

Knowledge on Prevention of Stroke and Its Associated Factors Among Hypertensive Patients at Debre Tabor General Hospital: An Institution-Based Cross-Sectional Study

Nigusie Selomon Tibebe ¹
Tigabu Desie Emiru ¹
Chalie Marew Tiruneh ¹
Adane Birhau Nigat²
Moges Wubneh Abate²
Agimasie Tigabu Demelash ²

¹Department of Pediatrics and Child Health Nursing, College of Health Sciences, Debre Tabor University, Debre Tabor, Ethiopia; ²Department of Adult Health Nursing, College of Health Sciences, Debre Tabor University, Debre Tabor, Ethiopia

Introduction: Globally, stroke is the second leading cause of death. About 70% of strokes were occurring in low- and middle-income countries, and high blood pressure is the main risk factor of stroke due to its poor recognition of stroke prevention methods. Therefore, the study aimed to assess knowledge on stroke prevention and its associated factors among hypertensive patients at Debre-Tabor General Hospital, Northwest Ethiopia, 2020.

Methods: An institutional-based cross-sectional study was conducted in Debre-Tabor General Hospital from February 20 to March 20/2020. A systematic random sampling technique was used. Data were collected through an interviewer-administered questionnaire. Data were entered into Epi data version 4.2.0.0 and exported to SPSS version 25 for cleaning and analysis. A reliability test was done, and the Cronbach alpha coefficient value was 0.709. Bivariate and multivariable binary logistic regression analyses were done, and variables with a p-value of ≤ 0.05 in the multivariable analysis were considered as statistically significant at a 95% confidence interval.

Results: From 423 study participants, 410 of them responded completely and a response rate is 96.92%. Among the total respondents, 24.9% (95% CI: 20.7, 29.3) of participants had good knowledge of stroke prevention methods. Young age (AOR: 2.082; 95% CI (1.071, 4.049)), urban residence (AOR: 3.230; 95% CI (1.665, 6.267)), and having long followed-up duration (AOR: 3.015; 95% CI (1.870, 4.861)) were factors associated with good knowledge on stroke prevention methods.

Conclusion: This study revealed that participants had poor knowledge of stroke prevention. Young age, urban residence, and having long duration hypertension follow-up were predictors of good knowledge on stroke prevention. These findings have immense importance of different stakeholders that have responsibilities on the reduction of hypertension complications characteristically stroke. Further, it is chief for health-care providers for hypertension intervention activities.

Keywords: knowledge, prevention, stroke, Debre Tabor General Hospital, Ethiopia

Background

Globally, stroke is the second leading cause of death. About 70% of strokes were occurring in low- and middle-income countries. Furthermore, over the last four decades, the stroke incidence in low- and middle-income countries has more than doubled.^{1,2}

Even though stroke is preventable through the prevention of modifiable risk factors, it is one of the leading causes of death and disability worldwide.³ For example, people with hypertension were four times more likely to have a stroke

Correspondence: Nigusie Selomon Tibebe
Department of Pediatrics and Child Health Nursing, College of Health Sciences, Debre Tabor University, Debre Tabor, Ethiopia
Email nigie1221@gmail.com

than those with normal blood pressure.⁴ As a result, hypertension (HTN) is the most common modifiable risk factor for stroke.⁵ Additionally, about 80% of people who had high blood pressure were attacked by stroke.⁶

As the studies conducted in Nepal and Australia, educational status was a statistically significant predictor of knowledge on stroke prevention; indicating that achieving higher educational level results in good stroke prevention modality.⁷⁻¹⁰

As the study conducted in India among people with hypertension on knowledge of stroke prevention revealed that 70% of hypertensive patients had inadequate knowledge, 30% had moderate knowledge regarding.¹¹

Another study conducted in Nigeria among hypertensive patients on knowledge and practices of stroke prevention showed that 90.8% of the study participants had good knowledge of stroke prevention modalities.¹²

According to the World Health Organization report (2017) in Ethiopia, stroke was the second leading cause of death (6.23%) and it was a massive financial burden not only for patients but also for society as a whole. Therefore, public stroke knowledge will be the key tip in stroke prevention activities.⁸

Furthermore, people with hypertension are at high risk for developing a stroke.¹³⁻¹⁵ Therefore, to prevent the occurrence of stroke assessing the knowledge of hypertensive patients about prevention is decisive. For this reason, this study was aimed to assess knowledge on stroke prevention and its associated factors among hypertensive patients.

Methods and Materials

Study Area

The study was conducted at Debre-Tabor General Hospital, which is found in the Debre-Tabor town. It is located 667 kilometers far from Addis Ababa; the capital city of Ethiopia and 103 kilometers from the city of Amhara regional state, Bahir Dar. Annually, the hospital provides a service for more than a hundred thousand patients. Monthly and approximately 856 hypertensive patients had a follow-up at the chronic clinic.

Study Design and Period

An institution-based cross-sectional study design was used from February 20 to March 20, 2020.

Source Population

- All hypertensive patients who have followed-up at DTGH chronic illness follow-up clinic.

Study Population

- All hypertensive patients who came to Debre-Tabor General Hospital chronic illness follow-up clinic during the data collection period.

Inclusion Criteria

- All hypertensive patients who were aged ≥ 18 years came to DTGH's chronic illness follow-up clinic during the data collection period.

Exclusion Criteria

- All hypertensive patients were seriously ill and unable to communicate.

Sample Size Determination

The sample size was calculated using single population formula by considering P as 50% (no previous study was done), with a 95% confidence level, and a 5% margin of error.

$$n = \left(\frac{Za}{2}\right)^2 * p(1 - P)/d^2$$

Where;

- n - is the estimated sample size
- p - is the proportion of patients who have good knowledge of stroke prevention
- d - is the margin of error

Then;

$$n = \frac{1.96^2 * 0.5(1 - 0.5)}{(0.05)^2} = 384$$

By adding a 10% non-response rate the final sample size was 423.

Study Variables

Dependent Variables

- Knowledge of stroke prevention methods (Good or poor).

Independent Variables

- Socio-demographic characteristics (age, sex, religion, residence, occupational status, educational status, marital status, income status).
- Clinical variables (duration of hypertension, previous history of stroke, family history of stroke, and DM).

Operational Definition

Hypertension

A diagnosis of high blood pressure: a health worker had told the participant that they had elevated blood pressure. It is defined as systolic blood pressure greater than or equal to 140 mmHg and/or diastolic blood pressure greater than or equal to 90 mmHg and/or receiving treatment for high blood pressure.

Knowledge on Stroke Prevention

It was assessed by asking the participants to give a response to 11 stroke prevention knowledge-related questions. Each correct answer was recorded as 1 and the incorrect answer as 0. The mean of the answers was considered to categorize the participants as having good stroke prevention knowledge and having poor stroke prevention knowledge.¹²

Good Knowledge of Stroke Prevention

Participants who had scored the mean value and above of stroke prevention knowledge-related questions.

Sampling Methods and Procedures

The study was conducted at Debre-Tabor General Hospital's chronic illness follow-up clinic. A systematic random sampling technique was used to select the study participants. Approximately 856 patients were having follow-up service in the clinic monthly. The first participant was selected using the lottery method. Then, the study participants were interviewed every two patients; hence, the interval (k-value) was approximately 2 ($856/423 = 2$).

Data Collection Techniques and Tools

A structured closed-ended questionnaire adapted from different kinds of literature^{12,16,17} was used. Data were collected through face-to-face interviews. The questionnaires consisted of four parts: namely, socio-demographic factors, clinical variables, risk factors of stroke, and knowledge on stroke prevention. Three data collectors and one supervisor have participated in the data collection process.

Data Quality Control Measures

Both the data collectors and the supervisor were trained for one day. The questionnaire was translated into Amharic, the national language of Ethiopia, and back-translated to English for its consistency. A pretest was conducted 5% (22 samples) of the samples at Nefas Mewucha Hospital. Furthermore, a reliability test was done with the Cronbach alpha coefficient, and its value

was 0.709. Finally, data were checked for its completeness before entry to computer software for analysis.

Data Processing and Analysis

Data were entered and coded into Epi data version 4.2.0.0 and exported to SPSS version 25.0 for cleaning and analysis. Descriptive statistics were summarized in percentage and frequency. And inferential statistics like odds ratio, binary logistic regression, and multiple logistic regression were used to determine the association between the dependent variable and different independent factors. Statistical significant variables ($p < 0.25$) in the binary logistic regression analysis were entered for multivariable analysis and P-value less than 0.05 was considered as significant at 95% CI. Hosmer and Lemeshow goodness-of-fit test was checked.

Results

Socio-Demographic Characteristics of Study Participants

Out of 423 study participants, 410 responded completely with a response rate of 96.92%. Among the respondents; 63.9% of them were men and the majority (88%) of them were forty-five years and above with a mean age of 55.7 and $SD \pm 9.5$ years.

Regarding religion; 91.0% of the respondents were orthodox Christians. The majorities (72.7%) of them were urban residents and 84.1% of them were married. Approximately three-fourth (70.5%) of the respondents were educated and one-third (33.4%) of them were government workers (Table 1).

Clinical Variables

The majority of the respondents (60.5%) were diagnosed with hypertension in the past five years. Most (97.1%) of the respondents had no previous history of stroke. Moreover, about 4.4% of the respondents had a family history of stroke and 6.3% of them had diabetic Mellitus concomitantly (Table 2).

Risk Factors of Stroke Responded by Participants

About 96.6% of the respondents were identified high blood pressure as the risk factor for stroke followed by heart diseases (64.4%), excess alcohol drinking (63.7%), diabetic Mellitus (61.2%), and smoking (60.7%) (Table 3).

Table 1 Socio-Demographic Characteristics of Hypertensive Patients at Debre Tabor General Hospital, Northwest Ethiopia, 2020 (n=410)

Variables	Category	Frequency	Percent (%)
Sex	Male	262	63.9
	Female	148	36.1
Age	< 45	49	12.0
	≥ 45	361	88.0
Residence	Urban	298	72.7
	Rural	112	27.3
Religion	Orthodox	373	91.0
	Muslim	37	9.0
Educational status	Unable to read and write	121	29.5
	Able to read and write	289	70.5
Marital status	Single	25	6.1
	Married	345	84.1
	Widowed	40	9.8
Occupational status	Government worker	137	33.4
	Merchant	120	29.3
	Farmer	94	22.9
	Housewife	40	9.8
	Retired	10	2.4
	Labor worker	6	1.5
Income status	< 5000 ETB	287	70.0
	≥ 5000 ETB	123	30.0
Source of information (more than one choice)	Radio	69	16.8
	TV	148	36.1
	Health professions	376	91.7

Abbreviations: ETB, Ethiopian birr; TV, television.

Stroke Prevention Questions Responded by Respondents

Ensuring appropriate treatment of hypertension was the most identified stroke prevention method, which was responded to by three hundred ninety-one respondents, whereas only thirty participants responded to regular blood donation as one of the stroke prevention methods (Table 4).

Knowledge of Participants on Stroke Prevention Methods

One hundred two (24.9%) of the respondents had good knowledge of stroke prevention methods (Figure 1).

Table 2 Clinical Characteristics of Hypertensive Patients at Debre Tabor General Hospital, Northwest Ethiopia, 2020 (n=410)

Variables	Category	Frequency	Percent (%)
Duration of hypertension	< 5 years	248	60.5
	≥ 5 years	162	39.5
Previous history of stroke	Yes	12	2.9
	No	398	97.1
Family history of stroke	Yes	18	4.4
	No	392	95.6
Having diabetic Mellitus	Yes	26	6.3
	No	384	93.7
Stroke victim	Yes	33	8.0
	No	377	92.0
Appropriate treatment of HTN	Yes	391	95.4
	No	19	4.6

Factors Associated with Knowledge on Stroke Prevention Methods

Bivariable and multivariable logistic regression analyses were used to determine factors affecting knowledge on the prevention of stroke. On bivariate analysis; age, sex, residence, educational status, duration of hypertension, family history of stroke, having diabetic Mellitus comorbidity, and income status were found to be significantly associated with knowledge on prevention of stroke. For adjusting potential confounders, those variables which were significant at bivariable analysis were entered into multivariable logistic regression. The result revealed that younger age, urban residence, and long duration of hypertension were significantly associated with knowledge on prevention of stroke. However, the remaining listed above variables were not significant at a p -value ≤ 0.05 .

Younger patients were two times more likely to have good stroke prevention knowledge as compared with older patients (AOR: 2.082; 95% CI (1.071, 4.049)). Similarly, urban residents were 3.2 times higher to had good stroke prevention knowledge than patients from a rural area (AOR: 3.230; 95% CI (1.665, 6.267)).

Patients diagnosed with hypertension five years ago were three times more likely to have good stroke prevention knowledge as compared with those diagnosed in the past five years (AOR: 3.015; 95% CI (1.870, 4.861)) with a p -value of ≤ 0.05 (Table 5).

Table 3 Stroke Risk Factors of Hypertensive Patients at Debre Tabor General Hospital, Northwest Ethiopia, 2020 (n=410)

Variables	Category	Frequency	Percent
High BP	Yes	396	96.6
	No	14	3.4
Diabetes mellitus	Yes	251	61.2
	No	159	38.8
Heart disease	Yes	264	64.4
	No	146	35.6
Abnormal blood cholesterol level	Yes	57	13.9
	No	353	86.1
Unhealthy diet/excess fat in the diet	Yes	96	23.4
	No	314	76.6
Smoking	Yes	249	60.7
	No	161	39.3
Obesity	Yes	167	40.7
	No	243	59.3
Drinking excessive alcohol	Yes	261	63.7
	No	149	36.3
Physical/emotional stress	Yes	116	28.3
	No	294	71.7
Sedentary lifestyle	Yes	70	17.1
	No	340	82.9
Sexual intercourse	Yes	12	2.9
	No	398	97.1
Sudden exposure to cold weather	Yes	111	27.1
	No	299	72.9
Sudden loss of vision	Yes	216	52.7
	No	194	47.3
Sudden loss of memory	Yes	83	20.2
	No	327	79.8

Abbreviation: BP, blood pressure.

Discussion

The prevention of stroke in a hypertensive patient is highly important in the promotion of health and to improve the quality of life, and reduce the prevalence rate of chronic illness. If the people have adequate knowledge regarding the prevention of stroke, that can prevent not only the severity of complications (ie, stroke) but also death. The present study was conducted to assess the level of knowledge of hypertensive patients regarding the prevention of stroke.

Due to the increasing impact of chronic diseases (eg hypertension) which leads to stroke on the community,

Table 4 Stroke Prevention Methods of Hypertensive Patients at Debre Tabor General Hospital, Northwest Ethiopia, 2020 (n=410)

Variables	Category	Frequency (N)	Percent (%)
Engage in regular physical exercise	Yes	111	27.1
	No	299	72.9
Lose weight (if overweight or obese)	Yes	218	53.2
	No	192	46.8
Ensure appropriate treatment of hypertension	Yes	391	95.4
	No	19	4.6
Control blood sugar level	Yes	215	52.4
	No	195	47.6
Avoid or quit smoking	Yes	212	51.7
	No	198	48.3
Reduce consumption of fatty foods	Yes	99	24.1
	No	311	75.9
Eat fruits and vegetables regularly	Yes	32	7.8
	No	378	92.2
Avoid excessive alcohol intake	Yes	257	62.7
	No	153	37.3
Females should avoid the use of oral contraceptives	Yes	52	12.7
	No	358	87.3
Ensure appropriate treatment of heart diseases	Yes	221	53.9
	No	189	46.1
Donate blood regularly	Yes	30	7.3
	No	380	92.7

prevention, and health promotion have become increasingly important over the past few decades.¹⁸

This is our new information from the survey to show the level of knowledge about the prevention of stroke among hypertensive patients. Above and beyond, knowledge of hypertensive patients on preventive methods of stroke is essential to prevent stroke morbidity and mortality.

In this study, 24.9% (95% CI; 20.7, 29.3) of the participants had good knowledge of stroke prevention methods, which is lower than the study conducted in Nigeria (90.8% 49.4%)^{12,19} Vienna (77%),²⁰ and Kerala (78.3%).¹¹ This incongruity might be due to differences in the socio-economic and socio-demographic characteristics of the participants. But, it is higher than the study conducted in India and China (30%),^{11,21} Hegarmanah Village

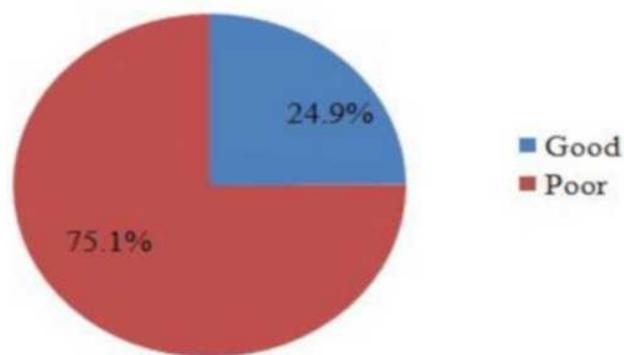


Figure 1 Knowledge on stroke prevention of hypertensive patients at Debre Tabor General Hospital, Northwest Ethiopia, 2020 (n=410).

Jatinangor (10%).²² The possible reason might be due to population size which cannot address the information regarding knowledge on stroke prevention modalities.

In the present study, age was one of the predictors of knowledge on stroke prevention among hypertensive patients. Younger aged hypertensive patients were 2.08 times more likely to have good stroke prevention knowledge than older-aged patients [AOR: 2.08 (1.071–4.049)].

The reason might be due to younger individuals are engrossed to use different technologies to get stroke-related information, whereas older individuals are not.

An-other predictor of knowledge on stroke prevention among hypertensive patients was the residence. Urban residents were 3.23 times more likely to have good knowledge on stroke prevention than those who were in rural [AOR: 3.23 (1.665–6.267)]. The result is supported by the research done in Nigeria.²³ The possible reasons might be due to the availability of accessed information in urban than rural areas.

Knowing the duration of hypertension in hypertension management has great importance for the occurrence of hypertension-related complications in developing countries. In this study, patients diagnosed with hypertension before five years were 3.02 times more likely to have knowledge on stroke prevention than those diagnosed in the past five years [AOR: 3.02 (1.870–4.861)]. The possible reasons might be due to redundant contact with health-care providers for follow-up purposes which results in access to information about prevention modalities of stroke.

Table 5 Factors Associated with Knowledge of Stroke Prevention Methods Among Hypertensive Patients at Debre Tabor General Hospital, Northwest Ethiopia, 2020 (n=410)

Variables	Category	Knowledge of Stroke Prevention		COR (95% CI)	AOR (95% CI)
		Good	Poor		
Age	< 45	18	31	1.915 (1.020–3.595)	2.082 (1.071–4.049)*
	≥ 45	84	277		
Sex	Male	71	191	1.403 (0.868–2.269)	1.436 (0.847–2.435)
	Female	31	117		
Residence	Urban	90	208	3.606 (1.886–6.892)	3.230 (1.665–6.267)**
	Rural	12	100		
Educational status	Unable to read and write	14	107		
	Able to read and write	88	201	3.346 (1.817–6.163)	1.969(0.889–4.363)
Duration of hypertension	< 5 years	41	207		
	≥ 5 years	61	101	3.049 (1.921–4.839)	3.015 (1.870–4.861)**
Family history of stroke	Yes	7	11	1.989 (0.750–5.276)	1.492(0.523–4.259)
	No	95	297		
Having DM co-morbidity	Yes	11	15	2.361 (1.047–5.323)	1.952(0.803–4.747)
	No	91	293		
Income status	< 5000 ETB	65	222		
	≥ 5000 ETB	37	86	1.469 (0.915–2.361)	1.573(0.902–2.743)

Notes: | = Reference group, *P<0.05= statistically significant, **P<0.01=highly statistically significant.

Abbreviations: COR, crude odds ratio; AOR, adjusted odds ratio; CI, confidence interval.

Limitation of the Study

Since the study was institutionally based generalization of the findings to the general population is limited; too, since it was restricted to a public hospital, hypertensive patients who are considered economically sufficient may have a follow-up at a private hospital. Moreover, the study is limited by the fact that it was cross-sectional and used close-ended questions. This might have limited the participants' responses regarding their knowledge of stroke prevention modalities.

Conclusion

The study revealed that hypertensive patient's knowledge about stroke prevention methods was poor. Being young age, urban residence and long duration of hypertension follow-up were the predictors of knowledge on prevention of stroke.

These findings have immense importance for different stakeholders who have responsibilities on the reduction of hypertension complication routinely stroke, besides to this, it is chief for health-care providers for hypertension intervention activities.

Abbreviations

AHA, American Heart Association; AOR, Adjusted Odds Ratio; CI, Confidence Interval; COR, Crude Odds Ratio; DM, Diabetic Mellitus; DTGH, Debre-Tabor General Hospital; ETB, Ethiopian Birr; HTN, Hypertension; WHO, World Health Organization.

Data Sharing Statement

Data will be available upon request from the corresponding author.

Ethical Approval and Consent to Participate

Ethical clearance was obtained from the College of Medicine and Health Science's Ethical Review Board on behalf of Wollo University. Verbal consent was obtained from all study participants before the interview. The verbal informed consent was acceptable and approved by the Ethical review board on the behalf of Wollo University because of the educational status of the participant (ie ability to read and write), and that this study was conducted under the declaration of Helsinki. A formal letter of cooperation was written to Debre Tabor General Hospital administrative office from Wollo University and permission was obtained from the hospital administrative office. Study participants

were informed about the purpose and their right to refuse the study.

Acknowledgments

The authors would like to thank the University for its Financial Support. Besides, we want to acknowledge data collectors and supervisors for their commitment to collect the data accurately.

Author Contributions

All authors made substantial contributions to conception, design, acquisition of data, or analysis and interpretation of data. And took part in drafting the article or revising it critically for important intellectual content; agreed to submit to the current journal; gave final approval of the version to be published, and agree to be accountable for all aspects of the work. All authors have read and approved the final manuscript.

Funding

This research did not receive any grant from any funding agency in the public, commercial, or not-for-profit sectors.

Disclosure

The authors report no conflicts of interest for this work.

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