

Bridging Knowledge Gaps in Stroke Prevention and Management

An Educational Approach for Patients and Nursing Personnel.

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Abstract

Knowledge gaps in stroke care occur at several levels. Patients may not recognize warning signs, understand personal risk factors, or know why long-term treatment must continue. Nursing personnel may have uneven preparation in neurological assessment, emergency escalation, complication prevention, rehabilitation support, and patient teaching. These gaps interact because patients receive clearer and more consistent information when the professionals caring for them share current knowledge and use a common educational pathway. This article examines a structured approach to stroke education for patients and nursing personnel. Patient content includes symptom recognition, emergency response, vascular risk reduction, medication understanding, rehabilitation, and recurrence prevention. Professional content includes rapid assessment, protocol-based care, dysphagia safety, neurological monitoring, early rehabilitation, communication, and discharge preparation. Effective education should use baseline gap assessment, active learning, simulation, teach-back, repeated reinforcement, and materials adapted to communication and literacy needs. A randomized controlled trial (RCT) can compare the programme with usual education by measuring patient awareness, nursing knowledge, observed competency, retention, adherence, care-process indicators, and selected clinical outcomes. Published trials show that educational interventions can improve stroke knowledge and satisfaction, although effects on behavior, risk-factor control, function, and quality of life are less consistent. Knowledge scores should therefore be interpreted as intermediate outcomes. Sustainable improvement requires organizational support, standardized protocols, continuing competency assessment, and collaboration among patients, caregivers, nurses, and the wider stroke team.

Keywords: stroke prevention, stroke management, knowledge gaps, patient education, nursing personnel, professional competency

Abbreviations

Abbrev.	Meaning	Abbrev.	Meaning
AF	Atrial fibrillation	AHA	American Heart Association
ASA	American Stroke Association	BE FAST	Balance Eyes Face Arm Speech Time
BP	Blood pressure	CT	Computed tomography
FAST	Face Arm Speech Time	NIHSS	National Institutes of Health Stroke Scale
RCT	Randomized controlled trial	TIA	Transient ischemic attack

Introduction

Stroke is a time-sensitive neurological emergency and a major source of mortality and disability. Much of its global burden is associated with modifiable vascular risks, although the distribution of those risks and access to care vary widely (GBD 2019 Stroke Collaborators, 2021). Effective prevention and management require more than the availability of clinical services. People must recognize symptoms and seek help quickly, survivors must understand secondary prevention, and health professionals must apply evidence consistently across acute care, rehabilitation, and follow-up.

Knowledge is often uneven at each stage. Patients may identify weakness as a warning sign but overlook sudden speech, visual, or balance problems. Some understand that blood pressure (BP) matters but cannot explain their personal target or medicines. Nursing personnel may know general stroke features yet lack confidence in structured neurological assessment, time-of-onset documentation, swallowing precautions, or rehabilitation teaching. The resulting gap is not simply a lack of facts. It includes limited ability to apply information in a stressful situation, communicate it clearly, and sustain appropriate action over time.

A coordinated educational strategy can link the two groups. Nurses who receive current, competency-based preparation can deliver consistent patient teaching, reinforce preventive behaviors, and recognize when information has not been understood. Patients and caregivers can then participate more effectively in treatment decisions, discharge planning, and recovery. This article analyzes the main knowledge gaps, proposes content and methods for a joint educational programme, and describes how its effects can be evaluated without equating test performance with clinical benefit.

The Nature of Stroke Knowledge Gaps

Knowledge gaps may be factual, procedural, or contextual. A factual gap exists when a learner cannot identify a warning sign or risk factor. A procedural gap occurs when the person knows what should happen but cannot perform the action, such as administering a neurological scale correctly or activating an emergency pathway. A contextual gap appears when correct information is applied inappropriately because the learner does not understand exceptions, timing, patient characteristics, or local protocols. Educational assessment should identify which type of gap is present because each requires a different response.

Patients and staff also face different consequences from incomplete knowledge. Delayed symptom recognition can postpone emergency treatment. Misunderstanding medicines can contribute to nonadherence or unsafe self-adjustment. In clinical practice, inconsistent assessment or escalation can delay imaging and specialist review. During recovery, inadequate knowledge about swallowing, mobility, mood, cognition, and fatigue can undermine safety and participation. These consequences show why a programme should cover the complete care continuum rather than concentrate only on a single lecture about stroke definition.

Knowledge Gaps Among Patients and Caregivers

Recognition and Emergency Action

The first priority is rapid recognition and response. FAST and BE FAST can help people remember facial weakness, arm weakness, speech difficulty, sudden visual disturbance, and loss of balance. The message must remain simple: any sudden neurological deficit requires immediate activation of local emergency services. Symptoms that disappear may indicate a transient ischemic attack (TIA) and still need urgent assessment. Patients should know the last known well time is important, but they should not delay care while trying to determine the exact diagnosis.

Education should explain why hospital assessment cannot be replaced by home observation. Clinical examination and computed tomography (CT) help distinguish ischemic stroke from hemorrhage and guide treatment. Reperfusion options are time sensitive and available only to selected patients after assessment (Powers et al., 2019). The nurse should communicate urgency without promising thrombolysis or thrombectomy. This distinction reduces false reassurance and avoids creating the belief that treatment is automatic if a person reaches hospital within a particular number of hours.

Prevention and Long Term Self Management

Primary and secondary prevention teaching should connect general risks to the individual. Important topics include hypertension, diabetes, abnormal lipids, tobacco use, physical inactivity, diet, obesity, atrial fibrillation (AF), and prescribed therapy. After stroke or TIA, prevention depends on the identified cause and the person's clinical profile. American Heart Association and American Stroke Association (AHA and ASA) guidance recommends cause-specific management and sustained control of vascular risks (Kleindorfer et al., 2021). Education should therefore be based on the patient's actual diagnosis and treatment plan.

Medication teaching requires more than naming tablets. Patients should understand the purpose, schedule, major precautions, and action to take after a missed dose or suspected adverse effect. Nurses must stay within professional scope and direct medication changes to the prescriber. Follow-up education should include rehabilitation goals, fatigue, falls, swallowing, communication, mood, cognition, return to activity, and community support. Reviews show that patients and caregivers have changing information needs, which supports repeated education rather than one session at discharge (Hafsteinsdóttir et al., 2011).

Knowledge Gaps Among Nursing Personnel

Nursing personnel need competence in rapid assessment and coordinated response. This includes recognizing stroke mimics and deterioration, documenting onset or last known well time, conducting a focused neurological examination, monitoring physiological variables, preparing the patient for imaging, and escalating according to the local stroke pathway. The National Institutes of Health Stroke Scale (NIHSS) requires standardized training and should not be improvised. Competency also includes accurate handover, because missing information about onset, anticoagulation, baseline function, or recent procedures can affect urgent decisions.

Gaps extend beyond acute treatment. Nurses must apply dysphagia screening pathways, aspiration precautions, skin protection, mobility support, nutrition and hydration monitoring, continence care, and prevention of avoidable complications. Rehabilitation nursing uses daily care as an opportunity to encourage safe independence. Clarke (2014) found that nurses' contribution to rehabilitation was shaped by staffing, teamwork, role clarity, and access to stroke-specific education. Tanlaka et al. (2023) similarly described nursing roles in teaching, coaching, coordination, advocacy, and prevention of harm.

Patient education is itself a professional competency. Nurses need to assess readiness, use plain language, adapt teaching for aphasia or cognitive impairment, include caregivers with consent, and confirm understanding through teach-back. An action-research study by Aslani et al. (2016) found that improving self-care education required changes in knowledge, attitudes, routines, and the practice environment. A training programme should therefore address both educator skill and barriers such as limited time, inconsistent materials, and unclear responsibility.

Closing the Knowledge to Practice Gap

Education changes practice when it requires learners to use knowledge. For patients, teach-back can test whether the person can recognize symptoms, state the emergency action, describe personal risks, and explain medication purpose. Demonstration can assess home BP monitoring or safe mobility where appropriate. For staff, simulation can test recognition, assessment, escalation, and communication. Case discussion can explore complex situations, while bedside coaching can connect protocols with actual care. Repeated brief sessions are often more feasible than one long programme and provide opportunities for correction.

Standardized materials reduce conflicting messages but should not eliminate individualization. A common core can define warning signs, emergency response, risk management, treatment principles, and rehabilitation safety. Nurses then adapt examples, pace, language, and delivery method. Printed and digital material should be readable, culturally appropriate, and available in relevant languages. People with aphasia may need supported conversation, pictures, gesture, and input from speech and language professionals. Information should be revisited when the person's condition and capacity to learn improve.

Staff reinforcement should include competency reassessment, audit, and feedback. Written knowledge tests can identify misconceptions, but observed performance is needed to assess clinical competence. Audit indicators may include completion of dysphagia screening before oral intake, documentation of neurological observations, escalation of deterioration, delivery of discharge education, and evidence of teach-back. Feedback should specify the behavior that needs improvement and the protocol that supports it. A punitive approach may hide learning needs, whereas a safety-focused approach encourages questions and reporting.

Evidence From Educational Interventions

Patient-education trials have produced mixed outcomes. Rodgers et al. (1999) reported improved stroke knowledge and satisfaction after a comprehensive programme, without better perceived health status. Smith et al. (2004) found reduced anxiety but no statistically significant knowledge effect. Benoit et al. (2020) demonstrated that a pre-discharge session improved stroke knowledge and warning-sign identification for up to 12 months, although risk-factor control and self-reported adherence did not differ. These findings show that content, timing, reinforcement, participant burden, and outcome selection influence results.

Evidence for staff education also supports cautious interpretation. An integrative review found that education and training interventions could improve staff knowledge and aspects of stroke care, but programmes and outcome measures varied (Jones et al., 2018). A more recent scoping review confirmed wide variation in content, methods, and implementation and identified a need for stronger evidence linking nurse training with patient outcomes (Zhao et al., 2024). Training should therefore be evaluated at several levels: learning, observed behavior, care processes, and patient outcomes.

Evaluation in a Randomized Controlled Study

An RCT can compare the structured programme with usual education, but the unit of randomization must match the intervention. Randomizing individual patients is suitable when the patient component can be delivered separately. Randomizing nurses or wards may be preferable when staff behavior and shared materials affect all patients, although cluster designs require adjustment for intracluster correlation and usually need larger samples. Investigators should minimize contamination and document which content each participant receives.

Primary outcomes should be defined before recruitment. Patient outcomes may include recognition of warning signs, intended emergency response, knowledge of individual risk factors and medicines, self-efficacy,

anxiety, satisfaction, adherence, BP control, readmission, and quality of life. Staff outcomes may include a validated knowledge test, NIHSS agreement, simulation performance, protocol adherence, documentation quality, confidence, and teaching competence. Allocation concealment, blinded outcome assessment where feasible, and intention-to-treat analysis strengthen validity.

Follow-up is necessary because immediate post-test improvement may represent short-term recall. Baseline-adjusted analysis can compare changes between groups, while repeated measurement can estimate retention. Knowledge and confidence should not be treated as equivalent to skill. Wolf et al. (2017) found limited benefit from a general self-management programme after mild stroke, which illustrates the importance of matching the intervention to stroke-specific needs. Process evaluation can show whether an apparent failure resulted from ineffective content, low attendance, poor fidelity, or insufficient organizational support.

Equity Ethics and Implementation

A knowledge-gap intervention must include people who are often excluded from education research. Stroke survivors may have communication disability, impaired cognition, fatigue, low literacy, sensory loss, or limited access to follow-up. Consent procedures should support communication and should not assume that aphasia equals incapacity. Materials should avoid blaming patients for modifiable risks and should acknowledge that stroke can recur despite appropriate prevention. Caregiver involvement requires the patient's permission whenever the patient can decide.

Sustained implementation depends on protected learning time, accessible protocols, adequate staffing, stroke-team support, suitable teaching materials, and leadership review of audit findings. Competency should be reassessed when protocols change and at planned intervals. Units should also monitor whether education reaches different language, literacy, and disability groups. If awareness improves only among participants who already have fewer barriers, the programme may widen rather than close the knowledge gap.

Limitations and Future Directions

Educational studies often use locally developed questionnaires, self-reported behavior, small samples, and short follow-up. Clinical outcomes are influenced by stroke severity, reperfusion treatment, comorbidity, rehabilitation access, and social conditions, which can obscure the effect of education. Future trials should use validated measures, report intervention fidelity, include cost and implementation outcomes, and combine quantitative results with interviews. Qualitative findings can explain which messages were memorable, why advice was difficult to follow, and how nurses adapted education in real care settings.

Conclusion

Bridging knowledge gaps in stroke prevention and management requires coordinated education for patients, caregivers, and nursing personnel. Patients need actionable understanding of warning signs, emergency response, personal risk factors, medicines, rehabilitation, and recurrence prevention. Nursing personnel need standardized assessment, escalation, safety, rehabilitation, communication, and teaching competencies. Evidence indicates that education can improve knowledge and satisfaction, while effects on behavior and health outcomes remain variable. A well-designed programme should therefore combine active learning, repeated reinforcement, accessible materials, competency assessment, and organizational support. Evaluation should measure retained knowledge, observed practice, care processes, and patient outcomes so that improvement reflects safer decisions rather than higher test scores alone.

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