The Effectiveness of a Stroke Educational Activity Performed by a Schoolteacher for Junior High School Students

Fumio Miyashita, MD,* Chiaki Yokota, MD,* Kunihiro Nishimura, MD,† Tatsuo Amano, MD,* Yasuteru Inoue, MD,* Yuya Shigehatake, MD,* Yuki Sakamoto, MD,* Shoko Tani, PhD,‡ Hiroshi Narazaki, MS,§ Kazunori Toyoda, MD,* Kazuo Nakazawa, PhD,‡ and Kazuo Minematsu, MD*

Background: The purpose of this study was to determine whether our stroke education system can help junior high school students acquire stroke knowledge when performed by a schoolteacher. *Methods:* A stroke neurologist gave a stroke lesson to 25 students (S group) and a schoolteacher through our stroke education system. After instruction, the schoolteacher performed the same lesson using the same education system to another 75 students (T group). Questionnaires on stroke knowledge were examined at baseline, immediately after the lesson (IL), and at 3 months after the lesson (3M). We analyzed the results of stroke knowledge assessment by linear mixed effects models adjusted for gender and class difference using the student number. *Results:* We assessed 24 students in the S group and 72 students in the T group. There were no significant differences in the changes of predicted scores of symptoms and risk factors adjusted for gender, class difference, and each student knowledge level until 3M between the 2 groups. Correct answer rates for the meaning of the FAST (facial droop, arm weakness, speech disturbance, time to call 119) at IL were 92% in the S group and 72% in the T group, respectively. At 3M, they were 83% in the S group and 84% in the T group. The correct answer rates of FAST at 3M were not significantly different adjusted for group, gender, class difference, and correct answer rate at IL. *Conclusions:* A schoolteacher can conduct the FAST message lesson to junior high school students with a similar outcome as a stroke neurologist using our stroke education system. **Key Words:** School-based intervention—stroke enlightenment—FAST—online system.

Introduction

Stroke is the leading cause of disability and a main cause of death in Japan. The number of stroke patients and the burden of the elderly population will increase as society ages. With the advantage of acute thrombolytic therapy with intravenous recombinant tissue-type plasminogen activator for stroke outcome,[1,2] shortening the time between symptom onset and hospital arrival is essential for improving stroke outcome. Although the

From the *Department of Cerebrovascular Medicine, National Cerebral and Cardiovascular Center, Osaka; †Department of Preventive Medicine and Epidemiology, National Cerebral and Cardiovascular Center, Osaka; ‡Laboratory of Biomedical Sciences and Information Management, Research Institute, National Cerebral and Cardiovascular Center, Osaka; and §Department of Information Governance, National Cerebral and Cardiovascular Center, Osaka, Japan.

Received October 28, 2013; accepted November 20, 2013.

Grant support: This study was supported by Intramural Research Fund of the National Cerebral and Cardiovascular Center (22-4-1).

Disclosures: None.

Address correspondence to Chiaki Yokota, MD, Department of Cerebrovascular Medicine, National Cerebral and Cardiovascular Center, 5-7-1 Fujishirodai, Suita, Osaka, Japan. E-mail: cyokota@ncvc.go.jp.

1052-3057/$ - see front matter

http://dx.doi.org/10.1016/j.jstrokecerebrovasdis.2013.11.016

European Cooperative Acute Stroke Study III led to the expansion of the therapeutic time window of thrombolysis for acute ischemic stroke,[3] only a small proportion of patients arrive at the hospital within the time window.[4] Improving stroke awareness is an important factor for rapid access to the acute stroke center at symptom onset.

Although several studies have reported that stroke educational campaigns improve public knowledge about stroke in adults,[5-9] only a few studies have examined stroke education programs for children. Stroke enlightenment for youth is a promising strategy for the prevention of cardiovascular disease. Because of compulsory education, implementing stroke lessons in the education programs of elementary or junior high school is a promising means for spreading stroke knowledge in Japan. We developed a stroke education system that is performed by stroke neurologists for junior high school students.[10] As the next step, to extend stroke enlightenment all over the country, we investigated whether this education system was effective when schoolteachers rather than physicians present the stroke lessons to students. The aim of this study was to verify the effectiveness of our education system in junior high schools when performed by a schoolteacher.

Methods

The research was carried out in partnership with the Suita City Board of Education. The Suita City Board of Education approved this study, and this study obtained exempted approval from the institutional review board based on our domestic guideline because of using only an anonymized and unconnectable data set of questionnaire responses.

Subjects

This study was conducted at a public junior high school at Suita City, Osaka Prefecture, Japan, from July 2011 to October 2011. Subjects were 100 students in 4 classes of the third grade (40 girls, 14-15 years old). The subjects were divided into 2 groups: 1 class with 25 students received a 45-minute stroke lesson by a stroke neurologist (S group), and the remaining 3 classes with 75 students in total received a 45-minute lesson by a schoolteacher of health and physical education (T group).

Stroke Education System and Items with FAST Message

Our stroke education system consisted of an online system and the lecture materials were Power Point files including stroke risk factors, signs, symptoms, and the FAST massage (facial droop, arm weakness, speech disturbance, time to call 119).[5] All junior high schools in Suita City have their own computer systems, and each student could use the online systems during the stroke lesson. At first, a stroke neurologist (T.A.) gave the stroke lesson to 25 students (S group) using our online stroke education system (Fig 1, A). A schoolteacher monitored the lecture and received instructions on how to use the stroke education system. Within 2 weeks after the instruction, the schoolteacher performed the lesson using the same system to the other 75 students (T group). Education items of a pen, file, magnet, and sticky note, all recorded with the FAST message (Fig 1, B), were distributed to all the students after the lesson.

Assessments

A questionnaire on stroke knowledge (a total of 12 items for stroke signs and 10 items for risk factors) was examined using the online system in all the students before (baseline [BL]) and immediately after the lesson (IL). At 3 months after the lesson (3M), the same questionnaire was applied. The questionnaire comprised multiple choice questions and close-ended questions, which assessed stroke signs and risk factors. The 12 items for stroke signs included 6 symptoms of stroke ("headache," "vision loss," "facial weakness," "speech disturbance," "numbness on 1 side of the body," and "weakness on 1 side of the body") and 6 incorrect or atypical symptoms ("chest pain," "dyspnea," "weakness on 4 limbs," "abdominal pain," "edema in feet," and "joint pain"). The 10 items for risk factors consisted of 7 stroke risk factors ("alcohol intake every day," "smoking," "hypertension," "dyslipidemia," "hyperglycemia," "obesity," and "arrhythmia") and 3 incorrect or atypical risk factors ("constipation," "urinary frequency," and "stiffness of neck"). Furthermore, the meaning of the FAST message, such as each word of F, A, S, and T, was also examined by a single choice test, at IL and 3M.

Analysis of Data

Statistical analysis was performed using the JMP 8.0 statistical software (SAS Institute Inc., Cary, NC) or Stata software, version 12.0 (StatCorp LP, College Station, TX). We collected individual results of questionnaires on stroke knowledge at each time point until 3M using the unconnectable student number. Results of the questionnaire in each group at BL were compared with those at 3 months and those at IL by the Fisher exact test. For calculating scores, the student got 1 point if he chose a correct answer or did not choose an incorrect answer. Therefore, the scores of questionnaires on stroke signs and risk factors ranged from 0 to 12 and 0 to 10, respectively. In each questionnaire on stroke signs and risk factors, we summed these points of each student in assessing stroke knowledge. Because each student's score was measured repeatedly in a longitudinal manner, linear mixed effects models adjusted for gender and class difference and were used to analyze the association between the score of knowledge for symptoms or risk and lessons