

Recognition of stroke among community residents and the improvement after intensive health education: A cross-sectional study.

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Research article

Keywords: stroke, community residents, warning symptoms, intensive education

Posted Date: January 31st, 2020

DOI: <https://doi.org/10.21203/rs.2.17601/v2>

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Version of Record: A version of this preprint was published on October 12th, 2020. See the published version at <https://doi.org/10.1186/s12883-020-01951-6>.

Abstract

Background: This study aimed to investigate stroke recognition in a community population (including high-risk groups of stroke) in Jinjiang District of Chengdu and strengthen the publicity of the impact of stroke-related knowledge on community residents' stroke recognition. **Methods:** By conducting an epidemiological survey, nine communities in Jinjiang District were sampled, and a questionnaire on stroke-related knowledge was designed to investigate the community residents in Jinjiang District of Chengdu City. We carried out stroke health education activities with the theme of "understanding stroke" and evaluated the impact. **Results:** There were 1685 valid questionnaires, and the awareness level of stroke risk among community residents in Jinjiang District of Chengdu was 11.4%. The proportion of people who recognized that there was a risk of stroke increased with the increase in the number of risk factors ($P < 0.001$). Participants with three or more risk factors were aware that the risk of stroke was only 40.3%. The recognition rate of stroke warning symptoms among community residents was 29.8–59.5%. Among them, the recognition rate of common stroke symptoms such as limb weakness, language disorder, and imbalance was more than 50%, and the cognitive proportion of rare symptoms including monocular or binocular blurred vision and severe headache with no known cause was only about 1%. When faced with five sudden stroke warning symptoms, the proportion of participants who chose to make an emergency call (120, in China) was about 41.5%. Nearly 10% of the respondents chose to consult a doctor, take medicine, or wait. After strengthening publicity and education, there was a significant improvement in the identification of stroke risk factors, stroke warning symptoms, and stroke management. The number of respondents who chose to dial 120 increased from 59.2% to 82.7%. **Conclusions:** The recognition of stroke among community residents in Jinjiang District of Chengdu is low. Strengthening publicity and education on stroke-related knowledge and post-stroke treatment can significantly improve patients' cognition of stroke-related knowledge and enhance community residents' awareness of giving priority to dialing 120 after the onset of stroke symptoms. **Key words:** stroke, community residents, warning symptoms, intensive education

Background

Stroke is the single disease with the highest disability rate. Its high morbidity, mortality, and disability rates constitute a heavy burden and a great source of pain to the society, families, and patients [1]. The number of new stroke patients in China is about 2 million every year, of which 70–80% is unable to live independently due to disability [2]. At present, the incidence of stroke in China is increasing at an annual rate of 8.7%. Stroke care in China includes medication, surgical intervention, and rehabilitation. The nationwide annual cost for the treatment of cerebrovascular disease is more than 10 billion yuan, coupled with indirect economic losses of nearly 20 billion yuan [3]. Various health education measures have been undertaken to raise public awareness of stroke-related knowledge to reduce the incidence, mortality, and disability rates of stroke. However, the level of understanding about stroke warning symptoms and first aid systems among community residents was generally low [4–7]. There are few relevant reports in the literature from China and abroad. This study investigated the ability of community

residents to identify the warning symptoms of stroke and the awareness of first aid and the effect of strengthening health education on stroke recognition among community residents. Herein, we aimed to investigate the current status and problems of community stroke prevention and propose and implement a new community stroke prevention service model to effectively reduce community stroke incidence.

Methods

Sampling

We conducted a survey of nine community residents of Jinjiang District, Chengdu, from February 2017 to February 2019 (including Chunxi, Yanshikou, Niushikou, Hongsha, Jinjiang, Lianxin, Wanke, Quan subtree, Daci temple). The subjects were permanent residents of the community (aged ≥ 18 ; household registration was required to be considered a local, and the residents should have lived in the locality for more than 2 years).

Survey contents

Using an epidemiological investigation, combined with the literature reports from China and abroad, a questionnaire on stroke-related knowledge was designed to conduct a random sampling survey among nine community residents in Jinjiang District, Chengdu. The main outcome measures included the understanding of stroke risk and its factors (including high blood pressure, hyperlipidemia, diabetes, heart disease, unhealthy lifestyle, drinking, smoking, stroke, obesity, age, genetic factors, atherosclerosis, vascular stenosis, lack of exercise, blood viscosity, gender, emotional, overwork, mental stimulation, other) and the identification and treatment of stroke-related symptoms or signs. We aimed to carry out stroke health education activities with the theme of “understanding stroke” and evaluate the effect. Stroke knowledge was publicized in a variety of ways, including: (1) Designing and making short videos for television and short animated videos in which neurologists explained the risk factors of stroke and its prevention and treatment measures described the main symptoms and signs of stroke (5 “Suddens,” including difficulty speaking, articulating, or understanding; blurred vision in one eye or both eyes; severe headache of unknown cause; dizziness, difficulty walking, imbalance, or uncoordinated movements; numbness or weakness on one side of the face or limb), the method of rapid identification of stroke (“Fast,” which means numbness or weakness on one side of the face, numbness or weakness in one upper limb, speech or understanding difficulties). The session on first aid after the onset of stroke emphasized the importance of making an emergency call (120, in China) immediately after the onset of stroke and the harm of delayed treatment and invited stroke survivors to talk about their personal experience and the positive and correct treatment measures of their families (dial “120”). We used television, the Internet, WeChat, magazines, and other media channels for publicity. (2) We produced a pamphlet on stroke health education to be distributed to all families in the community and produced posters of stroke-related knowledge to display in public places in the community. The duration of intensive stroke education activity was 1 year. The level of community stroke awareness was investigated before and after the activity, and the effect of intensive publicity was evaluated. The main evaluation

indicators were the proportion of residents receiving stroke propaganda and the change of residents' recognition of stroke-related knowledge (stroke risk factors, stroke symptoms and signs, stroke and the treatment of specific symptoms). Face-to-face interviews are conducted by uniformly trained investigators.

Data collection

Data were collected via a questionnaire on community residents' stroke-related knowledge. The contents mainly included (1) the general data of the subjects: gender, age, nationality, education level, family monthly income, medical insurance, etc., and (2) stroke-related knowledge: stroke risk factors, warning symptoms, treatment measures of sudden symptoms, determination of post-stroke treatment, etc. The contents mainly aimed at strengthening the treatment of stroke risk factors, warning symptoms and sudden symptoms and determining the treatment after stroke.

Statistical analysis

After sorting out the data processing and survey data, the data were entered into the EPIDATA database and then imported into SPSS version 20 (IBM Corp., Armonk, NY, USA) for statistical analysis. Count data were expressed as percentages and analyzed using the chi-square test.

Results

Demographic characteristics of the respondents

Of the 1685 respondents, 768 were males (45.6%) and 917 females (54.4%), with an average age of 50.5 ±16.2 (range, 18–92) years.

Relationship between the number of stroke risk factors and stroke risk recognition

The awareness level of stroke risk among community residents was 11.4%. The proportion of participants who recognized that there was a risk of stroke increased with the increase in the number of risk factors ($P < 0.001$). However, only 40.3% of participants with three or more risk factors were aware of the risk of stroke (Table 1).

One hundred and fifty-four participants (9.1%) could correctly identify 1 stroke risk factor, and 132 (7.8%) could correctly identify 2 stroke risk factors. One hundred and thirty-three participants (7.9%) were able to identify at least 3 stroke risk factors. Also, 1164 participants (69.1%) could not correctly identify any risk factors for stroke, of which 1061 cases (91.2%, 63.0% of the total) could not provide any answer. Of the 1685 subjects, 922 (54.7%) did not know which part of the body was affected by stroke, only 699 (41.5%) knew that stroke affected the brain, and 17 (1.0%) believed that stroke affected the heart. Forty-seven participants (2.8%) believed that stroke affected other parts (such as the hands, feet, cervical vertebrae, etc.).

Recognition of stroke warning symptoms among subjects

The recognition rate of stroke warning symptoms among community residents was 29.8–59.5%. Among them, the recognition rate of common stroke symptoms such as limb weakness, language disorder, and balance disorder was more than 50%. For the other two relatively uncommon symptoms, the rate of recognition of severe headaches, including blurred monocular or binocular vision and no known cause, was only about 1/3. In addition, more than 1/4 considered shortness of breath, chest pain, and panic as symptoms of stroke.

Recognition of stroke warning signs

When faced with five sudden stroke warning signs, the proportion of participants who chose to dial 120 was lower, and the proportion that chose to go to the hospital was similar to that of those who chose to dial 120. Nearly 10% of respondents chose others such as consulting a doctor, taking medicine, waiting, or observing.

Assessment after strengthening health education

There was no significant difference in the general situation of residents' cognition of stroke before and after intensive publicity and education (Table 5). After strengthening publicity and education, there was a significant improvement in the identification of stroke risk factors, stroke warning symptoms, and stroke management. The number of respondents who would dial 120 increased from 59.2% to 82.7%.

Discussion

The results of this study showed that the awareness level of stroke risk among community residents was 11.4%, and the rate of recognition of stroke risk increased with an increase in the number of risk factors ($P < 0.001$). However, only 40.3% of participants with three or more risk factors were aware of the risk of stroke. The results suggested that community residents had a low level of awareness of stroke risk. Among all the subjects, 154 (9.1%) could correctly identify 1 stroke risk factor, and 132 (7.8%) could correctly identify 2 stroke risk factors. Also, 1164 participants (69.1%) could not correctly identify any risk factors for stroke, of which 1061 cases (91.2%, 63.0% of the total) could not provide any answer. However, a foreign demographic survey conducted in 2015 showed that 59.2% of the respondents were able to identify at least one stroke risk factor [9]. This study concluded that the community residents in Jinjiang District had a low awareness of stroke risk factors. It is necessary to strengthen the popularization of knowledge regarding stroke.

Of the 1685 subjects, 922 (54.7%) did not know which part of the body was affected by stroke, only 699 (41.5%) knew that stroke affected the brain, and 17 (1.0%) believed that stroke affected the heart. Forty-seven subjects (2.8%) believed that stroke affected other parts (such as the hands, feet, cervical vertebrae, etc.). Similar to the report of a foreign study, 35% of respondents in this study knew that the organ in which stroke occurs was the brain [10].

The recognition rate of stroke warning symptoms among community residents was 29.8–59.5%. Among them, the recognition rate of common stroke symptoms such as limb weakness, language disorder, and balance disorder was more than 50%. For the other two relatively uncommon symptoms, the recognition rate of severe headaches, including blurred monocular or binocular vision and no known cause, was only about 1. In addition, more than one considered shortness of breath, chest pain, and panic as stroke manifestations, suggesting that community residents still lack knowledge of stroke warning symptoms. A domestic survey on the recognition of stroke among community residents in Chongqing found that the recognition rate of stroke warning symptoms was 30.7–75.6% [11]. A study of 1472 respondents found that sudden headaches (54.1%), vertigo (51.0%), and dyslexia (44.3%) were the most recognizable stroke warning symptoms [12].

When faced with five sudden stroke warning symptoms, most of the respondents chose to send the patients to hospital emergency department (by dialing 120 or going to the hospital themselves), but the proportion who preferred dialing 120 was lower. Similar to foreign reports, a survey conducted in New York found that 33.3–72.4% of emergency calls were first made in the face of stroke warning symptoms, compared with 14–17.6% in Michigan. The results of the latest questionnaire survey on a small sample size abroad showed that 73.0% of the respondents chose to go to the hospital themselves and emergency calls comprised 43.8% and 62.6% [15], respectively. Calling the emergency system in time allows patients to arrive at the hospital more quickly and receive diagnosis and treatment (such as stroke green channels such as recombinant tissue plasminogen activator) than if they were sent to the hospital or via other transport routes.

In this study, we designed and produced television short films and animated short films and distributed health pamphlets to explain the risk factors of stroke and their prevention and treatment measures. Through 1 year of intensive publicity and education, the residents' recognition of stroke-related knowledge (stroke risk factors, stroke symptoms and signs, stroke and the treatment of specific symptoms) was significantly improved. The number of respondents who dialed the 120 emergency system increased from 59.2 percent before publicity to 82.7 percent. This study believes that strengthening publicity and education of stroke-related knowledge and post-stroke treatment can significantly improve the cognition of stroke-related knowledge and enhance the community residents' awareness of the priority of dialing 120 after the onset of stroke. It can effectively reduce the pre-hospital delay in patients with stroke.

The shortcomings of this study are as follows: (1) the scope of the survey is limited to Jinjiang District of Chengdu, the sample size is limited, and the results do not reflect the overall situation of Chengdu, and (2) the closed questions used in this survey may affect some open-ended questions that reflect relatively more open-ended questions, resulting in a higher response rate in the evaluation of cognitive ability of stroke-related knowledge.

Conclusions

In summary, the results of this community-based survey showed that the recognition of stroke warning symptoms of community residents in our city is low. In the face of sudden symptoms of stroke, even among those who have cognitive ability to all common stroke warning symptoms, the proportion of choosing to dial 120 is also lower. Taking measures to further improve the recognition of stroke-related knowledge among community residents can enhance the awareness of community residents to call 120 after the onset of stroke and effectively reduce the pre-hospital delay among stroke patients.

Declarations

Ethics approval and consent to participate

We obtained ethical approval for this study from the Medical and Health Research Ethics Committee in Second People's Hospital of Chengdu. Written informed consent was obtained from all study participants.

Consent for publication

Not applicable

Availability of data and materials

The datasets used and/or analyzed during the current study are available from the corresponding author on reasonable request.

Competing interests

The authors declare they have no competing interests.

Funding

This work is funding by the Health and family Planning Commission of Chengdu (2015009), which is not involved in the database management (collection, analysis, interpretation of data) and has no access to patient information. The funding body did not participate in designing the study or writing the manuscript. The study protocol has undergone peer-review process by the funding body.

Authors' contributions

XMZ was responsible for the concept and design of the study, data collection, and the first draft of the paper and final manuscript. RX and JW were responsible for the concept and design of the study and the data analysis and interpretation. LYH was responsible for the data collection. All authors read and approved the final manuscript for publication.

Acknowledgements

We thank all the community residents in Jinjiang District of Chengdu City.

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Tables

Table 1. Relationship between the number of stroke risk factors and stroke risk cognition

Number of risk factors	Stroke risk cognition (%)
0	7.2
1	12.4
2	21.6
≥3	40.3
Total	11.4

Table 2. Cognition of stroke risk factors among respondents

Risk factor	n	(%)
High blood pressure	385	22.8
Hyperlipidemia	188	11.2
Diabetes	170	10.1
Heart disease	125	7.4
Unhealthy lifestyle	95	5.6
Drinking	90	5.3
Smoking	88	5.2
Stroke	72	4.3
Obesity	47	2.8
Age	31	1.8
Genetic factors	26	1.5
Atherosclerosis	19	1.1
Vascular stenosis	11	0.7
Lack of exercise	11	0.7
Blood viscosity	9	0.5
Gender	4	0.2
False		
Emotional	33	2.0
Overwork	20	1.2
Mental stimulation	10	0.6
Other	6	0.4

Table 3. Cognition of stroke warning symptoms

Warning symptoms	Yes	No	No idea or uncertain
Difficulty speaking, articulating, or understanding	953 (56.6)	149 (8.8)	583 (34.6)
Shortness of breath	470 (27.9)	380 (22.6)	835 (49.6)
Blurred vision in one eye or both eyes	502 (29.8)	336 (19.9)	847 (50.3)
Severe headache of unknown cause	612 (36.3)	208 (12.3)	865 (51.3)
Chest pain, panic	533 (31.6)	335 (19.9)	817 (48.5)
Dizziness, difficulty walking, imbalance, or uncoordinated movements	956 (56.7)	138 (8.2)	591 (35.1)
Numbness or weakness on one side of the face or limb	1002 (59.5)	119 (7.1)	564 (33.5)

Table 4. Cognition of stroke warning signs management in subjects [n (%)]

Warning signs	Drive to hospital	Consulting a doctor	Call for 120	Call family members	Other
Difficulty speaking, articulating, or understanding	719 (42.7)	221 (13.1)	599 (35.5)	48 (2.8)	98 (5.8)
Shortness of breath	604 (35.8)	180 (10.7)	769 (45.6)	37 (2.2)	95 (5.6)
*Blurred vision in one eye or both eyes	577 (34.2)	270 (16.0)	680 (40.4)	66 (3.9)	92 (5.5)
*Severe headache of unknown cause	723 (42.9)	136 (8.1)	709 (42.1)	40 (2.4)	77 (4.6)
Chest pain, panic	652 (38.7)	167 (9.9)	702 (41.7)	45 (2.7)	119 (7.1)
*Dizziness, difficulty walking, imbalance, or uncoordinated movements	708 (42.0)	128 (7.6)	736 (43.7)	47 (2.8)	66 (3.9)
*Numbness or weakness on one side of the face or limb	745 (44.2)	117 (6.9)	697 (41.4)	47 (2.8)	79 (4.7)

Table 5. General situation of residents

	Before (n=1514)	After (n=1617)	P
Gender			0.059
Male	594	688	
Female	920	929	
Age (mean±SD)	51.2±15.6	53.4±16.6	0.289
Nationality			0.493
Ethnic Han	1500	1598	
Other	14	19	
Marital status			0.418
Unmarried	190	199	
Married or cohabiting	1147	1258	
Divorce or separation	67	62	
Bereavement	110	98	
Degree			0.274
Primary schools and below	178	201	
Junior middle school	397	407	
High school	605	689	
College or above	334	320	
Medical insurance			0.803
Yes	1407	1499	
No	107	118	
Smoke			0.306
Yes	487	548	
No	1027	1069	

Table 6 Cognition of Stroke before and after intensive educational activities

	Before (n=1514)	After (n=1617)	P
List the number of risk factors for stroke	2.62±1.46	4.18±2.07	<0.001
Answer risk factors ≥ 3 (%)			
List the number of stroke warning signs	628 (41.5)	1009 (62.4)	<0.001
Know stroke warning symptoms ≥2	1.28±1.25	1.67±1.37	<0.001
Answer 5 Suddens correctly			
Answer "Fast" correctly	542 (35.8)	779 (48.2)	<0.001
Call for 120			
	138 (9.1)	269 (16.6)	<0.001
	119 (7.9)	306 (18.9)	<0.001
	896 (59.2)	1338 (82.7)	<0.001

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