



Journal Homepage: -www.journalijar.com

INTERNATIONAL JOURNAL OF ADVANCED RESEARCH (IJAR)

Article DOI:10.21474/IJAR01/17991
DOI URL: <http://dx.doi.org/10.21474/IJAR01/17991>



RESEARCH ARTICLE

TIME IS BRAIN: ASSESSING EMERGENCY HEALTHCARE WORKERS' KNOWLEDGE OF EARLY RECOGNITION OF STROKE AND WARNING SIGNS

Diya Saha, Darpanarayan Hazra and Indraneel Dasgupta

Department of Emergency Medicine, Peerless Hospital and B.K. Roy Research Centre, Kolkata.

Manuscript Info

Manuscript History

Received: 10 October 2023

Final Accepted: 14 November 2023

Published: December 2023

Key words:-

Stroke, Cerebro Vascular Accident,
Thrombolysis, Emergency Department

Abstract

Background: A stroke, also known as a cerebrovascular accident (CVA), has a profound impact on the human brain. Early recognition and successful treatment of strokes not only enhance patients' clinical outcomes but also play a crucial role in preventing fatalities. The knowledge of strokes is highly significant for Emergency Medical Services (EMS) and nurses. In order to evaluate the level of awareness, this audit was conducted in the Emergency Department (ED) of a prominent tertiary care center in Eastern India.

Methodology: This study primarily involved EMS and ED nurses. A self-administered questionnaire consisting of three sections was employed to assess their level of awareness regarding stroke. The questionnaire covered various factors, which were then coded, and a basic analysis was conducted using Microsoft Excel.

Results: A total of 52 participants, including nurses, EMS personnel, and students took part in the questionnaire-based audit. The mean age of 27.83 years (SD: 7.56), with a notable percentage holding a General Nurse Midwifery (GNM) degree. Around 75% (n: 37) of the participants had received BLS/ACLS training within the past 1-2 years. It was concerning to find that a significant number of nurses and EMS personnel who frequently attended ambulance calls provided incorrect responses to a question regarding the appropriate destination for suspected stroke patients. However, the majority demonstrated good awareness of warning signs, clinical manifestations, and diagnostic procedures related to acute stroke patients. Only a small fraction (one-tenth) of the participants accurately identified the time window for thrombolysis in stroke cases, and few could recognize patients who may require definitive airway intervention.

Conclusion: The majority of participants showed insufficient knowledge regarding the appropriate disposition of stroke patients and correctly identifying the window period for thrombolysis. However, they demonstrated a strong understanding of warning signs, clinical manifestations, and diagnostic procedures associated with acute stroke patients.

Copy Right, IJAR, 2023,. All rights reserved.

Corresponding Author:- Darpanarayan Hazra

Address:- Consultant, Department of Emergency Medicine, Peerless Hospital and B.K. Roy Research Centre, Kolkata.

Introduction:-

A stroke, often referred to as the brain's equivalent of a heart attack, is a sudden and potentially devastating event. (1)The brain relies on a continuous flow of blood for its proper functioning, and any obstruction to this flow can have serious consequences. This obstruction can occur due to the movement of a blood clot towards the brain or due to the narrowing or bursting of blood vessels, resulting in a disruption of the brain's energy supply and subsequent damage to its tissues, leading to a stroke. (2,3)The longer the interruption of blood flow to the brain persists, the more severe the consequences can be. It is characterized by a sudden and focal or global neurological impairment that lasts for more than 24 hours or leads to death, with its origin presumed to be vascular. (4–6)It can be classified into different types, such as ischemic stroke, intracerebral hemorrhage, subarachnoid hemorrhage, or unspecified types. According to the National Institute of Neurological Disorders and Stroke, it was the second leading cause of death and the third leading cause of disability-adjusted life-years (DALYs) lost worldwide in 2019.(7) While the incidence of stroke decreased in most regions between 1990 and 2016, it increased in east Asia and southern sub-Saharan Africa. (8)A comprehensive study on stroke epidemiology in south, east, and southeast Asia revealed that hypertension is the most prevalent risk factor, followed by diabetes mellitus and smoking. (9)Ischemic stroke occurs more frequently than hemorrhagic stroke. Furthermore, there are variations in stroke epidemiology among countries in South, East, South-East Asia, Middle- East, and West. (8)

Nurses and Emergency Medical Services (EMS) play a crucial role in reducing mortality and disability among stroke patients who arrive at the emergency department (ED). (10–12)However, there is limited information available regarding the awareness and knowledge of EMS and emergency nurses regarding stroke patients in South Asian countries like India, where cultural, healthcare, nursing care and EMS systems differ from those in Western countries.

Therefore, our objective through this audit was to assess the awareness and knowledge of ED nurses, EMS personnel, and students regarding the significance of early recognition of stroke and recent advancements in stroke management.

Methods:-**Study Setting and period:**

This cross-sectional analytical questionnaire based audit was conducted in the ED of a reputable hospital situated in Kolkata, West Bengal over a period one month (December 2022). To maintain the institution's anonymity, the hospital name has been withheld

Participants:

The study encompassed all nursing staff, EMS personnel, and EMS students within the designated center of the Emergency Department (ED). Individuals who expressed their unwillingness to participate or provided incomplete responses were excluded from the analysis.

Study design:

A self-administered questionnaire with three sections was utilized. The first section captured information regarding participants' age, gender, years of experience working in the ED, and current designation, among other details. The second section comprised mostly subjective-type questions that required participants to respond with either a "yes" or "no." These questions primarily focused on clinical scenarios commonly encountered by nursing staff and EMS personnel. The third section consisted of two multiple-choice questions pertaining to the golden hour of thrombolysis and the necessity of a definitive airway.

To ensure high participation rates, the study was carried out during the participants' regular work shifts. The nursing in-charges played an active role in motivating the staff to take part in the survey. Additionally, the researchers obtained prior permission from the nursing superintendent to conduct the study, who authorized a dedicated 10 to 15-minute time slot within the participants' work hours for questionnaire completion. Throughout the questionnaire completion process, one of the study authors was present in the room to offer support and address any inquiries or concerns raised by the participants.

Statistical Analysis:

The collected data were entered into Microsoft Excel for Mac Version 16.73 and analysed as appropriate. Categorical variables were reported in terms of frequencies and percentages, while continuous variables were presented as means \pm standard deviations. Due to the limited sample size of the audit, only basic analysis was conducted. The authors intend to conduct a comparative audit involving other private and government hospitals in the city, which may yield significant statistical findings.

Ethical Considerations:

The audit was carried out following approval from the hospital's managing director, medical superintendent, and nursing superintendent. Strict measures were taken to ensure the confidentiality of all analysed data through anonymization and de-identification. Participation in the study was voluntary, and no coercion was involved. Therefore, formal permission from the institutional review board was not sought. However, it is acknowledged that for future multi-centric studies, the requirement for institutional review board approval will be duly considered and adhered to.

Results:-

A total of 52 personnel from the ED, including nurses, EMS personnel, and EMS students, actively participated in the questionnaire-based audit. The cohort had a mean age of 27.83 years (SD: 7.56), and a significant proportion held a General Nurse Midwifery (GNM) degree. Approximately three-fourths of the participants had previously undergone basic life support/ advanced cardiac life support (BLS/ ACLS^{*}) training within the past 1-2 years. Among the staff members, the majority had 3-4 years of experience, followed by those who were newly recruited (less than 6 months)(Table 1).

Variables	Frequency n-52(%)
Age	27.83 (SD: 7.56) years
Males	9 (17.3)
Females	43 (82.7)
<i>Nursing staff: 31 (59.6)</i>	
General Nurse Midwifery - diploma course in nursing (3 years)	28 (53.8)
Bachelor of science in nursing – 4 years course	3 (5.8)
<i>Emergency Medicine technician (2 years course): 21 (40.4)</i>	
Previously trained with BLS/ ACLS [*]	37 (71.2)
Within 1 year	10 (27.0)
1 year – 2 years	14 (37.9)
More than 2 years	13 (35.1)
<i>Emergency Medical Services or nursing staff's level of experience</i>	
Less than 6 months	14 (26.9)
6 months – 1 year	1 (1.9)
1 year – 2 years	5 (9.6)
2 years – 3 years	6 (11.6)
3 years – 4 years	15 (28.9)
4 years – 5 years	1 (1.9)
More than 5 years	10 (19.2)

Table 1:- Demographics characteristics, prior completion of Basic Life Support (BLS)/ Advance Cardiac Life Support (ACLS) programs, years of experience in the emergency medical services.

It was concerning to observe that among the nurses and EMS personnel who frequently attended ambulance calls, a significant number incorrectly responded to a question regarding the appropriate destination for a stroke-suspected patient. On a positive note, the majority demonstrated good awareness of the warning signs, clinical manifestations, and diagnostic procedures related to acute stroke patients. (Table 2- section A)

However, the results were disappointing in terms of the multiple-choice questions, as only a small fraction (one-tenth) of the participants correctly identified the thrombolysis time window for stroke, and few were able to identify patients who may require a definitive airway intervention. (Table 2 – section B)

Table 2:- Responses provided for the questionnaire (section A and B).

Questions	Correct response n (%)
<i>Section A (answers were in 'Y/N')</i>	
If u suspect a patient with stroke, will you take the patient to the nearest neuro care hospital ?	9 (17.3)
If there is sudden dizziness, loss of balance, or coordination can the patient have stroke ?	42 (80.8)
Can sudden onset seeing out of one or both eyes be a feature of stroke?	43 (82.7)
Can facial weakness and uneven smile present as stroke ?	47 (90.4)
Weakness in one side of the body, can it present as stroke ?	43 (82.7)
Sudden onset severe head pain, can it be a presentation of stroke ?	43 (82.7)
Impaired speech, slurred speech, difficulty repeating simple phrases can it mimic stroke ?	47 (90.4)
Are you aware of the contents of the crash trolley ?	46 (88.5)
Is BP more than 120/80 mmHg a risk factor for stroke ?	37 (71.2)
Can atrial fibrillation cause an ischemic stroke ?	40 (76.9)
Can obesity (BMI [@] > 25kg/m ²) be a risk factor of stroke ?	43 (82.7)
Can smoking predisposes to stroke ?	44 (84.6)
Is there a role of antiplatelets or anti coagulation in patients with haemorrhagicstroke ?	35 (67.3)
Is Computed Tomography (CT) scan mandatory in every patients of acute stroke ?	45 (86.5)
If u suspect a patient with stroke, will you keep a peripheral IV access in the ambulance?	39 (75.0)
Is there any role of checking CBG in a patient with suspected stroke ?	44 (84.6)
Will you transfer a patient from home to ambulance to trolley to ER bed is spine board necessary ?	44 (84.6)
Can early recognition of stroke save a life ?	46 (88.5)
<i>Section B (Multiple choice questions)</i>	
What is the indication of intubation in a patient with stroke ? a. GCS* - 13 or more b. Gasping c. GCS* less than 8 d. GCS* 12 or less	32 (61.5)
What is the window period for thrombolysis ? a. 1-2hr b. 2-3hr c. 3-4hrs d. <4.5hrs e. > 6 hrs	6 (11.5)

BMI[@]: Body Mass Index; GCS*: Glasgow Coma Scale; RBG*: Random Blood Glucose levels.

Discussion:-

Almost all stroke patients initially experience symptoms at home, where they first encounter ED nurses and EMS personnel. Subsequently, they are transferred to various healthcare facilities based on their specific needs. As the primary healthcare workers (HCWs) to encounter these patients, ED nurses and EMS personnel hold significant responsibilities, and it is crucial for them to remain updated on stroke management practices. (10,11) Proficient healthcare workers (HCWs) should possess the capability to recognize the key indicators of stroke, identify the onset of symptoms, initiate primary care measures, contact the nearest neurological healthcare ED while providing a concise case summary. (13,14) They should also be skilled in establishing intravenous (IV) access, administering oxygen supplementation, and, if necessary, inserting an oropharyngeal or nasopharyngeal airway or performing a definitive airway intervention in critical situations.

Awareness regarding the recognition of stroke, early symptom identification, and the importance of promptly transferring patients to designated neurological centers is of utmost importance. Upon arrival at the healthcare facility, the ED serves as the first point of contact, with triage nurses playing a vital role in assessing patients and identifying signs and symptoms of ischemic stroke. ED nurses are at the forefront of providing interventions aimed at preserving ischemic cerebral tissue and preventing further neurological deterioration. With advancements in stroke treatment emerging from clinical trials, it becomes imperative to disseminate this information to nurses responsible for the care of stroke patients. Nurses should receive evidence-based education on stroke management

and be provided with opportunities for continuous professional development. Adequate training and comprehensive knowledge are essential for nurses to effectively manage stroke patients and enhance their clinical practice.

Our audit revealed a significant gap in knowledge concerning the importance of transferring stroke patients to the nearest neuro-facility. This knowledge deficit may stem from the routine practice of bringing various medical and surgical emergencies to our center, which is understandable considering the private setup's goals of patient intake. However, the lack of understanding regarding the time window for stroke treatment and the necessity of thrombolysis in eligible patients suggests that these HCW may not have received adequate training or experience in managing acute stroke cases which is a major concern. Additionally, it is crucial to emphasize the importance of informing the emergency department (ED) prior to patient transfer to ensure preparedness among ED personnel. Although not explicitly addressed in our study, our team of ED nurses and EMS personnel consistently follow the practice of notifying ED physicians before transferring patients, facilitating a smooth transition of care. Nonetheless, it is noteworthy that a majority of participants demonstrated a strong understanding of stroke symptoms and the importance of obtaining radiological imaging for patients suspected of having a stroke. Additionally, it is encouraging to observe that the majority of participants had received training in Basic Life Support (BLS) and Advanced Cardiovascular Life Support (ACLS) courses accredited by the American Heart Association.

The situation regarding the management of stroke patients differs significantly between India and the Middle East or the West, particularly concerning the roles of ED nurses and EMS personnel. In the latter regions, there are established guidelines and protocols that are applicable to all healthcare professionals, regardless of whether they work in private or government settings. However, developing countries like India still have a considerable distance to cover in establishing such standardized protocols. The development of such protocols necessitates extensive multi-centric studies to ensure their effectiveness and applicability in diverse healthcare settings.

Conclusion:-

The majority of participants, specifically three-fourths of them, have received training in BLS and ACLS courses. However, there is a noticeable lack of knowledge regarding the importance of the time window in stroke patients, the necessity of thrombolysis in appropriate cases, and the significance of transferring patients to the nearest neuro-facility. Despite this gap, it is worth noting that overall, most participants demonstrate familiarity with the fundamental aspects of early stroke clinical features.

Recommendations:-

Regular training sessions and practical exercises are essential to enhance the pre-hospital and in-hospital care of stroke patients. Additionally, conducting a re-audit using the same questionnaire after a period of six months will allow for assessing any advancements or improvements resulting from the training interventions. This iterative approach will ensure ongoing evaluation and continual enhancement of stroke care practices.

Acknowledgements:-

None.

Financial support and sponsorship:

None.

Conflicts of interest:

There are no conflicts of interest.

Data availability statement:

We are willing to share the data that underlies the findings presented in this article upon request, making it accessible to reviewers, readers, and the journal.

References:-

1. Stroke | National Institute of Neurological Disorders and Stroke [Internet]. [cited 2023 May 27]. Available from: <https://www.ninds.nih.gov/health-information/disorders/stroke>
2. Guzik A, Bushnell C. Stroke Epidemiology and Risk Factor Management. Contin Minneap Minn. 2017 Feb;23(1, Cerebrovascular Disease):15–39.

3. Rink C, Khanna S. Significance of Brain Tissue Oxygenation and the Arachidonic Acid Cascade in Stroke. *Antioxid Redox Signal*. 2011 May 15;14(10):1889–903.
4. Coupland AP, Thapar A, Qureshi MI, Jenkins H, Davies AH. The definition of stroke. *J R Soc Med*. 2017 Jan;110(1):9–12.
5. Sacco RL, Kasner SE, Broderick JP, Caplan LR, Connors JJ (Buddy), Culebras A, et al. An Updated Definition of Stroke for the 21st Century. *Stroke*. 2013 Jul;44(7):2064–89.
6. Tadi P, Lui F. Acute Stroke. [Updated 2023 Feb 28]. In: StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing; 2023 Jan-. Available from: <https://www.ncbi.nlm.nih.gov/books/NBK535369/>
7. Feigin VL, Brainin M, Norrving B, Martins S, Sacco RL, Hacke W, et al. World Stroke Organization (WSO): Global Stroke Fact Sheet 2022. *Int J Stroke Off J Int Stroke Soc*. 2022 Jan;17(1):18–29.
8. GBD 2016 Stroke Collaborators. Global, regional, and national burden of stroke, 1990–2016: a systematic analysis for the Global Burden of Disease Study 2016. *Lancet Neurol*. 2019 May;18(5):439–458. doi: 10.1016/S1474-4422(19)30034-1. Epub 2019 Mar 11. PMID: 30871944; PMCID: PMC6494974.
9. Venketasubramanian N, Yoon BW, Pandian J, Navarro JC. Stroke Epidemiology in South, East, and South-East Asia: A Review. *J Stroke*. 2017 Sep;19(3):286–94.
10. How to Better Value EMS Clinicians as Key Care Team Members | Journal of Ethics | American Medical Association [Internet]. [cited 2023 May 27]. Available from: <https://journalofethics.ama-assn.org/article/how-better-value-ems-clinicians-key-care-team-members/2022-09>
11. Melaika K, Sveikata L, Vilionskis A, Wiśniewski A, Jurjans K, Klimašauskas A, et al. Prehospital Stroke Care, Paramedic Training Needs, and Hospital-Directed Feedback in Lithuania. *Healthcare*. 2022 Oct 7;10(10):1958.
12. Seo AR, Song H, Lee WJ, Park KN, Moon J, Kim D. Factors Associated with Delay of Emergency Medical Services Activation in Patients with Acute Stroke. *J Stroke Cerebrovasc Dis*. 2021 Jan 1;30(1):105426.
13. Adelman EE, Meurer WJ, Nance DK, Kocan MJ, Maddox KE, Morgenstern LB, Skolarus LE. Stroke awareness among inpatient nursing staff at an academic medical center. *Stroke*. 2014 Jan;45(1):271–3. doi: 10.1161/STROKEAHA.113.002905. Epub 2013 Oct 17. PMID: 24135928; PMCID: PMC4578720.
14. Colton K, Richards CT, Pruitt PB, Mendelson SJ, Holl JL, Naidech AM, Prabhakaran S, Maas MB. Early Stroke Recognition and Time-based Emergency Care Performance Metrics for Intracerebral Hemorrhage. *J Stroke Cerebrovasc Dis*. 2020 Feb;29(2):104552. doi: 10.1016/j.jstrokecerebrovasdis.2019.104552. Epub 2019 Dec 12. PMID: 31839545; PMCID: PMC6954314.