

# Low awareness of stroke guidelines and preference for Chinese herbs in community physicians: a national survey in China

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**Background:** Physicians' adherence to stroke guidelines is becoming a critical part of public stroke care system. The objective of this national survey was to examine Chinese physicians' awareness of the guidelines in secondary stroke prevention.

**Methods:** This is a non-commercial and no-incentive internet survey. Respondents were asked to perform a self-examination of 13 questions regarding their stroke practice. Their awareness of stroke guidelines, preference for Chinese traditional herbs (CTH), and patients' expense for stroke treatment were surveyed and compared between physicians from community and from tertiary hospitals using univariate analysis and logistic regression.

**Results:** A total of 8,581 physicians (70.1% from community hospitals) responded to the survey. Only 32.1% physicians considered risk factors control necessary for stroke. For the treatments of symptomatic carotid stenosis, only 10.4% physicians selected carotid endarterectomy and anti-platelet plus controlling stroke risk factors. Only 21.45% physicians selected warfarin anticoagulation for stroke patients with atrial fibrillation. In contrast, a high percentage (64.56%) of physicians had positive attitude towards CTH. Compared with those from tertiary hospitals, community physicians were more likely unaware of the guidelines and preferred CTH. Those who prescribed CTH reported more patients' cost ( $P < 0.001$ , OR 1.78, 95% CI, 1.55-2.04) than who didn't.

**Conclusions:** There is a very low awareness of stroke guidelines in Chinese community physicians. A well-organized continuing stroke-guidelines education should be an essential part of public stroke-care system in China. Also, more well-designed clinical trials are required to establish the safety and effectiveness of CTH.

**Keywords:** Guideline adherence; stroke; China; community health workers; Chinese traditional medicine

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## Introduction

Stroke patients are at high risk of recurrent stroke. It is important to comprehensively evaluate stroke etiology and give evidence-based secondary prevention therapies. To improve the quality of managements, the guidelines of stroke secondary prevention have been published and updated in many countries (1-5). Applying these guidelines in clinical practice significantly reduce the recurrence of stroke (6,7). The physicians' adherence to the guidelines, therefore, is becoming a critical part of public stroke care system.

With 2.5 million new stroke cases each year, stroke has been the leading cause of mortality and disability in China (3). The recurrence of stroke in Chinese patients is 16-20% at 1 year after

initial event, higher than the average rate of 11.1% worldwide (8,9). Given the diverse social economic status among different regions, China is facing great challenges to establish a cost-effective public stroke care system. In 2010, Chinese guidelines for the secondary prevention of ischemic stroke and transient ischemic attack was opened to the public (3). In this study, we performed a national survey to evaluate the awareness of current stroke guidelines in Chinese physicians.

## Methods

### *Survey development and participants*

This is an investigator-initiated, non-commercial, and no-

incentive survey of the physicians who visit the sole Chinese government-authorized website ([www.haoyisheng.com](http://www.haoyisheng.com), HYS) for continuing medical education (CME). In China, CME is a mandatory requirement for each registered physician. To obtain the official admitted CME scores from HYS, the physicians need to register by providing their identities and working settings. When a visitor logged in HYS, a window with our survey popped out automatically. If the visitors declined the survey, they could continue their visits by closing the window. This study was performed from Oct 2010 to Jan 2012, and was approved by Peking Union Medical College Hospital ethic group.

### Survey content

Survey respondents were asked to perform a self-examination of 13 questions regarding their current practice in stroke (Supplement). Physicians may select their preferred treatment strategies or prescriptions on cardiogenic stroke and large artery atherosclerotic stroke before checking the “standard answers”. The specialty and title of physicians, level of hospital, and expenses of stroke patient were also surveyed.

### Data collection and procession

All data were automatically saved on line and could be transferred into an electronic Excel database (Microsoft Corp.) if required. The private information including name and identity number was kept secret by HYS, while the working hospitals, gender, age and log-in time were open to the investigators. Statistics analysis was performed using SAS Version 9.0.

### Analysis

Our primary outcome measures were: (I) the percentage of physicians who selected the treatment strategies or prescriptions recommended by stroke guidelines; (II) the percentage of physicians who prescribed Chinese traditional herbs (CTH); (III) the stroke patients' expense reported by physicians. We compared the provided answers from neurologists and non-neurologists; physicians from tertiary and community (primary and secondary) hospitals; experienced physicians (attending physicians and professors) and un-experienced physicians (residents and unrated physicians) using univariate analysis (*Table 1*) and logistic regression.

## Results

A total of 8,581 physicians from all 32 provinces and regions in China responded to the survey. Physicians demographic and profession characteristics are summarized in *Table 2*. In the responders, 70.1% were from community hospitals (39.52% from secondary and 30.49% from primary hospitals) and 12.39% from tertiary hospitals. Most respondents (81.84%) were junior (resident) or intermediate (attending doctor). Neurologists account for 15.48% of the respondents, while more respondents (45.08%) had their stroke practice in internal medicine department.

### Concepts on stroke etiologies and risk factors control

A high percentage (62.34%,  $n=5,349$ ) of doctors agreed to establish their treatment strategy based on the etiologies of stroke (stroke subtypes) whereas 24.39% ( $n=2,093$ ) based on the severity of stroke, and 6.14% ( $n=527$ ) based on the principle of “combining Chinese traditional medicine and Western medicine”. Doctors from community hospitals, non-neurologists and un-experienced physicians (junior) less likely concerned about the etiology of stroke (*Figure 1A*).

For a patient with a history of TIA or stroke, only 32.1% physicians believed well risk factor modification could reduce the risk of recurrent stroke. Of these physicians, 73.46% also agreed CTH for secondary prevention, which was not recommended by the guidelines. Physicians from community hospitals and non-neurologists were less likely to manage the risk factors, and more likely to give additional CTH treatment (*Figure 1B*).

### Concepts of large artery atherosclerotic stroke managements

Regarding to the treatments of symptomatic carotid stenosis, only 10.4% physicians selected carotid endarterectomy and anti-platelet plus controlling stroke risk factors, which are recommended by the guidelines (1,3). For the treatments of symptomatic middle cerebral artery stenosis, only 9.96% physicians selected aspirin or clopidogrel (1), and 23.32% physicians selected the target of  $<70$  mg/dL and lifelong statin use (1). In contrast, as high as 55.34% physicians preferred to prescribe CTH in their practice. Physicians from community hospital, non-neurologists, and un-experienced physicians were less likely to adhere to the guidelines. Physicians from community hospital and non-neurologists were more likely to prescribe CTH (*Figure 1C*).

**Table 1** Comparison between physicians from tertiary hospitals and community hospitals (Chi-Sq test)

Responders	Total number	Proportion (%)	Neurologists (%)	Non-neurologists (%)	P	OR	Tertiary hospitals (%)	Community hospitals (%)	P	OR	Attending physicians or professors (%)	Residents or undefined (%)	P	OR
Treating according to etiology of stroke	5,349	62.3	76.0	59.8	<0.001	2.1	69.5	64.1	<0.001	1.3	65.9	57.9	<0.001	1.4
Risk factors controlling														
Favoring risk factors control (HTN and DM)	731	8.5	15.5	7.2	<0.001	2.4	13.5	8.7	<0.001	1.6	10.4	6.2	<0.001	1.7
Prescription of CTH	5,648	65.8	48.0	69.1	<0.001	0.4	55.1	66.5	<0.001	0.6	66.0	65.6	0.8	1.01
LDL-C lowered to <70 mg/dL	2,001	23.3	29.7	22.1	<0.001	1.5	26.6	25.1	0.3	1.08	27.0	18.8	<0.001	1.6
LAA stroke														
Recommended treatment for symptomatic carotid stenosis	892	10.4	24.6	7.8	<0.001	3.8	18.0	10.8	<0.001	1.8	13.2	6.9	<0.001	2.1
Prescription of CTH	4,017	46.8	32.8	49.4	<0.001	0.5	39.7	47.4	<0.001	0.7	46.6	47.1	0.2	0.98
Recommended treatment for symptomatic MCA stenosis	855	9.96	19.3	8.3	<0.001	2.7	12.0	10.3	0.096	1.2	10.1	9.9	0.7	1.02
Prescription of CTH	4,749	55.3	38.3	58.5	<0.001	0.4	44.7	56.7	<0.001	0.6	54.8	56.1	0.2	0.95
Cardiac stroke														
Warfarin to treat atrial fibrillation	1,841	21.5	38.3	18.4	<0.001	2.8	32.9	21.5	<0.001	1.8	25.3	16.7	<0.001	1.7
Prescription of CTH	4,026	46.9	28.5	50.3	<0.001	0.4	38.2	46.5	<0.001	0.7	44.7	49.7	<0.001	0.8
Attitudes towards CTH														
Agreeing no convincing evidence for or against CTH	2,115	24.7	37.9	22.2	<0.001	2.1	32.5	25.5	<0.001	1.4	27.5	21.1	<0.001	1.4
Prescribing no CTH	951	11.1	18.0	9.8	0	2.0	14.7	10.8	<0.001	1.4	10.4	11.96	0.02	0.9
CTH, Chinese traditional herbs.														

Table 2 Physician demographic and profession characteristics	
Characteristics	Percentage (%)
Gender	
Male	54.46
Age (years)	39±9
Stroke practice setting	
Department of Neurology	15.48
Department of Internal medicine	45.08
Department of Chinese Traditional Medicine	9.04
Other settings (small out clinics etc.)	30.40
Level of hospital	
Primary	30.49
Secondary	39.52
Tertiary	12.39
Non-classified	17.61
Title	
Junior (residents)	39.75
Intermediate (attending doctors)	42.09
Senior (professors)	13.17
Non-classified	4.99

### Concepts of cardiogenic stroke managements

For a stroke patient with atrial fibrillation, only 21.45% physicians selected warfarin anticoagulation treatment, which is recommended by the guidelines (1). The remaining selected anti-platelet, CTH, cardiac surgery, or combination of them. A high percentage of physicians (46.92%) prescribed CTH in their practice. Physicians from community hospital, non-neurologists, and un-experienced physicians were less likely to follow the guidelines, and more prone to prescribe CTH (*Figure 1D*).

### Physicians reports on CTH and patients expense

A high percentage (64.56%) of physicians had positive attitude towards CTH (effective and/or with little side-effect): 34.39% physicians prescribed one kind of CTH for their patients; 29.77% physicians prescribed two or more kinds of CTH; and 24.75% physicians preferred to give their patients intravenous CTH in every spring and autumn. Only 11.08% physicians did not prescribe CTH at all, and 24.65% physicians agreed that there is no convincing evidence supporting or opposing CTH.

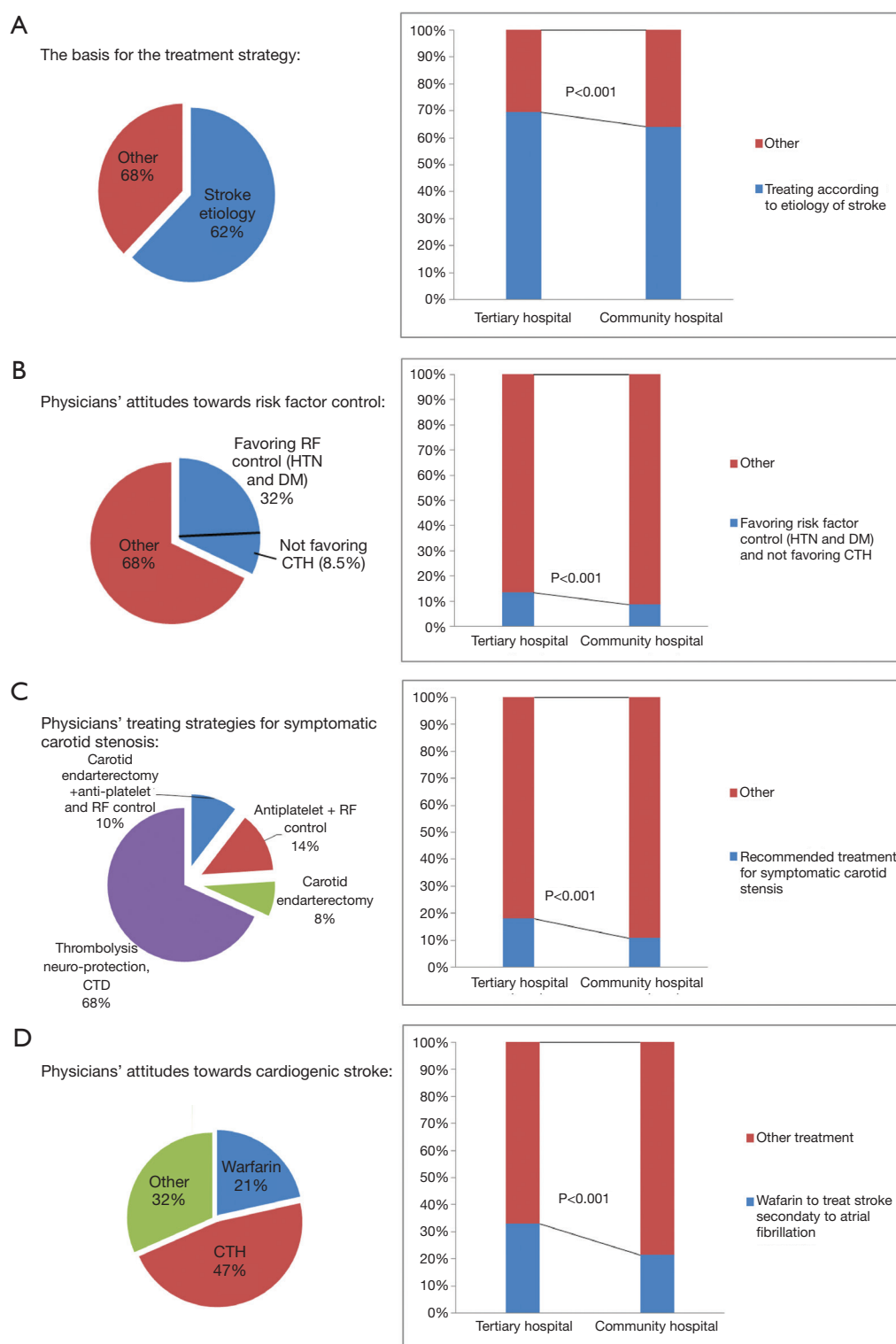
Physicians from community hospitals ( $P<0.001$ , OR =0.71), non-neurologists ( $P<0.001$ , OR =0.47), and un-experienced physicians ( $P<0.001$ , OR =0.70) were less likely aware of that CTH had no convincing evidence (*Figure 2*).

A total of 63.1% physicians reported their patients' expenses for secondary stroke prevention were more than 200 RMB (about \$34) per month. Those who prescribe one kind or more CTH for their patients reported more expenses ( $P<0.001$ , OR =1.78, 95% CI, 1.55-2.04).

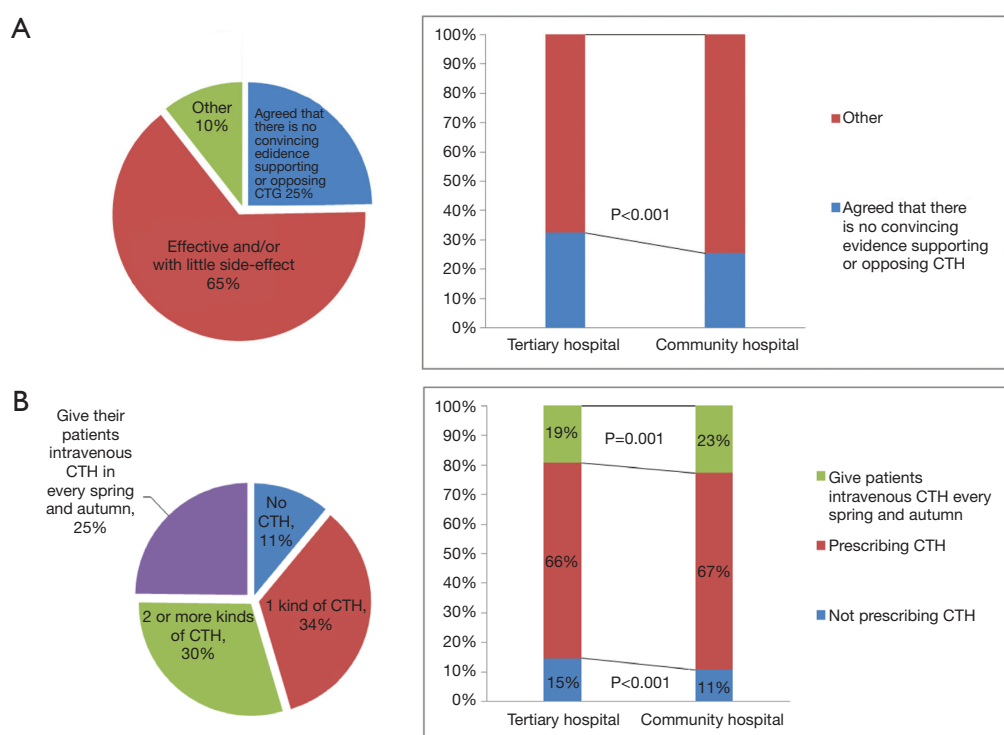
## Discussion

Several studies showed there was a gap between the guidelines and clinical practice. In the Reduction of Atherothrombosis for Continued Health (REACH) registry, a large investigation obtaining the data from 44 countries, 18% of the patients with a stroke history did not receive any antiplatelet therapy; and 43% did not receive any statin (10-12). Another survey of 3,489 Chinese neurologists from tertiary hospitals (with relatively high quality medical service in China) showed insufficient awareness of secondary stroke prevention guidelines. Less than 40% of Chinese neurologists are aware of the BP control goal in non-diabetic patients after an episode of ischemic stroke or TIA (13). In this survey, a wide gap was also seen between the responders' concepts and stroke guidelines. Over all, less than one third responders considered risk factors control necessary for stroke, and less than 20% physicians gave treatments according to the guidelines. Most of the responders were community physicians and they were more likely unaware of the guidelines compared with those from tertiary hospitals. Therefore, the results suggest the stroke care in Chinese community hospitals is especially far away from the guidelines.

In this study, the physicians' concepts of CTH were also surveyed. According to the theories of Chinese traditional medicine, "stasis of blood" is believed to be the main cause of ischemic stroke. The extracts of herbs such as Chuan Qiong, Erigeron Breviscapus, Radix Notoginseng, Radix Salviae Miltiorrhizae, Carthamus tinctorious, and Ginkgo, are believed to have an effect on "dissipating blood stasis". In this survey, more than half of Chinese physicians had positive attitude towards CTH and preferred to prescribe CTH. The results suggested the concept of Chinese traditional medicine are more widely accepted and used in stroke patients than the guidelines. Given there is no convincing evidence of CTH in stroke (14), the prescriptions of CTH may highly increase the cost of stroke treatment with unknown effects. While more clinical trials



**Figure 1** (A) The basis for the treatment strategy of physicians. A total of 62.34% agreed to establish their treatment strategy based on the etiology of stroke; (B) physicians' attitudes towards risk factors control. A total of 32% favored BP and DM controlling; (C) physicians' treating strategies for symptomatic carotid stenosis; (D) physicians' attitudes towards cardiogenic stroke. The column figure on the right shows that physicians from community hospitals are less prone to follow the guidelines.



**Figure 2** (A) Physicians' attitudes towards CTH; (B) physicians' prescription of CTH for their patients.

with good quality are required to establish the efficacy and safety of CTH, the completed clinical trials of CTH should be systematically reviewed and a special guideline for CTH may be warranted.

Our study has several strengths. Current survey was the first survey of physicians from different level of hospitals with a large sample. It was designed according to local culture. Compared with the style of official non-interactive survey, the “self-examination” style with a small number of questions is more likely accepted by Chinese physicians. The non-commercial, no-incentive characteristics of the survey make the data more reliable. However, this study suffered from several limitations. The physicians who declined participating in the survey (closing the survey window) couldn't be recorded technically in this study. The response rate was not calculated and reported. Potential bias, therefore, may exist. For example, only the physicians who are interested in stroke or who are enthusiastic about self-learning responded to this survey. Second, this survey was performed via internet media. Physicians without convenient internet access in some rural area of China may have no chances to respond to the survey.

Our results are meaningful for optimizing the public stroke care system. China is a representative of a developing

country with a rapid economy growth. The health care system is undergoing huge changes. Currently, Chinese patients with “mild diseases” are encouraged to see the community physicians by the official authorities. A proportion of patients with minor stroke and transient ischemic attacks probably go to the community hospitals after the onset. In these patients, effective secondary stroke prevention managements must be given timely because a high rate of stroke recurrence happens (8). However, as reported in this study, the low awareness of guidelines in community physicians makes the stroke care system unlikely work in a cost-effective way. Therefore, it is important to establish a well-organized CME system for stroke guidelines training, which should be an essential complementary policy.

## Conclusions

In conclusion, we found there is a wide gap between the secondary stroke prevention guidelines and Chinese community physicians practice. Our results suggest that a well-organized CME system for stroke should be established as an essential part in this largest developing country.



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