Original Article

Risk Screening and Educating of Pharmacy Network in Khon Kaen as a Part of Stroke Fast Track Service

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Background: "Stroke Fast Track" is a service that aims to save acute stroke patients. The service is based on the concept that the acute ischemic stroke patient must be treated with rt-PA within 270 minutes. The pharmacist and pharmacy play an important role in education of stroke, risk screening and behavior change.

Materials and Methods: The present study focused on collecting past data of patients from service of 7 pharmacies in the Khon Kaen Pharmacy Network from January 15 to April 1, 2016 and categorized into 3 types: educating, risk screening, and pharmacist role.

Results: Educating data were collected from 242 participants. Out of a total score of 16, pre- and post-education scores were 10.79±3.81 and 15.83±0.49 (p<0.05), respectively. The number of service users who had heard of the phrase "Stroke Fast Track" increased from 2.54% to 100% (p<0.05), understanding of the signs of stroke increased from 21.14 to 100 (p<0.05). Risk screening data were collected from 318 service users. The majority of 72.64 percent, was at medium risk (1 to 6 points). The risks found in the present study were 54.7 percent of the service users had an oversized waist circumference and body mass index and 32.7 percent had high blood pressure (over 140/90 mmHg). In role of pharmacist, the results indicated that 100 percent of pharmacists educated participants about "Stroke Fast Track" and gave advice on behavior change to the service users.

Conclusion: Pharmacy Network can enhance knowledge about strokes, screen risk, and advice people on behavior change. It definitely leads to stroke risk reduction in the future. The linkage of this project to the national health system will have a clear benefit in helping people access "Stroke Fast Track".

Keywords: Risk screening, Stroke, Pharmacy, Community pharmacy

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Stroke is caused from an abnormality in circulation of blood flows to brain. When the blood in the blood vessels is inadequate for parts of brain, it eventually triggers an ischemic stroke. This abnormality affects the nervous system and it is usually an acute symptom underlying the high death rate, severe and chronic disabilities. World Stroke Organization (WSO) that in 2019, Stroke report 14 million people will have their first stroke this year, worldwide 80 million people live with the impact of stroke and 5.5 million people death due to stroke per year[1]. Prevalence of stroke in the United States use of NHANES 2013 to 2016 data as an estimated 2.5%. An estimated 7.0 million Americans ≥20 years of age self-report having had a stroke. On average, every 40 seconds, someone in the United States has a stroke[2].

In Thailand, the Ministry of Public Health report people have stroke 355,671 per 100,000 person and death due to stroke 34,729 per 100,000 persons in 2019[3]. All in all, strokes are a crucial health problem causing an inability to perform daily routines due to hemiparesis, dysphagia, neurological articulation disorders, ataxia, cortical blindness, etc[4]. Moreover, suffering from these symptoms naturally leads to depression and a need for close care. It also inevitably affects the economy, both at a family and national level because of the high cost of monthly care[5]. Therefore, the patients should be treated properly to decrease the seriousness and progression of symptoms affecting the brain and to prevent complications and recurrence.

Stroke Fast Track is a fast track service for acute stroke patients. The patient is sent immediately to the hospital when any stroke sign is shown, for example, face drooping, inability to speak, limb weakness, trouble walking, and blurred vision. It can be explained using FAST (F = Face drooping: one side of the face may be numb, A = Arms: one arm or leg dropping downward, having a sign of one-sided arm or leg weakness, S = Speech: having speech difficulty, speech may be in comprehensible; and T = Time: the symptom presents immediately). The patient should be

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treated with recombinant Tissue-Plasminogen Activator (rt-PA) within 3 to 4.5 hours in order to recover as fully as possible[6]. Medical personnel, including pharmacists, should play an important role in the treatment of patients, especially the community pharmacy that is able to approach the public easily. A community pharmacist should promote and educate people about "FAST", raise their awareness of stroke risk prevention, and advise them on high blood pressure management. Thailand needs to improve the role of community pharmacies, therefore, the Faculty of Pharmacy developed the pharmacy network to partially serve in the Stroke Fast Track system. This study was conducted to investigate the results of community pharmacy role development in the pharmacy network in Khon Kaen province area in Stroke Fast Track. The implementation of the study will be brought to the national stroke service system in the future.

Materials and Methods

The patients' past data were obtained from 7 pharmacies service in the pharmacy network in Khon Kaen province from January 15 to April 1 2016. The participants were from the general population aged 35 years old and older who were willing to answer the questionnaire and able to communicate. The study was divided into 3 parts as shown in the following:

Part 1 Educating

A questionnaire with 16 questions was employed. The questions were read aloud by the pharmacist to the target participant. This stage was considered the pre-test; the pharmacist then educated the participant about stroke. At least 2 weeks after this, the pharmacist made a phone call to ask the participant the same questions again; this was employed as a post-test.

Part 2 Risk screening

A screening form with 8 questions below was employed.

1) Do you have a first-degree relative who has ischemic heart disease or paralysis?

2) Have you ever smoked a cigarette in the past 6 months up until now?

3) Do you have blood pressure at or higher than 140/90 mmHg, or have received a high blood pressure diagnosis?

4) Do you have a blood sugar level at or higher than 120 mg% or have received a diagnosis of diabetes?

5) Have you been informed by the doctor or nurse that you have abnormal fat levels in your blood?

6) Do you have a body mass over 25 kg/m^2 or a waist circumference >90 cm in male, and >80 cm in female?

7) Do you have a history of stroke?

8) Do you have a history of heart disease?

Each question had 1 point. Low risk was 0 point, medium risk was 1 to 6 points, and high risk was 7 to 8 points. After screening, the pharmacists proceeded in performing their roles.

Part 3 Pharmacist role

3.1) Educate the participants about Stroke Fast Track. The pharmacist introduced the FAST document, emphasized that the patient must be sent to the doctor within 270 minutes immediately after the presence of the symptoms, gave the emergency hospital contact number at 1669, and distributed the brochure to the participants.

3.2) Instruct the participants to use the Stroke Fast Track Application. The service users could download the application by themselves or with the pharmacist's assistance.

3.3) Advise the participants to change their behavior related to their health problems.

The present study employed descriptive statistics and presented data in percentage frequency or mean and mean $\pm$ SD. The Chi-square was adopted to analyze the variable coefficients. The results are shown in Chi-square and *p*-value.

Results

Part 1 Educating

There were a total of 242 participants; the majority were female (69.42). The rest of the findings are as follows: average age was 47.48$\pm$10.21 years old, 80.17 percent were married, 44.63 percent had finished primary school, 62.81 percent earned their livingby selling things, and 85.12 percent had no disease. The results of participants' knowledge about stroke are shown in Table 1.

Part 2 Risk screening

The number of service users in the risk screening part was 318, with the majority of them males (59.12 percent) aged 54$\pm$11.89 years old. Scores of 7 to 8 points indicated the highest risk. The majority of 72.64 percent was at medium risk (1 to 6 points). The highest risk factor found was oversized waist circumferences and a body mass index of over 25 kg/m^2. The second highest risk factor was a blood pressure rate at/over140/90 mmHg. The details of the screenings are shown in Table 2.

Part 3 Pharmacist role

Pharmacists educated service users on FAST and gave advice on behavior change to a total of 318 participants (Table 3).

Discussion

The present study investigated the outcomes of pharmacy network development in Stroke Fast Track service. Pharmacists were involved in 3 parts: education on stroke, risk screening and performing the pharmacist role with service users who had recieved the risk screening. The study was conducted with Khon Kaen Province's population who used the service at 7 participating pharmacies.

In the education part, the results revealed that

Table 1. The results of knowledge measurement

Knowledge about stroke	Pre-educating	Post-educating	*p*-value
1) A stroke or a so-called "one sided paralysis" is caused from an abnormality in brain and causes chronic physical disability	80.16	100	<0.05
2) Stroke is a communicable disease	79.75	99.59	<0.05
3) If a stroke occurs once, it can recur	70.66	99.17	<0.05
4) Feeling numb or a "pins and needles" sensation on arms and legs is an imminent warning sign of disease	74.79	100	<0.05
5) Blurred vision, double vision or immediate blindness are warning signs of a stroke	67.36	99.17	<0.05
6) There are several factors promoting strokes, for example; diabetes, heart disease, and high blood pressure	82.64	99.59	<0.05
7) Strokes can be prevented by eating nutritious food from all 5 food groups, sleeping enough, taking adequate rest, and being cheerful	85.95	99.59	<0.05
8) Keeping blood pressure at a normal rate helps prevent strokes	82.23	99.17	<0.05
9) Skinny people are not at risk of having a stroke	78.10	96.28	<0.05
10) Annual health checkups help in reducing risks of stroke	80.58	99.17	<0.05
11) Stroke patients cause an impact on family finances	70.66	96.69	<0.05
12) Stroke affects a patient's socialization ability	66.94	95.04	<0.05
13) Have you ever heard the phrase "Stroke Fast Track"?	2.54	100	<0.05
14) Perceive the warning signs of stroke (Able to identify more than 1 sign)	21.48	100	<0.05
15) The first thing to do in helping a person with the presence of stroke warning signs			
15.1) Immediately take that person to the hospital	34.71	97.70	
15.2) Perform chest compressions	0.83	0.00	
15.3) Help that person lie down to rest	2.89	0.00	
15.4) Immediately take that person to see the closest doctor	7.02	2.30	
15.5) Other	0.00	0.00	
15.6) Do not know	54.54	0.00	
16) When is the best time to take a person with the presence of stroke warning signs to the hospital in order to help him/her have the highest chance of full recovery and return to normal life?			
16.1) within 1 hour	76.03	99.59	
16.2) 1.5 to 2 hours	16.12	0.41	
16.3) 3 hours	2.07	0.00	
16.4) 4 hours	4.54	0.00	
16.5) 5 to 6 hours	0.00	0.00	
16.6) 1 to 3 days	0.83	0.00	
16.7) 1 week	0.00	0.00	
Total	10.79±3.81	15.83±0.49	<0.05

Presented in percentage of people who had proper knowledge in each item

community pharmacy played an essential role in educating people on strokes; this was clearly seen in pre and post knowledge measurements. Pre-educating results in perceiving of stroke warning signs was only 21 percent; 67.36 percent could tell that vision trouble was one of the warning signs and 74.79 percent realized that feeling numb on limbs was a warning sign. The most compelling finding was that only 2.54 percent had heard about "Stroke Fast Track", which means the knowledge in this aspect was deficient in the majority of population. The overall findings reflected that access to stroke knowledge was limited and lack of awareness about strokes broadly existed in the general population. The

Table 2. Risk screening

Details	n (%)
1) Do you have a first-degree relative who has ischemic heart disease or paralysis?	11 (3.46)
2) Have you ever smoked a cigarette in the past 6 months up until now?	11 (3.46)
3) Do you have blood pressure at or higher than 140/90 mmHg, or have received a diagnosis of high blood pressure?	104 (32.7)
4) Do you have a blood sugar level at or higher than 120 mg%, or have received a diagnosis of diabetes?	23 (7.23)
5) Have you been informed by the doctor or nurse that you have abnormal fat levels in your blood?	12 (3.77)
6) Do you have a body mass over 25 kg/m^2 or waist circumference >90 cm in male, and >80 cm in female?	174 (54.7)
7) Do you have a history of stroke?	0 (0.00)

Table 3. Pharmacist role

Details	n (%)
1) FAST Stroke Fast Track education	318 (100)
2) Stroke Fast Track Application instruction	5 (15.72)
3) Behavior change advice	318 (100)

scores increased from 10.79±3.81 to 15.83±0.49 at the post educating stage. This correlated with Lecouturier study on[7] intervention systems in a television, radio, and newspaper campaign of stroke knowledge and reactions to emergency and immediate stroke treatment. The results concluded that the campaign raised higher stroke awareness among medical personnel and the general population. In addition, the study of Noamjit Nanual and Deunpensrikha (2012)[8] on stroke knowledge and behavior in reducing stroke risk of people who were at risk in Samliam community, Muang district, Khon Kaen province showed that 52.8 percent of the participants had more stroke knowledge and 76.4 percent demonstrated more preventative behavior in reducing stroke risk. It is clearly seen that providing stroke knowledge assists in reducing stroke risk. Therefore, campaigns and education conducted by pharmacists play a vital role in increasing knowledge and awareness of stroke among people.

The findings in the risk screening indicated that 72.64 percent of service users were at a medium risk (1 to 6 points). Those risks were oversized of waist circumferences and over 25 kg/m^2 of body mass index, and these risks were found in 54.70 percent of the service users. Blood pressure rates of 140/90 mmHg or over found in 32.70 percent of the service users.

Findings in the pharmacist role demonstrated that the pharmacists educated on FAST advised the following on behavior change: consistently eating good nutrition, exercising, going for health checkups, and taking medicine in order to avoid the risk of stroke. According to a study of Stacy Mangum et al[9] on the screenings conducted by community pharmacies, out of 351 patients with high blood pressure who were at risk of stroke needing immediate treatment at the hospital, there were 216 patients (62%) with over 140/90 mmHg blood pressure, 121 patients were immediately sent to the hospital, and 43 patients (36%) needed a change in medication. Moreover, 4% of patients were not at risk, 26% were at low risk, 32% were at medium risk, and 38% were at high risk. It can be concluded that community pharmacies played an important role in screening and evaluating patients who were at risk of stroke prior to being sent to the hospital. Another study on pharmacist roles conducted by Pedro Amariles et al[10] investigated pharmacist interventions in pharmaceutical care in patients with heart disease risk. The patients involved ranged in age from 25 to 74 years old and were measured for blood pressure and blood cholesterol levels. A total number of 741 patients were divided into 2 groups by a random sampling method. 356 patients received advice from the pharmacists whereas 358 did not. The comparison revealed that the group receiving advice had blood pressure and blood cholesterol at the expected levels while the other group did not; BP (52.5% vs. 43.0%, p = 0.017), TC (56.5% vs. 44.1%, p = 0.001), and BP/TC (37.1% vs. 21.8%, p<0.001). The results supported the conclusion that the pharmacist's advice helped patients to achieve the treatment goal and reduce other heart diseases risk, especially stroke. Taken together, all these findings support that the idea that the pharmacist's role is necessary for screening and stroke prevention. However, the present study does not include the evaluation of outcomes of giving advice for behavior change.

Conclusion

Pharmacy networks are able to educate about stroke knowledge, screen, and advice people on behavior change. The results of this study will surely lead to stroke risk reduction in the future. The further linkage of this project with the national health system will enhance knowledge and promote accessibility to the Stroke Fast Track system.

What is already known on this topic?

Pharmacists can provide knowledge about stroke

and can provide risk screening and behavioral modifications to reduce the risk of stroke.

What this study adds?

This study should be extended to the entire country and study the cost effectiveness of the service.

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Conflicts of interest

The authors declare no conflict of interest.

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