

KNOWLEDGE ABOUT STROKE AND ASSOCIATED FACTORS AMONG
HYPERTENSIVE PATIENTS ON FOLLOW UP AT PUBLIC HOSPITALS IN
JIMMA TOWN, SOUTHWEST ETHIOPIA, 2022

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ABSTRACT

Introduction: Stroke related knowledge is one of the determinants of stroke prevention practices. Having knowledge on prevention methods helps to prevent the severe complication of hypertension (stroke) and the forthcoming burden related to complications and death. However, to the investigator's searching capacity; study regarding knowledge about stroke its associated factors is not well understood in its fundamental level.

Objective: To assess knowledge about stroke and associated factors among hypertensive patients on follow-up at public hospitals in Jimma town, Southwest Ethiopia, 2022.

Methods: Facility based cross-sectional study was conducted at public hospitals in Jimma town from July 8 –September 5, 2022, among 401 hypertensive patients. A systematic random sampling technique was used for the selection of participants. Data were collected using interviewer-administered questionnaire, and record review chart, entered into Epi-data version 4.6, and then exported to the statistical package for social science version 25 for analysis. Frequencies, percentages, mean, median, standard deviation and interquartile ranges were used for descriptive analysis. Binary logistic regression was done to identify factors associated with knowledge about stroke. The strength of association was measured by the adjusted add ratio with its 95% confidence interval, and a P- value < 0.05 was considered statistically significant. Finally, the result was presented with tables, charts, and text.

Result: In this study, 401 participants completely responded to the interview; which yielded a response rate of 98.28%. Ninety-seven (24.2%) of the respondents had good knowledge about stroke. The educational level of college or above (AOR=3.7,95%CI;1.76,8.00), age less or equal to 45 years(AOR=2.6, 95%CI;1.54,4.50), urban residency(AOR=3.9, 95%CI; 2.22 ,6.82), perceived risk of stroke(AOR=1.9, 95%CI;1.10,3.27), history of stroke (AOR = 2.6, 95% CI;1.41,5.13), and duration of diagnosis for 5 years or more (AOR=2.7, 95% CI; 1.41,5.13) were factors significantly associated with good knowledge about stroke among hypertensive patients.

Conclusion and recommendations: About three out of four hypertensive patients on follow-up at public hospitals found in Jimma town had poor knowledge about stroke. So, improving this level of knowledge requires collaborative intervention of Jimma town public hospitals administrations, stakeholders, and health care providers.

Keywords: stroke, hypertension, patient, knowledge, follow up, Ethiopia.

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ABBREVIATIONS AND ACRONYMS

AOR:	Adjusted Odd Ratio
CI:	Confidence Interval
CNS:	Central Nervous System
COR:	Crude Odd Ratio
DBP:	Diastolic Blood Pressure
FMOH:	Federal Ministry Of Health
LMIC:	Low and Middle Income Countries
MMHG	millimeter Mercury
NCD:	Non-Communicable Disease
NINDS	National Institute of Neurological Disorders and Stroke
SBP:	Systolic Blood Pressure
SPSS:	Statistical Package for Social Science

CHAPTER 1: INTRODUCTION

1.1 Background

Stroke is defined as a neurological deficit attributed to acute focal injury of the central nervous system (CNS) by vascular cause; which ultimately affects the brain, retina, and spinal cord(1). It is mainly characterized by the sudden manifestation of trouble in balance or coordination, blurred or double vision, weakness of arm and leg, paralysis of one side of the body, sudden onset of headache, and speech difficulty(2).

Anyone can have a stroke at any age. However, the chance of developing a stroke increases with the presence of risk factors. Some risk factors for stroke can be modified, while others can't(3). Hypertension, physical inactivity, dyslipidemia, reduced green vegetables in the diet, increased salt in the diet, obesity, smoking(current smoker), stress, atrial fibrillation, coronary artery disease, alcohol and, diabetes mellitus are modifiable risk factors. Whereas, baseline age >50 years and family history of cardiovascular disorder are non-modifiable(3–6).

Hypertension is the most essential and prime modifiable risk factor for stroke and the actual risk of stroke increased four folds among people with hypertension than those with normal blood pressure (3,4,7,8). As it is witnessed by a systematic review and meta-analysis of the studies, 49% of strokes that happened in Ethiopia are contributed to hypertension(9). However, with adequate management of cases and modification of risk factors, stroke and its burden can be prevented(10).

In a country like Ethiopia, where there is insufficient manpower, and advanced medical supplies to manage stroke, prevention remains the only feasible option. Yet, the successful prevention of stroke demands adequate knowledge among hypertensive patients(11). In another word, developing a preventive behavior is predominantly dependent on knowledge about stroke(11–19). Loss of brain tissue is expeditious and irreversible as stroke progress, so it needs an emergent substitution of therapeutic interventions(20). Thus, early recognition of stroke is very crucial (13,14,21).

In Ethiopia, with the high prevalence of stroke risk factors, it demands communities' knowledge especially, those at high risk, to prevent stroke. Recognizing the emerging non-communicable diseases and their burdens, the federal ministry of health (FMOH) has prepared a national strategic plan to reduce avoidable mortalities of non-communicable diseases through strategies like increasing community awareness (22).

1.2 Statement of the problem

Globally, 80 million people living today once experienced a stroke. There are over 13.7 million new strokes each year, and five and a half million people die from strokes annually. Stroke is the second leading cause of death, and the third leading cause of disability in adults, as well as, survivors of stroke often experience loss of function, and they become dependent financially and socially (1,23–26). Additionally, it is taking 34% of the total health expenditure, which is estimated to be 9.83 trillion United States Dollars (27,28).

Trend analysis of stroke incidence indicated a consistent decline in high-income countries (29). However, there is an increasing trend in low and middle-income countries(LMIC) (30). Consequently,70% of strokes related deaths and 87% of disability-adjusted life-years occur in LMIC (31–33).

In Ethiopia, stroke is a prevalent disease with a resultant increase in mortality (9,34–36). According to the estimates of the global burden of disease study, stroke became the second-highest cause of cardiovascular death, next to coronary heart disease(23). Also, in-hospital mortality due to stroke ranges from 6.04 % to 37.37 % with an average of 14.03% death (37).

Ninety percent of strokes are preventable(4). However, this couldn't come to reality, because of challenges encountered mainly due to inadequate knowledge regarding stroke(20,38–40). For instance, as a result of poor awareness of stroke warning symptoms, 42% of hypertensive patients were lately presented to the hospital(14). The similar scenario was seen in Ethiopia, as the median arrival time to the hospital after the onset of stroke is 24hrs, which is very far from the acceptable 3hrs range of effectiveness of the thrombolytic drug(39).

Poor knowledge about stroke can be contributed to different factors. For instance, people with lower socioeconomic positions have an increased risk of stroke and poorer clinical and functional outcomes after developing a stroke(41,42). On the other hand, evidence shows people with high socioeconomic positions had better knowledge related to disease(43). This

emphasizes the need to take multiple factors into account to understand and improve hypertensive patients' knowledge about stroke (38).

Despite the efforts made to improve public awareness(44,45), stroke is continued to be a big issue of public health (37). In general, in resource-limited settings, many factors can contribute to stroke and its burdens. yet, the level of knowledge of hypertensive patients might have a big share (39,40). Hence, to tackle the increasing burden of stroke, it is important to know the level of knowledge about stroke and its associated factors.

Even though there are some studies conducted to show the level of hypertensive patient knowledge in the country, those studies focused on the Sociodemographic, clinical and behavioral characteristics of the patient. However, personal factor like subjective judgment about the risk of developing stroke and health seeking behaviors were not assessed. Besides, to the best of the investigator's searching capacity, the study regarding stroke-related knowledge among hypertensive patients is lacking in the study area. Therefore, this study aimed to assess knowledge about stroke and its associated factors among hypertensive patients on follow up at public hospitals in Jimma town.

1.3 Significance of the study

Understanding the level of knowledge about stroke helps hypertensive patients to get the appropriate concerns and educational intervention from health care providers so that it assists them in early recognition and prevention of stroke. This study may be helpful to health care providers by pointing out the area of focus regarding the health education of hypertensive patients. Additionally, the findings of this study may also contribute to the body of knowledge that helps in the future growth of the nursing profession.

Officials will also benefit from the current study by receiving up to date information which may help them in allocating the required resources in the area of health education, information dissemination, and awareness creation about stroke. Study hospitals may use the findings of this study to provide better services. It also provides reference data for government and non-governmental organizations who want to work on knowledge of stroke among hypertensive patients. Future researchers can use the findings of this study as input for their studies.

CHAPTER 2: LITERATURE REVIEW

2.1 Level of Knowledge about stroke

Stroke is one of the preventable complications of hypertension. One of the main strategies of stroke prevention is by improving stroke-related knowledge among hypertensive patients (20).

Different studies were conducted across different parts of the world to assess the level of knowledge about stroke. For instance, in a systematic review and meta-analysis of the studies by Melak and his colleagues, the level of good knowledge about stroke among hypertensive and diabetic patients ranged between 4.4% to 79% (38). Similarly, a nationwide cross-sectional study conducted in Spain on knowledge of stroke warning symptoms and intended action in response to stroke indicated that 65.2% of the respondents had adequate knowledge about warning signs of stroke(46).

Across Asian countries, different studies were conducted to assess the level of knowledge about stroke among hypertensive patients. For instance, an institution-based cross-sectional study done in Indonesia on influencing factors of stroke awareness among people with hypertension indicated that 22.54% of the respondents had good knowledge about stroke (47). Similarly, an institution-based study done in Indonesia among hypertensive, diabetic and congestive heart failure patients reported that 30.3% of the respondents had a high level of knowledge(48). Moreover, two different studies conducted in two different settings in India discovered that 24% (49), and 11.43% (50) of the respondents had good knowledge about stroke.

In Africa, studies have been conducted to indicate the level of stroke-related knowledge among hypertensive patients. For instance, a facility-based study done among hypertensive patients on follow up at primary healthcare centers in Morocco showed that 43.6% of the respondents had good knowledge about stroke(51). Similarly, an institution-based study conducted in Ghana among hypertensive-diabetic patients on follow-up reported that 79.18% of the respondents had good knowledge about stroke(52). Further, an institutional-based study done in Nigeria on both hypertensive and diabetic patients on the follow-up

indicated that 70.3% of hypertensive and diabetic patients had good knowledge related to stroke(53). Apart from institution-based studies, a study done in Nigeria among high-risk communities of Anambra State showed that 52.05% of the respondents had poor knowledge of stroke risk factors while 49.32% of them had poor knowledge of stroke warning signs (54).

In Ethiopia, an institution-based study conducted among hypertensive patients on follow-up at Felegehiwot Referral Hospital on the knowledge of warning signs and risk factors of stroke indicated that 18.3% of the respondents had good knowledge about stroke(40). Likewise, a study done at Gondar University referral hospital showed that 40.7% of hypertensive patients had a good level of knowledge about stroke(55). Moreover, a study conducted on knowledge of risk factors and warning signs of stroke among patients with heart diseases at Tikur Ambessa specialized hospital on the follow up indicated that 45.81% of them had adequate knowledge of stroke risk factors, and 42.7% of them had adequate knowledge about stroke warning signs(56).

2.2 Factors associated with knowledge about stroke

2.2.1 Sociodemographic factors

Variations in the level of stroke-related knowledge across different sociodemographic characteristics have been discovered in previous studies. For instance, two institution-based studies conducted in India, and Saudi Arabia indicated that female respondents had better stroke knowledge than their male counterparts (57,58). In the studies, age is another factor which contributes to variations in the level of stroke knowledge among hypertensive patients. For instance, studies conducted in three different settings in Ethiopia among patients on the follow up indicated that younger respondents had better knowledge about stroke than their counterparts(17,40,59).

Literature also indicated that level of education is one of the factors that affect knowledge about stroke among hypertensive patients. According to a systematic review of studies on the effect of socioeconomic position on knowledge of risk factors and warning signs of stroke, people with higher educational levels were likely to have better knowledge than

those with lower education levels (43). Similarly, different studies conducted in India (57), Saudi Arabia (58), Nigeria (53,60), and Ethiopia(17,40,59), indicated that a higher level of education was associated with a higher level of knowledge. However, a study done on awareness of stroke among urban and rural populations of northern Portugal showed that people with low educational levels had better knowledge about vascular risk factors of stroke(61).

Not only the above-mentioned factors but also the place of residency and economic status were sociodemographic factors associated with the level of knowledge about stroke among hypertensive patients. For instance, a study conducted on knowledge of stroke among hypertensive patients at primary health centers in Morocco indicated that respondents who reside in urban areas had better knowledge about stroke than those who reside in rural areas(51). Similarly, studies done in three settings in north Ethiopia showed that being urban in place of residency was associated with a good level of knowledge about stroke (17,40,59). Studies also showed the economic status of the respondents is one of the factors found to affect the level of knowledge. To mention some, two studies conducted in India(57), and Indonesia(47), showed that, respondents with a high level of economic status had better knowledge than those with lower economic status.

2.2.2 Personal factors

An institutional-based cross-sectional study conducted in Indonesia showed that a high level of knowledge on hypertension was associated with a high level of stroke knowledge (47). Additionally, two studies conducted in Ethiopia, and Indonesia showed that, knowing someone with a stroke was associated with a higher level of stroke-related knowledge (40,55).

2.2.3 Behavioral factors

A comparative cross-sectional study conducted in Portugal indicated that smoking is associated with the spontaneous recall of 4 warning signs(62). Additionally, in a hospital-based study done in Ethiopia, respondents who practice regular physical exercise had better knowledge than those who do not(55). Further, in the study done in India, lack of exercise and drinking alcohol were associated with poor knowledge(57).

2.2.4 Clinical factors

Clinical factors were found to be associated with the level of knowledge about stroke among hypertensive patients. For instance, institution-based studies conducted in Ethiopia showed that patients diagnosed with hypertension for more than five years had better knowledge than those who had a duration of diagnosis of less than five years (17,55,59). Additionally, different studies done in Newzealand (21), Norway(63), and Morocco(51), discovered that having a previous history of stroke enhances stroke-related knowledge among hypertensive patients.

Generally, various studies attempted to demonstrate the level of stroke-related knowledge among hypertensive patients. They also discovered that there is variation in stroke-related knowledge between sociodemographic groups, clinical, behavioral, and personal characteristics of the hypertensive patients.

2.1 Conceptual framework

The following conceptual framework was developed after reviewing different literature on factors associated with knowledge about stroke among hypertensive patients in different parts of the world(17,21,59,60,62,63,40,43,47,51,53,55,57,58). The arrows show the direction of association between a centrally situated dependent variable and peripherally located independent variables.

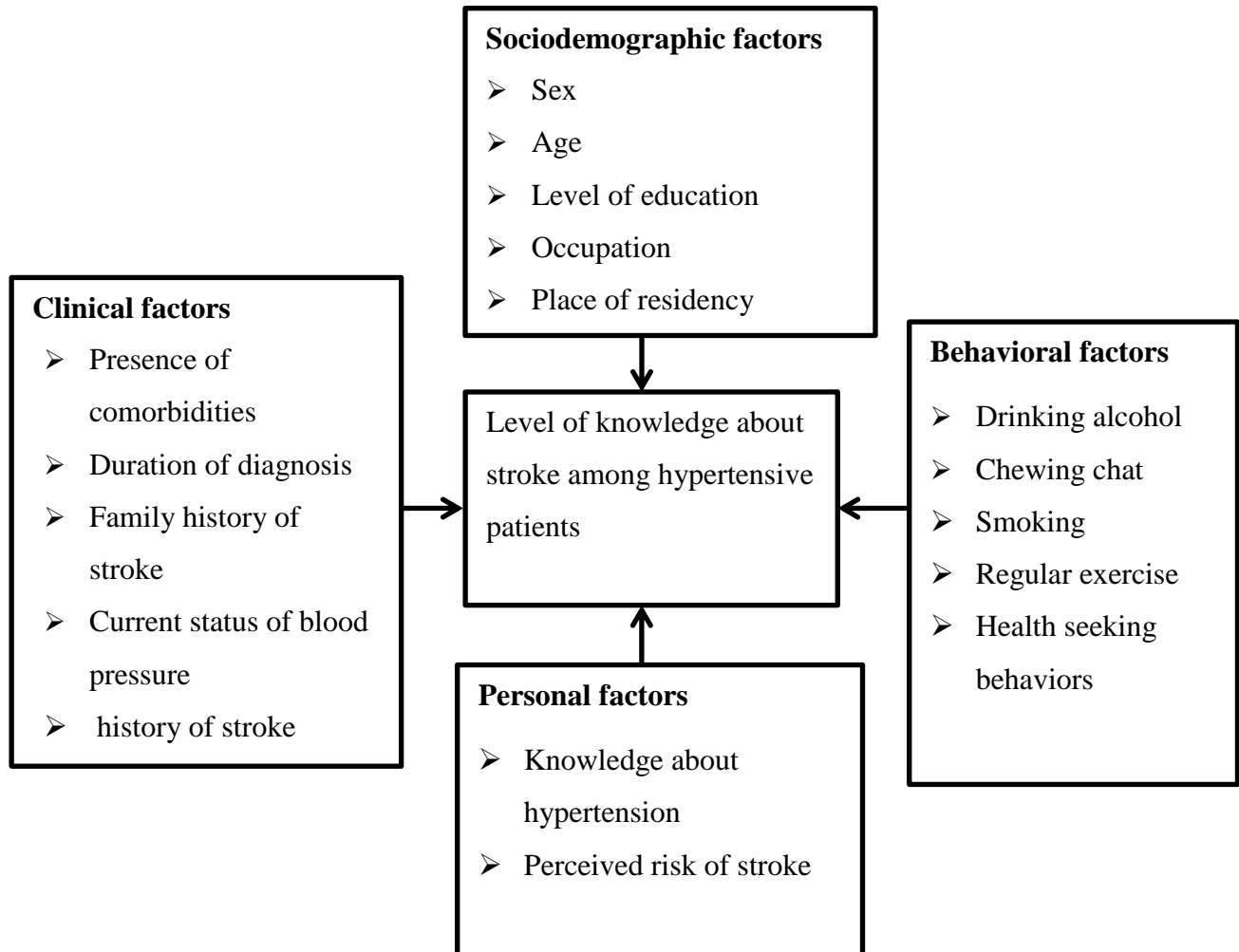


Figure 1: A conceptual framework developed to show factors associated with knowledge about stroke among hypertensive patients on follow-up at public hospitals in Jimma town, Southwest Ethiopia, 2022.

CHAPTER 3: OBJECTIVES

3.1 General objective

To assess knowledge about stroke and associated factors among hypertensive patients on follow-up at public hospitals in Jimma town, Southwest Ethiopia, 2022.

3.2 Specific objectives

- 1 To determine the level of knowledge about stroke among hypertensive patients
- 2 To identify factors associated with knowledge about stroke among hypertensive patients

CHAPTER 4: METHODS AND MATERIALS

4.1 Study Area and Study Period

This study was conducted at public hospitals in Jimma town. Jimma town is in the Oromia region, located 352 kilometers to the Southwest of Addis Ababa. There are two public hospitals in Jimma town. One is Jimma University Medical Center and the other one is Shenen Gibe Hospital. Jimma University Medical Center is one of the oldest public hospitals in the country. It is a renowned hospital in the Southwest part of the country. The hospital has different general departments and speciality units. The hospital provides different services at specific outpatient clinics and inpatient departments (64). There is one chronic disease follow-up unit with five rooms in which hypertensive and other patients with different chronic diseases are receiving care. About 1800 hypertensive patients have been attending their follow-up at Jimma University Medical Center up to July 2022. Eight nurses were working at the chronic follow-up clinic. Shenen Gibe Hospital is a general hospital found in Jimma town. The hospital provides different services for people living with chronic diseases at a specific ambulatory clinic (65). It has one chronic disease follow-up unit. There were around 460 hypertensive patients attending their follow-up until July 2022. Four nurses were working at the chronic follow-up unit. The study period was from July 8-September 5, 2022.

4.2 Study Design

- Facility based cross-sectional study was conducted.

4.3 Populations

4.3.1 Source Population

- All hypertensive patients on follow-up at public hospitals in Jimma town

4.3.2 Study population

- Sampled hypertensive patients on follow-up during the study period.

4.4 Eligibility criteria

4.4.1 Inclusion Criteria

- All hypertensive patients who were on follow-up at public hospitals in Jimma town during the study period and aged ≥ 18 years old were included.

4.4.2 Exclusion Criteria

- Seriously ill, and unable to communicate

4.5 Sample size determination

The sample size was estimated using the single population proportion formula;

$$N = \frac{Z^2 P(1-P)}{d^2}$$

Where;

N= Sample required

Z = 1.96 which is the standard normal deviation at 95% confidence level.

d= 0.05 (degree of precision)

p=40.7% taken for knowledge about stroke from a previous study(55).

$$N = \frac{1.96^2 * 0.407(1-0.407)}{.05^2} = 371$$

Adding a 10% non-response rate, the final sample size was 408.

4.6 Sampling Technique

Systematic random sampling after proportional allocation of sample size was used to select study participants for this study. Initially, two public hospitals in Jimma town were identified. Then, the total estimated numbers of hypertensive patients on follow-up at those health care facilities were known and recorded. Finally, the calculated sample size was proportionally allocated as follows:

$ni = n \left(\frac{Ni}{N} \right)$, Where; ni = number of study units allocated to each institution; n =the total number of patients in each institution; Ni = calculated sample size; N = the total number of patients in both institutions.

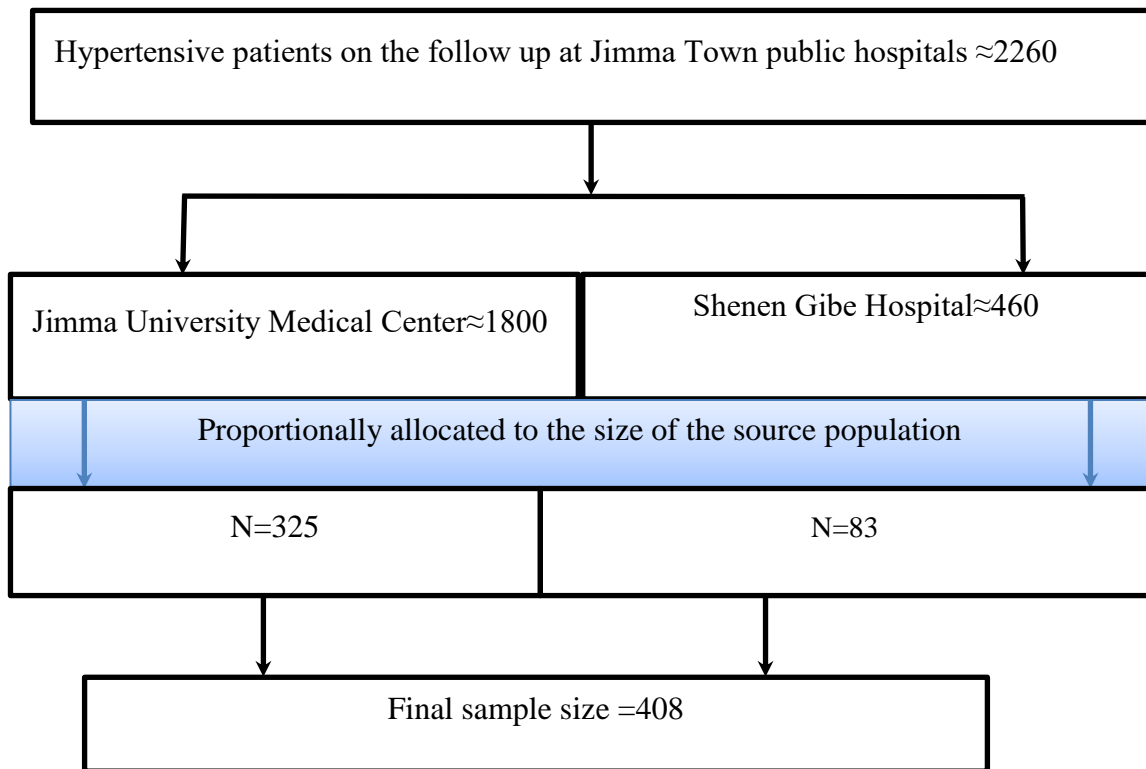


Figure 2: Schematic presentation of sampling procedure among hypertensive patients on follow-up at public hospitals in Jimma town, Southwest Ethiopia, 2022

To select the study participants, the average number of hypertensive patients expected to visit chronic follow-up clinics during the study period was obtained from the registration book which was estimated to be 2260. The sampling interval (k^{th} value) was obtained by dividing the total estimated number of hypertensive patients (2260) by the total sample size which is 408. So, the ' k^{th} ' value is approximately 5. On day one, the first patient was included using the lottery method. Then, every 5th visiting patient was interviewed at their exit time. To prevent recollection of data from a sample, each participant medical record number was recorded at the time of the interview.

4.7 Study Variables

4.7.1 Independent variables

- **Sociodemographic variables:** Age, sex, occupation, level of education, wealth status, and place of residency.
- **Clinical variables:** Duration of diagnosis, presence of comorbidities, family history of stroke, history of stroke, and current status of blood pressure
- **Behavioral variables:** Alcohol drinking, chewing chat, smoking, regular exercise, and health-seeking behavior.
- **Personal variables:** Knowledge about hypertension, perceived risk of stroke.

4.7.2 Dependent Variable

- Level of knowledge about stroke

4.8 Operational definitions and definitions of terms

Knowledge about stroke: In this study, it refers to knowledge about signs and symptoms, risk factors, and prevention methods. It was assessed by requesting the participants to respond to stroke knowledge questions with “yes/no” answers. There are 26 stroke knowledge questions (6 signs/symptoms, 11 risk factors, and 9 prevention methods). Each correct answer was recorded as ‘1’ and an incorrect answer was recorded as ‘0’ so that the maximum score is ‘26’ and the minimum score is ‘0’. Fifty percent (50%) of the total score

were considered to categorize the participants as having good or poor stroke knowledge. Accordingly, participants who scored $\geq 50\%$ on the stroke knowledge questions were considered as having ‘good knowledge’ and those who scored $< 50\%$ on the stroke knowledge questions were categorized as having ‘poor knowledge’(40).

Knowledge about hypertension: was assessed by requesting participants to respond to hypertension knowledge questions. A modified tool from a previous study which contains 11 items with “yes/no” answers was used; so that, the maximum score is ‘11’ and the minimum is ‘0’. The median score (8) was used to classify the level of knowledge about hypertension. Accordingly, the score below the median score was categorized as ‘poor knowledge’, and the score above or equal to the median score was categorized as ‘good knowledge’(66).

Wealth status: Households were given scores based on the assets they own, like a television, radio, and others in addition to housing characteristics such as a source of drinking water, toilet facilities, and flooring materials. The presence or absence of house hold assets was assessed by 15 questions. ‘1’ point was given for presence and ‘0’ was given for the absence of the asset; so that, the maximum score is ‘15’ and the minimum score is ‘0’. The individual scores were added together and distribution among study participants was divided into five quintiles each comprising 20% of the total participants(67). Accordingly, participants whose score falls in the 1st and 2nd quintiles were categorized as ‘low’, participants whose score falls in the 3rd quintile were categorized as ‘middle’, and participants whose score falls in the 4th and 5th quintiles were categorized as ‘high’(68).

The perceived risk of stroke: it was assessed using 1 item which is “Do you think you are at risk of having a stroke?” with “yes”, “no”, and “I don’t know” answers. Accordingly, participants who responded “yes” were categorized as having ‘good perception’, and participants who responded “no”, or “I don’t know” were categorized as having ‘poor perception’.

Regular exercise: refers to participants who practice regular exercise for 30 minutes a day at least five days a week(69).

Smoker: refers to a participant who currently smokes any tobacco products such as cigarettes or rolled tobacco (40).

Current alcohol drinker: refers to participants who consumed a drink containing alcohol in the past 1 year to the study period(70).

Chat chewer: refers to a participant who chewed khat within the past 30 days before the study period (71).

Status of hypertension: patients on follow-up who had systolic blood pressure (SBP) of <140 mmHg and/or diastolic blood pressure (DBP) of < 90 mmHg for the general hypertensive population, or SBP < 130mmHg and/or DBP < 80mmHg in patients with diabetes mellitus, or chronic kidney disease. Otherwise, uncontrolled hypertension (72).

Health-seeking behavior: health-seeking behavior is defined as any action undertaken by individuals who became ill and/or perceived to be ill to find an appropriate solution for his/her health problems(68). It was assessed by requesting participants to respond to health-seeking behavior questions, which contain 5 items with “yes/no” answers so that, the maximum score is ‘5’ and the minimum score is ‘0’. The mean score(2.87) was used to classify the respondents(73). Accordingly, participants who scored equal to or above the mean score were categorized as having good health-seeking behavior whereas; participants who scored below the mean were categorized as having ‘poor health-seeking behavior.

4.9 Data Collection procedure and instruments

Data were collected using an interviewer-administered structured questionnaire and a medical record review chart. A record review chart was used to review patient cards to identify common comorbidities with hypertension, duration of diagnosis of hypertension, the status of hypertension, previous history of stroke, and family history of stroke. The other part was assessed by using questionnaires that were adapted after reviewing the literature. The questionnaire was prepared in English and then translated into Afan Oromo and Amharic by the language expert. The Afan Oromo and Amharic version questionnaire were again translated back to English by an independent language expert. Then, the original English questionnaire and the back-translated version were compared to check for any

inconsistency that might have happened in the process of translation. Then, Amharic and Afan Oromo version questionnaires were used for the data collection.

The questionnaire was adapted from different literature (17,20,40,55,59,66,67), and contains 4 parts and 77 items:-

Part I: Sociodemographic characteristics which contain 23 items of which question about age is open-ended, and the others are closed-ended questions. The first 8 sociodemographic characteristics were measured using 1 item each. Whereas, wealth status was measured using 15 items taken from the updated equity tool(67), which was modified from the Ethiopian demographic health survey 2016(74).

Part II: Questions related to personal factors and source of information. This part contains 13 items, which include questions to assess knowledge about hypertension and question to assess the perceived risk of stroke and a question to assess sources of information about stroke. The source of information about stroke was assessed using one question with multiple-choice answers. To assess the knowledge of patients about hypertension, a modified tool from a previous study (66) which contains 11 items with yes /no answers was used. To assess the perceived risk of stroke, a tool from a previous study(75), which contains one item with “yes”, “no” and “I don’t know” answers, was used.

Part III: Questions related to knowledge about stroke, assessed by a total of 26 items (6 signs, and symptoms, 11 risk factors, and 9 prevention methods). Questions related to signs/symptoms of stroke were asked as specified by NINDS(20). Questions related to risk factors and prevention methods were adapted from different literature(17,40,55).

Part IV: This part contains questions related to behavioral characteristics and a record review chart to assess the clinical characteristics of the respondents which were adapted from previous studies (17,40,55,59) used. Questions related to behavioral characteristics of the patients include chat chewing, alcohol drinking, exercise, and smoking which contain 4 closed-ended questions with “yes/no” answers. It also contains questions to assess health-seeking behaviors which contain 5 items with “yes/no” answers. In the end, it contains a record review chart to assess clinical variables which has 6 items including a family history of stroke, previous history of stroke, the status of hypertension, presence of comorbidities, and duration of diagnosis of hypertension. Three BSc (Bachelor of Science) nurse data

collectors, two for Jimma University Medical Center and one for Shenen Gibe hospital and one MSc (Master of Science) nurse was appointed as supervisor for both hospitals.

4.10 Data quality Assurance

Before the start of data collection, training was given to data collectors for one day on the technique of data collection, the purpose of data collection and content of the questionnaire and how to obtain permission for an interview, how to approach the respondents, and how to deal with difficulties that might arise during data collection. The tool was pretested at Seka chekorsa primary hospital by taking 5% (21 hypertensive adult patients) of the total sample size before 2 weeks of the actual data collection to assess instrument simplicity, flow, or consistency and to improve the reliability of the instrument. Internal consistency was measured using Cronbach's alpha and it was found to be adequate ($r=0.94$ for overall knowledge about stroke questions). Data were checked for completeness and accuracy each day. The supervisor was responsible to oversee how well the data collection was going, collecting the questionnaires, and checking their completeness. The principal investigator did an ongoing checkup each day during the data collection to ensure the quality of data by re-checking the filled questionnaire.

4.11 Data processing and analysis

Following the data collection, data were rechecked for completeness and entered into Epidata version 4.6 and then exported to SPSS version 25 for analysis. Coding and recoding were done at each step for the variables as necessary. Descriptive statistics like frequencies, percentages, mean, median, standard deviation and interquartile range were used for descriptive analysis. The binary logistic regression model was used to assess the association between dependent and independent variables. First, bivariable binary logistic regression was done for all independent variables. Next, variables with a p-value of less than or equal to 0.25 were sorted and entered into multivariable binary logistic regression. Then, multivariable binary logistic regression analysis was conducted to identify factors that were statistically associated with hypertensive patients' knowledge about stroke. Model fitness was checked using the Hosmer-Lemeshow goodness of fit test and the model adequately fitted the data at ($P\text{-value}=0.675$). Multi-collinearity test was done by using the

variance inflation factor and tolerance test. The maximum tolerance value was 0.942 and the maximum variance inflation factor was 1.635. An adjusted odd ratio with a 95% confidence interval (CI) was used to measure the strength of the association between dependent and independent variables. Variables with $p\text{-value} < 0.05$ were declared as statistically significant. Finally, the result was presented in texts, tables, and charts as appropriate.

4.12 Ethical considerations

Ethical clearance was obtained from the institutional review board of Jimma University, Institute of health. Then, an official letter was obtained from the school of nursing and submitted to Jimma university medical center and Shenen Gibe hospital administration for permission and cooperation before data collection. Written consent was obtained from each participant to ensure that participation is voluntary and that they could withdraw at any time from the study. The written consent consisted of the study purpose and procedures, potential risks and benefits, voluntary participation, and right of withdrawal; the information provided by each respondent was kept strictly confidential. Respondents were also informed that their answers to the questions will be grouped with other participants' answers and reported as part of the study.

4.13 Dissemination plan

Findings of the study will be disseminated through the scientific presentation, and submission of hard & soft copies to relevant authorities (School of nursing, Institute of health, Jimma University, and Jimma University Medical Center and Shenen Gibe hospital). Furthermore, possible efforts will be made to publish the study in a local or international reputable journal.

CHAPTER 5: RESULT

The result of the study was presented in seven sub sections: sociodemographic characteristics, sources of information, personal factors, behavioral factors, clinical factors, knowledge about stroke, and factors associated with knowledge about stroke. Out of 408 sampled participants, 401 participants responded completely to the interview and yielded a response rate of 98.28%.

5.1 Sociodemographic characteristics of the respondents

The mean age of the respondents was 52.43(\pm 11.71 years), of which two hundred seventy-two (67.8%) of them were older than 45 years. Larger proportion of the respondents were;- male (232, 57.9%), Oromo (262, 65.3%), Muslim (235, 58.6%), married (309, 77.1%), and rural residents (213, 53.1%). One hundred sixty-two (40.4%) were not attended any formal education, 137 (37.7%) were low in wealth status, while one hundred forty (33.4%) of the respondents were housewives (Table 1).

Table 1: Sociodemographic characteristics of respondents among hypertensive patients on follow-up at Jimma town public hospitals, Southwest Ethiopia, 2022

Characteristics	Category	Frequency	Percent
Sex	Male	232	57.9
	Female	169	42.1
Age	\leq 45 years	129	32.2
	$>$ 45 years	272	67.8
Ethnicity	Oromo	262	65.3
	Amhara	89	22.2
	Tigre	10	2.5
	Dawuro	36	9.0
	Others*	4	1
Religion	Muslim	235	58.6
	Orthodox	119	29.7
	Protestant	43	10.7
	Others**	4	1

Marital status	Married	309	77.1
	Single	30	7.5
	Divorced	23	5.7
	Widowed	39	9.7
Educational level	No formal education	162	40.4
	Elementary(1-8)	109	27.2
	Secondary(9-12)	66	16.5
	College and above	64	16
Occupation	Housewife	140	33.4
	Farmer	115	29.9
	Merchant	69	17
	Self-employed	16	4.7
	Government employed	32	8
	Non-government employed	19	4.5
	Others ^{***}	10	2.5
Place of residency	Rural	213	53.1
	Urban	188	46.9
Wealth status	Low	137	37.7
	Middle	142	35.4
	High	108	26.9

Others;*= Sidamo, Kafa, Yem. **=Wakefata, Catholic, Jehovah's witnesses. ***= students, retired.

5.2 Participant's sources of information about stroke

Regarding different sources from which they get information about stroke, 77.3% named health care providers as the source of information (figure 3).

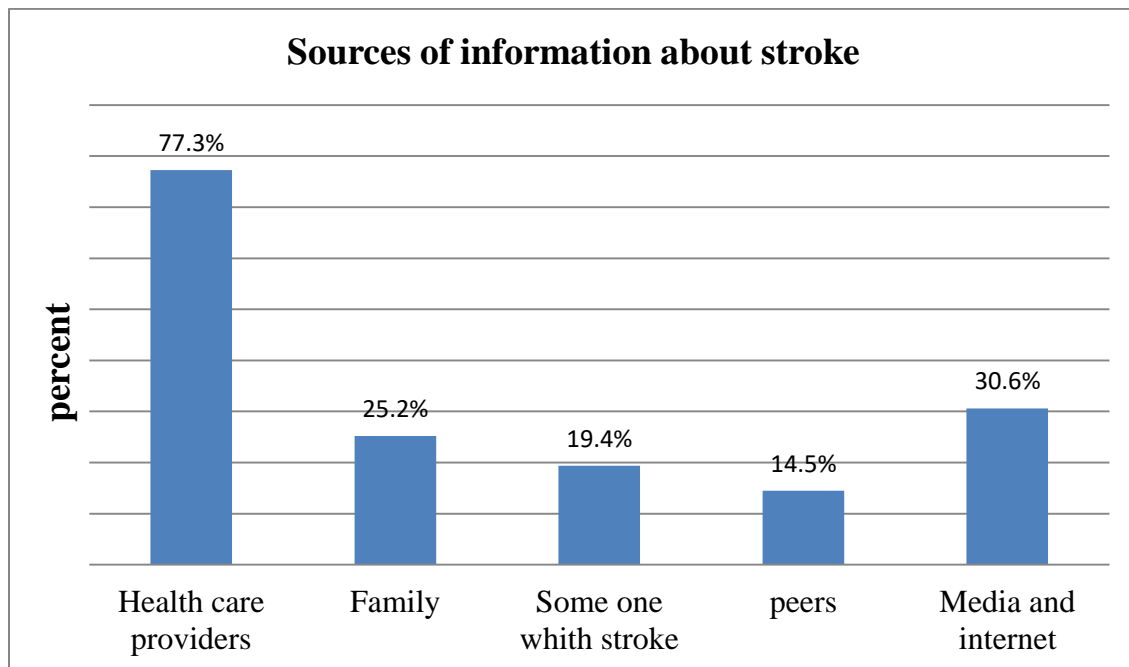


Figure 3: Distribution of the source of information about stroke among hypertensive patients on follow-up at public hospitals in Jimma town, Southwest Ethiopia, 2022

5.3 Personal factors

5.3.1 Participants' knowledge about hypertension

This study showed that the median score for knowledge about hypertension is 8, with an interquartile range of Q1-Q3 (7-10). Two hundred and seventy-eight (69.3%) of the respondents had good knowledge of hypertension. Concerning individual knowledge items, the most frequently identified individual knowledge item was 'having fruits and vegetables in a diet', which was identified by 353(88%) of the respondents. On the other hand, the least identified item was "blood pressure greater than 130/90mmhg is considered high" which was correctly identified by 181(45.1%) of the respondents (Table 2).

5.3.2 Participants' stroke risk perception

Regarding perceived stroke risk, 246 (61.3%) of the respondents had a poor perception about the risk of developing a stroke (figure4).

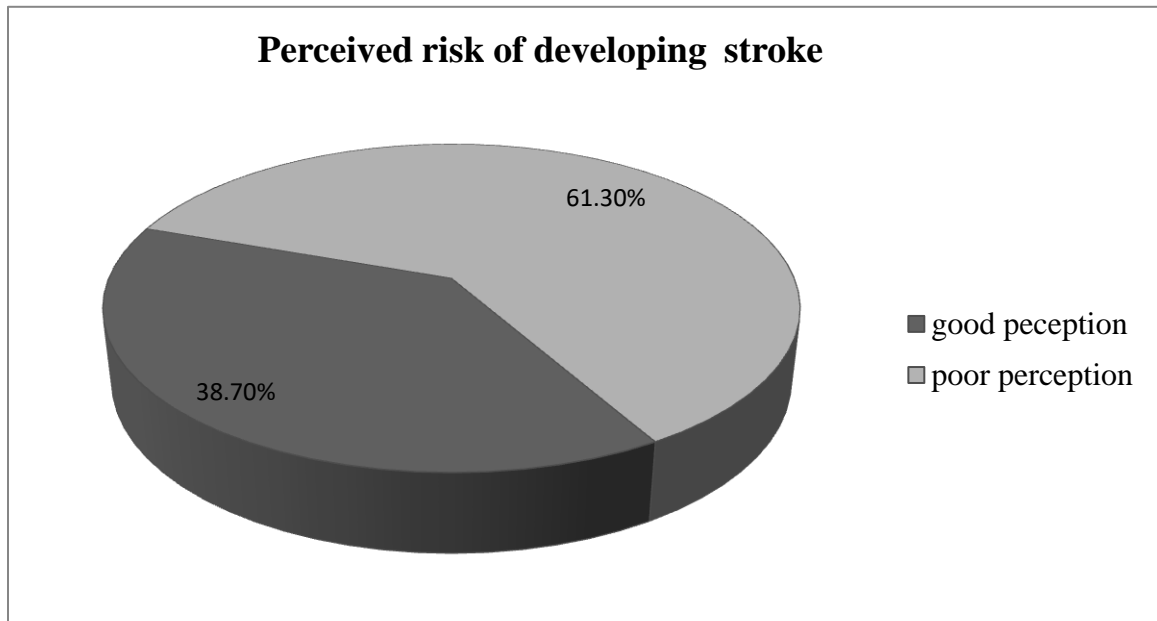


Figure 4: Stroke risk perception among hypertensive patients on follow-up at public hospitals in Jimma town, south west Ethiopia, 2022.

5.4 Behavioral factors

One hundred twenty (29.9 %) of the respondent chewed chat in the previous month to the study period, 71(17.7%) were drinking alcohol within the past year to the study period, while 40(10%) of the respondents were smokers, and 67(16.7%) of the respondent's do exercises regularly. In this study, the mean score of health-seeking behavior is 2.87(\pm 1.18). Two hundred and fifty (62.3%) of the respondents had good health-seeking behavior. Looking at individual items in the health-seeking behaviors, 349(87%) of the respondents sought health care when they felt ill. On the other hand, only 181(45.1%) of the respondents check their health status before getting sick (Table 3).

Table 2: Behavioral factors related to stroke among hypertensive patients on follow-up at public hospitals in Jimma town, Southwest Ethiopia, 2022.

S.no	Items	Response	
		Yes (%)	No (%)
1	chat chewer	120(29.9)	281(70.9)
2	Alcohol drinker	71(17.7)	330(82.3)
3	Smoking	40(10)	361(90)
4	Practice regular exercise	67(16.7)	334(83.3)
Health seeking behaviors	1 Sought treatment when felt ill	349(87)	52(13)
	2 Get health checkups before getting ill	181(45.1)	220(54.9)
	3 get available vaccination	270(67.3)	131(32.7)
	4 Practiced health-oriented leisure activities which can be one of the followings (swimming, running, playing tennis, and running)	106(26.4)	295(73.6)
	5 Avoid things that are harmful to health	157(39.2)	244(60.8)
Overall health-seeking behavior		Poor (%)	151(37.7)
		Good (%)	250(62.3)

5.5 Clinical factors

Among the respondents, 95(23.7%) had uncontrolled blood pressure. Sixty-five (16.2%) had a history of stroke, 85(21.2%) had a family history of stroke, and 174(43.4%) had comorbid diseases with hypertension. Regarding the duration of hypertension, 231(57.6%) had duration of diagnosis of 5 years and above (Table 4).

Table 3: Clinical factors of stroke among hypertensive patients on follow-up at public hospitals in Jimma town, Southwest Ethiopia, 2022

S.no	Items	Response	
1	history of stroke	Yes (%)	66(16.5)
		No (%)	335(83.5)
2	Family history of stroke	Yes (%)	83(20.7)
		No (%)	318(79.3)
3	Presence of comorbidities	Yes (%)	174(43.4)
		No (%)	227(56.6)
4	status of hypertension	Controlled (%)	306(76.3)
		Uncontrolled (%)	95(23.7)
5	Duration of hypertension	<5years (%)	170(42.4)
		≥5years (%)	231(57.3)

5.6 Participants' knowledge of stroke

5.6.1 Participants' Knowledge about signs and symptoms

Regarding the knowledge component of signs and symptoms; 234 (58.4%) of the respondents were unable to recognize any signs, and symptoms of a stroke. Whereas, 25(6.2%) of the respondents identified all of the listed signs/symptoms of a stroke. Looking into individual items about signs and symptoms, 116(28.7%) of the respondents recognized sudden trouble seeing in one or both eyes as a manifestation of stroke. However, only 80 (20 %) of them recognized sudden severe headaches as a symptom of stroke.

5.6.2 Participants' knowledge about risk factors

On the subject of risk factors, 243(60.6%) of the respondents were unable to recognize any risk factors of stroke. Whereas, 31(7.7%) of them identified all of the listed risk factors of stroke. Hypertension was named as a risk factor for stroke by 116(28.9%) of the respondents. On the other hand, smoking (80, 20%), and stress (80, 20%) were identified as risk factors by the smallest number of respondents.

5.6.3 Participants' knowledge about prevention methods

Regarding prevention methods, 262(65.3%) of the respondents were unable to recognize any prevention methods for stroke. On the other hand, 15(3.7%) identified all of the listed prevention methods for stroke. The most recognized prevention method was controlling blood pressure by 108(26.9%) of the respondents which is followed by controlling blood sugar by 97 (24.2%). Whereas, 75 (18.7%) of the participants recognized cessation of smoking as a prevention method of stroke.

5.6.4 Participants' overall knowledge about stroke

Among the respondents, ninety-seven (24.2 %, 95% CI; 20.1%-28.7%) had good knowledge about stroke (Table 5).

Table 4: Knowledge about stroke signs/ symptoms, risk factors and prevention methods among hypertensive patients on follow-up at public hospitals in Jimma town, south west Ethiopia, 2022

	Items	Response	
		Yes (%)	No (%)
signs /symptoms	1. Sudden speech problem	103(25.7)	298(74.3)
	2. Sudden trouble seeing in one or both eyes	116(28.9)	285(71.7)
	3. Sudden numbness or weakness of the face, arm, or leg	123(30.7)	278(69.3)
	4. A sudden confusion	87(21.7)	314(78.3)

	5. Sudden loss of balance or coordination	104(25.9)	297(74.1)
	6. Sudden severe headache with no known cause	80(20)	321(80)
Risk factors	1. Smoking	80(20)	321(80)
	2. Cardiac disease	98(24.4)	303(75.6)
	3. Lack of exercise	104(25.9)	297(74.1)
	4. High blood pressure	116(28.9)	285(71.1)
	5. Family history of stroke	88(21.9)	313(78.1)
	6. High level of cholesterol	83(20.7)	318(79.3)
	7. Obesity or overweight	86(21.4)	315(78.6)
	8. Diabetes mellitus	90(22.4)	311(77.6)
	9. Eating salty food	92(22.9)	309(77.1)
	10. Drinking alcohol	83(20.7)	318(79.3)
	11. Stress	80(20)	321(80)
prevention methods	1. Engaging in regular exercise	86(21.4)	315(78.6)
	2. Decreasing weight (if overweight)	89(22.2)	312(77.8)
	3. Controlling blood pressure	108(26.9)	293(73.1)
	4. Controlling blood sugar	97(24.2)	304(75.8)
	5. Appropriate treatment of heart diseases	93(23.2)	308(76.8)
	6. Cessation of smoking	75(18.7)	326(81.3)
	7. Reducing consumption of fatty foods	83(20.7)	318(79.3)
	8. Avoiding drinking alcohol	84(20.9)	317(79.1)
	9. Eating fruits and vegetables	82(20.4)	319(79.6)
Overall knowledge		Good (%)	97(24.2)
		Poor (%)	304(75.8)

5.7 Factors associated with participants' knowledge about stroke

In the bivariable binary logistic regression, candidate variables with a p-value of less than or equal to 0.25 (sex, ethnicity, religion, marital status, level of education, occupation, place of residency, wealth status, perceived risk of stroke, drinking alcohol, smoking, regular exercise, history of stroke, family history of stroke, health-seeking behaviors, knowledge about hypertension, duration of diagnosis, and age of respondents) were entered into multivariable binary logistic regression for further analysis. The backward method was used to determine the final predictors of knowledge about stroke by controlling the potential cofounders.

In multivariable binary logistic regression, six variables were found to be associated with knowledge about stroke. Accordingly, age of the respondents, educational level, place of residency, perceived risk of stroke, duration of diagnosis, and having a history of stroke were significantly associated with knowledge about stroke.

From Sociodemographic factors, age of the respondent was found to be associated with knowledge about stroke. Accordingly, respondents who were younger than or Equal to 45 years were 2.6 folds likely to have good knowledge than those who were older 45 and more years ($P < 0.001$, AOR=2.636, 95%CI;1.54, 4.51). Similarly, respondents who attained an educational level of college and above were 3.7 folds likely to have good knowledge than those who did not have formal education ($P = 0.001$, AOR=3.752, 95% CI; 1.76, 8.00). Moreover, respondents who reside in urban areas were 3.9 folds likely to have good knowledge than respondents who came from rural areas ($P = 0.002$, AOR=3.894, 95%CI; 2.22, 6.82).

Perceived risk of stroke was another factor associated with the respondent's level of knowledge about stroke. Accordingly, participants who had a good perception about the risk of having a stroke were 1.9 times more likely to have good knowledge than those who had a poor perception of the risk of developing a stroke ($P = 0.02$, AOR=1.904, 95%CI; 1.11,3.27).

From the clinical characteristics of the respondents, duration of diagnosis and having a history of stroke were found to be associated with knowledge about stroke. Accordingly, Respondents who had a duration of diagnosis of 5 or more years were 2.7 folds more likely to have good knowledge than those who were diagnosed for less than 5 years (P=0.001, AOR=2.668, 95%CI;1.50,4.71). Similarly, respondents who had a previous history of stroke were 2.6 times more likely to have good knowledge than those who had no previous history of stroke (p=0.003, AOR=2.633, 95%CI; 1.37, 5.03) (Table 6).

Table 5: Multivariable binary logistic regression analysis of factors associated with knowledge about stroke among hypertensive patients on follow-up at public hospitals in Jimma town, South west Ethiopia, 2022

variables	category	level of knowledge about stroke		COR(95%CI)	AOR(95%CI)	P-value
		Good (%)	Poor (%)			
Age	≤45	53(13.3)	76(18.9)	3.338(2.08,5.35)*	2.6(1.54,4.51)**	<0.001
	>45	47(11.7)	225(56.1)	1	1	1
level of education	No formal education	19(4.7)	143(35.7)	1	1	1
	Elementary	30(7.5)	79(19.7)	2.858(1.51-5.40)*	1.6(0.81, 3.30)	0.169
	secondary	22(5.5)	44(11)	3.763(1.87-7.58)*	1.8(0.87, 3.94)	0.110
	college and above	29(7.2)	35(8.7)	6.236(3.14,12.39)*	3.7(1.76, 8.00)**	0.001
place of residency	rural	26(6.5)	187(46.6)	1	1	1
	urban	74(18.5)	114(28.4)	4.669(2.82-7.73)*	3.9(2.22, 6.82)**	<0.001
perceived risk	poor	44(11)	202(50.4)	1	1	1
	good	53(13.2)	102(25.4)	2.385(1.49-3.79)*	1.9(1.10-3.27)**	0.02
duration of diagnosis	<5 years	30(7.5)	140(34.9)	1	1	1
	≥5 years	70(17.5)	161(40.1)	2.029(1.25-3.29)*	2.7(1.51,4.71)**	0.001
history of stroke	no	70(17.5)	265(66)	1	1	1
	yes	30(7.5)	36(9)	3.155(1.82-5.48)*	2.6(1.38,5.03)**	0.003

1= reference group, *=significant at p-value ≤0.25, **= significant at p-value<0.05

CHAPTER 6: DISCUSSION

This study revealed that slightly less than one forth (24.2%, 95%CI;20.1%, 28.7%) of the respondents had good knowledge about stroke which varies with the age of respondents, level of education, place of residency, perceived risk of stroke, duration of hypertension, and previous history of stroke. This level of knowledge is very low since the patients at high risk of stroke are expected to have good knowledge about stroke. The majority of hypertensive patients have alarmingly low knowledge of signs/ symptoms, risk factors, and prevention methods of stroke as 58.4%, 60.6%, and 65.3% of the respondents couldn't recognize any signs/symptoms, risk factors, and prevention methods of stroke respectively.

This finding is consistent with studies done in India; 24% (49),24.3% (57), and Indonesia, 22.54% (47). Similarities in the result might be due to the fact these countries are developing and share similar challenges like lack of economic resources and publicly funded well-functioning healthcare systems for stroke prevention, and a large percentage of people living in rural areas where healthcare is not accessible(76). Likewise, in these studies, there is a similarity in sociodemographic characteristics like age and educational level in which majority of respondents were greater than 45 years and low in the level of education.

On the other hand, this finding is lower than the study done in Nigeria;70.3% (53), Ghana;79.18%(52), and Morocco;43.6% (51). The inconsistency might be explained by possible differences in the implementation of stroke prevention strategies in those countries. For instance, in Ethiopia, a study revealed there is a gap in policy and strategies as well as in its implementation in the area of awareness creation for non-communicable diseases(77). Another possible explanation for the discrepancy is sampling method, as the study done in Ghana used convenience sampling which might not represent the actual population. In the study done in Nigeria, the majority of the respondents had formal education which might have increased the likely hood of having good knowledge. This finding is also not inline with the study done in Gondar, Ethiopia;40.7%(55). The possible explanation for the difference might be the place of residency, as the large proportion of the respondents in the Gondar study were from urban areas, which might increase the chance of having good

knowledge due to easy access to healthcare facilities and different sources of information (78).

This finding is higher than studies conducted in Thailand;20% (79), India;11.43% (50), and Bahirdar, Ethiopia;18.3%(40). The possible explanations for these discrepancies might be the difference in sampling methods and sociodemographic differences. In the study done in Bahirdar, more than half of the respondents were from urban areas and a majority of them were less than 45 years old. The study conducted in India used non-probability sampling so that the result might not be representative of the actual population. Additionally, the study population in the Indian study were elderly, and about two third of participants in the study conducted in Thailand were also elderly hypertensive (aged ≥ 60). The elderly population might have diminished memory functions compared to younger individuals(80).

Participants who were younger or equal to 45 years were 2.6 folds likely to have good knowledge about stroke than those older than 45 years. This finding is due to the fact that physiological changes in the brain make an older adult to perform poorly on item recognition, or recall memories than younger individuals (80). Another explanation might be that growing old may lead to limited interaction with different information and make them less interested in medical development, thereby resulting in a low level of healthcare knowledge. This finding is consistent with studies done in Debratabor(17), Bahirdar(40), and South Gondar, Ethiopia(59).

Respondents who achieved an educational level of college or above were 3.7 folds likely to have good knowledge than those who did not have formal education. This is due to the fact education contributes to better health care knowledge(81). An individual who achieved a higher level of education have more access to sources of information about stroke can read and hear different languages, and can search for information from the internet and social media. This finding is supported by studies from India(57), Saudi Arabia(58), Nigeria(53,60), and Ethiopia (17,40,59). However, this finding is contradicted by the study done in Portugal in which people with low educational levels had good knowledge about risk factors(61). The reason for the discrepancy is that the study done in Portugal looked at

vascular risk factors and vascular risk factors are more prevalent among people with lower socioeconomic positions (82).

Respondents who reside in urban areas were 3.9 folds likely to have good knowledge than those who reside in rural areas. This might be due to better access to different sources of information in urban areas, as there is better access to media, and they have many health care facilities around them than rural residents(78). This finding is supported by studies conducted in Morocco(51), Debrator; Ethiopia(17), Bahirdar; Ethiopia(40), and Gondar; Ethiopia(55).

Participants who had a good perception of the risk of developing a stroke were 1.9 times more likely to have good knowledge than those who had a poor perception. This is due to the fact that an individual with a perceived risk of developing a disease tends to know more about the disease and develops preventive behaviors (83).

In this study, hypertensive patients diagnosed for more than 5 years were 2.7 folds likely to have good knowledge about stroke than those diagnosed in the past five years. The possible explanation for this finding might be due to patients with a longer duration of diagnosis have a better chance to hear different information and get advice from health professionals. Also, might have a chance of attending different health education sessions than those recently diagnosed. Hence, such exposure to a number of useful information might lead them to have a good knowledge than their counterpart. This finding is in line with studies done in Debrator(17), and Gondar; Ethiopia (55).

Lastly, respondents who had a previous history of stroke were 2.6 folds likely to have good knowledge than those who had no previous history of stroke. This finding is possibly explained by awareness and health education sessions provided for stroke patients during the management of the disease and care for the patient(84). It could also be explained by concerns and attention given by the patient to the disease in the fear of developing another stroke. This finding is supported by studies done in Newzealand(21), Norway(63), and Morocco(51).

Limitations of the study

- Since the cross-sectional study design was used, the cause-and-effect relationship could not be established.
- The result might be subjected to recall bias and social desirability bias in which patients might unwilling to admit that they practice socially unacceptable behaviors (like smoking and drinking).
- This study is confined to public hospitals; economically sufficient hypertensive patients might follow their appointment at private health facilities.

CHAPTER 7: CONCLUSION AND RECOMMENDATIONS

7.1 Conclusion

About three out of four hypertensive patients at follow-up clinics in Jimma town public hospitals have poor knowledge about stroke. For the reason that all hypertensive patients are at high risk of developing stroke, this much low level of knowledge is troubling. Additionally, age of the respondent, educational status, place of residency, perceived risk of stroke, history of stroke, and duration of hypertension were factors associated with the knowledge about stroke among hypertensive patients.

7.2 Recommendations

Collaborative efforts of the administration of the hospital, health care providers and other stake holders are required to improve knowledge by considering the growing burden of stroke, and the shortage of manpower as well as facilities to adequately manage the cases. Paying attention to different factors that affect the level of knowledge makes an important contribution to reducing stroke burdens. Even though it is essential to consider these factors, since the level of knowledge is low overall, then it should be increased for all. Based on the findings of this study, the following recommendations were forwarded.

❖ To Jimma town public hospitals administrations:

- Health education should be provided consistently, so, officials should strengthen an educational program for hypertensive patients that emphasize complications, especially stroke.
- Should strengthen collaboration with social institutions and health extension workers to disseminate health information about stroke
- Should bring educational intervention to the community level using health education, and awareness creation programs, as well as through community radios and any feasible media.

❖ Health care providers:

- Should use existing contact effectively to provide effective educational intervention to improve knowledge of hypertensive patients about stroke manifestations, risk factors and prevention methods.

- Should address variations in the level of knowledge among different Sociodemographic groups, and clinical characteristics by giving more emphasis to those who have no formal education, who do not perceive they are not at risk of having a stroke, who aged more than 45 years, have no history of stroke, have a duration of diagnosis less than 5 years, and live in the rural areas.
- Should address incorrect views regarding the risk of developing stroke by communicating with the patients about their actual risk.

To future researchers: There may be hypertensive patients who do not attend follow-up at the community level. So, knowing the level of knowledge about stroke signs/symptoms, risk factors, and a prevention methods at a community level is important. Hence, future researchers should focus on large or full-scale research at the community level as well as at zonal, regional or national levels. Additionally, future researchers should use a strong design to establish a cause-and-effect relationship between knowledge and independent factors.

The implication to nursing practice

One implication of the result is the importance of increasing the knowledge of hypertensive about stroke signs and symptoms, risk factors and prevention methods. The majority of respondents in this study did not know hypertension is the risk factor for stroke. One of the essential areas of nursing practice is health education, and this finding signifies the importance of working actively and providing health education accordingly. More than 60% of the respondents perceived that they were not at risk of having a stroke when their actual risk is many folds than healthy individuals. This condition can lead to a continuation of an unhealthy lifestyle or poor adherence to self-care. This signifies the importance of paying attention to patients' perceptions regarding the risk of developing a stroke. Another issue is that 29.9% of the respondents were chat chewers and 83.3% of the respondents did not practice regular exercises. This also indicates the importance of focusing on behavioral modifications educational strategies.

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ANNEX I: INFORMATION SHEET

My name is I am here on the behalf of Gemechis Teshome, a student at Jimma University School of nursing. “He is conducting a research on ‘knowledge about stroke and associated factors among hypertensive patients’”. He received permission from Jimma University faculty of health science and the hospitals. You are selected to participate in this study because you are currently attending a hypertensive follow-up.

The purpose of the study: to assess knowledge about stroke and its associated factors among hypertensive patients on the follow-up.

What we will ask you to do: If you agree to participate in this study, I will proceed to ask you questions on this paper. The questions will only cover the content related to demographic, behavioral factors, and knowledge related to stroke among patients with hypertension. Answering questions will take about 25 minutes to complete.

Taking part is voluntary: I would like to inform you that your participation is entirely voluntary, and if you wish to withdraw from the study, you may do so at any time. You will not be requested to give reasons for withdrawing from the study, and it will have no effect on you or any relative in your family.

Your answer is confidential: neither your name nor any other self-identifying information was collected.

Risks and benefits: There were no direct benefits from participating in this study, but your participation may help to improve knowledge, particularly among patients with hypertension, to prevent stroke. Your participation will help to conduct other studies in the future. You are allowed to ask any question before you agree to take part in this study and be made to sign this consent.

ANNEX II: INFORMED CONSENT FORM

I have heard the above information, and have received answers to any questions I asked.

I consent to take part in the study.

Signature of the participant:

_____ Date: ____/____/____

Signature of the data collector: _____ Date:

_____/_____/_____

Name of the data collector: _____

Phone number of the data collector: _____

ANNEX III: QUESTIONNAIRE

Part I: Socio-demographic characteristics of participants

S.no	Characteristics	Category		
100	Sex	1. male 2. Female		
101	Age	_____		
102	Ethnicity	1. Oromo 2. Amhara 3. Tigre 2. Dawuro 5.Others(specify)_____		
103	Religion	1. Muslim 3. Protestant 2. Orthodox 4. Others(specify)_____		
104	Marital status	1. Married 3. Widowed 2. Single 4. Divorced		
105	Educational level attained	1. No formal education 2. Primary school (1-8) 3. Secondary school (9-12) 4. College and/ above		
106	Occupation	1. Housewife 2. Farmer 3. merchant 4. Self employed 5. Government employed 6. Non-government employed 7. Others(specify)_____		
107	Place of residency	1. Rural 2. urban		
108	Wealth index	Questions	Responses	
		1. Does your household have electricity?	1. yes	2. no
		2. Does your household have a radio?	1. yes	2. no
		3. Does your household have a television?	1. yes	2. no

	4. Does your household have a refrigerator?	1. yes	2. no
	5. Does your household have an electric mitad?	1. yes	2. no
	6. Does your household have a table?	1. yes	2. no
	7. Does your household have a chair?	1. yes	2. no
	8. Does your household have a bed with a cotton/sponge/spring mattress?	1. yes	2. no
	9. Does any member of this household have a bank account?	1. yes	2. no
	10. What is the main source of drinking water for members of your household?	1. Piped to yard /plot	2. others
	11. What kind of toilet facility do members of your household usually use?	1.Pit/ventilator improved	2. no facility
	12. What type of fuel does your household mainly use for cooking?	1.electricity	2. wood
	13. What is the main material of the floor in your household?	1.Earth/sand	2. other
	14. What is the main material of the exterior walls in your household?	1.Bamboo with mud	2. other
	15. What is the material in the roof of your house?	1.Metal/corru gated iron	2. other

Part II: Questions related to personal factors and source of information

Source of information about stroke

Instruction: The respondents are expected to choose from alternatives to the following question. Based on their responses, encircle their choices!

S.no	Question	Responses	
200	From where do you get information about stroke?	1. from healthcare professionals 2. from family 3. from someone with a stroke 4. from peers	5. from the media(Radio, TV, and internet) 6. others (specify)_____

Hypertension knowledge scale to assess the level of knowledge about hypertension				
Instruction: The respondents are expected to answer ‘yes’ or ‘no’ to the following questions about hypertension. Based on their responses, encircle their choices!				
S.no	Questions	Responses		
201	Hypertension is a serious condition that can lead to complications	1. Yes	2. No	
202	An individual with hypertension should go for check-ups regularly	1. Yes	2. No	
203	A patient with hypertension needs to have a reliable means of blood pressure monitoring between visits to their healthcare provider	1. Yes	2. No	
204	A blood pressure level of above 130/90mmhg is considered high	1. Yes	2. No	
205	Smoking cigarettes has a negative effect on persons with hypertension	1. Yes	2. No	
206	Drinking alcohol has a negative effect on persons with hypertension	1. Yes	2. No	
207	Increased physical exercise decreases the blood pressure of a person with hypertension	1. Yes	2. No	
208	A diet that contains fruits and vegetables is good for a person with hypertension	1. Yes	2. No	
209	A diet consisting of low-fat milk and whole-wheat bread is good for a person with hypertension	1. Yes	2. No	
210	Corned beef and salted meat are good for a person with hypertension	1. Yes	2. No	
211	Meals rich in green bananas, baked chicken, and beans are good for a person with hypertension	1. Yes	2. No	
Stroke risk perception				
212	Do you believe you are at risk of having a stroke?	1. Yes	2. no	3. I don't know

Part III: Questions to assess participant’s knowledge about stroke

Instruction: Participants in this study are expected to answer ‘yes’ or ‘no’ to the following questions about the signs/symptoms of a stroke. Encircle their choices based on their answers!			
300	Do the followings are signs/symptoms of a stroke?		
	1. sudden speech problem	1. yes	2. no
	2. sudden trouble seeing in one or both eyes	1. yes	2. no
	3. sudden numbness or weakness of the face, arm or leg	1. yes	2. no
	4. sudden confusion	1. yes	2. no
	5. sudden loss of balance or coordination	1. yes	2. no
	6. sudden severe headache with no known cause	1. yes	2. no
Risk factors of stroke			
Instruction: participants in this study are expected to answer ‘yes’ or ‘no’ to the following questions about the risk factors of a stroke. Encircle their choices based on their answers!			
301	Do the followings are risk factors for stroke?		
	1. Smoking	1. yes	2. no
	2. Cardiac disease	1. yes	2. no
	3. Lack of exercise	1. yes	2. no
	4. High blood pressure	1. yes	2. no
	5. Family history of stroke	1. yes	2. no
	6. High level of cholesterol	1. yes	2. no
	7. Obesity or overweight	1. yes	2. no
	8. Diabetes mellitus	1. yes	2. no
	9. Advanced age	1. yes	2. no
	10. Drinking alcohol	1. yes	2. no
11. Stress	1. yes	2. no	
Prevention methods for stroke			
Instruction: participants in this study are expected to answer ‘yes’ or ‘no’ to the following questions about the preventions methods of a stroke. Encircle their choices based on their answers!			

302	Do the followings are prevention methods for stroke?		
	1. Engaging in regular exercise	1. yes	2. no
	2. Decreasing weight (if overweight)	1. yes	2. no
	3. Controlling blood pressure	1. yes	2. no
	4. Controlling blood sugar	1. yes	2. no
	5. Appropriate treatment of heart diseases	1. yes	2. no
	6. Cessation of smoking	1. yes	2. no
	7. Reducing consumption of fatty foods	1. yes	2. no
	8. Avoiding drinking alcohol	1. yes	2. no
	9. Eating fruits and vegetables	1. yes	2. no

Part IV: Questions to assess the clinical and behavioral characteristics of the respondents

Behavioral questions			
Instruction: participants are expected to answer ‘yes’ or ‘no’ to the following questions. Encircle the choices based on their answers!			
S.no	Questions	Responses	
400	Did you chew Khat in the last 30 days?	1. Yes	2. No
401	Did you drink any beverage containing alcohol in the past 1 year?	1. Yes	2. No
402	Do you smoke?	1. Yes	2. No
403	Do you exercise at least 30 minutes a day for 5 to 7 days a week?	1. Yes	2. No
Health seeking behaviors			
500	Do you seek treatment when you get ill?	1. Yes	2. No
501	Did you ever get health checkups before you get ill?	1. Yes	2. No
502	Did you ever get vaccinated for a disease?	1. Yes	2. No
503	Do you practice health-oriented leisure activities which can be swimming, running, or playing tennis, and running?	1. Yes	2. No
504	Do you avoid things that are harmful to health?	1. Yes	2. No

Medical record review chart		
600	Duration of diagnosis of hypertension	_____
601	status of blood pressure	1. controlled 2. uncontrolled
602	history of stroke	1. Yes 2. No
603	Family history of stroke	1. Yes 2. No
604	Presence of comorbidities	1. Yes 2. No
605	If yes to,604 write the presenting comorbid disease	1. _____ 2. _____ 3. _____ 4. _____

.....thank you.....

DECLARATION

JIMMA UNIVERSITY, INSTITUTE OF HEALTH, FACULTY OF HEALTH
SCIENCE, SCHOOL OF NURSING

I, the undersigned, declare that this MSc thesis is my work and that it has never been submitted for a degree at Jimma University or any other university. I also declare that I have properly credited all sources of materials utilized in this thesis.

Name: - Gemechis Teshome (BSc)

Signature -----

Date of submission-----/-----/-----

This thesis has been submitted for examination with my approval as university advisor.

APPROVAL OF THE FIRST ADVISOR

Name of the first advisor: Mr.Admasu Belay (MSc, Asst Prof)

Date _____ Signature _____

APPROVAL OF THE SECOND ADVISOR

Name of the second advisor: Mr. Girma Bacha (MSc)

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APPROVAL OF THE EXTERNAL EXAMINER

Name of the Examiner: _____

Date. _____ Signature _____

APPROVAL OF THE INTERNAL EXAMINER

Name of the Examiner: _____

Date. _____ Signature _____