Original article

The barriers and facilitators to the telephonic application of the FAST assessment for stroke in a private emergency dispatch centre in South Africa

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ABSTRACT

Background: Stroke is one of the leading contributors to morbidity and mortality globally. The incidence of stroke is on the increase in Sub-Saharan countries such as South Africa. As stroke is a time-sensitive condition, emergency medical services (EMS) play an important role in the early recognition of stroke. The telephonic application of the FAST (Face, Arm, Speech, Time) assessment has been suggested to screen patients for stroke, but this is not applied consistently. This study aimed to identify the barriers and facilitators to the telephonic application of the FAST assessment.
Methods: This retrospective, exploratory study sampled 20 randomly selected emergency calls to a private EMS in South Africa, with suspected stroke. After verbatim self-transcription, data were analysed using inductive content analysis to identify the barriers and facilitators to the application of the FAST assessment. Results were arranged according to themes.
Results: Results indicated that in 15/20 (75%) of the calls, the FAST assessment was successfully applied. Eight barriers under three themes (practical barriers, emotionality, and knowledge and understanding) and three facilitators under one theme (clear communication) were identified. Most notably, language discordance, lack of empathy and caller frustration featured prominently as barriers while caller cooperation and clear instructions were prominent facilitators.
Conclusion: With the barriers known, methods to address these may be constructed. Additional training and credentialing for call-takers may be a reasonable first step. These lessons can likely be applied to other telephonic acuity and recognition algorithms.

African relevance

- In Sub-Saharan Africa, stroke is one of the leading causes of death and lasting morbidity.
- Stroke is a time-sensitive emergency as the effectiveness of available treatments decrease over time; while the risk associated with such treatment increases over time.
- The first step in expeditious emergency care for time-sensitive conditions is recognition, preferably at dispatch centre level.
- In order to avoid mistriage and bolster telephonic recognition, it is essential to understand the barriers and facilitators to applying telephonic triage algorithms.

- This study highlights some important barriers and facilitators that should be considered during the development of telephonic triage algorithms and dispatch training.

Introduction

Stroke has been identified as one of the leading causes of death and disability worldwide [1]. In Sub-Saharan Africa (SSA), stroke is the leading cause of death and its incidence is predicted to increase by 68% between 2008 and 2025 [1,2]. In the South African context, stroke is the second leading cause of death due to Non-Communicable Diseases and the largest contributor to disability [3,4]. Stroke accounted for 8,1 million disability adjusted life-years in 2017 [5].

The epidemiological transition from infectious diseases to non-

communicable and lifestyle diseases seen in SSA is largely due to urbanisation and poor lifestyle [3,6,7]. Improved management of diseases such as human-immunodeficiency virus and tuberculosis (among others) has resulted in improved life-expectancy and made the development of diseases such as stroke likely [8]. Furthermore, SSA is characterised by poor management of risk factors such as hypertension. When this is coupled with poor public education and limited access to emergency care services, the impact of stroke may result in lasting socio-economic hardship for many, owing to longstanding morbidity [5,6,9].

Stroke is a time-sensitive emergency, as the effectivity of available treatments decrease over time; while the risk associated with such treatment increases over time [10,11]. The likelihood of having a good recovery from ischemic stroke has been shown to decrease by 15% for every 30 min delay in treatment [12].

The first step in delivering expeditious emergency care to patients suffering stroke is recognition. Delays in recognition impedes downstream events, ultimately resulting in delayed definitive treatment and the associated impact on morbidity and mortality [13,14]. Owing to poor patient education regarding stroke presentation, the call centre of emergency medical services (EMS) plays an important role towards early recognition [15]. The application of the FAST (Face, Arm, Speech, Time) assessment has been suggested for the early telephonic recognition of patients with potential stroke [16]. It has been found to be particularly useful in settings where public awareness of stroke is relatively low [17]. Such telephonic screening and recognition algorithms are particularly important in settings with limited EMS resources, ensuring that the right cadre of prehospital provider is dispatched to the right patient.

A recent study demonstrated that while the telephonic FAST assessment provided a modest accuracy at recognising stroke in the emergency medical services, it was severely underutilised – the assessment outcome was denoted as "unknown" or was not asked in approximately half of the cases [18]. As underutilisation may both affect the accuracy and undermine the value of a telephonic recognition algorithm, it will be useful to understand why this was observed. This study therefore aimed at identifying barriers and facilitators to the application of the FAST assessment for patients with suspected stroke in a South African private EMS.

Methods

Study design

This retrospective, exploratory study employed content analysis to analyse calls made to a private EMS to determine the barriers and facilitators to the telephonic application of the FAST assessment.

Setting

The private EMS provider, which operates nationally within South Africa, receives an average of 1500 calls per day and provides prehospital services to both patients with and without medical insurance. As a private EMS provider, its main functions are to transport patients to hospital while providing medical treatment.

Call-takers in this service mostly do not come from a medical background and receive one-month of training before handling live calls. The training mostly focuses on the computer-aided dispatch (CAD) system with minimal medical literacy training.

In the event that a call-taker suspects stroke, the corresponding emergency call category is selected. The CAD system then provides a series of prompts detailing the FAST assessment according to a predefined English script. The call taker enters confirmation of the FAST assessment outcome (i.e. Yes, No, Unknown) into the system, or in some instances leaves the outcome blank. Based on this outcome, the case will then be prioritised and the correct cadre of prehospital provider dispatched to the incident.

Sample

A total of 520 calls with suspected stroke were made to the EMS between 1 December 2017 and 28 February 2018. Of these calls, the FAST assessment outcome was omitted or denoted as "unknown" in 43% (*n* = 223) of cases. All 520 calls with the emergency call category selected as "stroke" were included in the sampling frame. From this, calls logged as self-dispatch and calls handed over to the private service by another EMS service provider were excluded from the sampling frame. Furthermore, as the FAST assessment is currently only scripted in English, this study only included calls in which English was predominantly used.

Using the information captured on the system, the CAD system of the private ambulance service provides an extract with four possible results: 1) Yes – The call-taker indicated that the assessment was asked and that it was positive; 2) No – The call-taker indicated that the assessment was asked and it was negative; 3) Unknown – The call-taker indicated that the assessment was asked and the result was unknown (or the answers were unknown), for instance when a caller is not with a patient; 4) Blank – The caller-taker did not indicate any result and thus it is assumed that the FAST assessment was not asked. This extract was in the form of a Microsoft Excel (Microsoft Corporation, Washington, United States of America) spreadsheet and the only way to verify the result is to listen to the original voice recording.

The call recordings were separated into 2 groups: calls in which the FAST assessment outcome was captured as either 1) Yes, 2) No or 3) Unknown, and calls in which the FAST assessment outcome was 4) Blank. To enhance representativeness of different situations in the original sampling frame, ten calls were randomly sampled from each group using the randomisation function on Microsoft Excel 2016 (Microsoft Corporation, Washington, United States of America). Data saturation was reached in the initial sample. In this study, we defined data saturation as the point where no new codes were found in subsequently sampled calls [19].

Content analysis

Calls were subjected to verbatim self-transcription and data were analysed using inductive content analysis to the latent level. Identifying data were omitted in the transcription process. For analysis, all calls were pooled and analysed. The reason for this was that an instance where the FAST assessment was ultimately successfully asked could contain barriers that are overcome with facilitators. Similarly, an instance where the FAST was denoted as "Unknown", some barriers could still be forthcoming. Codes and themes were reviewed by the research team through regular meetings. Content analysis was performed using nVivo version 12 (QSR International Pty Ltd., Victoria, Australia) by following four steps suggested by Elo & Kyngäs: [20]

1) Preparation
2) Selecting units of analysis
3) Making sense of the data (open coding, generating coding sheets, grouping of codes, creating themes, abstraction)
4) Organising themes and sub-themes that collectively describe the findings

Methodological rigour

The trustworthiness of the research was ensured through credibility, transferability, confirmability and dependability [21].

Credibility was achieved by designing the research according to a retrospective, exploratory design and interpreting the data using the content analysis method. The credibility and dependability of the findings were enhanced through researcher triangulation, whereby one member of the research team performed the analysis (created codes and themes) which was then reviewed by the other two members of the

team. ET and WS have formal postgraduate training in qualitative research. EM was provided with relevant ad hoc training for the project.

To increase transferability and confirmability, rich descriptions of the calls and the researchers' interpretations thereof as well as a transparent account of code and theme generation was reported (Table 1). Transferability was sought by providing detailed information on the study and the execution thereof to enable future investigators to determine the extent to which the findings could be applicable to their contexts.

Approvals

Ethical approval to conduct this research was obtained from the Faculty of Health Sciences' Human Research Ethics Committee of the University of Cape Town (HREC Ref nr: 387/2019). The study was approved for a waiver of consent. Organisational approval was obtained from the private emergency medical service.

Results

Results indicated that the FAST assessment was successfully applied in 15/20 (75%) cases.

We found a predictable flow pattern in all calls: call takers introduce themselves, request demographic details (such as name, contact details, address and medical insurance details), inquire about the patient's symptoms, and closed the call with a call reference number and sometimes pre-arrival instructions for patient care.

Eight barriers and three facilitators were identified and are described in Tables 2 and 3 below.

Discussion

The aim of this study was to identify barriers and facilitators to the application of the FAST assessment for patients with suspected stroke in a South African private EMS. Eight barriers under three themes (practical barriers, emotionality, and knowledge and understanding) and three facilitators under one theme (clear communication) were identified.

The FAST assessment cannot be applied in instances where a caller is not in the vicinity of the patient in question or where a patient is unconscious and can therefore not perform the actions (smiling, raising their arms or speaking) required to meaningfully apply the FAST assessment [16].

Language discordance has been shown to hinder healthcare access [22–24]. It is thus not surprising that language presents a barrier to the effective application of telephonic screening algorithms such as the FAST assessment, despite only sampling English calls. While a large proportion of South Africans are able to speak English, for most it is not their first language. With eleven official languages in South Africa, this might mean that both caller and call-taker might need to navigate informational exchanges during emergency calls, while both are not communicating in their mother tongue. It is for this reason that we believe language discordance still emerged as a barrier in this study.

With increasing migration and asylum-seeking, it is expected that language discordance between caller and call-taker may occur more

Table 1
Thematic development.

Meaning unit	Code	Theme
"I don't need so much enquiry"	Frustration	Heightened emotionality (Barrier)
"She is responding and she's trying to wake her"	Unconscious patient	Practical limitations (Barrier)
"Okay let the patient raise both arms, does one arm drift down if you try to raise the both, both of her arms?"	Instruction	Clear communication (Facilitator)

Table 2
Barriers to the FAST assessment.

Theme	Code	Description
Practical barriers	Caller not with patient	Caller cannot assess patient due to proximity
	Unconscious patient	Patient is reported to be unresponsive
	Difficulty hearing	Call-taker struggles to hear the caller leading to miscommunication
	Language	A language mismatch between the caller and call-taker exists
Emotionality	Heightened frustration	Caller gets agitated with call-taker and answering questions
	Lack of empathy	Caller is emotional, call taker expresses no empathetic words
Knowledge and understanding	Lack of understanding	The caller is uncertain of how to perform the FAST assessment
	Spontaneous description	Caller describes the patient's stroke signs and symptoms without being prompted

Table 3
Facilitators to the FAST assessment.

Theme	Code	Description
Clear communication	Conscious patient	The patient is awake and can be assessed
	Caller cooperation	Caller is open to instruction and cooperative
	Clear instructions	Call taker gives clear and understandable instructions

commonly. Providing telephonic instructions in a caller's native language has been shown to improve compliance in the application of telephonic cardiopulmonary resuscitation [25]. It is recommended that culturally appropriate screening algorithms be developed and translated to allow for improved understanding and application. This may facilitate their application through clear communication and allowing for improved caller cooperation.

The spontaneous mention of stroke signs and symptoms by the caller was found to be a barrier to applying the FAST assessment, but is likely not associated with a decreased accuracy of call-taker stroke recognition, and can explain why it would not prompt an asking of the FAST assessment. Caller stroke recognition and spontaneous mention of stroke signs and symptoms have previously been associated with improved call-taker stroke recognition. It was suggested that this was due to improved public education on stroke [26]. While it is not known what the South African public's stroke education is, education campaigns through the media could likely improve this, and ultimately aid call-taker stroke recognition.

Callers became frustrated with the questioning from call-takers. One caller shouted: "*I don't need so much enquiry!*" Such frustration may be seen as a manifestation of the caller's anxiety with the emergency situation and an associated sense of urgency to get help. Questions that might appear to the caller as seemingly irrelevant could be interpreted as a waste of valuable time. We suggest that call-takers share the importance of these questions with the callers in a clear and concise way, to allay these concerns.

During an emergency situation, callers may be experiencing a sense of loss of control [27]. Furthermore, the cooperation of a caller has been shown to be dependent on their emotional state when calling for an ambulance and the manner in which they report the emergency [28]. Consequently, the call-taker plays an essential role to take control of the situation and provide comfort through empathy [27]. When this is not displayed, frustration ensues, which may hinder communication and the application of telephonic screening algorithms, like the FAST assessment. This is demonstrated in the current study.

Social interaction is dependent on empathy as it has the potential to

improve communication skills [29]. Addressing the caller's emotions, such as aggression, frustration and anxiety has been proposed to improve caller cooperation [28]. Emergency situations are filled with emotion and navigating the emotions appropriately could lead to a better relay in communication. Clear communication between the caller and call-taker plays a fundamental role in patient outcomes as it allows for the initiation of life-saving bystander interventions while EMS are on their way [30].

Empathy, decisiveness and flexibility have been described as core skills for emergency call-takers [27]. Yet, there currently does not exist a dedicated training course or credentialing certification for emergency call-takers in South Africa. There is an urgent need to develop and implement such evidence-based courses. While specific recommendations on the content of such courses cannot be made based on these results, we can recommend specific empathy training with emergency call-takers to facilitate the call-taking process.

While this study focused on the barriers and facilitators to the telephonic application of the FAST assessment in the context of stroke, these results likely have broader application to other elements of communication in the emergency dispatch centre. Facilitating clear communication through empathy and language concordance may minimise call-taking times and allow for improved emergency response times. This may also improve the accuracy of the FAST assessment and other telephonic acuity and recognition algorithms.

The ability to accurately determine the acuity and most likely aetiology of the emergency is essential in settings where prehospital resources are limited. In so doing, the most appropriate resource can be dispatched to the patient expeditiously. Again, in the context of stroke, hospital-based stroke teams can then also be alerted to prepare for the patient's arrival and thus limiting in-hospital delays to definitive care.

This study only sampled a few calls made in English, of a single private ambulance service. Patients who make use of private EMS are often of higher socio-economic status and might therefore have a higher level of education and language proficiency. This limits the transferability of the results presented.

Cases were sampled based on the call-taker's selection of the "stroke" emergency call category. Call-takers therefore already have a suspicion of stroke, which may affect the way in which they engage with the FAST assessment. This might mean that some cases with stroke might have fallen outside of the sampling frame. Future work should determine the accuracy with which call-takers can identify potential stroke and select the appropriate call category to trigger the FAST assessment.

Future studies may explore these barriers and facilitators from the lens of the call-taker through qualitative interviewing or surveys. Furthermore, future research should also aim to investigate a larger and more representative sample from both state and private emergency medical services and include languages other than English. Finally, an inquiry into empathy and empathy training should be made, developed and implemented. This may show improved application of telephonic assessment algorithms.

Conclusion

Stroke is a time-sensitive emergency that requires early recognition to initiate timely definitive management. The application of the FAST assessment demonstrates the potential to screen patients for stroke. Practical barriers, emotionality, and knowledge and understanding, hinders the telephonic application of the FAST assessment while clear communication facilities it through improved cooperation of the caller.

With the barriers known, methods to address these may be constructed. We suggest measures to overcome language discordance and promote empathy. Additional training on clear communication strategies could harness the facilitators identified and bolster the accuracy of the FAST assessment and increase uptake. These lessons can likely be applied to other telephonic acuity and recognition algorithms.

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