

Editorial

Bridging the gaps in stroke emergency care: Lessons from Iran and the region

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Introduction

Stroke remains one of the leading causes of death and permanent disability worldwide, and its burden is growing in low- and middle-income countries like Iran and the surrounding region. The barriers to the treatment of acute stroke are not so much a function of the availability of advanced therapies such as intravenous thrombolysis and thrombectomy, but pervade the full continuum of care—from public education on symptoms, through rapid response during an emergency, through risk factor management and follow-up after hospital discharge. A recent study from Iran provides valuable information regarding these gaps, as well as a potential for systems-level interventions. These lessons resonate throughout the Middle East and the developing world.

Public awareness and pre-hospital barriers

Better outcomes begin with public knowledge of risk factors and signs. In a study in Iran, awareness of stroke warning signs was again found to be lacking, with most individuals failing to recognize common symptoms of acute hemiparesis or speech impairment.¹ Lack of awareness consistently results in delays in obtaining help. Where pre-hospital EMS is not well developed, this knowledge gap contributes to systemic inefficiencies and further widens the treatment gap.

Public education programs such as the “FAST” or “BE-FAST” models in the West are underutilized in Iran and the majority of the region. Without extensive community education, the majority of the patients present outside the therapeutic window for thrombolysis or thrombectomy. Therefore, culturally modified, community-oriented awareness programs become a necessity.²⁻⁴

Systemic delays in emergency departments

Even once patients reach emergency departments (EDs), treatment is delayed. A chart review at an Iranian ED identified significant door-to-needle delays and a significant proportion of acute ischemic stroke patients

who were treated late.² Delays were often due to inefficient triage systems, limited access to urgent imaging, and poor knowledge of stroke protocols among the care teams.

These findings are not unique to Iran. Across the Middle East, stroke pathways are disjointed with non-uniform application of guideline-directed therapy. Compared to high-income countries, where “code stroke” algorithms streamline patient management, the majority of Middle Eastern hospitals operate with limited resources and coordination gaps. Preventable morbidity and mortality follow, particularly in young patients who constitute a greater proportion of strokes in the Middle East than in Western populations.

Risk factors and patient profiles

Local findings also reveal unique risk factor patterns that complicate the prevention and management of stroke. The results of a four-year follow-up study of Iranian lacunar stroke patients revealed unique demographic and clinical characteristics with high rates of hypertension and diabetes as modifiable risk factors.⁵⁻⁹ Cohort findings also highlighted the established association between the history of hypertension and diabetes and the occurrence of stroke.¹⁰ These reports emphasize the importance of primary prevention activities within the region, where risk factors associated with lifestyle are increasing in parallel with urbanization.

Predictors of recurrent stroke even more emphasize the complexity of long-term care. A retrospective cohort study identified a range of clinical variables associated with recurrence, emphasizing the imperative need for organized follow-up and secondary prevention programs.¹¹ However, continuity of such care is even more frequently neglected in strapped health systems, where care attention is otherwise disproportionately diverted to acute stabilization.

Innovations in stroke assessment and care

Early diagnosis is the foundation of acute stroke

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treatment, but often lies in the way due to EDs that are full and under-resourced. In response, a short version of the NIH Stroke Scale (NIHSS) was recently tested in Iranian EDs and proved useful for rapid bedside evaluation.⁶ Streamlined tools like this can have a life-changing impact throughout the region, particularly in rural hospitals where neurologists may not be readily available.

Outside of stroke acute care, the complexity of co-managing comorbidities remains evident. A study examined why INR in stroke patients with atrial fibrillation is often out of range, revealing challenges in managing anticoagulation.⁹ A randomized controlled trial also assessed treatment of stroke-induced neurogenic lower urinary tract dysfunction, an implication of addressing post-stroke complications as a whole.⁸ These studies illustrate that stroke is a process that is not only acute but also chronic, requiring coordinated and multidisciplinary management.

The regional perspective

The following are challenges in Iran that mirror those in the remainder of the Middle East and North Africa (MENA) region. Delay in hospital arrival, absence of stroke-capable hospitals, and fewer reperfusion therapies are common barriers. According to the World Health Organization, the Eastern Mediterranean Region has one of the highest rates of growth of the burden of non-communicable disease, with stroke ranking among the largest drivers.¹² Yet, health systems remain ill-prepared to respond to the added demand.

One of the most significant limitations is the insufficiently trained stroke neurologists and interventionalists. While several countries, such as Turkey and the United Arab Emirates, have made significant strides in developing stroke networks, others lag behind due to political instability, financial constraints, or decentralized health administration. Multilateral regional efforts, such as cross-border training programs and collaborative stroke registries, may counter these disparities.

Policy implications and future directions

In order to improve stroke outcome in Iran and the countries of the region, a multi-level strategy is required:

1. Public Education: National campaigns to improve public awareness about stroke symptoms and risk factors, using culturally appropriate messages.
2. Pre-Hospital Systems: Building EMS capacity and implementing pre-hospital stroke triage protocols.
3. Emergency Department Optimization: Implementation of standard “code stroke” paths with immediate access to imaging and thrombolysis.
4. Long-Term Care: Establishing stroke clinics to offer secondary prevention, monitoring of anticoagulation, and rehabilitation.
5. Regional Collaboration: Establishing regional centers of excellence and stroke registries to enable

knowledge sharing and quality improvement.

The Iranian experience is evident: stroke care can't be improved by acute-phase-focused strategies. Until the care continuum—awareness, acute treatment, and long-term management—is addressed, patients will continue to endure preventable disability and mortality.

Conclusion

Stroke is an emergency with a time-critical window of opportunity, but also a long-term illness with lifelong implications. Iranian data identify major barriers, ranging from low community awareness to systematic delay and gaps in secondary prevention. The implications of these findings are not only relevant to Iran but also to the broader Middle East, where healthcare systems face similar challenges. To close these kinds of gaps, governments, healthcare providers, and communities will need to work together to create stroke-capable systems that respect both speed and continuity of care. The risks are great, but so are the potential benefits for real outcomes.

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Authors' Contribution

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