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Knowledge, Attitudes, and Perceptions on Stroke in Lubumbashi City in DRC

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Abstract

Stroke is a major public health problem, particularly in sub-Saharan Africa, where the incidence and mortality related to this pathology are increasing. This analytical cross-sectional study, conducted in Lubumbashi, Democratic Republic of Congo (DRC), aimed to assess the knowledge, attitudes, and perceptions of stroke among the local population. A sample of 454 participants, selected by stratified probability sampling, were interviewed using a standardized questionnaire. The results reveal a significant deficit in knowledge on risk factors and signs of stroke, with only 33.5% of participants able to identify the critical elements. Preventive attitudes are influenced by cultural and religious beliefs, and although 81.1% of participants report seeking medical help in case of suspected stroke, nearly 19% opt for alternative practices. Misperceptions of the causes of stroke, such as "God's will" or "bad luck", are widespread, highlighting the need for awareness campaigns tailored to the local context. Multivariate analysis of factors associated with stroke knowledge reveals that direct family experience with stroke, perception of personal risk and exposure to stroke information are important determinants of better knowledge and hand-job relationships. Factors associated with increased knowledge of stroke include direct family experience, perception of personal risk, and exposure to information about stroke. This study highlights the urgent need to strengthen public education and community interventions to improve stroke prevention and management in the region.

Keywords

Knowledge, Attitude, Perceptions, Stroke, Lubumbashi

1. Introduction

Stroke is a major public health problem, representing the second leading cause of death globally with 6.55 million deaths per year, or 11.6% of all deaths, and the third leading cause of overall disability (disability-adjusted life years, or DALYs) [1]. Stroke is also a leading cause of dementia and long-term disability, leading to considerable economic costs, particularly in low- and middle-income countries (LMICs) [2]. In sub-Saharan Africa, the incidence of stroke is increasing, with mortality exceeding 80%, which constitutes a public health crisis [3]. This region has much higher stroke mortality than in developed countries, and an increasing proportion of young adults are affected [3]. According to WHO, stroke-related deaths and disability-adjusted life years (DALYs) lost are at least seven times higher in LMICs, mainly in Africa, than in high-income countries [4]. However, the health system in sub-Saharan Africa, largely oriented towards infectious diseases, has limited resources for the prevention and treatment of noncommunicable diseases (NCDs), such as stroke and its risk factors [4]. These factors include high blood pressure (hypertension), diabetes mellitus, alcohol abuse, smoking, insufficient fruit and vegetable intake, and genetic and ethnic factors [5]. Sickle cell disease and HIV are causes of stroke [5]. Aggravating factors include inadequate training of health workers. Lack of adequate medical information and poor control of risk factors contribute to the increasing incidence of stroke in Africa [6] [7]. In the Democratic Republic of Congo (DRC), Lubumbashi, the capital of Haut-Katanga province, is the second largest city in the country and a major economic hub. Despite its growth, the city faces significant health care constraints, with inadequate medical infrastructure and limited awareness of noncommunicable diseases such as stroke [8] [9]. Health centers in Lubumbashi lack adequate resources for stroke management, contributing to suboptimal stroke management [10]. This study aims to assess the knowledge, perceptions, and attitudes toward stroke among the population of the city of Lubumbashi, with the aim of contributing to the improvement of stroke management in Haut-Katanga province in the DRC.

2. Materials and Method

This analytical cross-sectional study took place over a six-month period, from September 2023 to March 2024, in the city of Lubumbashi, Democratic Republic of Congo. Lubumbashi, with its diverse population and varied health infrastructure, including university clinics, was chosen as the study setting because of its potential to provide a representative overview of knowledge and perceptions about stroke. The target population consisted of Lubumbashi residents aged 18 years and older, regardless of gender, education level or occupation.

The interviewers were trainee doctors in their final year of medical school. They were trained before going into the field. They asked for the consent of patients to complete the 27-question questionnaire, which could take less than 15 minutes to complete. At the end of the questionnaire, we will take your blood pressure and measure your weight and height.

Patients were free to accept or refuse to take part in this survey. In the latter case, there will be no consequences. We guarantee the anonymity and confidentiality of the information obtained in this survey. By signing below, you agree to participate freely and voluntarily in this study and affirm that the necessary information concerning this study has been provided to you.

Stratified probability sampling was used, with strata corresponding to the city's communes, to ensure fair representation of cultural and socio-economic subgroups. The sample size was calculated using the standard statistical formula, assuming an unknown prevalence of stroke (P = 50%), with a margin of error of 5% and a confidence level of 95%. The initial result of 384 participants was increased to 454 to account for potential non-response. Within each stratum, participants were selected by simple randomization. Inclusion criteria included residence in Lubumbashi, minimum age of 18 years, and voluntary consent to participate in the study. Individuals with known cognitive impairment (as determined by a rapid assessment using a standard scale) or temporary residence status were excluded.

Data were collected using a pre-tested standardized questionnaire (**Annex 1**), including sections on sociodemographic characteristics, knowledge of stroke risk factors and signs, and participants' attitudes and perceptions. Data were collected through face-to-face interviews, conducted by trained interviewers to maximize the response rate.

Data analysis was performed using SPSS software version 27.0. Qualitative variables were described in terms of frequencies and percentages, while quantitative variables were analyzed using means and standard deviations (for those normally distributed) or medians with minimums and maximums (for those not normally distributed). Relationships between sociodemographic variables and stroke knowledge were assessed using logistic regressions. The research protocol was approved by the Ethics Committee of the School of Public Health, University of Lubumbashi. All participants provided free and informed consent, in accordance with the Declaration of Helsinki II. The ethical principles of confidentiality, autonomy and beneficence were strictly respected. Data were anonymized, protected by unique codes, and stored securely, with limited access to the research team. The database will be retained for a limited period before final destruction. No direct risks or benefits have been identified for participants in this study.

3. Results

3.1. Socio-Demographic Characteristics of Respondents

Descriptive analyses of the collected data highlight the sociodemographic characteristics of the participants, providing an overview of the study population. The

median age is 30 years, with a range from 18 to 70 years. The majority of participants are men (267), representing 58.8% of the sample, with a sex ratio of 1.4 M/F as report in Table 1. 285 participants (63%) have a secondary education level, while 11 (2.4%) have a university degree.

3.2. Knowledge about Strokes

The majority of participants, 266 (58.6%) are not aware of stroke risk factors, reflecting a general lack of awareness in the population. Among those who are aware of the risk factors, smoking and stress are the most frequently mentioned, suggesting that they may be more publicized or considered more relevant by the public. There is low recognition of major factors such as high blood pressure (hypertension) and diabetes. Among the signs of stroke, loss of motor skills is the sign most recognized by participants 122 (26.9%), language disorder is the second most recognized sign 29 (6.4%) and other signs, such as headache/dizziness 8 (1.8%) and vision disturbances 3 (0.7%), are rarely mentioned. While 250 (55.1%) of the participants do not know any sign i.e., more than half of the participants are not familiar with the signs of stroke. Overall, only 152 (33.5%) of the participants have a satisfactory knowledge of the signs and risk factors of stroke, while 302 (66.5%) cannot identify any.

Table 1. Proportions on knowledge of stroke (Comparison based on gender, level of education and age group (have you ever heard of stroke?)).

Gender	Yes	No
Man	82.8%	17.2%
Woman	64.7%	35.3%

In an urban context such as that of Lubumbashi, the second largest city in the Democratic Republic of Congo and a major university center, public health issues remain critical, particularly around cardiovascular diseases such as stroke. A local analysis carried out on a sample of residents explored the influence of certain socio-demographic variables on knowledge of this pathology. The study revealed that men in Lubumbashi appear to be better informed about stroke than women, with an 82.8% knowledge rate versus 64.7% for women. This difference could be explained by unequal access to medical information, often concentrated in academic or professional circles, where male representation remains strong. This disparity highlights the need for inclusive information strategies, targeting women, including in working-class neighborhoods.

A clear correlation between level of education and knowledge of stroke was found. Participants with a university education had a level of knowledge of almost 90%, while those with a basic or primary education were significantly less informed. These results underline the importance of formal education as a lever for health prevention. At local level, this calls for the integration of health education in schools, and the multiplication of awareness-raising campaigns in markets,

churches, and community spaces (Table 2).

Table 2. Comparison based on level of education.

Educational level	Yes	No
1	75.0%	25%
2	46.4%	43.6%
3	89.5%	10.5%
4	72.7%	27.3%

Table 3. Age-based comparison.

Age range	Yes	No
<20 ans	43.8%	56.2%
20 - 29 ans	72.9%	27.1%
30 - 39 ans	76.9%	23.1%
40 ans and over	83.2%	16.8%

Knowledge increases with age (Table 3). In our studies, young people under 20 were the least informed (43.8%), while adults over 40 were 83.2% more aware. This trend could be explained by greater exposure to stroke cases among family and friends, or by gradual awareness as people age. This finding reinforces the urgent need to raise awareness among younger generations, particularly in schools and universities, where stroke is sometimes perceived as an "old people's" disease.

3.3. Attitudes towards Stroke

Regarding preventive attitudes, almost half of the participants 224 (49.3%) adopt a proactive approach to stroke prevention, citing practices such as a balanced diet and stress management. However, an equivalent proportion 230 (50.7%) do not demonstrate a sufficient preventive attitude. Among those who do not demonstrate an adequate preventive attitude, many refer to cultural and religious beliefs, in particular evoking faith in God 67 (15%), as the main prevention strategy. In terms of response to suspected stroke, 368 (81.1%) respondents said they would seek immediate medical help. However, 86 (18.9%) participants opted for inappropriate behaviors, such as self-medication or late consultation. The analysis of combined attitudes, integrating both prevention and appropriate response to suspected stroke, reveals that only 199 (43.8%) of participants adopt a good attitude.

3.4. Perceptions of Strokes by Respondents

The majority of participants 406 (89.4%) have an incorrect perception of stroke, based on erroneous beliefs about the causes, symptoms, or consequences. Only 4.0% of participants have an accurate perception, while 30 participants (6.6%)

have a partial understanding.

Analysis of perceptions of the causes of strokes shows uneven knowledge and often influenced by cultural beliefs. Among the correct perceptions, high blood pressure is the most frequently identified cause (67 participants), followed by coagulation disorders (19 participants) and excess cholesterol (15 participants). Some answers, such as stress, overwork, emotional shock (15 participants) and cerebral hemorrhage (15 participants), reveal partial understanding. However, erroneous beliefs persist widely. Perceived causes such as God's will (61 participants), bad luck (59 participants), bewitchment (10 participants) and infidelity of the spouse (9 participants) reflect inaccurate conceptions influenced by sociocultural factors. These results highlight the importance of tailored awareness campaigns to correct erroneous perceptions and promote medically validated knowledge about strokes. Regarding personal stroke risk, only (9.0%) of participants (41 individuals) considered themselves at risk, while (82.6%) (375 participants) did not feel concerned, and (8.4%) (38 participants) reported not knowing whether they were at risk. These data indicate low risk awareness, posing a challenge for primary prevention.

3.5. Factors Associated with Knowledge of Stroke

Univariate analysis of factors associated with stroke knowledge revealed that eight variables had a statistically significant relationship. The factors included male gender, certain occupations (agriculture and manual labor, education and training, liberal and intellectual profession), having heard of stroke, having a family member affected by stroke, perception of personal stroke risk, and regular practice of sport.

However, multivariate analysis allowed these results to be refined, showing that only four factors remained significantly associated with better knowledge of strokes: Occupation in agriculture and manual work, Having already heard of strokes, having a family member who had suffered a stroke, Personal perception of the risk of stroke (Table 4).

Table 4. Key results.

Variable	Category	Workforce (%)
Global knowledge of stroke	Knowledge of signs and risk factors	152 (33.5%)
	No knowledge of signs and risk factors	302 (66.5%)
Attitude towards stroke prevention	Good attitude	224 (49.3%)
	Bad attitude	230 (50.7%)
Attitude in the conduct to adopt in the face of a suspected stroke	Good attitude	368 (81.1%)
	Bad attitude	86 (18.9%)
Combined attitude in prevention and conduct to be adopted	Good attitude	199 (43.8%)
	Bad attitude	255 (56.2%)

Continued

	Correct perceptions	18 (4.0%)
General perception of strokes	Partially correct perceptions	30 (6.6%)
	Misperceptions	406 (89.4%)
Perception of the causes of strokes	High blood pressure (correct)	67 (14.8%)
	God's Will (Wrong)	61 (13.4%)
	Bad spell (erroneous)	59 (13.0%)
	(Wrong) Spell	10 (2.2%)
Perception of personal stroke risk	Considers himself at risk	41 (9.0%)
	Does not consider himself at risk	375 (82.6%)
	Don't know	38 (8.4%)
Factors associated with knowledge of stroke (multivariate analysis)	Adjusted OR (95% CI)	p-value
Agricultural occupation and manual work	0.363 (0.166 - 0.791)	0.011*
Having heard about strokes	0.110 (0.037 - 0.325)	<0.001***
Family member affected by stroke	0.236 (0.120 - 0.461)	<0.001***
Perception of personal risk of stroke	0.367 (0.141 - 0.955)	0.040*

4. Discussion

This study highlights important trends in knowledge, attitudes and perceptions of stroke in a young and predominantly secondary-educated population, a demographic profile consistent with that observed in other studies in sub-Saharan Africa, where increasing urbanization exposes an active population to emerging cardiovascular risk factors, such as sedentary lifestyle and unbalanced diet [11]-[13]. However, the low proportion of participants with university education could explain gaps in the in-depth understanding of complex diseases such as stroke [14]. A concern is the influence of cultural and religious beliefs on the perception of the causes of stroke, with spiritual explanations such as "God's will" or "bad luck" remaining prevalent, reflecting a significant barrier to the dissemination of medical knowledge. This trend, also observed in other African surveys, highlights the need to involve religious leaders in awareness campaigns to combat these misperceptions [15] [16]. Furthermore, although participants overwhelmingly report a proactive attitude towards stroke, concrete preventive behaviors, such as controlling hypertension or practicing regular physical activity, are clearly insufficient, a finding corroborated by other studies [9]. Knowledge of the signs and risk factors

of stroke remains particularly low, with only 33.5% of respondents able to identify critical elements, thus compromising the chances of a rapid and effective intervention, a phenomenon already observed in similar contexts in Africa and Asia [17] [18]. The limited recognition of key symptoms, such as loss of motor skills, reinforces the urgent need for targeted educational campaigns to improve stroke recognition. Although 81.1% of participants report seeking medical help in case of suspected stroke, nearly 19% would still turn to alternative practices, thus exacerbating delays in care. Finally, analysis of factors associated with stroke knowledge reveals that direct family experience with stroke, perception of personal risk and exposure to stroke information are crucial determinants of better knowledge. However, the relationship between manual occupations and better awareness is intriguing and could reflect specific local dynamics in Lubumbashi, requiring further investigations to understand these results divergent from the trends observed elsewhere [19] [20]. This study highlights opportunities to improve stroke awareness through public health strategies that integrate culturally and community-based approaches.

The study carried out in Lubumbashi revealed marked correlations between certain socio-demographic variables and the level of knowledge of stroke. While several of the trends observed were to be expected, such as the positive effect of level of education on knowledge of the disease, other more unexpected results merit further analysis.

It is particularly interesting to note that some manual workers showed a level of awareness sometimes higher than that of some office workers. This observation can be explained by several hypotheses. These populations are often exposed to cases of stroke in their immediate environment, which may raise their awareness empirically. Active use of traditional media: Manual workers frequently listen to the radio, which remains a powerful vector for disseminating health messages. However, these results deserve to be explored in greater depth in a complementary qualitative study, to better understand the channels and contexts of informal learning.

5. Conclusion

This study, conducted in the city of Lubumbashi, highlights a significant deficit in knowledge, preventive attitudes and adequate perceptions towards stroke. It draws attention to the urgent need to strengthen public education on modifiable risk factors, warning signs and preventive measures for stroke in Lubumbashi. A multisectoral approach involving communities, health professionals and policy makers is essential to reduce the burden of stroke in the region. Awareness campaigns should be adapted to the local context, taking into account cultural and religious beliefs, in order to improve long-term health outcomes. Finally, this study highlights opportunities for public health policies in Haut-Katanga, such as expanding access to health education, early detection of cardiovascular diseases and promotion of healthy lifestyles.

Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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Annex. Inquiry Form

A. Questionnaire

1. What is your age: .....
2. Are you a? a. Male b. Female
3. Which commune do you live in? .....
4. What is your level of education? a. Primary b. Secondary c. University d. None
5. What religion do you practice? a. Catholic b. Islam Revival Church c. No religion d. Other to specify
6. What is your profession? a. Farmer b. Craftsman c. Retailer d. Company director
   e. Executive and higher intellectual profession f. Intermediate profession
   g. Clerical h. Manual worker i. Retired j. Not working
   k. Other, please specify
7. Have you ever heard of stroke? a. Yes b. No
   If yes, how were you informed? c. Media posters d. Doctor e. Close f. Other
   If yes, do you think this information/awareness-raising was important? g. Yes h. No
8. In your opinion, what would be the most effective way to disseminate information about stroke to the general population: .....
9. How would you define stroke in your own words: .....
10. Do you have a family member who has suffered a stroke? a. Yes b. No
    If yes, what symptoms did they have? c. Did you know from these signs that it was a stroke?
    d. What was your first course of action?
    e. According to family members, what was the cause of this stroke?
11. Have you ever had a stroke? a. Yes b. No

If yes,

12. What symptoms did you experience: .....
    a. Did you know or see from these signs that it was a stroke? a. Yes b. No
    b. What was the first thing you did: .....
    c. According to family members, what was the cause of this stroke: .....
13. In your opinion, a stroke can occur:
    a. At any age (from birth to old age) b. Only from adulthood onwards
    c. Only in elderly subjects d. Don't know
14. In your opinion, which organ is affected by a stroke: .....
15. Choose the true statement(s) about stroke:
    a. It's a disease of the rich b. It's a disease of the poor
    c. It's a contagious disease d. It is an African disease
16. Do you know the risk factors for stroke? a. Yes b. No

If yes, which factor do you know? .....

17. In your opinion, stroke is caused by:
    a. God's will b. Bewitchment c. Spouse's unfaithfulness d. Spell cast e. Bad spell
    f. Other(specify) .....
18. Do you think you are at risk of having a stroke?
    a. Yes b. No c. Don't know
19. Do you have (check all that apply)
    a. Treatment for diabetes b. Treatment for cholesterol c. Treatment for blood pressure

d. Treatment for cardiac arrhythmia, atrial fibrillation, or atrial fibrillation.

20. How can stroke be prevented?

a. Faith in God b. Respect for customs c. Avoid contact with stroke victims

d. Wearing talisman e. Other (specify).....

Habitus

21. Do you smoke tobacco? (Check this box if you quit smoking less than 3 years ago.

a. Yes b. No

If yes, please specify

c. The daily quantity: .....

d. Duration of consumption: .....

22. Do you smoke cannabis?

a. Yes b. No

23. Do you drink alcohol?

a. Yes b. No

If yes, specify type (beer, wine, local alcohol, whisky): .....

c. Daily quantity: .....

d. Duration of consumption: .....

24. Are you overweight?

a. Yes b. No

25. Do you do sport?

a. Yes b. No

If yes, please specify.

c. Type: .....

d. Frequency: .....

e. Duration: .....

26. Do you know the signs of a stroke?

a. Yes b. No

If yes, what signs do you know? .....