk factors while hypertension, diabetes mellitus, smoking[4-6], hyperlipidemia, diet, and physical inactivity are modifiable risk factors.[7] Lifestyle factors contribute to around two-thirds risk of stroke, while genetic factors account for one-third.[8] Hypertension remains the most important, well-documented modifiable risk factor of stroke,[9,10], and has been found in 64 % of stroke patients.[10] Worldwide, hypertension is believed to cause 7.5 million deaths, about 12.8% of

the total of all annual deaths.[11] Nepal reached 12,909 deaths due to stroke, constituting 8.04% of the total mortality.[12] A meta-analysis reported that the estimated rate of hypertension was found to be 27.3% in Nepal.[13] Studies from Nepal among hypertensive patients have highlighted inadequate awareness of stroke.[14-16] Awareness of stroke among hypertensive patients can reduce the risk of stroke by recognizing the importance of blood pressure control.[17] It is possible to prevent or avoid up to 80% of strokes by raising awareness about the risk factors and warning signs associated with stroke.[18] A systematic review of studies from 2010 to 2020 on stroke awareness among hypertensive patients found significant variation in awareness, ranging from 4.4% to 79%. Awareness of stroke signs and symptoms ranged from 23.6% to 87%.[19] Low levels of awareness on stroke were found in Indonesia (77.4%) [20], India (76%),[21,] and Nepal (61.3%)[14]. A study from Nepal shows that one of the main reasons for the rise in stroke-related deaths is patients' lack of awareness about the risk factors.[22] Poor awareness of stroke among hypertensive patients leads to inadequate management, unhealthy lifestyles, non-compliance with medications, and irregular blood pressure monitoring. However, educating these patients about stroke risks, warning signs, treatment, complications, and prevention can help reduce stroke incidence. [23-25] Despite the high risk, stroke awareness among hypertensive patients remains low due to the lack of structured health education efforts. Therefore, this study aims to assess stroke awareness among hypertensive patients attending a tertiary hospital not only to fill the gap in existing literature, but also to support the development of targeted educational and preventive strategies that can reduce stroke-related morbidity and mortality. So, the researchers were interested in assessing the awareness regarding stroke among patients with hypertension attending a Tertiary Hospital.

METHODS

A descriptive cross-sectional study was conducted in the Outpatient Department (OPD) of Manmohan Cardiothoracic Vascular and Transplant Centre (MCVTC), Maharajgunj, Kathmandu among 106 patients diagnosed with hypertension. The sample size was determined using Cochran's formula (1977), based on a prevalence rate of 0.51.[16] A non-probability convenience sampling technique was used to collect the sample. This method was chosen due to practical considerations such as limited time, resource constraints, and the ease of accessing eligible participants who were already attending the OPD of MCVTC for follow-up treatment. Hypertensive patients aged 18 years and above, of both sexes, diagnosed for at least six months, attending the OPD of MCVTC for follow-up, taking antihypertensive medication, able to communicate in Nepali, and willing to participate were included in the study. Patients with gestational hypertension, speech difficulties, a prior history of stroke, or those working in healthcare were excluded.

The research instrument was developed in English language and then translated into Nepali language. It comprised three parts: 1) socio-demographic characteristics, 2) disease-related factors, including a family history of stroke, duration of hypertension, co-morbidities, and the duration of antihypertensive treatment, and 3) awareness of stroke. The awareness section included items on knowledge of stroke risk factors, warning signs and symptoms, immediate actions, preventive measures, diet, activities, consequences, and preventive measures. The score ranged from a minimum of 18 to a maximum of 49 and the total score was converted to 100%. Awareness levels were categorized as good (≥ 75%), fair (50-74%), or poor (0-49%).[16] The instrument was determined through extensively reviewing the literature, and consulting with cardiologists and neurologists. Pretesting was done among 11 patients with hypertension at the Nephrology Department of Tribhuvan University Teaching Hospital. Ethical approval was obtained from the Institutional Review Committee, Institute of Medicine (Ref. 491 [6-11] E2), and administrative permission was taken from the hospital authority. Data was collected using a Nepali version questionnaire through face-to-face interviews from 28th April to 11th May 2024 six days a week, excluding public holidays.

Written informed consent was obtained from each respondent before data collection. To ensure confidentiality, respondents' information was not disclosed to others and was used solely for study purposes. The dignity of participants was respected by allowing them voluntary participation and the right to refuse or withdraw from the study at any time. Privacy was maintained by conducting interviews in a separate room in the Cardiac OPD of hospital.

Data were entered in the SPSS version 16 and Descriptive statistics were used to calculate frequency, mean, percentage, and standard deviation. Chi-square and Fischer exact test was used to measure the association between stroke awareness and demographic and disease-related variables.

RESULTS

Regarding the socio-demographic characteristics, 55.7% were in the age group 40-59 years and the mean age was 53.4 years (SD ±12.372), 59.4% were male, and 92.5% were married. The majority (53.8%) of the respondents belonged to Brahmin/Chettri ethnicity, 60.4% lived in urban municipalities, 35.8% had no formal education, 34.9% were homemakers, and 45.3% had income sufficient for 6-12 months.

Table 1: Respondents' Disease-related Information (n=106) nn=106=106 106 106

Variables	Number	Percentage
Duration of hypertension (in years)		
< 5	48	45.2
6-10	37	34.9
11-15	13	12.3
16-20	5	4.7
21-25	3	2.8
Duration of antihypertensive medication (in years)		
5	53	50.0
6-10	37	34.9
11-15	9	8.5
16-20	5	4.7
21-25	2	1.9
Regularity of medicine intake	103	97.2
Regular follow-up visit	83	78.3
Presence of comorbidities	79	74.5
Co-morbidities (n=79)		
Heart disease	48	60.8
Hypothyroidism	36	45.6
Diabetes mellitus	22	27.8
High blood cholesterol level	21	26.6
Chronic kidney disease	5	6.3
*Others	5	6.3
History of stroke in family	14	13.2

**Gastritis, gout, asthma, and benign prostate hyperplasia*

Table 1 shows the disease-related information. Most of the respondents (45.2%) had hypertension for 6 months to 5 years, and 50% of the respondents were taking antihypertensive medication for the same duration. All most of the respondents (97.2%) took their prescribed medications regularly, 78.3% had a regular follow-up visit, and 74.5% had comorbidities such as heart disease (60.8%), hypothyroidism (45.6%), and diabetes mellitus (27.8%). A family history of stroke was found in 13.2% of respondents.

Table 2: Respondents' Awareness on Stroke: Meaning, Risk Factors, Warning Signs, and Immediate Action (n=106)

Variables	Number	Percentage
Meaning of stroke		
A sudden interruption of blood flow to the brain that leads to paralysis	44	41.5
Risk factors of stroke *		
Alcohol intake	87	82.1
High blood pressure	86	81.1
Stress	79	74.5
Cigarette smoking	78	73.6
High blood cholesterol	76	71.7
Increasing age	60	56.6
High blood sugar	58	54.7
Sedentary lifestyle	50	47.2
Family history of stroke	50	47.2
Warning signs of stroke *		
Sudden difficulty in walking or unable to walk	82	77.4
Sudden numbness or weakness in the face, arm, or leg (especially on one side of the body)	81	76.4
Sudden trouble speaking or loss of voice	63	59.4
Sudden trouble seeing in one or both eyes or blurring of vision	55	51.9
Immediate actions for stroke warning signs		
The person should be taken to the nearest hospital	69	65.1

**Multiple responses*

Table 2 shows that 41.5% of respondents correctly identified the meaning of stroke, which is a sudden interruption of blood flow to the brain that leads to paralysis. Regarding risk factors, 82.1% mentioned alcohol intake, 81.1% said hypertension, and 47.2% respondents equally said about sedentary lifestyle and a family history of stroke. Most of the respondents recognized sudden difficulty walking (77.4%) and numbness in the face, arm, or leg (76.4%) are stroke warning signs. The primary immediate action was to take the person to the nearest hospital, which was correctly responded by 65.1%.

Table 3: Respondents' Awareness on Preventive Measures and Diet (n=106) n=106 106 106

Preventive measures of stroke *	Number	Percentage
Take medicine regularly as a prescription	101	95.3
Consumption of low salt diet	99	93.4
Abstinence from alcohol	99	93.4
Regular medical follow-up with doctor	98	92.5
Quitting smoking	97	91.5
Consumption of diet high in fruits, vegetables, and fiber-rich	96	90.6
Control and management of high blood pressure	90	84.9
Consumption of low-fat diet	89	84.0
Performing active exercise daily	79	74.5
Managing stress	73	68.9
Control and management of high blood sugar level	68	64.2
Maintaining normal body weight	66	62.3
Daily dietary salt Intake		
1/2 teaspoon (less than 3 gm)	35	33.0
Foods and fruits to be consumed per day*		
4 to 5 servings of fruits	93	87.7
2 to 3 servings of low-fat dairy products	70	66.0
4 to 5 servings of vegetables	56	52.8
2 to 3 servings of lean meats, poultry, and fish	33	31.1
Foods to be avoided *		
Red meat	95	89.6
Salty snacks	95	89.6
Deep-fried foods	91	85.8
Sugar-rich foods	89	84.0

**Multiple responses*

Table 3 shows that almost all the respondents (95.3%) identified with regular medicine intake, (93.4%) consumption of a low-salt diet, (93.4%) abstaining from alcohol, (92.5%) regular medical follow-ups, (91.5%) quitting smoking and (90.6%) consumption of a diet high in fruits, vegetables, and fiber as preventive measures of stroke. Similarly, 84.9% said managing high blood pressure, 84.0% said a low-fat diet, 80% avoiding red meat, salty snacks, deep-fried foods, and sugar-rich foods lowers the risk of stroke.

Table 4: Respondents' Awareness on Daily Activities, Measures to Reduce Stress and Complications (n=106)

Variables	Number	Percentage
Daily activities (5 days a week) *		
Daily home activities like gardening and mopping for 30 minutes	93	87.7
Moderate-intensity activities like yoga and badminton for 30 minutes daily	88	83.0
Sweat-inducing activities for 30 minutes daily,	74	69.8
Vigorous-intensity activities like running and heavy lifting for 20 minutes daily	38	35.8
Measures to reduce stress *		
Interacting with family	102	96.2
Practicing meditation, yoga, and dhyana	97	91.5
Visiting friends, family, and relatives	90	84.9
Sleep for 6-8 hours per day	81	76.4
Staying busy	81	76.4
Brisk walking	46	43.4
Consequences of stroke *		
Unable to walk	93	87.7
Unable to speak or loss of speech	87	82.1
Paralysis of limbs for lifelong	70	66.0
Loss of vision	70	66.0
Loss of memory	56	52.8
Loss of ability to control bowel and bladder	42	39.6

**Multiple responses*

Table 4 reveals that most of the respondents, were aware of daily home activities like gardening and mopping (87.7%) and moderate activities like yoga and badminton (83.0%) for 30 minutes, 5 days a week and 35.8% recognized vigorous activities like running and heavy lifting to 20 minutes could prevent stroke. Regarding stress reduction measures, almost all the respondents mentioned interacting with family (96.2%), practicing meditation (91.5%), and visiting friends and relatives (84.9%). Regarding the consequences of stroke, 87.7% of respondents mentioned inability to walk, 82.1% said loss of speech, and 66.0% said lifelong limb paralysis.

Table 5: Respondents' Level of Awareness on Stroke

Level of awareness	Number	Percentage
Good (≥75%)	43	40.6
Fair (50-74%)	52	49.1
Poor (0-49%)	10	9.4
Total	**106**	**100**

Table 5 presents the respondents' level of awareness regarding stroke. Nearly half (49.1%) had a fair level of awareness, 40.6% had a good level of awareness and only 9.4% had a poor level of awareness of stroke.

Table 6: Association between the Level of Awareness and Demographic and Disease Related Variables (n=106)

Variables	Level of awareness			Chi-square	*p* value
	Poor	Fair	Good		
	No. (%)	No. (%)	No. (%)		
Age (in completed years)				0.851	0.323
≤ 50	4(9.3)	20(46.5)	19(44.2)		
>50	6(9.7)	32(51.6)	24(38.7)		
Sex				1.756	0.416
Male	4(6.5)	31(50.0)	27(43.5)		
Female	6(14.0)	19(44.2)	18(41.9)		
Place of residence				22.665	0.001*
Urban municipality	1(1.6)	26(41.3)	36(57.1)		
Rural municipality	9(21.4)	26(61.9)	7(16.7)		
Marital status					0.512[a]
Married	10 (9.8)	50(49.0)	42(41.2)		
Unmarried	0(0.0)	2(66.7)	1(33.3)		
Educational status				17.339	0.001*
Non- formal	7(18.4)	25(65.8)	6(15.8)		
Formal	3(4.5)	27(40.3)	37(55.2)		
Duration of hypertension				0.147	0.929
<7 years	6(60.0)	28(53.8)	23(53.5)		
≥7 years	4(40.0)	24(46.2)	20(46.5)		
Duration of anti-hypertensive medicine intake				0.689	0.709
<7 years	7(70.0)	31(59.6)	24(55.8)		
≥7 years	3(30.0)	21(40.0)	19(44.2)		
Regular medicine intake					0.003[a]*
Yes	7(70.0)	50(96.2)	43(100.0)		
No	3(30.0)	2(3.8)	0(0.0)		
Regular follow-up visits					0.005[a]*
Yes	7(7.1)	48(49.0)	43(41.0)		
No	3(42.9)	4(57.1)	0(0.0)		
Presence of co-morbidities				1.400	0.497
Yes	9(11.4)	39(49.4)	31(39.2)		
No	1(3.8)	13(50.8)	12(46.2)		
History of stroke in family				2.717	0.257
Yes	0(0.0)	6(42.9)	8(57.1)		
No	10(11.0)	46(50.5)	35(38.5)		

[a]*Fischer exact test is computed for value*

**Significance level ≤ 0.05*

Table 6 shows that there is a significant association between respondents' level of awareness regarding stroke and selected socio-demographic variables including place of residence (p = 0.001) and educational status (p = 0.000). A significant association was also found between stroke awareness and regular medication intake (p=0.003) and regular follow-up visits (p = 0.005). No significant associations were observed with other variables.

DISCUSSION

This study assessed stroke awareness among patients with hypertension. In this study, the mean age of respondents was 53.4 years (SD ± 12.372). This finding is similar to studies conducted in Saudi Arabia and Ethiopia which reported mean ages of 55.7 years (SD ± 8.16) and 54.1 years (SD ± 9.5), respectively. [24,26] In this study, 41.5% of respondents correctly identified the meaning of stroke as a sudden interruption of blood flow to the brain that leads to paralysis. In contrast a study from Dhulikhel, Nepal reported that only 2.5% of respondents identified blocked blood vessels as the cause of stroke.[15]

Regarding the risk factors of stroke, in the present study 82.1% of respondents recognized alcohol intake, 81.1% high blood pressure, 74.5% stress, 73.6% smoking, and 71.7% high cholesterol. These findings are similar to the study conducted in Ethiopia and Pakistan, where 96.6% [26] and 93.5[27] respectively said high blood pressure a major risk factor. In another study in South India,74.5% of participants recognized stress and 71.7% recognized high cholesterol as risk factors for stroke, consistent with the present study's results.[25] In contrast, a study conducted in Dhulikhel, Nepal reported significantly lower awareness, with only 43.9% of respondents recognizing high blood pressure as a risk factor.[15]

In the present study, regarding awareness of stroke warning signs and symptoms, 77.4 % of respondents said sudden difficulty walking and 76.4% numbness in the face, arm, or leg. These findings are similar to a study conducted in Pakistan where 66.9% of respondents recognized limb weakness or numbness .[27.] This finding contrasts with the study conducted in Iraq where 29.8% of respondents recognized facial, arm, or leg numbness or weakness as warning signs.[23] Similarly, in a study conducted in Saudi Arabia, 54% of respondents were aware of weakness or numbness on one side of the body, and 51.5% recognized severe headaches as warning signs.[24] In India, 44.7% to 47.3% of respondents knew about sudden numbness or weakness, difficulty speaking, and trouble walking.[25]

Regarding respondents' awareness of immediate actions for those who show warning signs and symptoms, 65.1% said to take them to the hospital immediately. The finding is lower than studies conducted in Dhulikhel, Nepal, and Pakistan where 85.7% and 87.5% of respondents said that a person should be taken to the hospital immediately.[15,27]

In the present study, the majority of respondents (93.4%) recognized that consuming a low-salt diet and avoiding alcohol are important preventive measures against stroke. This aligns with the widely accepted DASH (Dietary Approaches to Stop Hypertension) principles, which emphasize reduced sodium intake and healthy lifestyle practices. In contrast, a study from Morang, Nepal found that respondents primarily emphasized the importance of regular follow-up visits and effective management of hypertension as key preventive strategies. [29] Similarly, in Ethiopia, respondents said treating hypertension could prevent stroke.[26] These differences may reflect variations in health education, accessibility of healthcare services, and public awareness across regions. Overall, the findings from all three studies highlight the importance of taking several steps to prevent stroke. These include eating a healthy diet, taking medicines regularly as prescribed, visiting the doctor for regular check-ups, and keeping blood pressure under control.

In the present study, 40.6% had a good level of awareness, 49.1% had a fair level, and 9.0 % had a poor level of awareness of stroke prevention. This finding is similar to a study conducted in Bharatpur, Nepal where 51.6% of respondents had good knowledge, 32.6% had fair knowledge, and 15.8% had poor knowledge.[16] This finding

is higher than international studies conducted in Ethiopia 24.9%[26], Indonesia 22.54%[20] and Uttarakhand, India 24% [21], who reported low awareness levels. In a study from Chitwan, Nepal 61.3% of participants had poor stroke awareness.[14]

In this study, the level of awareness of stroke showed statistically significant associations with place of residence (p =0.001), educational status (p = 0.001), regular medicine intake (p = 0.003), and regular follow-up schedule (p = 0.005). These findings are consistent with studies conducted in Nepal, where a significant association was found between stroke awareness, educational status (p = 0.048) and place of residence (p < 0.001), [14] as well as other studies showing associations between educational status (p = 0.001)[16], education level and knowledge (p = 0.001). [29]

CONCLUSION

The findings of this study conclude that patients with hypertension have a fair level of awareness of stroke. However, there is a need for more targeted awareness programs focusing on lifestyle modifications, health promotion, and adherence to antihypertensive treatment. In addition, programs should emphasize the importance of a balanced diet, including low-salt intake, regular consumption of fruits and vegetables, and avoiding alcohol, to help prevent stroke and improve overall health in patients with hypertension.

Conflict of Interest

The authors declare that no conflict of interest.

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