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A Comparative Literature Review of "Stroke 120" and "FAST" in China's Stroke Emergency Education

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Abstract. Stroke remains one of the major causes of death and disability in China. Pre-hospital delay is a key obstacle hindering timely treatment. Therefore, the effectiveness of stroke education tools is particularly important. Through a systematic literature review, this article compared and analyzed the actual application effects of the internationally recognized stroke identification tool "FAST" and the Chinese-ized identification tool "Stroke 120" in public education and behavioral intervention. Although both have highly consistent structural designs and core goals, existing empirical studies have shown that "Stroke 120" has a more significant intervention effect in terms of public recognition rate and the use of emergency services. This advantage is mainly attributed to its high local fit in language structure and cultural memory patterns. However, current related research still has limitations such as the lack of randomized controlled trials, insufficient samples from rural areas, and lax control of demographics. This article emphasizes the significance of the localization of health education tools in terms of communication efficiency and behavioral transformation and suggests promoting "Stroke 120" nationwide, strengthening the scientificity and comprehensiveness of the intervention mechanisms, and conducting more comparative studies to optimize the evidence-based foundation of China's stroke emergency education system.

Keywords: Stroke, FAST, Stroke 120

1. Introduction

Stroke is a major component of cardiovascular disease in China. The Report on Cardiovascular Health and Diseases in China (2023) reported that the number of stroke patients has risen to 13 million. The average annual death rate is approximately 1 person dying from a stroke every 28 seconds. The estimated total number of deaths in a year is approximately 11,300 [1]. According to data from the Centers for Disease Control and Prevention of the United States, patients should arrive at the hospital within 3 hours after the onset of symptoms in order to receive timely treatment [2]. The median time from onset to hospital admission for ischemic stroke patients nationwide in 2020 was 23.83 hours, indicating that the pre-hospital delay situation in China is extremely serious [3]. However, nowadays, strokes among young people are also gradually becoming a global financial crisis. This further highlights the urgent need for more effective primary-level education interventions and identification tools for stroke [4].

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Under this severe situation, it is of vital importance for the public to promptly recognize the symptoms of stroke and shorten the pre-hospital treatment time. Currently, the internationally widely promoted stroke recognition phrase is "FAST." However, since 2016, the domestic medical community in China has launched a localized version of the recognition tool "Stroke 120," whose memory method combines Chinese culture and dialing habits, aiming to better conform to the psychology and language habits of the Chinese public.

This study intends to conduct a systematic literature review to compare the performance and effects of "FAST" and Stroke 120 in the Chinese environment. The goal is to reveal the advantages and disadvantages of the two recognition tools in actual application in China and provide a policy recommendation and promotion basis for China's stroke prevention and public education strategies.

2. Overview of "FAST" and stroke 120 tools

2.1. "FAST"

"FAST" is a stroke recognition code widely used in public health education. It was first designed by a group of acute stroke physicians, emergency personnel and emergency doctors in the UK in 1998 to simplify the Cincinnati Prehospital Stroke Scale (CPSS) and was then promoted throughout the United States. In 2013, it was officially adopted as the national public education standard for stroke by the American Heart Association/American Stroke Association (AHA/ASA).

The "FAST" tool helps the public quickly identify stroke symptoms through four key identification steps:

First, "F" stands for facial drooping, where one observes whether the patient has unilateral facial drooping or numbness. This can often be determined by asking them to smile;

Second, "A" represents arm weakness, where the patient is asked to raise both arms simultaneously to check for unilateral drooping;

Third, "S" refers to speech difficulty, such as slurred speech or inability to express; Finally, "T" emphasizes the urgency of the situation (time to call 911). Once any of the above symptoms occur, one should immediately call the emergency number and record the exact time the symptoms appeared, as every minute of delay can have an irreversible impact on the patient's prognosis [5].

Currently, "FAST" is used as the standard tool for rapid stroke identification and public education in countries and regions such as North America and Europe. The related promotional activities usually combine television advertisements, community demonstrations, and multimedia dissemination, targeting the elderly population and the families of young adults to enhance their abilities to recognize the early symptoms of stroke and their emergency response capabilities.

2.2. Stroke 120

To address the knowledge gap and cultural adaptation issues regarding stroke recognition among the Chinese public, in 2016, Professor Li's team from the Neurology Department of Huashan Hospital affiliated with Fudan University officially proposed the "Stroke 120" tool as a localized stroke recognition method [6]. The core concept of this tool is to combine the Chinese emergency call number "120" with the three core symptoms of stroke and design a public recognition model that better suits the language habits and memory logic of the local, thereby improving the recognition efficiency and emergency response speed.

The recognition process is based on the three numbers "120," which correspond to three key actions in sequence: The first number "1" represents "looking at a face," meaning observing whether

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the patient's face is tilted; "2" represents "checking both arms," meaning identifying if there is weakness or inability to lift one arm on one side; "0" represents "listening to speech," meaning judging whether the patient has symptoms such as unclear speech or difficulty speaking. Once any of the above symptoms occur, one should immediately call the "120" emergency number for aid. The entire recognition process is concise, clear, and easy to remember and has a particularly significant promotion effect among the elderly population and those with lower educational levels.

3. The common functions and design concepts of "FAST" and stroke 120

Although "FAST" and Stroke 120 were developed in different countries and under different contexts, their core functions and design principles are highly consistent. Both are public-oriented tools for rapid identification of stroke symptoms. Their main goal is to enhance the judgment ability of the general public, especially non-medical personnel, when they encounter sudden stroke symptoms, shorten the time window from symptom recognition to calling the emergency number, and achieve more timely medical intervention.

Firstly, in terms of identifying key points, both methods focus on the three most representative symptoms of stroke, namely abnormal facial expressions (such as mouth deviation), unilateral limb weakness (such as arm drooping), and language disorders (such as slurred speech). These three symptoms are not only common in clinical settings but also easy for the public to identify through visual observation or simple interaction, which aligns with the sudden onset and urgent nature of stroke.

Secondly, both tools place the emphasis on emergency response time at the core of their design. Whether it is "Time to call 911" in "FAST" or the last step, "Call 120," in Stroke 120, the underlying message is "Time is brain cells." Therefore, in their design, both incorporate symptom recognition and emergency assistance behavior closely together, forming a complete behavioral chain.

Again, from the perspective of the communication model, both "FAST" and Stroke 120 adopt simple and memorable structures and mnemonic methods to enhance public recall rates. "FAST" presents a clear process through four English letters, while Stroke 120 utilizes the well-known emergency number "120" familiar to Chinese people for localization transformation. This model design lowers the learning threshold for the public and makes the tool more easily disseminated in non-medical settings such as communities, families, and schools.

In all, they exhibit a high degree of consistency in terms of function orientation, identification of key points, behavioral guidance, and communication strategies. Both of them embody the public health communication concept of simplifying complex medical knowledge into behavioral instructions for the general public. They are indispensable and important parts of the stroke emergency education system.

4. The contrastive differences in practical applications

Due to the overall high consistency of functional structure and dissemination methods between Stroke 120" and "FAST," the below analysis of this paper will change its focus to the practical applicati"on effects of the two within the Chinese context. This literature review focuses on the below two important indicators: Public Stroke Recognition Rate and Emergency Medical Service Usage.

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4.1. Public stroke recognition rate

A cross-sectional survey conducted in 2020 in Minhang District, Shanghai, targeting community-dwelling elderly people, focused on the general awareness of FAST and Stroke 1-2-0 [7]. Among the 466 elderly individuals surveyed, the awareness rate of Stroke 1-2-0 was higher than that of FAST (6.01% vs. 0.43%, $p < 0.05$).

A prospective community study conducted by Liu MD, also in Shanghai, Minghang district, compared the different symptom recognition abilities of the elderly over 60 years old in two communities after learning "FAST" and "Stroke 120" [8]. To evaluate whether the localized tools have advantages in China, the researchers compared the performance in symptom recognition. The respondents in the community who received the "Stroke 120" education showed a significant increase in their awareness of the "Stroke 120" concept (89.4% compared to 6.8%, $P < 0.001$), while the awareness rate of the respondents who received the "FAST" stroke recognition education did not show a statistically significant difference from the pre-education survey results (0.9% compared to 0.4%). The experiment in the suburban area of Shanghai shows that the localized modification of Stroke 120 is more suitable for stroke emergency education and publicity in China.

4.2. Emergency medical service usage

In the Montreal region of Quebec Province, Canada, a five-round public FAST bilingual awareness campaign was conducted from 2015 to 2019 to enhance awareness of stroke recognition and emergency response [9]. The study found that this series of interventions led to a 28% increase in the number of EMS calls for suspected strokes per day ($P < 0.001$), with a 61% increase in EMS calls for patients with onset time less than 5 hours ($P < 0.001$). After three rounds of the campaign, the average daily EMS call volume significantly increased, with the highest odds ratio reaching 1.26 ($P < 0.001$). However, when the intervention was only conducted once, the change in call behavior was not significant.

In contrast, Shangha’si Minhang District's Stroke 120 community education program promoted awareness of stroke recognition through short video clips, community lectures, and neighborhood sources such as family doctors [10]. After the intervention, the percentage of utilization of emergency vehicles increased from 3.2% to 30.6%, 9.6 times greater, with an odds ratio of 9.41 ($P < 0.001$). Conversely, the ratio of arrival in hospital within 3 hours rose from 5.8% to 33.4% ($P < 0.001$). This indicates that Stroke 1-2-0 successfully triggered public responses on stroke with highly effective intervention effects at the behavioral level.

It is worth noting that the two research subjects have comparable populations, both focusing on the elderly in urban areas. The intervention methods also centered on community and mass communication. Although the FAST intervention in Canada did indeed increase the EMS activation level, the effect relied on continuous multiple rounds of publicity, and the improvement was much smaller than the single-round intervention effect of Stroke 1-2-0 in China. This comparison further highlights the advantages of the localized language structure tools in terms of cultural compatibility and behavioral transformation efficiency.

5. Discussion

This review, through comparative research, found that although FAST and Stroke 1-2-0 have highly consistent structural designs and functional goals, their actual application effects in the Chinese

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context vary significantly. Stroke 1-2-0 demonstrates stronger intervention effects and statistical significance in key intervention indicators such as public recognition rate and EMS call behavior.

To begin with, due to the limited number of published empirical papers and the lack of systematic quantitative data, this article was not able to strictly separate and statistically control the demographic variables, such as age group, educational level, pre-exposure awareness of stroke, and intervention measures, such as videos, lectures, and doctor's explanations, employed in different experiments. This can, to some extent, affect horizontal comparability among different studies.

Second, the existing research samples mainly focus on urban or suburban communities, and the west and middle underdeveloped regions and rural populations have not been given adequate coverage within the research studies. This influences the national-level representativeness of conclusions drawn from this study as well as the limitation in assessing the effectiveness and usefulness of local instruments in areas with scant education resources.

Third, to date, no study has contrasted the intervention effectiveness of FAST and Stroke 120 in similarly distributed populations through a randomized controlled design. This study's comparative analysis is primarily the compilation of results from independent studies, and additional prospective controlled experiments remain to be conducted to account for the relative strengths of the two in recognition accuracy, pre-hospital delay, and emergency response.

6. Conclusion

This study systematically examined the empirical literature published in recent years and comparatively assessed the intervention effectiveness and applicability of two major stroke education instruments: the internationally standardized FAST and the locally validated Chinese Stroke 120. By referencing evidence from various intervention reports and community-based research, the study did not only examine the shared structural characteristics and general educational functions of the instruments, for example, increasing public recognition of stroke symptoms and accelerating emergency response, but also presented substantial differences in their real-world effectiveness. These differences underscore the need for context-sensitive assessment as opposed to assuming equal effectiveness across groups.

One strength of this research is the direct comparison between two educational tools, thus plugging a research gap where cross-tool analysis is in short supply. Through the presentation of an evidence-based comparison, the research adds to the literature on a deeper understanding of how one tool meets China's unique public health requirements more effectively. Another strength is the localization focus since it emphasizes cultural and linguistic translation of health tools as a determinant of effectiveness.

However, some limitations remain. Direct empirical studies of FAST in the Chinese population are still scarce, restricting the validity of conclusions drawn about its comparative effectiveness. Subsequent studies should therefore include further experimental or longitudinal studies on FAST in China and head-to-head trials with Stroke 1-2-0. This would not only provide additional strength to the evidence base but also provide more definitive guidance for the formation of public health policy and the choice of optimal educational tool.

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