

Identify the Stroke Risk Factors among Stroke Patients at the Hospital

Birhanu Alemu^{1*}, Jill Hamilton², Telisa Spikes³, Rebecca Gary⁴

¹School of Nursing & Midwifery, College of Health Science, Addis Ababa University, Ethiopia

²Associate Professor at the Nell Hodgson Woodruff School of Nursing at Emory University in Atlanta, Georgia

³Nell Hodgson Woodruff School of Nursing at Emory University in Atlanta, Georgia

⁴FAAN Professor School of Nursing Emory University 1520 Clifton Rd. Ne Room 438 Atlanta, Georgia

Corresponding Author*

Birhanu Alemu

School of Nursing & Midwifery, College of Health Science,
Addis Ababa University, Ethiopia

Tel.: 251911910373

Email: birhanualemu720@yahoo.com

Copyright: ©2023 Alemu, B. This is an open-access article distributed under the terms of the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original author and source are credited.

Received: 01-Mar-2023, Manuscript No. jnn-23-90503; **Editor assigned:** 03-Mar-2023, Pre QC No. jnn-23-90503 (PQ); **Reviewed:** 05-Mar-2023, QC No. jnn-23-90503 (Q); **Revised:** 06-Mar-2023, Manuscript No. jnn-23-90503 (R); **Published:** 31-Mar-2023, DOI: 10.35248/2332-2594.23.14(3).341

Abstract

Objectives: The objective was to identify risk factors for stroke in patients with stroke in hospitals.

Background: The incidence and outcome of stroke are influenced by socioeconomic status. Social Determinants of Health (SDH) have previously been linked to stroke. Stroke is one of the leading causes of disability and death worldwide. It accounts for 42% of disability-adjusted life years and causes long-term disability in nearly 50% of survivors. Ethiopia has also shared the global problem and strokes are becoming more common. Stroke is a public health problem in Ethiopia. Despite the high prevalence of stroke in Ethiopia, there are data regarding drug treatment, treatment outcomes, and risk factors for a poor stroke outcome.

Methods: A literature review was used as a basis to identify risk factors in stroke patients. A literature search was conducted using PubMed and the Woodruff Health Sciences Center Library from the Health Database.

Results: A total of twenty studies that met the eligibility criteria were included in this literature review. Review articles showed that most risk factors were associated with hypertension and hypertension, followed by dyslipidemia and diabetes mellitus.

Conclusions: The increasing number of strokes in LIT countries like Ethiopia poses a challenge for the health care system and the community as a whole a better understanding of stroke risk factors is essential for the development and integration of early intervention and preventive measures for stroke severity required.

Keywords: Stroke • Risk factors • Adult stroke patients

Introduction

The incidence and outcome of stroke are influenced by socioeconomic status. There are few reports of population-level studies on these determinants [1]. Other studies have defined stroke as the sudden onset of focal neurological deficit attributable to a vascular cause [2].

Social Determinants of Health (SDOH) have previously been associated with incident stroke. Although SDOH often clusters within individuals, few studies have examined associations between incident stroke and multiple SDOH within the same individual [3].

According to the World Health Organization (WHO), stroke is a focal or global disorder of cerebral blood circulation that is ischemic or hemorrhagic with symptoms lasting 24 hours or more or leading to death [4].

Literature Review

Overall burden of stroke

Stroke is a leading cause of disability and death worldwide. Accounts for 42% of disability-adjusted life years and causes long-term disability in nearly 50% of survivors [5]. In 2020, strokes were the second leading cause of death after ischemic heart disease. According to WHO, estimates (2020), 15 million people worldwide experience a stroke each year. It is estimated that stroke mortality is seven times higher in low-income countries than in high-income countries. Sub-Saharan Africa (SSA) is experiencing an epidemiological shift, with increasing morbidity and mortality from non-communicable diseases competing with the already growing infectious disease burden [6]. The burden of stroke is high in sub-Saharan Africa, where incidence and prevalence range from 15 to 159 and 15 to 815 per 100,000 person-years, respectively [7].

Another study showed that the burden of stroke in LMICs increased due to changes in socio-demographics and lifestyles. Seventy percent of strokes and 80-85% of stroke-related disabilities and deaths occur in low- and middle-income countries. The outcome of a stroke depends mainly on the presence and severity of post-stroke complications [8]. Although the burden of stroke in Ethiopia is unknown, it is believed to be increasing, and stroke accounts for 2.5% of all hospital admissions and 13.7% of all medical admissions. According to the latest data released in 2017, the number of stroke deaths in Ethiopia reached 39,571, or 6.23% of all deaths. The age-adjusted stroke death rate is 89.82 per 100,000 populations [9].

Risk factors of stroke

The main risk factors for stroke are common to other Non-Communicable Diseases (NCDs) and most are modifiable with effective interventions. These include high blood pressure, smoking, high blood sugar, lack of exercise, being overweight, and obesity [10].

Stroke risk factors can be categorized as modifiable and non-modifiable. Age, gender, family history, and race/ethnicity are non-modifiable risk factors; while hypertension, smoking, diet, and physical inactivity are among the modifiable risk factors identified. Different risk factors apply to an African population when developing a stroke. Africa could be increasingly affected by the high burden of strokes and other vascular diseases resulting from changes in the field of health according to constantly changing social, economic, and demographic models [11]. Various studies conducted in different parts of the world have revealed that the factors associated with stroke are age, sex, smoking, low physical activity, obesity, alcohol, non-adherence to antihypertensive drugs, uncontrolled blood pressure, diabetes, and cholesterol levels. But the above factors are different in [12].

It is a preventable and treatable disease respectively by preventing modifiable risk factors and recognizing the warning signs [13]. Important risk factors for stroke are age, ethnicity, hypertension, diabetes mellitus, smoking, metabolic syndrome, and atrial fibrillation. There are many subtypes of stroke, and some subtypes are strongly age-related, such as atherosclerosis, atrial fibrillation, and small vessel disease. Also, older patients with ischemic stroke often have worse outcomes than younger patients [14]. 80% of stroke survivors had high blood pressure, the most common risk factor for stroke. Compared to men, women were more likely to suffer from diabetes, obesity, high LDL-C, and atrial fibrillation ($p < 0.05$). Men drank and smoked much more often than women ($P < 0.05$) [15].

Ethiopia has also shared the global problem and strokes are becoming more common. The Burden of Disease study reported that there were 52,548 strokes and 38,353 deaths in Ethiopia in 2016. Previous studies have shown hospital mortality ranged from 11% to 44% [16]. Stroke is a public health problem in Ethiopia. Despite the high prevalence of stroke in Ethiopia, data on drug treatment, treatment outcomes, and risk factors for poor stroke outcomes are scarce [17]. There are limited data on risk factors for stroke in sub-Saharan Africa, including Ethiopia. Therefore, this research would fill the information gap by estimating stroke risk factors through a literature review.

Methodology

Aim

Risk factors are of paramount importance, as intervention strategies aimed at reducing these factors can subsequently reduce the risk of stroke. Early detection and modification of risk factors are imperative. A literature search served as the basis for identifying risk factors in stroke patients.

Search strategy

A literature search was performed using PubMed and the Woodruff Health Sciences Center Library Health Database. PubMed is an American search engine. National Library of Medicine (NLM) and includes over 33 million citations from biomedical literature, life science journals, and online books.

Search terms/phrases

The database searches used Boolean terms "OR" and "AND" with combinations of the following search term: magnitudes of stroke, stroke risk factors, predictors of stroke, health outcome, and adult stroke patients.

Inclusion/ exclusion criteria

The literature search selected English-language journal articles from recent work on stroke risk factors between January 2012 and September 2022.

The following studies may be included:

- Abstract and free full text and full-text
- Year of publication 10 years (2012-2022)
- Conducted in low and middle income countries, type of article journal article
- Human species
- Adult age 19+ years

Searches that did not address the following topics: stroke risk factors and extent of stroke were excluded. Systematic reviews, literature reviews, and case reports were excluded from the report.

The final number of articles that will be discussed in the text

In this search, a total of 980 published were identified. After articles were removed by duplications, titles, and reading the abstract, 172 studies were assessed for eligibility criteria. Consequently, 152 studies were excluded due to the outcome of interest was not reported, having data that were not extractable and conducted in other countries. Finally, a total of 20 studies

that satisfy the eligibility criteria were included in this literature review. The detailed descriptions of the included studies are presented in (Figure 1).

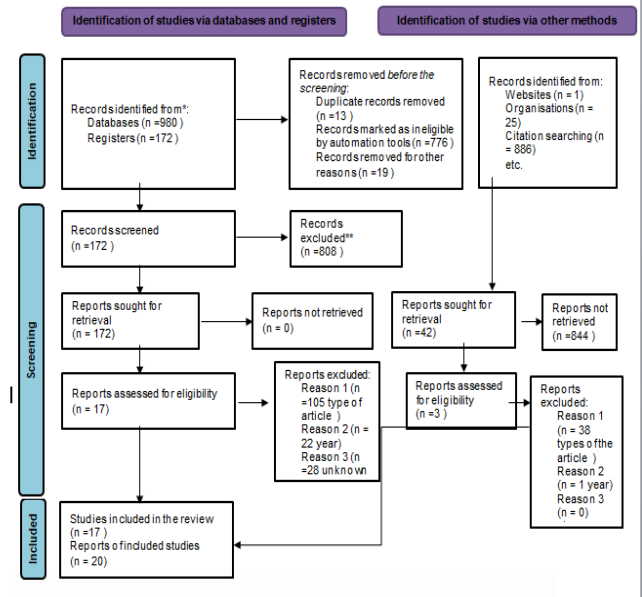


Figure 1. The flow chart diagram that describes the selection of studies included in this study: Prisma Flow Diagram- PRISMA 2020 flow diagram for new systematic reviews which included searches of databases, registers, and other sources

Results

To maximize the body of information on the magnitude of stroke risk factors, we selected about twenty articles to be included in the study. This helps authors gather information from the global to the national level. As a result, seventeen original papers consisting of stroke risk and severity factors were obtained through PubMed searches.

A further manual search of the available reference lists yielded three additional articles, bringing the number of articles meeting the criteria for this review to twenty. A total of twenty studies were reviewed. The researched articles were published between 2012 and 2022 in electronic databases – PubMed/Medline.

There were four global articles; four African articles and the rest were national articles. The articles available worldwide indicated that most of the risk factors were associated with high blood pressure and hypertension. The most common risk factor was hypertension, followed by dyslipidemia and diabetes mellitus [18].

The African content study shows that hypertension was present in 80% of all strokes and was significantly associated with hemorrhagic stroke ($p=0.03$). Overall, 38% of the documented stroke burden was due to hypertension.

The literature indicates that the most frequently identified risk factor was hypertension (75.9%), followed by family history (33.6%), alcohol consumption (22.4%), smoking (17.2%), and heart failure (17.2%). The majority of patients 94 (84.7%) had at least one prior risk factor, of which hypertension accounted for 44.1%.

Moreover, more than half of them (333, 55.8%) had at least one comorbidity, of which the most common comorbidities were hypertension (219, 64.9%), atrial fibrillation (114, 34.2%) and diabetes mellitus (83, 24.9%).

Most articles used a prospective cohort study and data were collected through interviews. The literature review shows the magnitude of risk factors and stroke in stroke patients. The characteristics of the selected literature reviews are shown in (Table 1).

Table 1. Description of the characteristics and contributions of the selected research studies and literature reviews.

Author/ year	Sample/ design	Data/tools	Results
--------------	----------------	------------	---------

Alebeek(2018)	1005/ prospective	Data extraction	Risk factors of 656 young stroke patients (aged 18–50) of the FUTURE study were categorized
Assefa (2022)	325/	Questionnaire	A quarter (26%) of stroke patients had predisposing co-morbidities for SAP, which included heart failure, diabetes, COPD, and chronic kidney disease
Ayehu(2022)	554/ prospective cohort study	Patients' charts and interviewed	Overall, the 28-day case fatality rate was 27.08% (150), the majority of deaths were recorded among hemorrhagic stroke patients 60% (90) and the remaining 40% (60) were ischemic strokes respectively.
Fekadu(2019)	116/ Prospective observational study	Data extraction checklist and patient interview	The most common risk factor identified was hypertension (75.9%) followed by family history (33.6%), alcohol intake (22.4%), smoking (17.2%), and heart failure (17.2%).
Flach (2020)	6052/ Cohort Study	Interview	Over the whole study period, a 54% increased risk of recurrence was observed
Gadisa(2020)	111/ hospital-based retrospective study	Interviewed	The majority of the patients 94 (84.7%) had at least one antecedent risk factor with which hypertension accounted for 44.1%.
Gufue (2020)	503 / A hospital-based retrospective cohort study	Checklist	Among the 323 (64.2%) hypertensive adult stroke patients admitted, 275 (85.1%) of them were diagnosed before admission and 48 (14.9%) of them were diagnosed after hospital admission.
Houessou (2021)	4671/ A door-to-door cross-sectional survey	Interviews	Overall, 3,588 (76.8%) had never heard about stroke, and only 402 (8.6%) could identify at least 1 vascular risk
Kefale (2020)	597/ retrospective cross-sectional	Data abstraction	Moreover, more than half of them (333, 55.8%) had at least one comorbid condition, of which the most common comorbid conditions were hypertension (219, 64.9%), atrial fibrillation (114, 34.2%) and diabetes mellitus (83, 24.9%).
Lioutas (2021)	14 059/ Retrospective cohort study	Prospectively collected data	Among 14 059 participants during 66 years of follow-up (366 209 person-years), 435 experienced TIA
Maredza (2016)	90,000		Overall, 38 % of the documented stroke burden was due to high blood pressure
Mekonen (2020)	89 were cases and 356/ A case-control study	Record review	Out of 89 cases and 356 controls, 32(36%) cases and 49(13.8%) controls were current alcohol drinkers.
Nigat(2021)	253/ Cross-Sectional Study	Face-to-face interviews	About 96.8% of the respondents identified high blood pressure as the risk factor for stroke.
Nutakki(2021)	324/ retrospective study	Chart review	Hypertension was present in 80% of all strokes and was significantly associated with hemorrhagic stroke (p=0.03).
Porat(2019)	53 Qualitative	Focus groups and interviews	Eight themes related to improving secondary prevention and management of multiple risk factors after stroke was identified from focus groups and interviews.
Samuthpongorn(2021)	542/ retrospectively	Reviewed	The most common risk factor was hypertension, followed by dyslipidemia and diabetes mellitus.
Sumelahiti(2021)	1505 cases and 3010 controls	Questionnaire	Self-reported hypertension (21%), high serum cholesterol (38%), and any diabetes (7%) were more common among migraineurs vs controls
Tamrat(2022)	422/ cross-sectional study	Interviewer	Hypertension and diabetes mellitus were the most common medical comorbidities reported among 259 (61.4%) and 114 (27%) stroke survivors, respectively.

Xia(2019)	158,929 / National Stroke Screening Survey	Interviewed	The stroke prevalence rate in the entire study population was 4.94%
Zemed(2021)	180 /A cross-sectional	Interviews	The majority of the participants (74.44%) had co-morbidity; 117 (87.31%) of them were hypertensive.

Discussion

This bibliographic search, to gather comprehensible information, contains the synthesis of the studies collected from the global to the national level. In summary, the most common risk factor for stroke is uncontrolled blood pressure or hypertension followed by diabetes mellitus. 71% of first strokes (4326) were ischemic, and the most common pre-stroke risk factor was hypertension (3760, 65%).

Risk factors for stroke included hypertension, diabetes mellitus, smoking, obesity, dyslipidemia, alcoholism, heart disease, history of stroke or transient ischemic attack, migraine, hormonal contraception, low fruit and vegetable intake, low physical inactivity, and a family history of vascular disease. The result of another paper showed that uncontrolled systolic blood pressure is 3.2 times more likely to develop stroke and uncontrolled diastolic blood pressure is 2.2 times more likely to develop stroke.

Most of the study papers cite hypertension as the primary outcome finding, which occurs primarily in hemorrhagic stroke (158.84%) compared to patients with ischemic stroke (175.44.6%). Most studies report hypertension as the primary endpoint, which occurs mainly in hemorrhagic stroke (158.84%) compared to ischemic stroke patients (175.44.6%).

A history of hypertension was reported by 61% of stroke survivors. Similarly, another study conducted in Addis Ababa, Ethiopia reported that hypertension occurred in 65% of all study participants, regardless of the type of stroke. The expected result was observed in the study.

Most of the stroke patients were hypertensive patients. These findings were confirmed by identified study articles. Furthermore, some unexpected results have been found in the literature studies. About 24.5% of participants chew chat and drink alcohol, and 13% of them smoke cigarettes.

In this finding, chat chewing is an additional risk factor contributing to the causes of stroke, which need further attention in the study area as this practice is more prevalent in the study area, Ethiopia. This literature review shows several risk factors that have contributed to the cause of stroke. However, the study doesn't reveal how it causes strokes.

Moreover, these new findings require more attention in the prevention of stroke risk factors. The lack of Ethiopian context-specific data limits the formulation of well-designed responses and treatment of stroke. Much, therefore, remains to be done urgently to address the current challenges related to the risk factors and clinical profile of stroke in Ethiopia.

More research is needed to identify stroke risk factors and their associations in the future. Further studies are needed to understand the mechanisms of stroke risk factors.

Strengths

- This study has been classified from global to national.
- It contains decennial articles.
- It generates the most important and expected information.

Limitations

- This study was not without limitations. There is heterogeneity among the included studies.
- The study is based primarily on patient cases and cannot be externally validated for the general population.

Conclusions

Strokes are increasingly common in low and middle income countries like Ethiopia, posing challenges to health systems and communities. The most commonly identified risk factor was high blood pressure, and that was alarming. A better understanding of stroke risk factors is needed for the development and integration of early interventions and preventive measures to reduce the incidence and severity of stroke.

Implications for Nursing Research

A stroke can make daily activities difficult. These problems can be due to several stroke-related conditions, such as weak limbs, numbness or paralysis, communication problems, vision problems, and unilateral neglect issues.

Social Determinants of Health (SDH), such as income level and education, can serve as predictors of adverse health outcomes. In particular, these indicators can increase the patient's risk of stroke. SDOHs are often beyond the physician's control and can be a frustrating obstacle to patient care.

Acknowledgements

The author thanks, Dr. Jill Hamilton, RN, Ph.D. FAN, Dr. Telisa Spikes, and Professor Rebecca Gary, RN, Ph.D., FAHA, FAAN collaborate in the preparation of this paper.

Nell Hodgson Woodruff School of Nursing of Emory University in Atlanta, Georgia.

References

- Houessou, MA., et al. Knowledge of stroke risk factors and signs in Parakou, a Northern City of Benin in West Africa. *Cerebrovasc Dis.* 50.1(2021):88-93.
- Assefa, M., et al. Factors associated with stroke associated pneumonia among adult stroke patients admitted to university of Gondar hospital, Northwest Ethiopia. *Sci Rep.*12.1(2022):12724.
- Ayehu, GW., et al. Case fatality rate and its determinants among admitted stroke patients in public referral hospitals, Northwest, Ethiopia: A prospective cohort study. *Plos one.*17.9(2022):0273947.
- Fekadu, G., et al. Risk factors, clinical presentations and predictors of stroke among adult patients admitted to stroke unit of Jimma university medical center, south west Ethiopia: prospective observational study. *BMC neurology.* 19.1(2019):1.
- Koenig, G. Gamma-glutamyltransferase: a predictive biomarker of cellular antioxidant inadequacy and disease risk. *Dis markers.* (2015).
- Gadisa, DA., et al. Clinical Characteristics, Treatment Outcomes, and its Predictors Among Hospitalized Stroke Patients in Ambo University Referral Hospital, West Ethiopia: A Retrospective Hospital-Based Study. *Vasc health risk manag.* (2021):591-604.
- Hagos, Z., et al. Survival of stroke patients according to hypertension status in Northern Ethiopia: seven years retrospective cohort study. *Vasc health risk manag.* (2020):389-401.
- Kefale, B., et al. Clinical pattern and predictors of stroke treatment outcome among hospitalised patients who had a stroke at Felege Hiwot comprehensive specialised hospital, northwest Ethiopia: a retrospective cross-sectional study. *BMJ open.* 10.12(2020):040238.
- Maredza, M., et al. Burden of stroke attributable to selected lifestyle risk factors in rural South Africa. *BMC Public Health.* (2016);16:1.
- Mekonen, HH., et al. Factors associated with stroke among adult patients with hypertension in Ayder Comprehensive Specialized Hospital, Tigray, Ethiopia, 2018: A case-control study. *PLoS one.* 15.2(2020):0228650.
- Nigat, AB., et al. Knowledge on stroke warning signs and associated factors among hypertensive patients, Northwest Ethiopia: an institution-based cross-sectional study. *Vasc health risk manag.* (2021):721-28.
- Nutakki, A., Risk factors and outcomes of hospitalized stroke patients in Lusaka, Zambia. *J neurol sci.* (2021);424:117404.
- Visser-Meily, A., et al. Psychosocial functioning of spouses of patients with stroke from initial inpatient rehabilitation to 3 years poststroke: course and relations with coping strategies. *Stroke.* 40.4(2009):1399-404.
- Samuthpongton, C., et al. Stroke risk factors, subtypes and outcome in elderly Thai patients. *BMC neurology.*21.1(2021):1-6.
- Xia, X., et al. Prevalence and risk factors of stroke in the elderly in Northern China: data from the National Stroke Screening Survey. *J neurol.* 266(2019):1449-58.
- Yadav, RS., et al. Social determinants of stroke hospitalization and mortality in United States' counties. *J Clin Med.* 11.14(2022):4101.
- Ray, S., et al. Different origins of gamma rhythm and high-gamma activity in macaque visual cortex. *PLoS biology.* 9.4(2011):1000610.
- Zewudie, AZ., et al. Treatment Outcome and Its Determinants among Patients Admitted to Stroke Unit of Jimma University Medical Center, Southwest Ethiopia. *Stroke res treat.* (2020).

Cite this article: Alemu, B., et al. Identify the Stroke Risk Factors among Stroke Patients at the Hospital. *J Neurophysiol* 2023, 14 (3), 001-004