

Significant Stroke Knowledge Deficiencies in Community Physician Improved with Stroke 120

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Background and Purpose: In the existing model of community health service in China, community general practitioners play important roles in health promotion as well as prehospital stroke recognition and management. We recently engineered Stroke 120 based on FAST for China. This investigation aimed to investigate its acceptance in community physicians and promote their stroke related knowledge. *Methods:* We conducted a stroke education session to community physicians or family doctors (total of 435 participants), teaching both FAST and Stroke 120. Online survey was distributed to the participants before and after the education session to evaluate the awareness of stroke and the acceptance of the stroke recognition tool. *Results:* Significant stroke knowledge deficiencies were found in community physicians. After the education session, percent of the participants knew that the thrombolytic therapeutic window (<4.5 hours) was improved from 54.0% to 91.6% ($P < .001$). A total of 88.5% of them would send their patients who had stroke to the nearest hospital with stroke center by emergency medical service, compared to baseline (64.4%, $P < .001$). In total, 95.2% of them would recommend thrombolytic therapy in the treatment of acute ischemic stroke compared to 82.7% (baseline $P < .001$). Although majority mastered both FAST (95.5%) and Stroke 120 (98.0%) through our education session, 96.3% of them believe that Stroke 120 is the most suitable for Chinese in stroke education. *Conclusions:* Stroke 120 strategy was well accepted by the community physicians in China and in the meantime improved knowledge regarding stroke was observed.

Key Words: Stroke—prehospital delay—stroke 120—awareness—education—community physician

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Introduction

Stroke is a major cause of disability and death worldwide.¹ Although thrombolytic therapy and endovascular thrombectomy are the major effective strategies dealing

with the acute ischemic stroke, short thrombolytic time window limits its eligibility to a large extent and prehospital delay is one of the most important factors

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worldwide especially in China.^{2,3} Though the Face, Arm, Speech, and Time (FAST) stroke awareness and educational program leads to reduced prehospital delays in English-speaking areas, language is the major limiting factor for expanding FAST to non-English speaking countries.⁴ Stroke 120, as a stroke awareness tool which eliminates the language barrier for Chinese, was launched in 2016 by our team, receiving a lot of complement among general public.⁵ In the existing model of community health service in China, community general practitioners play important roles in health promotion as well as prehospital stroke recognition and management.⁶ Plenty of money has been put into the construction of primary health care systems by the government.⁷ While previous studies have demonstrated that serious deficiency of knowledge regarding stroke existed in community physicians.⁶ This investigation aimed to investigate the acceptance rate of Stroke 120 among community physicians and in the meantime to improve their stroke knowledge.

Methods

This investigation protocol was approved by the Institutional Review Board of the Minhang Hospital affiliated to Fudan University.

Stroke 120 is a novel stroke awareness education tool, based on FAST (Fig 1).⁵ One refers to First to look for an uneven face; 2 refers to Second to examine for arm weakness. Zero refers to absence of clear speech. If any of the above symptoms suddenly occurs, 120 should be dialed immediately (120 is the specific medical emergency number used only in China).

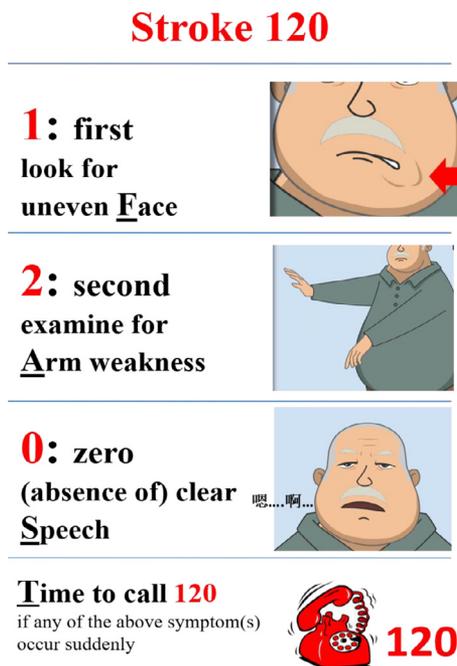


Figure 1. The Stroke 120 strategy.

We conducted an educational session for the community physicians from 3 different regions (Shanghai, Jiangsu, Zhejiang) during May to August in 2017. They were selected randomly from 10 local community hospitals and then assembled in a meeting room to take part in our educational session. We also created a Wechat group chat to bring all of them into it to insure the participants wouldn't change for the second survey. Before the session, we developed the survey online through Wenjuanxing (<https://www.wjx.cn/>), a professional online survey engine used in China and distributed it in the Wechat group chat to get the baseline situation. The survey consisted of the following questions: (1) Which stroke awareness tool can be easily remembered for you: FAST or Stroke 120. (2) Do you know the meanings of Stroke 120? (3) Do you know the meanings of FAST? (4) Which one is the thrombolytic time window of recombinant tissue plasminogen activator? (5) If someone around you had stroke, what will you do? etc. The session consisted of a lecture performed by neurologists with slide shows educating both FAST and Stroke 120. After the session, we distributed education profiles to all participants. One day later, we delivered the same survey through the same online platform to them in the Wechat group. One ID was only allowed to answer the survey one time to avoid duplicate date.

Statistical Analysis

Continuous variables are presented as mean and standard deviation, and categorical variables as frequency and percentage. Independent sample t tests were used to test difference between continuous outcomes, and chi-square for categorical outcomes. Statistical analyses and graphs were performed on SPSS version 20 (IBM Corp, Armonk, NY). Two tailed *P* value less than .05 is considered as statistically significant.

Results

Before the education session, total of 435 participants attended, we received 346 (79.5% response rate) online surveys (male 112, female 234) with an age range of 22-66 years (40.9 ± 7.6). 47.7% of them had College degree or below. 52.3% of them with a Bachelor degree or above as shown in Table 1. 39.9% percent of them with Junior title and 60.1% of them had Senior title. The most familiar terminology regarding stroke is "Zhongfeng (54.6%)" among community physicians (Fig 2). 82.7% of them thought thrombolytic therapy should be highly recommended (Table 2). Only 54.0% of them knew the thrombolytic time window of intravenous recombinant tissue plasminogen activator is less than 4.5 hours. A total of 64.4% of them would transfer their stroke patients to the nearest hospital with the capability of thrombolytic therapy by emergency medical service. 39.0% and 40.2% of them can detail the meanings of FAST and Stroke 120,

Table 1. Characteristics of the responders before and after the education session

		Before (n = 346)		After (n = 356)		P
Age		40.9	7.6	41.5	8.0	.382
Gender	Male	112	32.4%	118	33.1%	.827
	Female	234	67.6%	238	66.9%	
Title	Junior title	138	39.9%	150	42.1%	.544
	Senior title	208	60.1%	206	57.9%	
Academic qualification	College degree or below	165	47.7%	192	53.9%	.098
	Bachelor degree or above	181	52.3%	164	46.1%	

Values were expressed as mean and standard deviation or number and percentage.

respectively. In total, 90.5% of them thought Stroke 120 is easier for them to remember than FAST.

Next day after our education session, we delivered the same survey online and received 356 (81.8% response rate) copies of the survey. A total of 330 (92.7%) of 356 responded the survey a day before. The age range of them is 22-66 years (41.5 ± 8.0 , male 33.1%). In total, 46.1% of them had a Bachelor degree or above. There is no statistical difference in Age, Gender, Title, Academic qualification (.382, .827, .544, .098, respectively). Through our education session, 95.2% of them knew thrombolytic therapy plays a pivotal role in the treatment of acute ischemic stroke (Table 2). A total of 91.6% of them knew the thrombolytic time window is less than 4.5 hours which was increased from 54.0% ($P < .001$). The percentage of community physicians who would choose the nearest hospital which can perform thrombolytic therapy increased from 64.4% to 88.5% ($P < .001$). In total, 98.0% of them can detail the meanings of each number of Stroke 120 compared to 40.2% (at the baseline) ($P < .001$). Although the

percentage of community physicians who knew the exact meanings of FAST was also increased from 39.0% to 95.5% ($P < .001$), 96.3% of them thought that Stroke 120 is the most suitable stroke awareness tool in China compared with FAST (3.4%) (Table 2). The high acceptance rate of Stroke 120 can also be observed in different Academic qualification and Title (Fig 3).

Discussion

The aim of the study is to investigate the acceptance rate of Stroke 120 among community physicians and in the meantime promote their stroke awareness. Chinese Bureau of Statistics shows that there are 950,000 primary health care institutions for 2018 (date of publication: February 28, 2019),⁸ which indicates that nearly 90% of medical workers work in primary medical system. They play a critical role in the early identification of stroke symptoms, transferring patients timely to the hospitals with the capability of thrombolytic therapy. They are also

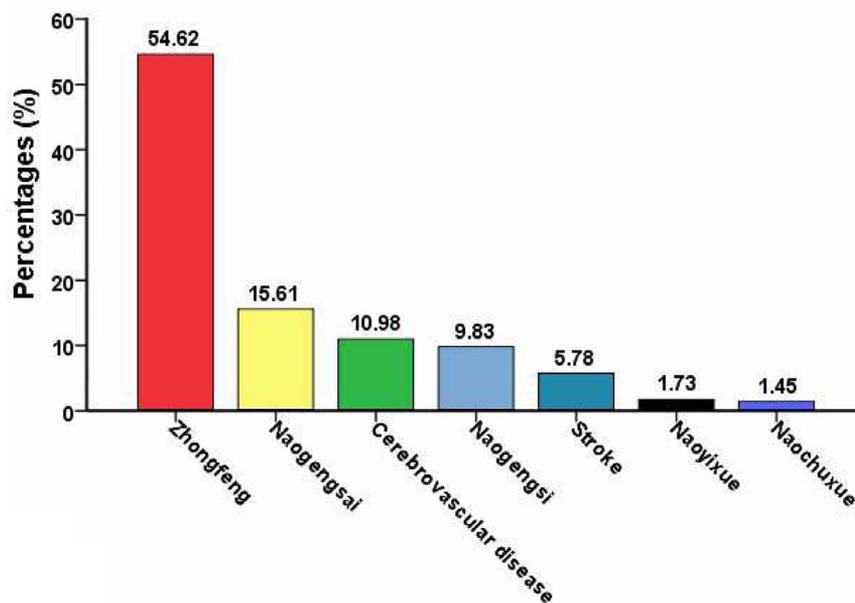


Figure 2. The most familiar terminology regarding stroke among community physicians. "Zhongfeng", "Naogengsai", "Cerebrovascular disease," and "Naogengsi" are commonly used terminology that have the equal meaning of stroke. "Naoyixue" and "Naochuxue" are commonly used terminology that have the equal meaning of hemorrhagic stroke.

Table 2. Stroke related knowledge before and after the education session

		Before (n = 346)		After (n = 356)	
What do you think of the role thrombolytic therapy plays in the treatment of acute ischemic stroke?	Too risky, not recommend	60	17.3%	17	4.8%
	Highly recommend	286	82.7%	339	95.2%
	<i>P</i>	<.001			
Which one is the thrombolytic time window of rtPA?	Less than 4.5 h	187	54.0%	326	91.6%
	More than 4.5 h	159	46.0%	30	8.4%
	<i>P</i>	<.001			
If someone or your patient around you had stroke, what will you do?	EMS to the best hospital	82	23.9%	33	9.3%
	Private vehicle to the best hospital	10	2.9%	1	.3%
	EMS to the hospital with stroke center	221	64.4%	314	88.5%
	Private vehicle to the hospital with stroke center	30	8.7%	7	2.0%
	<i>P</i>	<.001			
Do you know the meanings of Stroke 120?	Yes, I know all	139	40.2%	349	98.0%
	Yes, but not all	88	25.4%	5	1.4%
	No, I don't know	119	34.4%	2	.6%
	<i>P</i>	<.001			
Do you know the meanings of FAST?	Yes, I know all	135	39.0%	340	95.5%
	Yes, but not all	89	25.7%	15	4.2%
	No, I don't know	122	35.3%	1	.3%
	<i>P</i>	<.001			
Which stroke awareness tool is easier for you to remember?	Stroke 120	313	90.5%	343	96.3%
	FAST	23	6.6%	12	3.4%
	Others	10	2.9%	1	.3%
	<i>P</i>	.002			

Values were expressed as number and percentage. EMS means emergency medical service.

the leading force for community health education and secondary stroke prevention.^{6,9-11} There will be more community physicians in the future through standardized training for general practitioners and residents.

In China, we named our educational program as "Zhongfeng120", since Zhongfeng is the most accepted name of stroke in China as also evident in this study that it is the most familiar terminology among community

physicians (Fig 2). Previous studies have demonstrated that serious deficiency of knowledge regarding stroke existed in community physicians.^{6,12-14} In urban China, delayed referral of patients with stroke from primary health care system remained serious.² That is consistent with our finding, we noted that only 54% of the community physicians knew the thrombolytic time window is less than 4.5 hours before the education session. After the

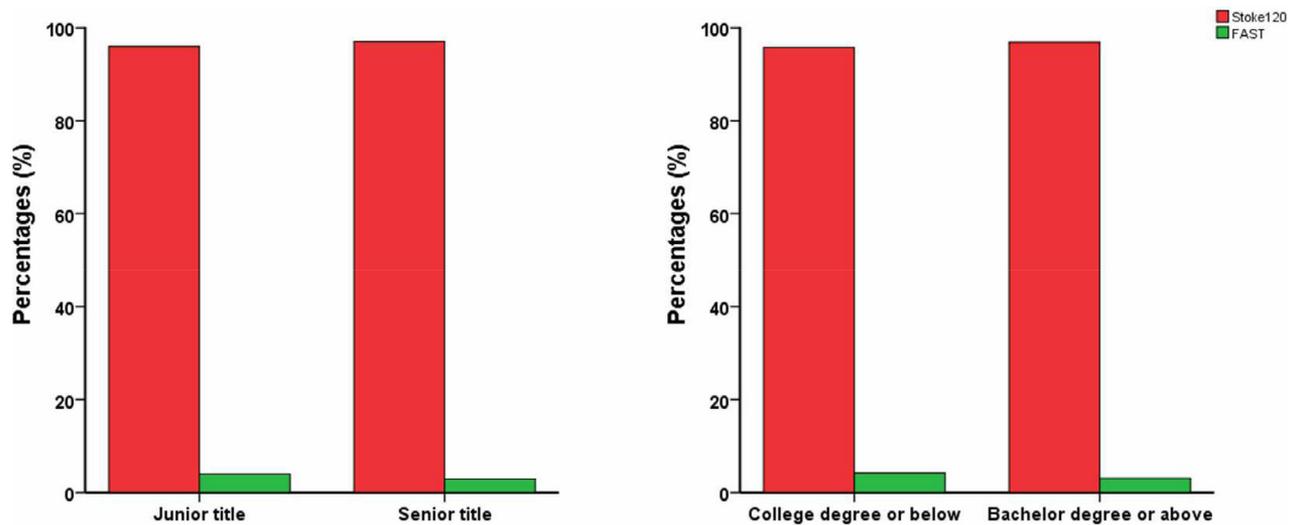


Figure 3. The acceptance rate of Stroke 120 after the education session in different academic qualification and title.

education session, such deficiency improved dramatically (from 54% to 91%). Understanding the risk of retransfer is suboptimal also, only 64.4% of the participants understand that it is critical to send stroke patients to hospitals with stroke care capabilities. Such knowledge deficiency was improved dramatically also. Although the thrombolytic therapy has been recommended in the acute phase of ischemic stroke for many years,¹⁵ but not all of the community physicians would recommend it for acute stroke patients. The reason maybe that they don't know the mechanism of thrombolytic therapy and they never use it in the community hospitals. To them, it's too risky to implement. By conducting the education session, their attitude toward thrombolytic therapy improved from 82.7% to 95.2%. Though more than 90.0% of them mastered both FAST and Stroke 120 after the session, but 96.3% of them thought Stroke 120 is the most suitable stroke education strategy in China even though FAST has been promoted for many years. The high acceptance rate of Stroke 120 can also be observed in different Academic qualification and Title. As we know, effective stroke identification tool plays the pivotal in reducing prehospital delay. The high acceptance rate of Stroke 120 among community physicians should help to improve the prehospital delay of stroke in China.

Limitations of the Study

Our study had several limitations. The major limitation is that the surveys were not answered by the exact same group, despite, we know most of them are from the same sampling pool and the sample size is relatively small. The participants are from 3 regions where economy is well-developed. It may not represent the characteristic of community physicians in less developed area. Further study is needed to be done for community physicians in rural areas. Finally, the duration of our program is short and its long-term benefits are uncertain. Another survey was urgently needed in the future to evaluate the long-term benefits of our program.

In Summary

Through this study, Stroke 120 strategy was well accepted by the community physicians in China and in the meantime improved knowledge regarding stroke was observed. The high acceptance rate of Stroke 120 among community physicians should help to improve the prehospital delay of stroke in China.

Declaration of Competing Interest

The authors declare that they have no conflict of interest.

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