Iran J Public Health, Vol. 55, No.1, Jan 2026, pp.63-75

Review Article

The Comparison of the Impact of Improving Emergency Care on the Prognosis and Treatment Rate of Elderly Patients in the Emergency Departments: A Meta-Analysis

#Ningning Dai, #Dan Zhao, Dongmei Yang, Jing Qian, Zeyu Xie, *Maling Xiang

Department of Emergency Medicine, the Fourth Affiliated Hospital of Soochow University, Suzhou Dushu Lake Hospital, Medical Center of Soochow University, Suzhou, China

***Corresponding Author:** Email: 13862094684@163.com
#These authors contributed equally to this work.

(Received 18 Jul 2025; accepted 15 Sep 2025)

Abstract

Background: A meta-analysis study was implemented to review the comparison of the impact of improving emergency care on the prognosis and treatment rate of elderly patients in the emergency department who have acute strokes.

Methods: An inclusive literature investigation was completed until April 2025, and 1765 related studies were reviewed. The 12 selected studies encompassed 1300 elderly patients in the emergency department who had acute strokes. The dichotomous or continuous methodologies with a fixed or random model were used to assess the comparison of the impact of improving emergency care on the prognosis and treatment rate of elderly patients in the emergency department who have acute strokes using odds ratios (ORs), mean difference (MD), and 95% confidence intervals (CIs).

Results: First-aid nursing had significantly lower rescue time (MD, -11.16; 95% CI, -15.74- -6.58, P<0.001), fatality rate (OR, 0.26; 95% CI, 0.16-0.43, P<0.001), and disability rate (OR, 0.30; 95% CI, 0.15-0.58, P<0.001) compared to control in elderly patients in the emergency department who have acute strokes.

Conclusion: First-aid nursing had significantly lower rescue time, fatality rate, and disability rate compared to control in elderly patients in the emergency department who have acute strokes. Nevertheless, since most of the studies nominated for evaluation in the meta-analysis had low sample sizes, care must be taken when working with their values.

Keywords: Elderly; Emergency department; Acute strokes; First-aid nursing

Introduction

Chronic diseases, diseases of the oral and dental, as well as an unhealthy diet, should be considered in the elderly. Therefore, attention should be paid to all social, physical, and psychological variables that affect the Quality of life of older people (1). Musculoskeletal disorders, or cumulative trauma disorders, are injuries to the body's musculoskeletal system, including muscles, tendons, ligaments, nerves, and spinal discs. They can occur gradually over time due to repetitive motions or overuse, or suddenly due to trauma. Musculoskeletal disorders can cause pain, stiffness, and limitations in mobility, impacting daily activities and work performance. Traumatic brain injury is one of the leading causes of death and disability that has serious consequences on people's health. Under-

DOI: https://doi.org/10.18502/ijph.v55i1.20973

standing the epidemiology of traumatic brain injury can be helpful for policymaking in health care management. However, appropriate control and prevention strategies should be focused on males, road traffic accidents, and groups under 40 years (2). The pooled incidence and prevalence of traumatic spinal cord injury were around10.5/1000.000 people and 4.4/10.000 people, respectively. Traumatic spinal cord injuries had occurred more frequently in males following motor vehicle collisions, and in the age group under 30 years. The pooled mortality rate due to traumatic spinal cord injuries was 3.9% (95% CI: 0.02 to 0.06; $P<0.05$) (3). Also, twelve sessions of the neck, core, and combined stabilization practices were previously shown to alleviate the pain and improve strength in the elderly with chronic non-specific neck pain (4). The coordinated activity between the different units such as police, the fire, and emergency wards can improve the services for accident injuries. Moreover, it reduces the time of emergency reach to the accident site and does the faster vital activity to accident injuries (5).

The swift advancement of emergency care has become pre-hospital first assistance for acute stroke. Expedited and uniform pre-hospital first-aid can significantly diminish the incidence of disability, fatality, and sequelae. Given the limitations of pre-hospital first-aid environments, most medical personnel primarily conduct a preliminary differential diagnosis depending on the subject's medical history, physical examination, and main complaints (6). Following the first stroke diagnosis, subjects received prompt airway treatment and respiratory assistance with procedures including oxygen treatment and a bag ventilation mask. Furthermore, in acute ischemic stroke subjects, vital signs must be watched, and blood glucose levels must be assessed to ensure subjects remain in a supine position with their heads tilted to one side, thereby preventing the aspiration of sputum, or vomit into the airway, which could lead to respiratory complications following pre-hospital first-aid. Acute ischemic stroke subjects presented to the hospital emergency room, where initial medical intervention was crucial for therapy (6, 7). The emergency department staff must assess the patient's condition upon arrival and develop a tailored treatment plan based on the specific circumstances of each patient, including establishing venous access as necessary, administering oxygen or psychological counseling, and implementing effective interventions (8). Nurses were involved in all aspects of first-aid for elderly subjects experiencing acute stroke, including emergency triage, the rescue room, and patient transport. Nonetheless, specialists in the center of chest pain certification did not completely acknowledge the critical role of nurses in all emergency response procedures. Nonetheless, accreditation and assessment criteria for all the facets of nursing procedure remain unestablished (9, 10). Simultaneously, physicians continue to play a pivotal role in enhancing first-aid protocol for senior subjects experiencing acute strokes in the emergency department; nevertheless, nurses do not completely comprehend the significance of refining the entire procedure. Furthermore, throughout all emergency procedures, the majority of elderly subjects experiencing acute strokes in the emergency room require prompt involvement by nurses during initial care (11). Medical personnel neglect the humanistic needs of patients, hence exacerbating their psychological burden and diminishing their compliance throughout the initial help phase. Consequently, the first-aid process may be inefficient, thereby diminishing the overall therapeutic efficacy (12, 13). The importance and utility of standardized clinical nursing standards were examined in previous research and investigated its necessity in the realities of clinical practice (14). The conventional rescue protocol was enhanced by amalgamating nursing with traditional medical first-aid, establishing 7 standardized nursing procedures (15). Structured nursing method facilitates prompt assessment and diagnosis, organizes the entire first-aid procedure, prevents redundant actions and unnecessary delays, and ensures timely rescue efforts (16, 17). In China, there is increasing focus on optimizing the emergency nursing workflow for elderly subjects experiencing acute stroke in the emergency department. A quantita-

tive standard matching model was utilized in the pre-hospital emergency nursing procedure, divided into five sub-procedures (18). These 5 sub-processes enable nurses to develop a coherent first-aid nursing concept and facilitate a proper and arranged transition. Prior analysis indicated that the formation of a chest pain optimization diagnosis and management team reduced emergency department rescue time for acute stroke elderly subjects from around 160 to around 80 minutes, while the proportion of patients meeting the standard rescue time increased from 20% to 70% (19). Current literature demonstrates that the streamlined procedure of emergency nursing positively impacts the management rate and prognosis of acute stroke elderly subjects (20, 21). Nonetheless, the study was not randomly allocated, and the sample size is deemed inadequate and lacks credibility (22). This study quantitatively synthesizes Professor Zhou Lanshu's analysis of the significance and usefulness of standardized clinical nursing standards, examining its necessity in conjunction with the realities of clinical practice (14). Consequently, this analysis quantitatively aggregated the published randomized controlled trials (RCTs) with greater sample sizes.

The existing meta-analysis goal was to review the routine utilization of first-aid nursing in elderly patients in the emergency department who have acute strokes by reviewing the most recent research. To compare first-aid nursing to control, a meta-analysis was done to estimate the effect of first-aid nursing on elderly patients in the emergency department who have acute strokes with a hypothesis that first-aid nursing would improve rescue time, disability rate, and fatality rate.

Methods

Eligibility criteria

To deliver an indication, the studies proving the efficiency of first-aid nursing compared to control in elderly patients in the emergency department who have acute strokes were elect (23).

Information sources

Fig. 1 characterizes the whole study. When the next inclusion criteria were fulfilled, studies were unified into the inspection: (24).

1. The study was prospective, observational, retrospective, or RCT research.
2. Elderly patients in the emergency department who have acute strokes were the studied personnel.
3. Interference was first-aid nursing.
4. The study appraised the influence of first-aid nursing and control in treating elderly patients in the emergency department who have acute strokes on estimated different variables.

If the study did not underline the significance of the comparison, it was excluded, as well as research that didn't check the features of the effectiveness of first-aid nursing in elderly patients in the emergency department who have acute strokes.

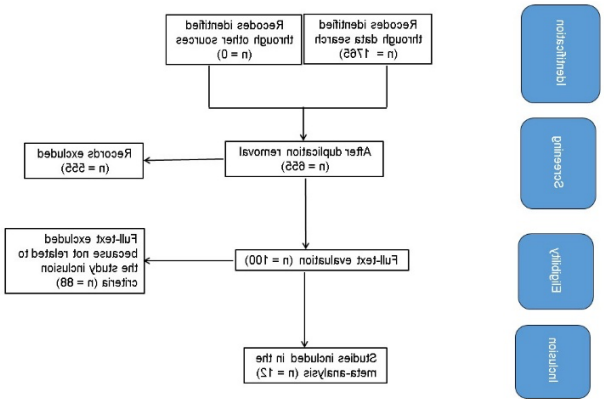

Fig. 1: A diagram illustrating the research methodology

Search strategy

Based on the PICOS approach, we identified a search protocol operation and described it as follows: "population" was people with elderly patients in the emergency department who have acute strokes; first-aid nursing was the "intervention"; first-aid nursing compared to control was the "comparison"; rescue time, disability rate, and fatality rate were the "outcome" and "study design" were was limitless and (25).

Until April 2025, we led a comprehensive exploration of the following databases: Embase, Google Scholar, PubMed, OVID, and the Cochrane Library. We used a keyword as shown in Table 1. Paper replications were abolished, and the rest were amassed into an EndNote file, and their titles and abstracts were reassessed to avoid an examination that would have been fruitless in establishing a link between the first-aid nursing in elderly patients in the emergency department who have acute strokes (26).

Table 1: Search Strategy for Each Database

Database	Search strategy
Pubmed	#1 "elderly"[MeSH Terms] OR "emergency department"[MeSH Terms] [All Fields] #2 "acute strokes"[MeSH Terms] OR "first-aid nursing"[MeSH Terms] [All Fields] #3 #1 AND #2
Embase	'elderly'/exp OR 'emergency department' #2 'acute strokes'/exp OR 'first-aid nursing' #3 #1 AND #2
Cochrane library	(elderly) :ti,ab,kw (emergency department):ti,ab,kw (Word variations have been searched) #2 (acute strokes):ti,ab,kw OR (first-aid nursing):ti,ab,kw (Word variations have been searched) #3 #1 AND #2

Selection process

The method followed the epidemiological declaration and was then arranged and evaluated using the meta-analysis method. The study followed the PRISMA checklist (25).

Data collection process

The criteria employed for data collection included research data, first author's name, year of research, geographical location, type of population, medical and treatment characteristics, quantitative and qualitative assessment methods, categories, statistical analysis, data sources, and outcome evaluation (27).

Data items

When the study generated different results, we separately congregated the data depending on an estimation of the effectiveness of first-aid nursing in elderly patients in the emergency department who have acute strokes (28).

Research risk of bias assessment

The author appraised the technique of elect studies to decide the potential for their bias. Technical quality was judged utilizing the "risk of bias instrument" from the Cochrane Handbook for Systematic Reviews of Interventions, Version 5.1.0 (29). Upon classification of each study based on the assessment criteria, it was assigned one of the following bias risks: Research was classified as having a low bias risk if all criteria were satisfied, and as having a medium bias risk if one or more quality criteria were unmet. Research was considered to have a substantial risk

of bias if several quality requirements were either completely or partially met.

Effect estimates

Sensitivity analysis was restricted to studies that estimated and characterized the effectiveness of first-aid nursing in elderly patients in the emergency department who have acute strokes. A subclass analysis was applied to compare the sensitivity of elderly patients in the emergency department who have acute stroke persons with control.

Synthesis methods

A dichotomous or continuous methodology with either a fixed or random-effect model was utilized to compute the odds ratio (OR), or mean difference (MD), and a 95% confidence interval (CI). The I2 index was assessed on a scale from 0 to 100%. At 0%, 25%, 50%, and 75% of the data, there was no, low, moderate, and high heterogeneity, respectively (30). To confirm the appropriateness of the model, additional frameworks exhibiting a high degree of resemblance among connected studies were also analyzed. A fixed-effect model was selected if I2 was below 50%; otherwise, a random-effect model was utilized. A subgroup analysis was conducted by dividing the original appraisal into previously defined result groups (31). A *P*-value of less than 0.05 was employed to establish the statistical significance of differences among subgroups.

Reporting bias assessment

We employed the Egger regression test and funnel plots, which illustrate the logarithm of odds ratios against their standard errors, to assess study bias both mathematically and intuitively. The presence of investigative bias was established by $P \geq 0.05$ (32).

Certainty assessment

Two-tailed testing was utilized to evaluate each *P*-value. Graphs and statistical analyses were produced using Reviewer Manager Version 5.3 (The Nordic Cochrane Centre, the Cochrane Collaboration, Copenhagen, Denmark).

Results

Tweleve papers that were published between 2016 and 2024 were selected for the study out of 1765 related studies that satisfied the inclusion requirements (33-44). Table 2 delivers the results of these investigations. At the beginning of the research, there were 1300 elderly patients in the emergency department who had acute strokes; 638 of them were utilizing first-aid nursing, and 662 were utilizing control (standard care). The sample size of the selected studies ranges between 50 and 180 patients.

First-aid nursing had significantly lower rescue time (MD, -11.16; 95% CI, -15.74- -6.58, $P<0.001$) with high heterogeneity ($I^2 = 99\%$), fatality rate (OR, 0.26; 95% CI, 0.16-0.43, $P<0.001$) with no heterogeneity ($I^2 = 0\%$), and disability rate (OR, 0.30; 95% CI, 0.15-0.58, $P<0.001$) with moderate heterogeneity ($I^2 = 52\%$) compared to control in elderly patients in the emergency department who have acute strokes as revealed in Fig. 2-4.

The nonexistence of data, including sex, race, and age, on comparison consequences, hindered the application of stratified models to examine the effects of exact constituents. Quantitative Egger regression test and visual analysis of the funnel plot, as seen in Figs. 4 and 5, revealed no indication of research bias ($P = 0.88$) as shown in Figs. 5-7. Nonetheless, it was demonstrated that there was no bias in the designated studies and that most of the implicated RCTs had inadequate procedural quality.

Table 2: Characteristics of the selected researches for the meta-analysis

Study	Country	First-aid nursing Method	Control method
Haixia, 2016 (33)	China	Emergency rapid nursing process	Routine nursing
Wei, 2017 (34)	China	Emergency nursing fast track	Routine nursing
Yan, 2017 (35)	China	Emergency quick nursing process to implement nursing work	Routine nursing
Yuhui, 2021 (36)	China	Emergency quick nursing process	Routine nursing
Turner, 2021 (37)	China	Emergency nursing green channel	Routine nursing
Huishan, 2021 (38)	China	Emergency nursing green channel	Routine nursing
Wenjing, 2021 (39)	China	Optimization of pre-hospital emergency nursing process	Routine nursing
Juan, 2022 (40)	China	Optimize the process of emergency nursing	Routine nursing
Li, 2023 (41)	China	Emergency quick nursing process	Routine nursing
Deng, 2024 (42)	China	Optimize the process of emergency nursing	Routine nursing
Wang, 2024 (43)	China	Emergency quick nursing process	Routine nursing
Zhang, 2024 (44)	China	Optimize the process of emergency nursing	Routine nursing
	Total	638	662

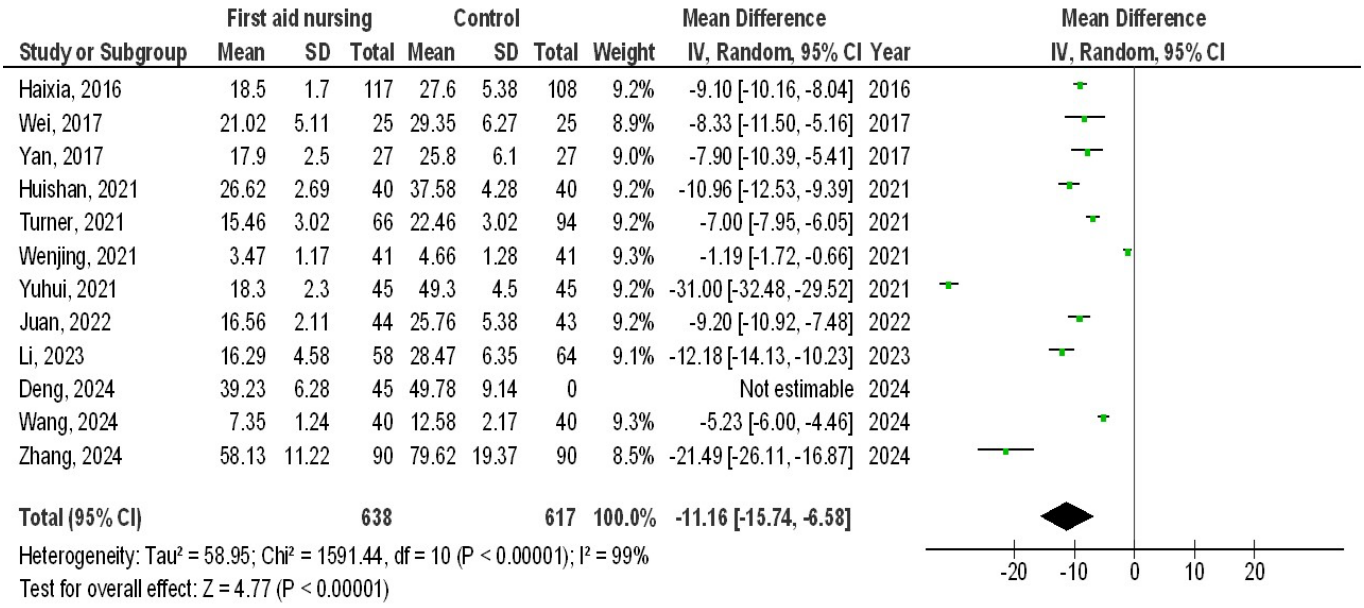

Fig. 2: Forest plot of first-aid nursing compared to control on rescue time in elderly patients in the emergency department who have acute strokes

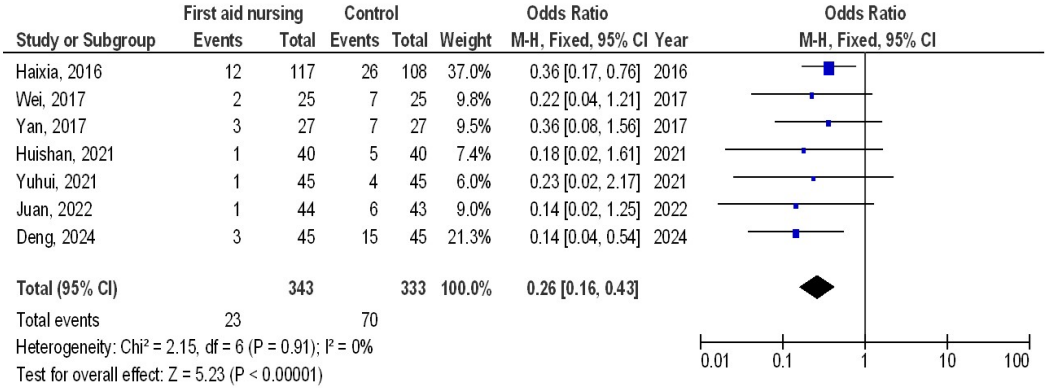

Fig. 3: Forest plot of first-aid nursing compared to control on fatality rate in elderly patients in the emergency department who have acute strokes

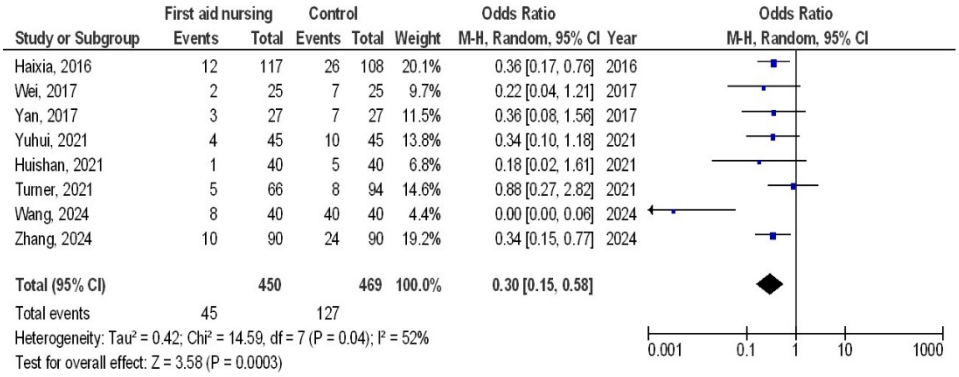

Fig. 4: Forest plot of first-aid nursing compared to control on disability rate in elderly patients in the emergency department who have acute strokes

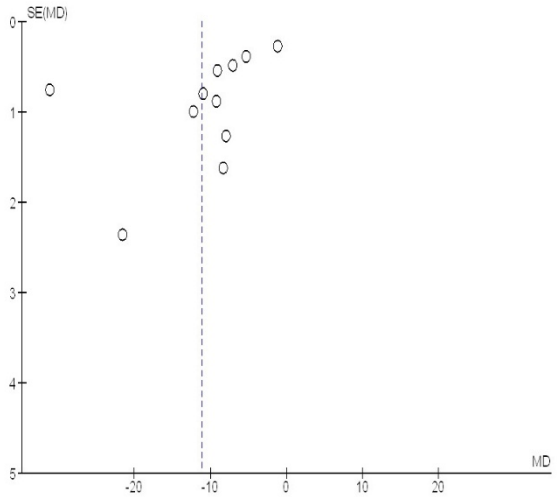

Fig. 5: Funnel plot of first-aid nursing compared to control on rescue time in elderly patients in the emergency department who have acute strokes

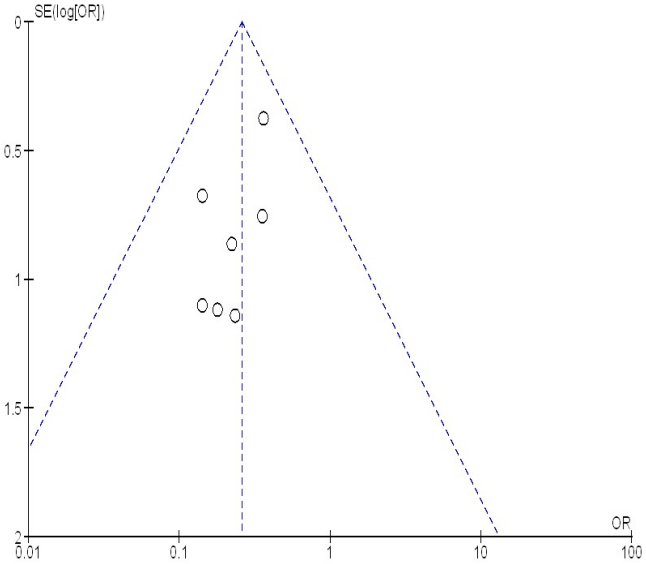

Fig. 6: Funnel plot of first-aid nursing compared to control on fatality rate in elderly patients in the emergency department who have acute strokes

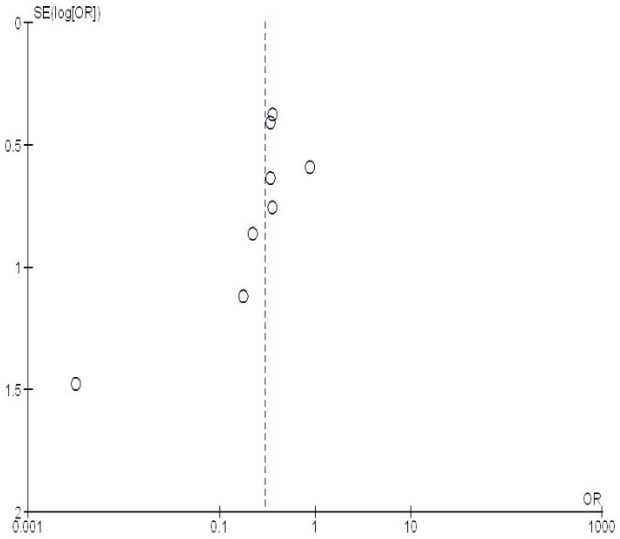

Fig. 7: Funnel plot of first-aid nursing compared to control on disability rate in elderly patients in the emergency department who have acute strokes

Discussion

Research indicates that, the use of a quick nursing approach during the management of acute ischemic stroke can decrease patient disability rates and enhance nursing satisfaction (45). Consequently, enhancing the quality of nursing is essential during the rescue procedure to comfort patients.

Historically, the management of acute ischemic stroke mostly encompassed blood pressure regulation, anticoagulant administration, thrombolytic intervention, and vascular interventional procedures (46). Nonetheless, most stroke patients arriving in the emergency department are in the acute phase (47). Consequently, it is imperative to implement a uniform nursing approach for subjects to mitigate the variability in nurses' practical

experience and work habits. Currently, studies on the clinical nursing pathway for acute ischemic stroke in China primarily emphasize health learning and psychological counseling; however, a standardized and specific nursing procedure integrating traditional medicine has yet to be established for pre-hospital first-aid and in-hospital emergency care (48). Simultaneously, other human factors frequently emerge during pre-hospital first-aid, leading to delays in optimal treatment timing. Research has validated that the application of a clinical nursing pathway could significantly reduce patients' visit duration (49). A comprehensive treatment protocol for hemorrhagic stroke subjects, employing a progressive approach to deliver diagnostic, therapeutic, and care interventions (50).

Results indicated a positive outcome in overall neurological function recovery and enhancement effective rate following therapy in the route group (51). Xu Min and colleagues confirmed that the deployment of clinical pathways greatly enhances patients' neurological function and the treatment capabilities of medical personnel. Currently, meta-analysis has validated that efficient diagnosis and acute ischemic stroke management mostly encompass thrombolytic treatment, antiplatelet treatment, intravascular interventional treatment, anticoagulant treatment, and stroke units (52). A study on endovascular interventional therapy showed that, in comparison to intravenous thrombolysis alone, the combination of endovascular interventional therapy and intravenous thrombolysis markedly enhances occluded blood artery recanalization rate (53). The reduction in bleeding risk post-treatment further substantiated the safety and effectiveness of endovascular interventional treatment for acute ischemic stroke. Consequently, several researchers consider that endovascular interventional treatment represents the second significant advancement in ischemic stroke management, after the introduction of recombinant tissue plasminogen activator for intravenous thrombolysis (54). Given the elevated reappearance and disability rates in individuals with acute ischemic stroke, personalized antiplatelet and anticoagulant medication must be administered upon admission.

Alongside the management of stroke risk factors for various individuals, antiplatelet medications are primary agents for the stoppage and management of localized thrombosis at stenotic sites in ischemic stroke resulting from atherosclerosis and major artery stenosis. Subjects with ischemic stroke who do not qualify for thrombolysis and have no contraindications must get aspirin promptly after onset, as per the guidelines. A study on clopidogrel for high-risk acute stroke patients indicated that the concomitant administration of clopidogrel and aspirin for three weeks post-transient ischemic attack significantly diminishes the 90-day deficit and incidence of recurrent hemorrhagic stroke. Oral warfarin anticoagulation treatment could successfully diminish the risk of stroke in cases of cardiogenic stroke resulting from atrial fibrillation. Despite the efficacy of oral anticoagulants in diminishing ischemic stroke recurrence rate, statistics indicate that merely 45% of subjects receive prolonged treatment with these medications. A study indicates that approximately 38% of individuals with ischemic stroke due to atrial fibrillation discontinue oral anticoagulant therapy upon discharge. The survival rate of patients receiving continuous oral anticoagulant treatment after one year was significantly greater than that of subjects not undergoing anticoagulant treatment. Moreover, current studies assert that enhancing targeted therapies in high-risk populations is crucial for diminishing the reappearance of ischemic stroke. Research indicates that stroke units are the most efficacious intervention for the diagnosis and management of ischemic stroke, surpassing thrombolytic treatment and antiplatelet treatment. It is a systematic and structured treatment strategy for stroke management that excludes novel therapeutic approaches (55).

The stroke unit primarily depends on strong interdisciplinary connections, involving neurophysicians, physiotherapists, social workers, registered nurses, psychologists, speech therapists, and the families of patients. Consequently, we may devise individualized diagnostic, therapeutic,

and nursing protocols for stroke subjects in a systematic and focused manner, encompassing prompt and efficacious management interventions, early rehabilitation training, complication prevention, and management, along with other medical and nursing strategies. Nevertheless, owing to disparities in stroke cognition and limitations within the medical infrastructure, system, and model, functional stroke units have yet to be established in our nation. For instance, stroke patients typically receive prompt and effective pharmacological intervention at onset; nonetheless, there is a notable disparity between the rehabilitation and prognostic programs in the subsequent phase compared to those in wealthy countries (56). Optimized first-aid nursing can establish an efficient first-aid channel, eliminating the conventional requirement for initial registration before treatment and payment. This approach minimizes patient wait times, ensures seamless information transfer, and includes dedicated personnel for guidance. It can also expedite patients' acclimatization to the hospital's structure and atmosphere, facilitating rapid diagnosis and treatment. Simultaneously, it can mitigate the adverse feelings of patients and their families, prevent confrontations between anxiety and medical personnel, and conserve diagnostic and treatment time (57). In cases of acute stroke, time is critical; prompt intervention enhances cerebral blood flow restoration and increases the likelihood of postoperative recovery. Research indicates that acute stroke subjects with shorter rescue times experience lower impairment and fatality rates compared to those with longer rescue times (58). During the rescue of subjects with acute stroke, physicians frequently overlook the myriad problems arising from the intervention, potentially leading to different difficulties that impede subsequent management and rehabilitation efforts. Consequently, in an integrated group, the nurses inquired about the subjects' status before the rescue and communicated this information to the doctors, facilitating anticipatory therapy during the rescue and minimizing the incidence of problems.

Limitations

Assortment bias could have arisen because certain papers that were to be included in the study were excluded. Nevertheless, all the excluded work didn't meet the necessary criteria to be included in the study. Still, the data was needed to determine whether influences e.g. ethnicity, age, and gender influenced the consequence. The impartial of the study was to define the influence of first-aid nursing and control in treating elderly patients in the emergency department who have acute strokes. Using imprecise or inadequate data from a preceding study most likely made the bias worse. The person's age, gender, ethnicity, and nutritional state were the main variables that most likely contributed to discrimination. Values may unintentionally be modified as a result of unreported investigations and inadequate data. Since all of the listed research produced results with small sample sizes, higher sample sizes are required for studies to produce more compelling data. Because of inadequate reporting and a lack of clarification from study authors, it was frequently unclear whether studies were susceptible to bias. Additionally, the bias assessment revealed extremely low to intermediate methodological quality, which means we are unable to make definitive judgments regarding the studied parameters. The evaluations in the certainty assessment were significantly impacted by the domains of indirectness of evidence and risk of bias.

Conclusion

First-aid nursing had significantly lower rescue time, fatality rate, and disability rate compared to control in elderly patients in the emergency department who have acute strokes. Nonetheless, due to the low sample size of most of the nominated studies discovered for comparison in the meta-analysis (8 studies out of 12<100 subjects), care must be used when interacting with its values. This might affect the significance of the assessed evaluations. Hence, further studies with larger sample size are required to validate this finding.

Journalism Ethics considerations

Ethical issues (Including plagiarism, informed consent, misconduct, data fabrication and/or falsification, double publication and/or submission, redundancy, etc.) have been completely observed by the authors.

Ethics approval

Not applicable.

Conflict of interest

The authors declare that there is no conflict of interests.

Acknowledgements

No funding was received for this study.

References

1. Poursadeqiyan M, Arefi MF, Pouya AB, Jafari M (2021). Quality of life in health Iranian elderly population approach in health promotion: A systematic review. *J Educ Health Promot,* 10:449.
2. Maleki MS, Mazaheri SA, Hosseini SH, et al (2023). Epidemiology of Traumatic Brain Injury in Iran: A Systematic Review and Meta-Analysis. *Iran J Public Health,* 52 (9):1818-1831.
3. Saheban Maleki M, Khedri B, Ebrahimpour Roodposhti M, et al (2022). Epidemiology of Traumatic Spinal Cord Injuries in Iran; a Systematic Review and Meta-Analysis. *Arch Acad Emerg Med,* 10 (1):e80.
4. Soroush S, Arefi MF, Pouya AB, et al (2022). The effects of neck, core, and combined stabilization practices on pain, disability, and improvement of the neck range of motion in elderly with chronic non-specific neck pain. *Work,* 71 (4):889-900.
5. Azizi A, Veisi FM, Amirian F, et al (2016). Epidemiology of lowers limb fractures in patient of taleghani hospital in Kermanshah in 2014. *Res J Med Sci,* 10:325-329.
6. Bieth T, Beauvais D, Romeu P, et al (2021). Validation of a new test for early assessment of unilateral neglect in acute stroke: The Rapid Unilateral Neglect Screening (RUNS) test. *Ann Phys Rehabil Med,* 64 (4):101399.
7. Alameri A, Patel P, Abidali H, et al (2020). Su1450 outcomes of ercp in patients with acute stroke: a national study. *Gastrointest Endosc,* 91 (6):AB352.
8. Han TS, Sharma P (2020). Response by Han and Sharma to Letter Regarding Article, "Prestroke Disability Predicts Adverse Poststroke Outcome: A Registry-Based Prospective Cohort Study of Acute Stroke". *Stroke,* 51 (6):e117-e117.
9. Dwyer M, Peterson GM, Gall S, et al 2020). Health care providers' perceptions of factors that influence the provision of acute stroke care in urban and rural settings: A qualitative study. *SAGE Open Med,* 8:2050312120921088.
10. Bruno A, Nichols FT (2020). Letter by Bruno and Nichols Regarding Article, "Prestroke Disability Predicts Adverse Poststroke Outcome: A Registry-Based Prospective Cohort Study of Acute Stroke". *Stroke,* 51 (6):e116.
11. Abraira L, Giannini N, Santamarina E, et al (2020). Corrigendum to "Correlation of blood biomarkers with early-onset seizures after an acute stroke event" [Epilepsy Behav 104(Pt B) (2020 Mar)]. *Epilepsy Behav,* 106:107045.
12. Benfield JK, Everton LF, Bath PM, et al (2020). Accuracy and clinical utility of comprehensive dysphagia screening assessments in acute stroke: A systematic review and meta-analysis. *J Clin Nurs,* 29 (9-10):1527-1538.
13. Suda S, Muraga K, Ishiwata A, et al (2020). Early Cognitive Assessment Following Acute Stroke: Feasibility and Comparison between Mini-Mental State Examination and Montreal Cognitive Assessment. *J Stroke Cerebrovasc Dis,* 29 (4):104688.
14. Han JY, Tan IYL (2020). Retrospective single-centre experience on the effect of the DAWN trial on the utilisation pattern, diagnostic yield and accuracy of CT perfusions performed for suspected acute stroke. *J Med Imaging Radiat Oncol,* 64 (4):477-483.
15. Baby P (2020). Malnutrition in acute stroke: what are we treating? *BJNN,* 16 (Sup2):S4-S9.
16. Cook AM, Morgan Jones G, Hawryluk GWJ, et al (2020). Guidelines for the Acute Treatment

of Cerebral Edema in Neurocritical Care Patients. *Neurocrit Care,* 32 (3):647-666.
17. Rudd A, Bladin C, Carli P, et al (2020). Utstein recommendation for emergency stroke care. *Int J Stroke,* 15 (5):555-564.
18. Amlie-Lefond C, Shaw DWW, Cooper A, et al (2020). Risk of Intracranial Hemorrhage Following Intravenous tPA (Tissue-Type Plasminogen Activator) for Acute Stroke Is Low in Children. *Stroke,* 51 (2):542-548.
19. Suddick KM, Cross V, Vuoskoski P, et al (2021). Holding space and transitional space: stroke survivors' lived experience of being on an acute stroke unit. A hermeneutic phenomenological study. *Scand J Caring Sci,* 35 (1):104-114.
20. Zaheer M, Pechuho SI (2020). The frequency of elevated serum glucose levels in acute stroke patients who are not known to have diabetes at the time of presentation in lady ready hospital Peshawar a cross-sectional study. *IJSBAR,* 49 (1):196-199.
21. Morello F, Santoro M, Fargion AT, et al (2021). Diagnosis and management of acute aortic syndromes in the emergency department. *Intern Emerg Med,* 16 (1):171-181.
22. Qi R, Liu H, Liu C, Xu Y, Liu C (2020). Expression and short-term prognostic value of miR-126 and miR-182 in patients with acute stroke. *Exp Ther Med,* 19 (1):527-534.
23. Stroup DF, Berlin JA, Morton SC, et al (2000). Meta-analysis of observational studies in epidemiology: a proposal for reporting. *JAMA,* 283 (15):2008-2012.
24. Gu R, Xu G (2024). A meta-analysis looking at the effects of continuous management for complications related to intraoperative pressure wound ulcers in women with breast cancer. *Int J Clin Med Res,* 2 (4):100-107.
25. Liberati A, Altman DG, Tetzlaff J, et al (2009). The PRISMA statement for reporting systematic reviews and meta-analyses of studies that evaluate health care interventions: explanation and elaboration. *J Clin Epidemiol,* 62 (10):e1-34.
26. Koang Y (2024). A meta-analysis on the use of photobiomodulation to regulate gingival wound healing in addition to periodontal therapies. *Int J Clin Med Res,* 2 (4):108-117.
27. Gupta S, Rout G, Patel AH, et al (2018). Efficacy of generic oral directly acting agents in patients with hepatitis C virus infection. *J Viral Hepat,* 25 (7):771-778.
28. Rabie SB, Kang H-C, Choi M, Suk H (2025). Assessing the efficacy of pharmacist-engaged interventions in influencing antibiotic prescribing behavior among general practitioners: meta-analysis. *Int J Clin Med Res,* 3 (3):52-65.
29. Higgins J, Thomas J, Chandler J, et al (2019). *eds. Cochrane Handbook for Systematic Reviews of Interventions.* . 2nd ed. ed. Chichester, UK: Wiley & Sons; .
30. Sheikhbahaei S, Trahan TJ, Xiao J, et al (2016). FDG-PET/CT and MRI for evaluation of pathologic response to neoadjuvant chemotherapy in patients with breast cancer: a meta-analysis of diagnostic accuracy studies. *Oncologist,* 21 (8):931-939.
31. Gupta A, Das A, Majumder K, et al (2018). Obesity is Independently Associated With Increased Risk of Hepatocellular Cancer–related Mortality. *Am J Clin Oncol,* 41 (9):874-881.
32. Higgins JP, Thompson SG, Deeks JJ, et al (2003). Measuring inconsistency in meta-analyses. *BMJ,* 327 (7414):557-560.
33. Haixia W (2016). Talking about the application effect of emergency quick nursing process in rescuing patients with acute stroke. *A series Contemp Med,* 14 (11):46-48.
34. Wei Y (2017). Effect of emergency nursing fast track on treatment time and effect of acute stroke. *The latest Medical Information Abstracts in the World,* 17 (A4):246.
35. Yan S (2017). Analysis of the application value of emergency quick nursing process in the rescue of patients with acute stroke. *TCM,* 15 (1):199-200.
36. Yuhui C (2021). Effect of emergency quick nursing process in the treatment of patients with acute stroke. *TCM,* 19 (33):160-161.
37. Turner AC, Zachrison KS (2021). Utilization of Advanced Imaging for Acute Ischemic Stroke. *Circ Cardiovasc Qual Outcomes,* 14 (4):e007845.
38. Huishan Y (2021) Effect of emergency nursing green channel on treatment success rate and satisfaction of acute stroke patients. Grass-roots Medical Forum, pp. 3466-3467.
39. Wenjing Y, Youmei R (2021). Effect of optimization of pre-hospital first aid nursing

process on first aid efficiency and prognosis of patients with acute stroke. *Heilongjiang med,* 45 (12):1274-1275.
40. Juan W, Rongzhi T, Tingyi Z (2022). Study on the effect of optimizing emergency nursing process on patients with acute stroke. *Psychol monthly,* 17 (3):167-169.
41. Li H, Shen Y, Huang X, et al (2023). Application effect of multidisciplinary collaborative nursing process in emergency care of patients with hypertensive cerebral hemorrhage. *Eur Rev Med Pharmacol Sci,* 27 (7):2745-2750.
42. Deng Y, Song J (2024). Application Effect Evaluation of Optimizing Emergency Nursing Process Before Emergency Coronary Intervention in Patients with AMI and Hypertension. *Altern Ther Health Med,* 30 (1):339-343.
43. Wang L, Hao X, Zou W, et al (2024). Optimizing the Effects of a Comprehensive Emergency Nursing Model on Rescued Patients with Acute Myocardial Infarction in the Cardiology Department. *Altern Ther Health Med*, 30(1):339-343.
44. Zhang Z, Gu D, Li S (2024). The Improved Emergency Nursing Procedure and Human-oriented Nursing Care Can Significantly Reduce Hard Feelings of Patients with Acute Myocardial Infarction. *Altern Ther Health Med,* 30 (12):406-410.
45. Harrington RA (2019). Prehospital Phase of Acute Stroke Care: Guideline and Policy Considerations as Science and Evidence Rapidly Evolve. *Stroke,* 50 (7):1637-1639.
46. Schlechtriemen T, Becker M, Hoor L (2019). Prähospitalphase der Schlaganfallversorgung. *Der Radiologe,* 59 (7):596-602.
47. Hosseinighousheh S, Arefi MF, Pouya AB, et al (2021). Health in disasters in Iranian schools: A systematic review. *J Educ Health Promot,* 10:365.
48. Azadi F, Amjad RN, Marioryad H, et al (2019). Effect of 12-Week Neck, Core, and Combined Stabilization Exercises on the Pain and Disability of Elderly Patients With Chronic Non-specific Neck Pain: A Clinical Trial. *Salmand: Iran J Ageing,* 13 (5):614-625.
49. Helms J (1978). Zur chirurgischen Anatomie des Felsenbeins. In: *Kleinhirnbrückenwinkel-Tumoren: Diagnostik und Therapie.* Ed(s), Plester D, Wende S, Nakayama N. Berlin, Heidelberg: Springer Berlin Heidelberg, pp. 3-23.
50. Ng JC, Churojana A, Pongpech S, et al (2019). Current state of acute stroke care in Southeast Asian countries. *Interv Neuroradiol,* 25 (3):291-296.
51. Amani S, Abbasi Dolatabadi Z, Ilaghinezhad Bardsiri T, et al (2022). Designing and Validation of Self-Assessment Tool of Professional Competency and Its Psychometrics in the Administrators of Preschool Educational Centers. *Iran J Public Health,* 51 (11):2582-2591.
52. Zaro-Weber O, Fleischer H, Reiblich L, et al (2019). Penumbra detection in acute stroke with perfusion magnetic resonance imaging: Validation with 15O-positron emission tomography. *Ann Neurol,* 85 (6):875-886.
53. Avasarala J, Wesley K (2018). Optimization of acute stroke care in the emergency department: a call for better utilization of healthcare resources amid growing shortage of neurologists in the United States. *CNS Spectr,* 23 (4):248-250.
54. Hosseini Foladi S, Poursadeqiyan M, Sheikh Aboumasoudi A (2023). Emergency First Aid Allocation Model in Prehospital Triage in Two-Level Supply Chain Network. *Iran J Public Health,* 52 (4):868-869.
55. Rinaldo L, Brinjikji W (2019). Response by Rinaldo and Brinjikji to Letter Regarding Article, "Racial and Ethnic Disparities in the Utilization of Thrombectomy for Acute Stroke: Analysis of Data From 2016 to 2018". *Stroke,* 50 (11):e340.
56. Bohmann FO, Kurka N, du Mesnil de Rochemont R, et al (2019). Simulation-Based Training of the Rapid Evaluation and Management of Acute Stroke (STREAM)—A Prospective Single-Arm Multicenter Trial. *Front Neurol,* 10:969.
57. Rehman H, Kalra A, Kochar A, et al (2020). Secondary prevention of cardiovascular diseases in India: Findings from registries and large cohorts. *Indian Heart J,* 72 (5):337-344.
58. Yokota C, Yamamoto Y, Kamada M, et al (2019). Acute stroke rehabilitation for gait training with cyborg type robot Hybrid Assistive Limb: A pilot study. *J Neurol Sci,* 404:11-15.