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FAST EDUCATION FOR EARLY STROKE DETECTION: HEALTH PROMOTION MODEL-INFORMED SYSTEMATIC REVIEW

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ABSTRACT
Family members and lay bystanders are often the first to recognise stroke signs and determine whether emergency care is sought promptly. FAST (Face, Arm, Speech, Time) simplifies symptom recognition, but improved knowledge does not necessarily translate into sustained action. To synthesise peer-reviewed primary evidence published from 1 January 2019 to 29 August 2026 on FAST and related stroke-education strategies among families and lay populations, and to interpret the findings using the Health Promotion Model (HPM). A structured narrative synthesis was conducted with reference to PRISMA 2020, SWiM, and PRISMA-S elements. Eligible studies were English-language primary reports published within the specified 2019–2026 period. Randomised studies were appraised with RoB 2 and non-randomised studies with appropriate JBI tools. Twenty-five primary reports represented 23 independent study/data units. Improvements were most consistent for knowledge and symptom recognition. Directly measured family attitudes were rarely assessed; preparedness or intention improved in several studies, mainly at short follow-up, whereas actual behaviours such as EMS/ambulance activation and earlier hospital arrival were heterogeneous and context-dependent. FAST is a useful core recognition message, while HPM is best positioned as a framework for developing interventions that address perceived benefits and barriers, self-efficacy, interpersonal and situational influences, and commitment to action.

Keywords: emergency medical services; FAST; health promotion model; stroke; stroke education

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INTRODUCTION

Stroke remains a leading cause of death and disability worldwide, with a disproportionate burden in low- and middle-income countries (Feigin et al., 2025). Because the benefits of reperfusion are highly time-dependent, family members or lay witnesses have an important role in recognising symptoms and promptly activating emergency medical services (Bosch et al., 2025). The effectiveness of education should therefore be interpreted across distinct outcomes: knowledge/symptom recognition, directly measured attitudes, preparedness or intention to act, and actual behaviour such as contacting EMS/ambulance services or expediting referral. FAST (Face, Arm, Speech, Time) is a widely used mnemonic that links symptom recognition with rapid action; related approaches include BEFAST, FAST Heroes/FAST 112 Heroes, Stroke-112, and Stroke 1-2-0. Earlier evidence suggests that stroke campaigns can improve awareness and intention to use emergency services, although effects on prehospital behaviour have not always been consistent (Mellon et al., 2015; Tshiswaka et al., 2018; Tan et al., 2022). Since 2019, the evidence base has expanded through retention studies, cultural adaptations, school-to-family education, and EMS-based evaluations; the 2026 AHA/ASA guideline continues to identify stroke-awareness education as an important component of care (Prabhakaran et al., 2026).

The Health Promotion Model (HPM) was used as a lens to understand factors that may bridge symptom recognition and action, particularly perceived benefits, perceived barriers, self-efficacy, interpersonal influences, situational influences, and commitment to action (Murdaugh et al., 2022). Because most primary studies did not explicitly apply HPM, these constructs were positioned as an

interpretive and intervention-development framework rather than as proven mediators. Accordingly, this review aimed to synthesise evidence published from 1 January 2019 to 29 August 2026 on FAST and related stroke-education strategies among families and lay populations, distinguishing knowledge/symptom recognition, directly measured attitudes, preparedness/intention, actual behaviour, and retention, and to map the findings to HPM constructs to inform prospectively testable intervention components.

METHOD

Design and reporting standards

This review used systematic evidence identification and structured narrative synthesis, with reporting guided by PRISMA 2020, SWiM, and PRISMA-S elements to the extent permitted by the historical documentation (Campbell et al., 2020; Page et al., 2021; Rethlefsen et al., 2021). Meta-analysis was not performed because of heterogeneity in study designs, interventions, populations, outcome definitions, instruments, and follow-up periods. The protocol was not prospectively registered in PROSPERO because the review evolved from an existing manuscript; methodological decisions made during the audit and update stages are reported transparently.

Eligibility criteria

Eligibility was defined using a modified PICOS framework. The primary population comprised family members, caregivers, parents/grandparents, or lay people who could potentially be the first witnesses of stroke. Interventions included FAST, BEFAST, FAST Heroes, and other relevant stroke-education strategies. Outcomes were separated into knowledge/symptom recognition, directly measured attitudes, preparedness/intention, actual behaviour, and retention. English-language peer-reviewed primary studies published from 1 January 2019 to 29 August 2026 were eligible; reviews, editorials, studies without educational exposure, and outcomes unrelated to the initial response to stroke were excluded. The 2019–2026 restriction applied to primary studies included in the synthesis; publications before 2019 cited in the Introduction were used only to establish prior evidence and were not counted as included studies.

Table 1.
Eligibility criteria used for methodological rescreening and the targeted search update.

Domain	Included	Excluded
Population	Family members, caregivers, parents/grandparents, or lay populations who could potentially be the first witnesses of stroke; family evidence was prioritised and lay-population studies were used as supporting evidence when relevant.	Healthcare professionals only without educational transfer to family/lay populations; populations unrelated to stroke recognition or the initial response to stroke.
Intervention/ concept	FAST, BEFAST, FAST Heroes/FAST 112 Heroes education, or other stroke-education strategies providing comparative/contextual evidence for symptom recognition and rapid response; components were mapped to HPM when data permitted.	No educational/campaign exposure; secondary prevention, rehabilitation, stigma, or media development without participant outcomes.
Comparator	Control, standard education, alternative mnemonic, geographic comparator, or pre-intervention period where available; not mandatory for implementation/pre-post studies.	Absence of a comparator was not an exclusion criterion when design and outcomes remained relevant, but the strength of inference was calibrated to the design.
Outcomes	Knowledge/symptom recognition; directly measured attitudes; preparedness or intention to act as related but distinct constructs; actual behaviour such as EMS/ambulance activation, early arrival, onset-to-door time or prehospital delay; retention.	Reach, clicks, cost, or outcomes unrelated to stroke recognition/initial response only. Intention or preparedness was not classified as actual behaviour.
Design/ publication	Peer-reviewed primary research: randomised/cluster-randomised trials, quasi-experimental studies, pre-post studies, interrupted time series, cohort/longitudinal studies, campaign evaluations, or analytical cross-sectional studies directly related to campaign exposure.	Reviews, editorials, opinions, abstract-only reports without adequate data, or sources that could not be adequately verified.
Language/ period	English-language publications from 1 January 2019 to 29 August 2026.	Outside the date range, non-English reports, or sources with inadequate traceability.

Information sources and search approach
To preserve an audit trail, evidence identification was divided into the historical search and a targeted update. The historical search used Scopus, ScienceDirect, Google Scholar, and DOAJ; archived records preserved the flow counts but not all database-specific search strings and yields, so unverifiable information was not reconstructed. The update through 29 August 2026 used PubMed/MEDLINE, exact-title searching, DOI/publisher-page verification, full-text checking, and backward and forward citation chasing. Concept blocks included stroke; FAST/BEFAST/FAST Heroes/Stroke-112/Stroke 1-2-0; family/caregiver/community; knowledge/attitude/preparedness/intention/behaviour; and EMS/ambulance/prehospital delay. HPM was not used as a mandatory search filter.

Study selection and data extraction
The historical search identified 524 records; after 26 duplicates were removed, 498 titles/abstracts were screened, 80 full texts were assessed, and 25 reports formed the initial evidence set. Rescreening against the narrowed review question retained eight reports; the targeted update and citation searching added 17 new reports. The final synthesis included 25 primary reports representing 23 independent study/data units after follow-up reports and subsets were mapped to prevent double counting. Orologa, Baskini, et al. (2024) was treated as a follow-up to Proios et al. (2022), whereas Cherfane et al. (2025) was treated as a subset of Iskandar et al. (2024); Safwan et al. (2024) was used as a companion report.

Extracted data included study design, sample, intervention format, FAST components, comparator, follow-up, knowledge, directly measured attitudes, preparedness/intention, actual behaviour, retention, measurement methods, and key findings. Intervention components were subsequently mapped to HPM constructs when sufficient information was available. The audit, rescreening, extraction, and appraisal undertaken for this revision were conducted by one reviewer; the potential for selection and extraction error is acknowledged as a limitation.

Risk of bias and critical appraisal
Randomised trials were appraised using RoB 2, including the cluster version where appropriate (Sterne et al., 2019). Non-randomised studies were assessed using the revised JBI tool for quasi-experimental studies, whereas analytical cross-sectional studies were assessed using the revised JBI analytical cross-sectional tool (Barker et al., 2024; Barker et al., 2026; JBI, 2026). Appraisal considered selection, attrition, confounding, outcome objectivity, temporality, and length of follow-up; JBI items were not converted into numerical scores.

Synthesis and interpretation
The synthesis was organised according to the proximity of outcomes to clinical action: knowledge/symptom recognition, directly measured attitudes, preparedness/intention, and actual behaviour; retention, cultural adaptation, implementation, and equity were analysed as cross-cutting themes. Intention to contact EMS or simulated actions were not classified as actual behaviour. Formal GRADE assessment was not applied because it had not been prespecified and the evidence base was highly heterogeneous; interpretive strength was weighed descriptively according to design, directness, precision, consistency, objectivity, and follow-up duration. A narrative sensitivity analysis restricted the evidence to stronger comparative designs, objective prehospital outcomes, longer follow-up, and independent study units to assess the stability of the conclusions.

RESULT

Study selection
Rescreening retained eight reports from the initial evidence set; the targeted update and citation searching added 17 new reports. The final synthesis comprised 25 primary reports representing 23 independent study/data units. The evidence base included randomised trials, quasi-experimental/pre-post studies, campaign evaluations, interrupted time series, longitudinal studies,

and analytical surveys; FAST, FAST Heroes, and BEFAST were the main focus, while other strategies provided contextual comparisons.

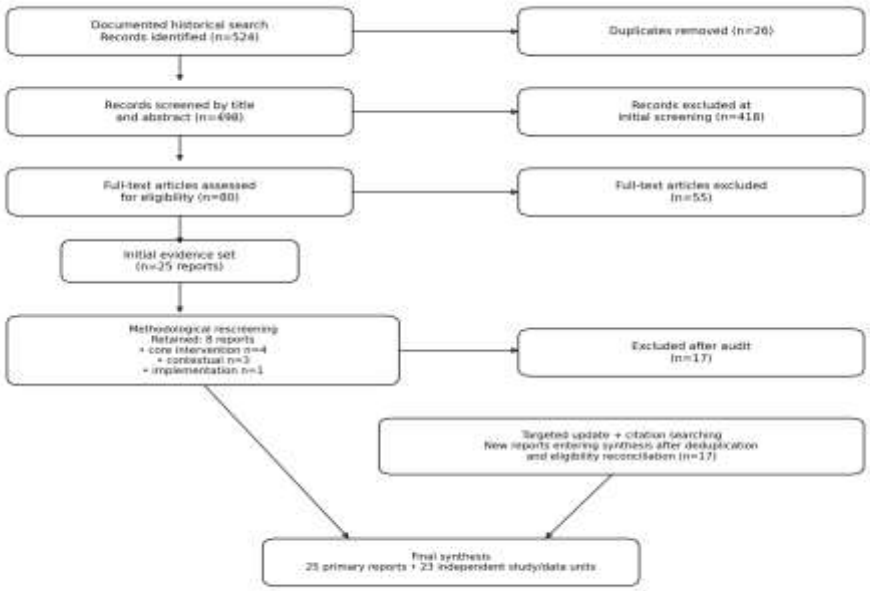


Figure 1. Evidence identification and methodological audit flow. The diagram distinguishes the documented historical search, methodological rescreening, and targeted update. Update counts indicate new reports entering the synthesis after deduplication, report-linkage checking, and application of eligibility criteria; database-specific export counts for the update were not reconstructed.

Characteristics of the evidence base

Studies were conducted in North America, Europe, Asia, New Zealand, Indonesia, Mexico, and multinational programmes. Knowledge/symptom recognition was the most frequently measured outcome. Family attitudes that were explicitly measured as attitudes were far less common; most studies used preparedness, intention, or scenario responses. Actual behaviours such as EMS activation, ambulance use, mode of arrival, and prehospital delay were least frequently measured and showed the greatest variability. Family-specific evidence mainly came from FAST Heroes, school-to-family transfer, and locally adapted FAST education.

Table 2.
Evidence synthesis by knowledge, attitudes, preparedness/intention, behaviour, retention, and HPM relevance.

Outcome domain	Overall pattern	Representative findings	Main limitations	Interpretation
Knowledge / symptom recognition	Most consistent improvement, particularly immediately after education.	FAST Heroes: recognition of three symptoms 48%→83%; subsequent wave 69%→87%. Wibawa et al. reported increased family knowledge after Banjar-language FAST animation.	Pre-post designs, self-report, testing effects, and short follow-up.	The most consistent evidence supports cognitive outcomes; improved knowledge does not establish behavioural change.
Direct attitudes / related preparedness-intention	Direct evidence on attitudes was limited; preparedness/intention more often improved in the short term.	Wibawa et al. reported improved family attitudes; Stroke Ready and SPEDI improved preparedness/intention; Williams et al. found	Definitions and instruments differed; preparedness and intention are neither synonymous with attitude nor actual	Claims about attitudes should be restricted to studies that directly measured them; related outcomes

Outcome domain	Overall pattern	Representative findings	Main limitations	Interpretation
		no overall difference at 12 months.	behaviour.	should be reported separately.
Family behaviour / emergency action	Heterogeneous and strongly context-dependent.	Yuan et al.: delay 18.72→6.00 hours and ambulance use 3.2%→30.6%; Chicago/Denmark evaluations did not show consistent improvement; Canadian FAST campaigns showed variable EMS effects.	Temporal confounding, service-system changes, non-random campaign exposure, and infrequent measurement of actual outcomes.	Transition from knowledge/attitudes to behaviour requires system support and strategies to address barriers.
Retention	Initial effects may decline; no mnemonic is universally superior.	Stroke 1-2-0 declined at 1 year; FAST vs BEFAST/Stroke-112 studies showed inconsistent differences in retention.	Attrition, small pilot samples, and heterogeneous follow-up intervals.	Repeated reinforcement is needed to maintain knowledge and commitment to action.
HPM relevance / implementation	HPM provides a framework for interpreting and designing the transition from knowledge → attitudes/preparedness → action, but HPM mediators have not been consistently tested.	Language adaptation, family support, decision practice, barrier reduction, and familiarity with EMS pathways align with perceived barriers/benefits, self-efficacy, interpersonal influences, and situational influences.	HPM was generally not tested as a mediator in primary studies.	HPM is best positioned as an intervention-development framework and a source of mechanistic hypotheses for prospective testing.

Critical appraisal and risk-of-bias patterns

The appraisal pattern showed a trade-off between design strength and outcome directness. Randomised trials provided stronger comparative inference but often assessed recognition, retention, or intention with short follow-up. By contrast, campaign evaluations and non-randomised studies more often used EMS data or time to hospital, but were more susceptible to temporal confounding, concurrent service changes, and secular trends. Design and proximity of the outcome to clinical action were therefore considered together.

Table 3.
Appraisal framework by study design and main interpretive concerns.

Study/design group	Appraisal tool	Dominant concern	Implication for interpretation
7 reports of randomised / cluster-randomised / pilot randomised studies	RoB 2 / cluster RoB 2	Short follow-up, attrition, limited statistical power in pilot studies, or reliance on intention/retention outcomes.	Provides the strongest comparative evidence, but claims remain constrained by outcome type and precision.
Pre-post / quasi-experimental / implementation studies	Revised JBI quasi-experimental	Control groups were often unavailable; testing effects, selection, and secular trends.	Supports the direction of change but does not by itself establish causality.
Campaign / ITS studies with EMS or delay outcomes	JBI quasi-experimental / ITS approach	Population exposure was not randomised; concurrent service changes may confound effects.	Outcomes are more clinically direct, but temporal confounding must be considered.
Repeated analytical surveys	Revised JBI analytical cross-sectional	Campaign exposure was self-reported and temporal inference was limited.	Useful for associations, reach, and equity; not for direct causal estimation.
Linked follow-up / companion reports	JBI tool matched to the parent design	Attrition and dependence on an existing sample.	Retained for complementary information but not counted as independent study units.

Family knowledge in early stroke detection

Knowledge showed the most consistent improvement. In FAST Heroes across 14 countries, parental recognition of the three core symptoms increased from 48% to 83%; in the subsequent wave it increased from 69% to 87%, while knowledge of the emergency number increased from 75% to 88% (Tsakpounidou et al., 2022; van der Merwe et al., 2023). Stroke 1-2-0 transfer through students in China increased family mastery from 24.7% to 79.9% immediately after the intervention, but this declined to 43.7% at one year, highlighting retention challenges (Li et al., 2020; Zhao et al., 2020). A longitudinal study among students in India also reported improved knowledge accompanied by a decline in preference for traditional treatment (Khan et al., 2021). In Indonesia, a Banjar-language FAST animation improved family knowledge and attitudes more than conventional education (Wibawa et al., 2025); multinational audiovisual interventions likewise improved knowledge (Iskandar et al., 2024; Safwan et al., 2024; Cherfane et al., 2025).

Attitudes, preparedness/intention, and retention after education

Evidence on directly measured attitudes remained limited; Wibawa et al. (2025) was among the studies that assessed this outcome explicitly. More commonly measured outcomes were preparedness or intention: Stroke Ready improved immediate preparedness (Robles et al., 2020), SPEDI improved recognition and intention to call 911 through one month (Springer et al., 2026), whereas a cluster-randomised trial among Black and Hispanic churchgoers found no overall difference at 12 months (Williams et al., 2019). Comparisons of FAST with Stroke-112 or BEFAST have not identified a single mnemonic that is consistently superior for retention (Tsai et al., 2022; Darkhabani et al., 2024; Guo & Saver, 2025). Among Spanish-speaking adults, five educational strategies all improved symptom recognition, while the primary between-group difference was not significant and some secondary outcomes differed at 6–9 days of follow-up (Márquez-Romero et al., 2026). This pattern supports periodic reinforcement without treating preparedness/intention as synonymous with attitude or actual behaviour.

Family behaviour and emergency response

Actual behaviour is the outcome closest to clinical impact, but direct family-level data remain limited. Correct actions in scenarios after FAST Heroes are more appropriately interpreted as preparedness/simulated action (Proios et al., 2022; Orologa, Tsakpounidou, et al., 2024). Objective evidence mainly came from community and service evaluations. Yuan et al. (2022) reported that after Stroke 1-2-0 education, median delay decreased from 18.72 to 6.00 hours and ambulance use increased from 3.2% to 30.6%, although the non-randomised temporal design cannot exclude the influence of service changes or secular trends.

Other campaign results were more heterogeneous. A community programme in Chicago and a Danish campaign did not consistently improve early arrival, EMS use, or delay despite increased knowledge (Prabhakaran et al., 2020; Bull Iversen et al., 2022). In Montreal/Laval, repeated FAST campaigns increased the mean number of EMS calls for suspected stroke, but the magnitude of effect differed between campaigns (Brissette et al., 2023); similar population-level evaluations reinforce that behavioural change is shaped by the service context (Gordon et al., 2019). Thus, improved knowledge does not establish a causal sequence leading to action; cost, access, trust in EMS, family support, and situational conditions remain important.

Mapping FAST to the Health Promotion Model, cultural adaptation, and equity

HPM mapping suggests that FAST can reinforce the perceived benefits of rapid action, whereas cost, symptom uncertainty, access, and concerns about ambulance use represent perceived barriers. Scenario practice may strengthen self-efficacy; involving partners or children draws on interpersonal influences; and local language, emergency numbers, transport, and referral pathways relate to situational influences. FAST Heroes illustrates the value of intergenerational transfer, while the Banjar-language FAST animation highlights the importance of cultural adaptation. Campaign effects also varied by education and sociodemographic characteristics (Rioux et al.,

2022; Andersen et al., 2026), indicating that communication should be simple, culturally relevant, and aligned with the local emergency system. This mapping remains an intervention-design implication rather than evidence that HPM mediators were tested across all studies.

Sensitivity analysis based on design strength and outcome directness

The sensitivity analysis did not change the overall pattern. In stronger comparative designs, the clearest benefit remained in knowledge/recognition, whereas evidence on directly measured attitudes was limited and preparedness/intention improved more often at short follow-up. When only objective prehospital outcomes were considered, findings became more heterogeneous. Restricting the analysis to longer follow-up and independent study units also did not change the conclusion: cognitive outcomes were the most consistent, whereas behavioural change requires stronger evidence and supportive service contexts.

Table 4.
Narrative sensitivity analysis of the main conclusions.

Sensitivity subset	Evidence pattern	Conclusion after restriction	Methodological meaning
Randomised / stronger comparative designs	Most assessed knowledge and preparedness/intention; direct measurement of attitudes and actual behaviour was less frequent.	Benefit remained clearest for knowledge; evidence on directly measured attitudes remained limited.	Causal inference is stronger, but directness to clinical behaviour is limited.
Objective prehospital outcomes	EMS, ambulance use, early arrival, and delay showed mixed results.	Behavioural effects were inconsistent across contexts even when knowledge often improved.	Clinical directness is higher, but system/temporal confounding remains important.
Longer follow-up	Knowledge retention and preparedness may weaken at longer follow-up; long-term data on directly measured attitudes are very limited.	Immediate post-test findings are insufficient to conclude that changes in attitudes or behaviour are sustained.	Immediate post-tests may overestimate sustainability of effects.
Independent study units only	Subset/follow-up reports were not counted as replications.	The direction of the synthesis did not change.	Reduces the risk of double counting and inflation of apparent consistency.

DISCUSSION

Integration of main findings: knowledge, attitudes, and behaviour

The evidence demonstrates a clear gap between cognitive outcomes and clinical action. FAST education and simple mnemonics most consistently improved knowledge and symptom recognition, whereas directly measured attitudes were far less frequently assessed. Preparedness and intention to act tended to improve mainly at short follow-up, but EMS activation, ambulance use, and early arrival showed more variable results. This distinction is important because knowledge, attitudes, intention, simulated action, and actual behaviour do not represent the same constructs. FAST is therefore best positioned as a core symptom-recognition message. To increase the likelihood that recognition translates into action, education should be accompanied by explicit instructions, decision-making practice, information on local emergency pathways, strategies to reduce barriers, repeated reinforcement, and family involvement.

Health Promotion Model mechanisms in FAST educational interventions

HPM helps explain why symptom recognition does not always lead to action. Perceived benefits reflect the belief that a rapid response can reduce disability, whereas perceived barriers include cost, uncertainty about symptoms, access limitations, and concerns about ambulance use. Self-efficacy relates to family confidence in applying FAST and making decisions; interpersonal influences include family support or consultation; situational influences include language, literacy, emergency

numbers, transport, and service availability. Commitment to action is then reflected in a concrete response plan. This mapping remains interpretive because most primary studies did not directly measure HPM constructs. Prospective testing through mediation analysis or structural equation modelling is needed before these mechanistic relationships can be considered confirmed.

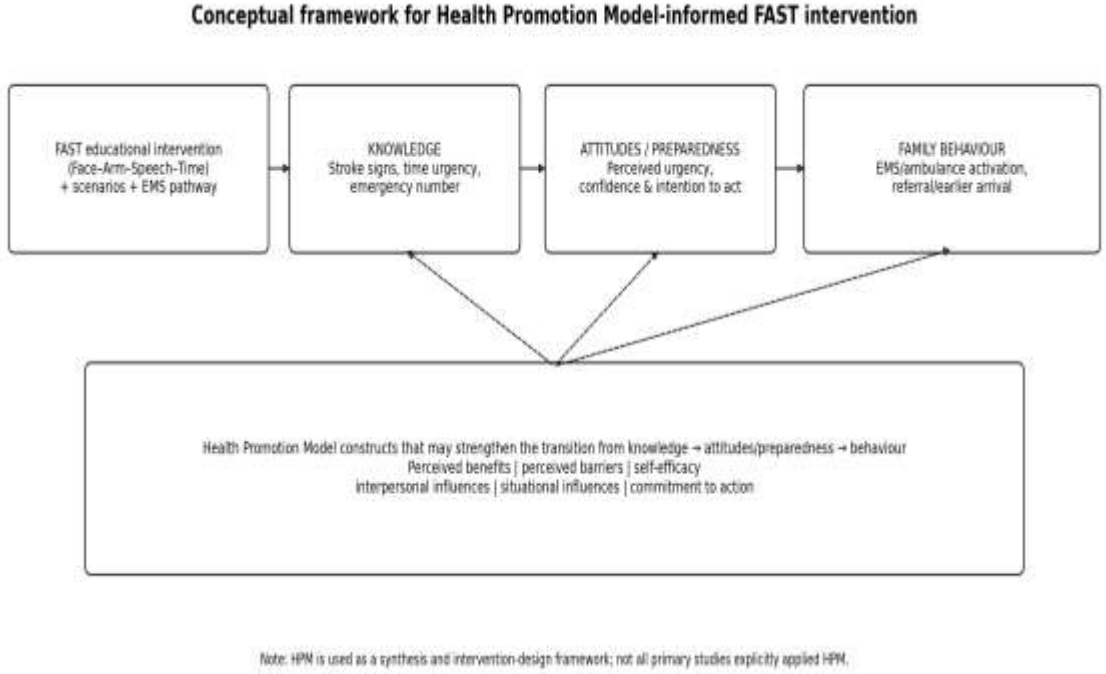


Figure 2. Conceptual framework derived from the synthesis for developing Health Promotion Model-informed FAST education. Arrows indicate hypothesised relationships for intervention development; not all primary studies explicitly applied or tested HPM.

Implications for the design of Health Promotion Model-informed FAST interventions

Based on the synthesis, HPM-informed FAST education for families could be designed around six components: a brief, language-appropriate FAST message; explanation of the benefits of rapid response; identification and reduction of barriers related to cost, transport, uncertainty, and access; scenario practice/role-play to strengthen self-efficacy; a family action plan specifying the responsible person, emergency number, referral facility, and safe transport alternatives; and periodic reinforcement through print or digital media. These components represent an evidence- and theory-informed design that requires testing, rather than an intervention package whose effectiveness has already been established across all studies.

Implications for practice and research

In community and family nursing practice, education should extend beyond the ability to recall FAST and ensure that families know what to do after symptoms are recognised, understand local emergency pathways, anticipate barriers that may delay decisions, and have a response plan. For research, HPM-informed FAST interventions should be tested with a comparator group and adequate follow-up. Knowledge, attitudes, preparedness/intention, and behaviour should be defined and measured separately using validated instruments. When actual stroke events are too infrequent, video vignettes or simulations may be used as appropriately labelled proximal outcomes and, where possible, complemented by objective data such as ambulance use, call time, mode of arrival, or onset-to-door time.

Strengths and limitations

The strengths of this review include the conceptual separation of knowledge, directly measured attitudes, preparedness/intention, and actual behaviour; mapping of follow-up/subset reports to reduce double counting; integration of evidence on FAST, FAST Heroes, BEFAST, cultural

adaptation, and prehospital data; and appraisal tailored to study design. This approach helps avoid overclaiming while generating a family-intervention framework that can be tested further.

The main limitations are incomplete reproducibility of the historical search, a targeted update through 29 August 2026 rather than a new exhaustive multisource search, and audit/extraction/appraisal conducted by a single reviewer. Few studies measured directly assessed attitudes or objective behaviour, outcome definitions varied, and not all studies directly involved family members. HPM was also not explicitly used in most primary studies; therefore, this review does not estimate the specific effect of an 'HPM-informed FAST intervention' but uses HPM as a development framework. Heterogeneity of designs and outcomes made meta-analysis inappropriate, and formal GRADE assessment was not applied; statements about the strength of evidence should therefore be understood as narrative interpretations based on design and directness.

Contribution and novelty

The novelty of this review lies in three aspects: (1) separating knowledge, directly measured attitudes, preparedness/intention, and actual behaviour so that effects in one domain are not assumed to represent another; (2) integrating family and lay-population evidence while preserving differences in directness and preventing double counting; and (3) mapping the evidence pattern to HPM to generate prospective intervention components without treating HPM as an established causal mechanism. Within this framework, FAST functions as a symptom-recognition tool, while HPM helps structure factors that may strengthen the translation of recognition into action.

CONCLUSION

FAST education and related stroke-education strategies show the most consistent improvements in knowledge and symptom recognition among families and lay populations. Evidence on directly measured family attitudes remains limited. Preparedness or intention to act improved in some studies, particularly in the short term, whereas changes in actual behaviour such as EMS activation, ambulance use, or earlier arrival remained variable and context-dependent. These findings support the development, rather than proof of effectiveness, of HPM-informed FAST interventions that integrate perceived benefits, reduction of perceived barriers, self-efficacy, interpersonal support, situational adaptation, decision practice, repeated reinforcement, and commitment to action. Future prospective research should test such interventions with comparator groups and adequate follow-up, using validated instruments that distinguish knowledge, attitudes, preparedness/intention, and behaviour. Where feasible, evaluation should include objective outcomes such as EMS/ambulance activation, call time, mode of arrival, or onset-to-door time. In family and community nursing practice, education should combine FAST recognition with decision practice, local referral pathways, barrier reduction, and periodic reinforcement.

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