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Instruments for assessing knowledge about stroke: an integrative literature review

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ABSTRACT

Aim: To summarize studies that used scales and questionnaires to assess the population's knowledge about acute stroke symptoms. Method: Integrative literature review, carried out in five databases, including free access articles and texts available in full, without date or language restriction, which used validated questionnaires to assess the population's knowledge about stroke. Result: 26 studies were included; composed of 19 cross-sectional studies, 10 in Asian countries and 13 used validated questionnaires from other studies; 16 studies used closed questions. Implications for practice: There is a need to build valid and reliable instruments to assess the population's actual knowledge about stroke and implement outcome-based interventions. It is important to build robust research to implement effective prevention and action in cases of stroke.

Keywords: Stroke; Surveys and Questionnaires; Health education; Public health

INTRODUCTION

Stroke is considered a public health problem due to its progressive nature of brain dysfunction, resulting in high rates of morbidity and mortality. It is the second leading cause of death worldwide and the primary cause of disability in parts of Europe[1]. In Brazil, it was the second leading cause of death between 1990 and 2019, with a 12% increase in the proportion of ischemic stroke (IS) and a 16% decrease in hemorrhagic stroke (HS) cases[2].

Delayed treatment initiation impacts mortality and results in permanent sequelae. Only 30 to 40% of patients presenting with acute stroke symptoms are hospitalized within the first four hours after symptom onset[2], a critical period for successful thrombolytic therapy.

According to the American Heart Association (AHA/ASA) guidelines, patients with IS should receive intravenous thrombolysis and additional endovascular treatment when they meet the eligibility criteria[4]. The period of up to four hours for the start of medication infusion is a significant predictor of positive clinical outcomes, while treatment delay is associated with a worse prognosis[5]. It is crucial for people to correctly identify stroke symptoms.

Public awareness levels regarding stroke warning signs and risk factors have been reported as low in various contexts, particularly among high-risk groups and older populations. To develop effective educational interventions and to evaluate and monitor their effectiveness, a validated tool is needed for a preliminary investigation of the extent of stroke awareness in the community[6].

Questionnaires represent one of these tools. They are used in clinical practice, health assessment, and research, covering a wide range of evaluation aspects[7]. However, given the mass development of research in this area, there is a need to assess how these studies are being conducted and which instruments are being used to analyze this knowledge. Considering the above, the interest emerged to conduct an integrative literature review with the primary objective of summarizing studies that used scales and questionnaires to assess the population's knowledge of acute stroke symptoms.

METHOD

This is an integrative literature review, conducted with a rigorous research method and predefined stages regarding the guiding question, data extraction, analysis, and

discussion of the findings, which was carried out and reported based on the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines[8].

To summarize the studies that used scales and questionnaires to assess the population's knowledge of stroke symptoms, this research was operationalized with the following steps: development of the guiding question; establishment of inclusion and exclusion criteria; definition of databases; selection of descriptors and development of search strategies; database searches; data collection and extraction for the Rayyan software; screening of articles through title and abstract reading, and critical reading of the included studies[9,10].

Data collection was performed using a structured instrument. The research question was developed using the PVO strategy, where "P" (population) represents the population of interest, which in this study refers to the lay population, i.e., individuals without health-related education; "V" (variable) represents the variable of interest, which refers to scales and questionnaires; and "O" (outcome) refers to knowledge of stroke symptoms11. Thus, the following guiding question was formulated: What scales and questionnaires are used to assess the population's knowledge of stroke symptoms?

The search was conducted in October 2022 using the Federal University of Mato Grosso do Sul (UFMS) Proxy through the Portal de Periódicos of the Coordination for the Improvement of Higher Education Personnel (CAPES) by two independent researchers to minimize selection bias. After testing the cross-references in databases that publish materials on the topic, only those that retrieved studies relevant to the guiding question were adopted. The databases searched were the Virtual Health Library (VHL), EMBASE, PUBMED (Central - PMC), Web of Science (Core Collection), CINAHL (Cumulative Index to Nursing and Allied Health Literature), and Elsevier's SCOPUS.

To structure the search strategies, English-indexed descriptors in Medical Subject Headings (MeSH) were used: Patients; Population; Surveys and Questionnaires; Stroke; Knowledge. In ENTREE: Patients; Population; Questionnaire, cerebrovascular accident; Knowledge. In Portuguese, the following descriptors indexed in the Health Sciences Descriptors (DeCS) were used: População; Paciente, Inquéritos e Questionários, Acidente Vascular Cerebral; Conhecimento.

Open-access research articles with full texts available, without date or language restrictions, that used validated questionnaires to assess the population's knowledge of stroke were included. Editorials, letters, conference proceedings, monographs,

dissertations, theses, and studies evaluating the knowledge of hospitalized stroke patients were excluded.

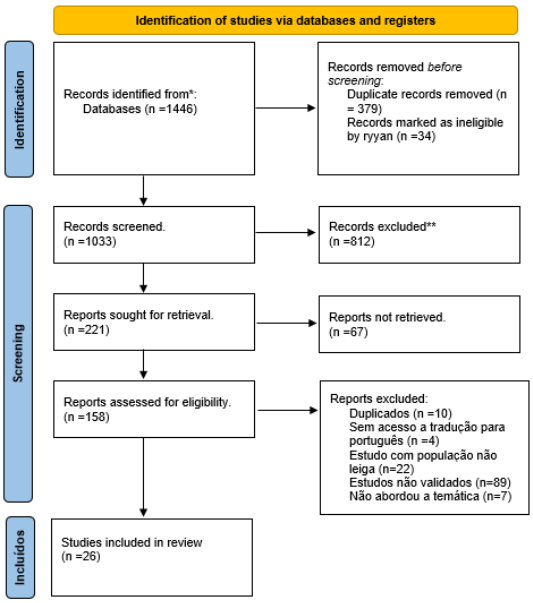
The articles were retrieved, and duplicates were removed using *Mendeley Desktop*. After this step, the *Rayyan* platform was used to perform a pre-analysis of the articles and to analyze the titles and abstracts of studies meeting the inclusion criteria. The articles were analyzed independently by two researchers, with the inclusion and exclusion criteria being applied, and disagreements resolved by consensus. Subsequently, the full texts of the articles were read, and studies that met the inclusion criteria were selected.

For data extraction, a spreadsheet in Microsoft Excel® software was used containing the following variables: article title, authors, year of publication, journal, country where the research was conducted; language, study objective, type of research and method employed, level of evidence, data collection period, participants, sample, study location, instruments used, validation, variables, instrument characteristics, results, study limitations, and conclusion. The results were reported in synoptic tables and descriptively.

RESULTS

The flow of the publication selection process is presented in the PRISMA Flow Diagram (Figure 1).

Figure 1. Flowchart of the process of selecting publications for study, Campo Grande, Mato Grosso do Sul, Brazil, 2022.



Most articles were published between 2018 and 2022, totaling 15 articles[12,13,22-26,14-21]. The remaining articles were published between 2013 and 2017, with seven articles[6,28,30-33,37], and between 2012 and 2018, with four articles[34,36,38,39].

Regarding the study design, 20 studies were cross-sectional[12,13,25,28,31–34,36,37,39,40,15,16,18,20–24], while experimental[26,28], quasi-experimental[14,19], and methodologica[l6,30] designs had two publications each. All included studies employed a quantitative approach.

Eleven articles were published in Asian countries[13,15,40,18–21,24,31,33,34], five in European countries[12,26,30,32,39], five in African countries[16,22,25,28,41], four in the Americas[6,23,27,36], and one was a multicenter study1[4]. The predominant language was English.

The study populations were mostly composed of the general public, represented in 20 articles[6,12,25,26,29–34,39,40,13,15,16,18,20–23]. The remaining studies evaluated patients from at-risk groups[19,24,28] and diverse populations in focus groups[14,27,36], with three articles each. Study settings included clinics, hospitals, and community centers, with some conducted remotely via telephone interviews or online forms.

Among the instruments used to assess participants' knowledge, 19 were self-administered questionnaires[6,12,25,27,28,30–34,36,13–17,20,21,24], and seven were interviews using questionnaires[18,19,22,23,26,39,41]. Of the total questionnaires used, 13 employed validated instruments from other authors[12,13,33,34,39,14,16,21,23,26,27,29,31]; seven conducted content validation[18,20,24,25,28,32,40], and six conducted cross-cultural validation[6,15,19,22,30,36].

The assessment of knowledge and actions in the event of a stroke was the objective of 18 studies[12,13,28,29,31–34,39,16,18,20,21,23–26]. Three studies aimed to evaluate the transfer of stroke knowledge through educational interventions[14,27,36], and five developed instruments or aimed to perform cross-cultural validation of previously validated questionnaires in other languages[6,15,19,22,30].

The variables addressed in the instruments focused primarily on stroke knowledge. Sociodemographic variables were examined in 13 articles[13,18,33,39,40,20,21,23,25,26,28,29,31]; risk factors in 17[13,15,28,31–34,39,40,16,18,19,21,22,24–26]; actions in case of stroke in 13[6,13,39,40,18,20,22,23,28,30,32,34]; and stroke prevention practices in five[16,18,22,25,28].

All articles investigated stroke signs and symptoms. Participants' medical history, understanding of treatment, and sources of stroke information were less frequently

addressed. The characterization of the studies, including the authors, year and country of publication, study objectives, study type, instrument characteristics, and main results, are described in Table 1.

The instruments have distinct characteristics regarding question structuring. Among those used for collecting data related to stroke knowledge, 17 utilized questionnaires with closed-ended questions[12,14,33,34,39,40,42,43,20,21,23,25–27,29,30], six used questionnaires with open-ended questions[26,22,31,32,36,39], and three employed a mixed approach with both open-ended and closed-ended questions[13,18,19.] Two articles did not specify the nature of the questions.

Regarding the method of instrument application, 21 articles applied the instrument in person[6,12,24,25,27–34,13,40,16,18–23], two provided the instrument for online completion[14,15], and three collected data by phone[36,39].

The number of questions was not reported in all studies. In some studies, it ranged from 18 to 28 questions. In phone interviews, the number of questions was smaller, ranging from one to five questions.

The results obtained were heterogeneous across studies. Although many analyzed the same variables, the analyses were conducted differently in each design, and the results were presented individually, making it difficult to identify consistent patterns.

Regarding the limitations reported in the articles, 10 pointed out sample representativeness issues[6,12,13,16,28,29,31–33,39]. Closed-ended questions were identified as limitations in four studies[13,15,23,29], and open-ended questions were a limitation in one study[31]. Another study cited the list response format as a limitation due to overestimating knowledge[34].

Four articles identified the cross-sectional design as a limitation due to the inability to infer causality[15,20,24,29]. Online availability of the instrument was mentioned as a limitation in two studies[13,15], and postal format in one study[18]. Four studies did not report limitations[22,25,26,36].

Seven studies concluded that stroke knowledge is inadequate and that educational actions are necessary[13,16,22,25,32,33,44]. Eight concluded that there is a need for educational actions focused on stroke knowledge[17,28,29,34,45-47]. Other studies reached diverse conclusions, such as the need for medical education strategies[19] and the organization of educational actions for specific groups[15]. In methodological design studies, the conclusion regarding the validation of questionnaires and cross-cultural adaptation was that these methods were reliable[21,30,48].

DISCUSSION

Analysis of the identified articles reveals that the use of reliable and validated instruments is infrequent. Coluci (2015) discusses the importance of instrument validation for evaluation and how such instruments are useful and capable of providing scientifically robust results when they demonstrate good psychometric properties. Despite the significant increase in the number of questionnaires, many are not developed and validated appropriately[7].

Examining the countries where the studies were conducted, it is observed that most were conducted in Asia and Africa, with notable mentions including Saudi Arabia[19,24,34.] This can be explained by the high prevalence of cardiovascular diseases, including stroke, in these regions. A study conducted in Iran reports that the incidence of stroke is higher than in many Western countries49. In 2019, according to the Global Burden of Diseases (GBD) Study, stroke remained the second leading cause of death and the third leading cause of death and disability combined worldwide. The majority of the global stroke burden is found in low-income and lower-middle-income countries[3].

Regarding objectives, all included articles aimed to assess the level of awareness and knowledge about stroke in different populations. Notably, the evaluation of public awareness regarding symptoms and response to stroke, risk factors, and available treatments following a stroke appears in several studies, such as those conducted in Tunisia, Malaysia, and Saudi Arabia[16,19,20,24,34]. Some studies aimed to identify factors associated with stroke awareness among the general population, as seen in Iran and Jordan[33,40]. Others sought to evaluate the effectiveness of specific educational interventions, such as the multicenter study on the transfer of stroke-related knowledge to parents following the global FAST Heroes educational campaign for children aged five to nine years in 14 different countries[14].

The repetition of the target audience "general population" indicates that the research aims to encompass as many individuals as possible, without specific limitations regarding age, gender, race, etc. This can be explained by the fact that stroke can affect anyone, making it crucial to raise awareness and inform the general population about stroke risks, symptoms, and prevention[50]. A comparative review study cites the prevalence of publications aimed at the general population with the goal of teaching them to prevent the disease and identify neurological symptoms early[51].

The questionnaires used in the studies show similarities in their structure, such as the inclusion of sections on sociodemographic characteristics and variables assessing stroke knowledge. However, there are some significant differences. The Stroke Knowledge Test (SKT) and the Stroke Action Test (STAT)[13] have three sections. The first addresses sociodemographic information, the respondent's medical history, and the presence of risk factors; the second investigates stroke knowledge with 20 items, and the final section explores appropriate stroke practices, consisting of 21 questions. The SKT questions cover risk factors, signs and symptoms, prevention, prevalence, treatment, and rehabilitation of stroke. In contrast, the STAT addresses risk factors, recognition of stroke signs, attitudes, and appropriate responses in case of stroke.

The Stroke Preparedness Questionnaire (SPQ) assesses parents' knowledge about stroke at three stages of the FAST Heroes program, which includes educational resources to teach children about stroke so they can relay this knowledge to their parents. It evaluates parents' knowledge about stroke at three points: before, immediately after, and six months after participating in the program, as well as sociodemographic characteristics and appropriate attitudes and responses in case of stroke[14].

Other differences between the questionnaires are related to the number of sections, the focus of the assessed knowledge, and the format of the questions. A study conducted in Singapore discusses the use of open-ended questions and points out that they may result in lower literacy compared to closed-ended questions. However, there is no widely accepted standardized questionnaire for measuring stroke knowledge. This results in difficulties in comparing studies due to different question formats[31].

A study conducted in the United States discusses the use of closed-ended questions, considering that such questions limit the amount of information collected[23]. In comparison, Saade and colleagues also suggest that questionnaires with closed-ended questions may overestimate respondents' knowledge[13]. Another study finds that responses might be overestimated by a multiple-choice questionnaire with limited options. It is reported that participants may have guessed the answers[15].

The literature on the use of open or closed questions and their actual capacity to measure knowledge on a specific topic is scarce, making this a research gap.

Regarding stroke knowledge assessment, all included articles found insufficient or inconclusive results when compared to the research objective. The lack of methodological rigor may render results unreliable, highlighting the need for standardized questionnaires. A study conducted in Singapore explicitly discusses this limitation, as

there are no widely accepted reliable standardized instruments for measuring stroke awareness[31].

Among the results obtained on the level of knowledge of the studied populations regarding stroke, there is evident low literacy. In this context, effective knowledge dissemination methods are necessary. Guidelines for early treatment of acute ischemic stroke patients discuss that the ability of the public to recognize stroke symptoms is vital for successful treatment and emphasize the importance of teaching the public about the symptoms of the disease[52].

Future research is needed to develop and disseminate standardized questionnaires for evaluating knowledge on this topic. Other study designs may assist in development, such as experimental studies with validated instruments aimed at evaluating open and closed questions and application methods.

Among the limitations of this research is the difficulty in finding information related to the characteristics of the questionnaires in the studies, which hindered data filtering.

CONCLUSION

This review provides an overview of the instruments used to assess knowledge about stroke. The selected studies identified strengths in application and validation methods, especially those that conducted cross-cultural validation. Weaknesses related to methodological rigor in instrument validation were also found.

There is a need for the development of valid instruments with good measurement properties that, when applied, provide reliable results regarding the real knowledge of the population about stroke and the reasons for delays in seeking medical attention.

It is possible to assert that there is a gap in the literature concerning standardized and accepted instruments for evaluating stroke knowledge. Comparisons between studies are challenging due to varying question formats and study designs.

This review's contribution to health, nursing, and multidisciplinary teams lies in its potential to guide the search for better research designs and types of instruments to achieve knowledge assessment goals. It also underscores the need for validation studies of instruments when evaluating knowledge on a particular topic, especially regarding stroke, as data collection with unvalidated instruments can lead to inconsistent results.

Building robust research in this area will enable the implementation of effective actions for prevention and response in the event of a stroke.

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Table 1 - Characterization of the studies included in the research, Campo Grande, Mato Grosso do Sul, Brazil (n=26).

Autor/ano / país de publicação	*Objetivo do estudo*	*Delineamento do estudo*	*Instrumento/ Número de itens*	*Principais resultados*
(CORREIA et al., 2022) Switzerland	Assess the level of local population awareness regarding stroke symptoms, response, risk factors, and available treatments.	Cross-sectional	Questionnaire – does not describe information about the questionnaire.	Of the 69 patients, 35% correctly identified a transient ischemic attack (TIA), and 29% considered it as severe as a stroke. Patients accurately identified three stroke symptoms, and 47.8% would call an ambulance immediately if they experienced symptoms. Only 37% mentioned three or more stroke therapies.
(SAADE et al., 2022) Lebanon	Identify the level of awareness about stroke in order to develop and implement preventive measures, particularly concerning primary stroke prevention.	Cross-sectional	Questionnaire – SKT (20 items) and the Stroke Action Test (21 items).	Out of the 410 participants, 48.5% had low knowledge about stroke. Residing in Mount Lebanon and occasional smoking were associated with significant Stroke Knowledge Test scores, while having university degree and diabetes mellitus were linked to higher scores. The overall average score on the Stroke Action Test was 41.3%. Among those surveyed, 36.8% would call emergency services in the event of stroke symptoms.
(TSAKPOUNIDOU et al., 2022) Multicenter	Measure the transfer of stroke-related knowledge to parents following a global FAST Heroes educational campaign.	Quasi-experimental	Questionnaire – Stroke Preparedness Questionnaire (SPQ) – 6 items.	4,202 parents participated in the program. Knowledge about stroke symptoms increased from 48% to 83% following the educational campaign. 86 parents completed all three surveys and showed a 55% improvement in knowledge about stroke symptoms. The educational messages were successfully communicated overall.
(MALAEB et al., 2022) Lebanon	Evaluate knowledge about stroke and determine the factors associated with stroke awareness among the general Lebanese population.	Cross-sectional	Questionnaire – validated by researchers – 6 items.	Among the 551 enrolled individuals, 403 were women, and 312 were under 30 years old. Women and those employed had a higher chance of identifying risk factors. Employed participants were more likely to recognize symptoms and consequences of stroke compared to the unemployed. Having a university degree rather than just a high school diploma increased the likelihood of taking a patient to the hospital.
(CHAKROUN-WALHA et al., 2021) Tunísia	Assess the level of stroke knowledge among visitors to Emergency Centers in southern Tunisia, focusing on risk factors, symptoms, and treatment of stroke.	Cross-sectional	Questionnaire – SKT; 20 items.	Of the 839 surveyed, 32.3% had a higher education level. The SKT score was significantly higher among younger participants, females, those from rural centers, with higher education levels, and those without reported chronic illnesses. Receiving stroke information via television or from relatives was an independent predictor of a high SKT score compared to other sources of knowledge.
(SAADATNIA; HAJIANNEJAD; YAZDABADI, 2020)	Investigate the awareness and attitudes of a sample of the general Iranian population regarding stroke.	Cross-sectional	Questionnaire – validated by researchers – 32 items.	Six hundred thirty individuals participated in the survey. Hypertension and stress were the most recognized risk factors. Factors such as heart disease were less recognized. Only 44.2% knew the treatment initiation time should be within three hours. Predictors of greater awareness include urban residence, education level, and prior knowledge of stroke.

Iran				
(CHANG et al., 2020) Sri Lanka	Evaluate appropriate literacy about stroke among the general public and physicians.	Cross-sectional	Interview using a questionnaire with 11 items.	Sample of 840 individuals. Knowledge about stroke varied: vascular cause (83.2%), affected organ (46.8%). Warning symptoms were identified by more than 50% of the respondents, who had low knowledge about risk factors. Education level and lack of information sources affect knowledge. Few doctors were aware of the therapeutic window for thrombolysis.
(ALBALAWI et al., 2020) Saudi Arabia	Assess the effect of an educational program on stroke knowledge and perception in at-risk individuals.	Quasi-experimental	Interview using a questionnaire – number of questions not specified.	313 individuals participated in the study. Before the intervention, 63.6% understood the cause of stroke. After the education, this percentage increased to 97.1%. Initially, 48% knew the symptoms of stroke and 55.96% knew two to four symptoms. After the intervention, these percentages were 98.4% and 79.8%, respectively.
(CHING et al., 2019) Malaysia	Study the level of knowledge about actions to be taken during a stroke and recognition of symptoms and associated factors among the general public.	Cross-sectional	Questionnaire – validated by researchers – 6 items.	4096 individuals comprised the sample. Over 80% recognized stroke symptoms, and 74.2% would go to the hospital within 4.5 hours. Individuals aged 45 or older, Malays, non-smokers, hypertensives, and diabetics would act correctly during a stroke. Additionally, those aged 45 or older, Malays, hypertensives, and those with a previous history of stroke recognized stroke symptoms well.
(AHMED et al., 2019) Malaysia	Develop a questionnaire to assess awareness and actions regarding stroke and heart attack symptoms and risk factors among the lay public.	Cross-sectional	Questionnaire – 18 items.	4096 participants. The average awareness and action regarding the symptoms and risk factors of myocardial infarction was 65.52 ± 6.3, with good internal consistency (Cronbach's alpha = 0.75), while the average awareness and action regarding the symptoms and risk factors of stroke was 61.93 ± 7.11, with acceptable internal consistency (Cronbach's alpha = 0.86).
(MVULA et al., 2019) Malawi	Explore stroke knowledge in a rural community in Malawi to provide basic information for planning prevention and management interventions.	Cross-sectional	Interview using a questionnaire – three questions.	739 were included in the study, with a predominance of females and a median age of 52 years. Knowledge about stroke was poor, with 71% unaware of the risk factors. Witchcraft was cited as frequently as hypertension as a cause. Knowledge was higher among the more educated and wealthy; and lower among men, singles, and younger individuals. HIV-positive individuals had greater knowledge about prevention compared to HIV-negative individuals.
(PATEL et al., 2019) Saudi Arabia	Assess changes in awareness of stroke symptoms and calling 9-1-1 from 2009 to 2014.	Cross-sectional	Interview using a questionnaire – one question.	27,211 participants. In 2014, awareness of stroke symptoms ranged from 76.1% to 93.7%; 68.3% recognized all symptoms, and 66.2% were aware of all recommended stroke knowledge. After adjustments, there was a significant increase of 14.7 percentage points in stroke knowledge from 2009 to 2014.
(ALHAZZANI et al., 2019) Saudi Arabia	Examine awareness of major symptoms, risk factors, and responses to stroke among the population of Abha, Southwest Saudi Arabia.	Cross-sectional	Questionnaire – number of questions not specified.	Of the 1,472 participants, only 63.6% and 43.7% correctly identified thrombosis and hemorrhage as types of stroke. The most identified risk factors were hypertension, dyslipidemia, and smoking. Severe sudden headache, dizziness, and difficulty speaking were the most recognized symptoms. Inadequate responses were observed in 18.8% of the participants. Doctors, nurses, friends, and relatives were sources of knowledge associated with better recognition of symptoms and risk factors.

(FARRAG et al., 2018) Egypt	Evaluate knowledge about stroke and awareness of risk factors, warning symptoms, prevention, treatment, and prognosis, as well as response to suspected acute stroke.	Cross-sectional	Questionnaire – validated by researchers, number of questions not specified.	1,154 participants. A low level of awareness about stroke was observed with an average score of 35.7%. Higher income, education level, having risk factors, and knowing someone with a stroke were significant predictors of a higher level of stroke awareness.
(HICKEY et al., 2018) Ireland	Determine whether there were improvements in the public's knowledge about stroke warning signs and emergency response after the intensive phase of the FAST media campaign in Ireland.	Experimental	Interview using the Stroke Awareness Questionnaire (SAQ), number of questions not specified.	1,010 participants. There were no significant differences in the participants' ability to define stroke or identify risk factors between the two surveys. Participants in the second survey were more likely to recognize stroke warning signs. There was an improvement in the intention to call an ambulance, but most did not consider thrombolysis as an emergency treatment for stroke.
(WILLIAMS et al., 2011) United States	Evaluate the effectiveness of an educational intervention on stroke delivered exclusively to pre-adolescent children in preparing both the children and their parents for stroke.	Experimental	Questionnaire – Seven questions.	1,144 participants. At the start of the study, only a small percentage of children had ideal stroke preparedness. After the intervention program, there was a significant increase in this preparedness, with a higher percentage in the intervention group compared to the control group. At three months, there was a significant number of children in the intervention group with ideal preparedness. There was an improvement in parents' knowledge about stroke symptoms in the intervention group.
(ARISEGI et al., 2018) Nigeria	Determine the knowledge and practices related to stroke prevention among hypertensive and diabetic patients in Sokoto, Nigeria.	Cross-sectional	Questionnaire – Validated by researchers, number of questions not specified.	Out of 248 participants, 70.3% had good knowledge about stroke, 89.1% about organs or body parts affected by stroke, 87% regarding stroke signs or symptoms, 86.6% about stroke risk factors, and 90.8% about stroke prevention. Stroke prevention practices were below ideal and were significantly associated with formal education and employment.
(KADDUMUKASA et al., 2017a) Africa	Assess the knowledge and attitudes towards stroke in an urban population in Mukono District, central Uganda.	Cross-sectional	Interview using a questionnaire – Validated by researchers, number of questions not specified.	440 participants were enrolled in the study. The main risk factors for stroke identified were stress (75.7%) and hypertension (45.2%), respectively. Only two study participants identified smoking as a risk factor for stroke. Individuals with hypertension had limited knowledge about stroke despite their high risk for the disease.
(CARUSO et al., 2015a) Argentina	Validate the STAT questionnaire for Argentine Spanish and the SAFAR ACV questionnaire.	Methodologica	Questionnaire – One open-ended question.	The final version was administered to 26 patients. The Cronbach's alpha was 0.92 for the initial test and 0.93 for the retest. There are no differences in the average number of correct responses between the test and the retest ($p = 0.86$). There are no significant differences between the test and the retest in the SAFAR stroke questionnaire.
(DENTI et al., 2015) Italy	Conduct a cross-cultural adaptation of the original STAT version for application to the Italian population.	Methodologica	Questionnaire – 28 items.	202 participants. The pre-final version of the STAT instrument was developed with few discrepancies compared to the original. Most items were considered appropriate, understandable, and useful. Additional testing of the final version showed good participant responses, with no floor or ceiling effects. Internal consistency was high for both versions.
(LIM et al., 2014) Singapore	Study the level of awareness of stroke symptoms and risk factors among residents of Singapore in a public housing estate.	Cross-sectional	Interview using the Stroke Awareness Questionnaire (SAQ) – 2 open-ended questions.	Out of 687 respondents, 2.4% identified the brain as the source of the pathology, and 47.6% could name at least one of the three FAST symptoms, while 40% could name two or more of the seven established stroke risk factors (high blood pressure, high cholesterol, smoking, diabetes mellitus, advanced age, previous heart attacks, and stroke). Only 59.4% knew the emergency service phone number.

(WELTERMANN et al., 2013) Germany	Compare stroke knowledge between diabetics in Germany and Turkey.	Cross-sectional	Questionnaire – three open-ended questions	231 participants; 52.8% had good knowledge of symptoms, 67.9% good knowledge of action, and 39.4% good knowledge of stroke. A logistic regression analysis showed better knowledge of stroke if participants were younger than 61 years, had good language skills, and lived in a single-generation household, while gender, years since migration, and diabetes control did not play a role.
(ESHAH, 2013) Jordan	Identify the level of knowledge about stroke and cerebrovascular risk factors among Jordanian adults.	Cross-sectional	Questionnaire – 20 items.	Out of 224 participants, only 30% correctly named three or more risk factors. The most recognized risk factors were smoking, hyperlipidemia, and obesity. Knowledge about stroke was low, with an average score of 8.8 out of 20 and 49% of participants scoring below average.
(AL AQEEL et al., 2012) Saudi Arabia	Assess stroke awareness in the Saudi population.	Cross-sectional	Questionnaire – 11 items.	Out of 2,287 participants, about 64% correctly understood what a stroke is, and 49.9% obtained knowledge about the subject through mass media. Regarding the mechanism and pathological outcome, 45.9% mistakenly believed that stroke and brain death are similar, especially among respondents aged 40 years. Only 21.7% correctly identified the five risk factors, while 18.4% correctly identified the three symptoms on the list.
(HICKEY et al., 2012) Ireland	Examine knowledge of stroke risk factors and warning signs among the adult population in Ireland.	Cross-sectional	Telephone interview using questionnaire – (SAQ). Number of questions not provided.	Out of 1,000 participants, 71% correctly identified the risk factors for stroke, but two-thirds did not recognize two warning signs. Less than 50% would call an ambulance in case of a stroke. Significant knowledge gaps were observed, especially among participants aged 65 years or older.
(GOLDSTEIN et al., 2009) United States	Evaluate stroke awareness among a Latino immigrant population in Durham, NC.	Cross-sectional	Telephone interview using questionnaire – 5 open-ended questions.	76 participants. Most (81%) could not correctly identify stroke risk factors, 57% did not recognize the symptoms correctly, and only 45% said they would call emergency services. However, most knew that stroke can be prevented (80%) and treated (86%).

Source: Data collection form**.**

Notice: SKT: *Stroke Knowledge Test*; SAQ: *Stroke Awareness Questionnaire*; SPQ: *Stroke Preparedness Questionnaire*