

ICASH-A17

EFFECTIVENESS OF ‘FAST’ STROKE CAMPAIGN FOR FAST STROKE RECOGNITION AND RESPONSE: A SYSTEMATIC REVIEW

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ABSTRACT

Background: FAST campaigns help people recognize the signs and symptoms of stroke rapidly to bring the patient to the hospital or emergency department immediately. However, the effectiveness is still being questioned. This present study is to evaluate the effectiveness of the campaign of early detection in stroke patients to reduce the risk of disability.

Methods: A systematic review of articles published between 2010 and 2017 examining the effectiveness of FAST campaign using interventions was conducted along with narrative synthesis and review of intervention development. Information from all relevant published articles that determine how the intervention was developed and evaluated for measuring the effectiveness of FAST campaign were extracted and analyzed.

Results: Eleven studies were included, six studies report the effectiveness of FAST campaign, but the other five studies report that the campaigns still do not hit the target. The professionals claim that FAST campaign has been promoted internationally as a great success, but some studies report that the FAST campaign still do not have any significant impact in promoting swift response for Emergency Medical Services (EMS).

Conclusions: Campaigns aimed at the public may raise awareness of signs of stroke, but have limited impact on behavior. Thus, new campaigns of FAST should survey the principles of good design and be intensely evaluated for the effectiveness of the implementation.

Keywords: Stroke, FAST campaign, intervention, effectiveness

INTRODUCTION

According to the American Heart Association, heart disease and stroke were the No. 1 and No. 2 killers worldwide [1]. Based on the data from the World Health Organization (WHO) in 2004, 15 million people worldwide suffer from a stroke every year. One-third of the sufferers die, and one third have permanent disabilities [2]. According to Basic Health Research 2013, the prevalence of stroke in Indonesia was 12.1 per 1000 population. That number was raised compared to data from Basic Health Research in 2007 which amounted to 8.3 percent. Stroke has been the leading cause of death in almost all hospitals in Indonesia, at 14.5 % [3].

The most complex organ of the human body is the brain. It controls all the senses and functions of the body. Stroke sometimes called a brain attack because of a sudden interruption in the blood supply to the brain. Thus, the first treatment of stroke must be done quickly since this kind of disease attack the brain that is one of the vital human organs. It is expected that by doing the fast and precise handling, it

will be able to save lives and reduce the risk of disabilities [2]. In fact, the phenomenon that happens in Indonesia, people do not recognize the signs and symptoms of stroke so that patients are often late to get the proper care and the proper medical treatment, most of them arrived at the hospital more than 6 hours from stroke onset [4]. The delay in medical treatment of stroke can lead to permanent disability or even death.

Stroke does not only attack the elderly but according to a recent study by Arianto (2016) 45% of stroke cases occur in the age group of 45-64 years, and 11% was first diagnosed during the age of 35-44 years [5]. It shows that this deadly disease not only attacks the elderly, but it can be more dangerous since it starts targeting the younger ages [5]. The main thing that distinguishes stroke between the young people and the elderly is the recovery stage. Stroke onset in the young age can lead to a decrease in lifetime productivity because of a long recovery period or even a lifetime recovery. Although young patients can recover faster and potentially heal better, they are more likely to have minor or severe disabilities and even death [6].

In February 2009, the Department of Health in England launched the Face, Arm, Speech, and Time (FAST) mass media campaign to raise public awareness of stroke, specifically its symptoms and the need for an emergency response [7]. The *FAST* is an acronym for stroke symptoms that is used as a *mnemonic* to help the stroke patients' family in detecting and enhancing responsiveness to stroke victim needs more easily. It stands for Facial drooping, Arm weakness, Speech difficulties and Time to call emergency services. This campaign can increase people's knowledge of the dangers of stroke and increase public understanding of the early symptoms of stroke so that it can immediately be reported and handled by the emergency medical personnel and also the physician. Thus, the potential for a more severe stroke onset can be reduced. Adopted from the American Heart Association 'FAST' is a simple test to help people identify stroke symptoms, such as; 1. Face – has their face fallen on one side? Can they smile? 2. Arms – can they raise both arms and keep them there? 3. Speech – is their speech slurred? 4. it is Time to call 119 for *Emergency medical* services if you see any one of these signs [8,9].

Although it is necessary to hold a FAST campaign to help people recognize the signs and symptoms of a stroke rapidly and bring the patient to the hospital or emergency department immediately. However, the effectiveness is still be questioned since there are some cases studies that report the current use of FAST in social marketing campaigns might be insufficient to reduce pre-hospital delay at a population level and thus may have minimal impact on public health. On the other hand, some other studies report that the FAST campaign has a statistically significant impact on increasing people's awareness about stroke and how to act FAST. The Objectives of the present study were to evaluate the effectiveness of the campaign of early detection in stroke patients to reduce the risk of disability.

METHOD

Search strategy

The protocol for the systematic review was published on PRISMA-P (Preferred Reporting Items for Systematic review and Meta-Analysis Protocols) 2015 [10]. We conducted a systematic search in three databases (Proquest and Science direct) to retrieve relevant peer-reviewed publications of empirical studies. Databases were searched from 2010 to 2017. The search terms included three headings: (1) Stroke Detection, (2) Effectiveness, (3) FAST campaign.

Inclusion and exclusion criteria

The author screened the title and abstract of studies which are not full text and irrelevant. We had a language restriction, and we only review studies which written in English. We also limit our studies which use Fast methods to recognize stroke symptoms. Studies were selected according to these criteria: (a) targeted groups: the general public aged 18 or over; (b) outcomes: knowledge of stroke symptoms and, awareness of the need for emergency response, and time to arrive at the hospital.

Data extraction

Electronic databases were searched during the week of 11 - 21 November 2017 independently by three authors. Titles and abstracts were screened to identify studies of possible relevance and full paper obtained. A structured form was used to determine study inclusion. Three authors extracted data from the final papers into structured tables. The results are presented as a narrative synthesis as the intervention varied in their format and presentation, were evaluated using different methods and outcomes, and included a range of study populations.

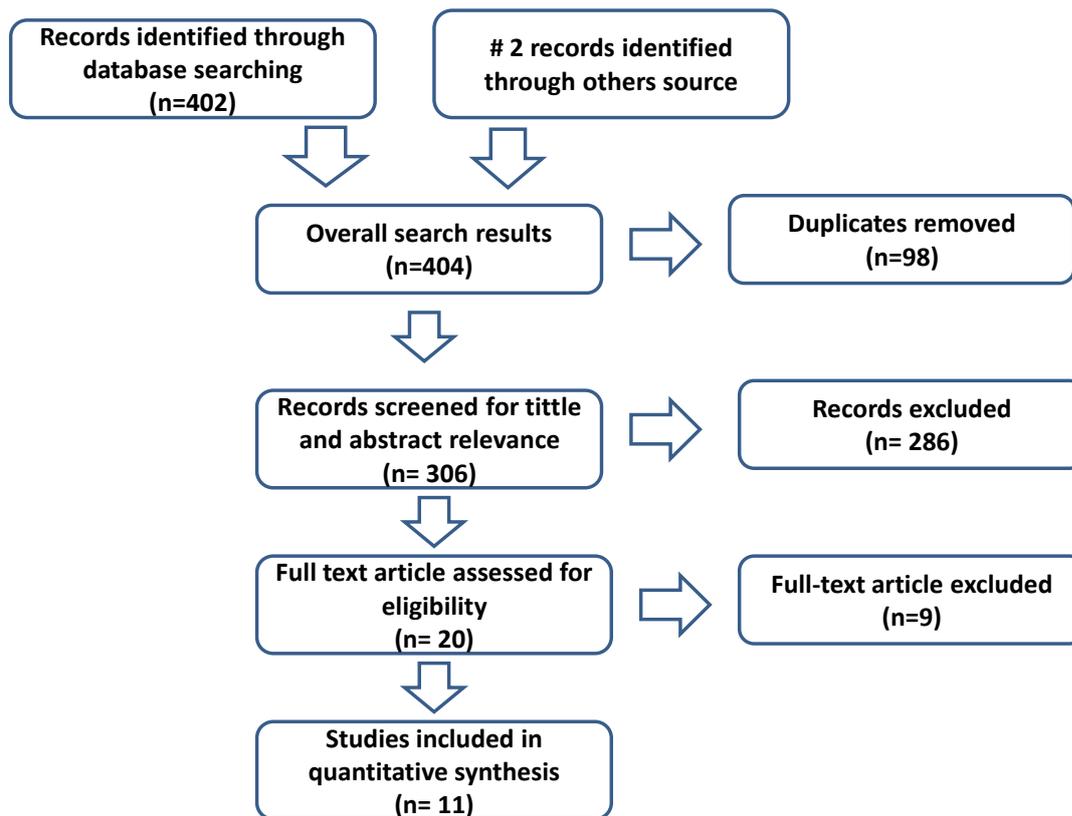


Diagram 1. PRISMA flow diagram of search result

RESULT

A total of 404 records were identified from 2 databases, and 306 unduplicated citations were scanned manually for potential inclusion. After screening the 306 records, 286 records were excluded. The remaining 20 records were assessed for eligibility. The review examined the effectiveness of the FAST campaign, and only 11 systematic reviews studied to meet the purpose of this studies.

In the table, it shows that people know about stroke symptoms and their information sources were surveyed can be from mass media such as television, newspaper, radio and also from personal communication sources such as posters, leaflets, internet, and health professionals. However, some studies indicate that these kinds of campaigns still do not increase people response to call the EMS immediately. However, other studies report that the campaigns may increase people awareness of stroke symptoms since it uses the simple language so that all people understand easily and make the method of FAST more useful to be applied.



Table 1. The result of Systematic Review

No.	Study	Year	Sample	Intervention	Findings
1.	Dombrowski, U Stephan Ph.D., et al.	2015	A sample of the general, adult population in Newcastle upon Tyne, UK, was selected randomly from the electoral register. (all adults aged 18 or over who are eligible to vote in the UK)	The campaign includes all waves, such as television advertisements targeting the general population, with the earlier waves including additional dissemination channels such as radio, the press, and outdoor advertising. The campaign also included printed materials, such as leaflets and posters, displayed and available in primary care.	Raising awareness of stroke signs and symptoms and the need to call EMS based on the current use of FAST in social marketing campaigns might be insufficient to reduce pre-hospital delay at a population level and thus may have minimal impact on public health.
2.	Aroor, S. et al.	2017	All patients admitted to the University of Kentucky Stroke Center between January and December 2014	A simple modification of the FAST mnemonic to be BE-FAST, adding a “B” for balance and an “E” for eyes.	It was found that 14% of patients with acute stroke would be missed using FAST alone, and this proportion was reduced to 4.4% with the addition of a history of gait and visual symptoms (BE-FAST).
3.	Lecouturier et al.	2010	Targeted groups in English: the general public aged 18 or over	Some mass media campaigns	Ten mass media intervention studies met the inclusion criteria; six targeted the public and four both public and professionals.
4.	Kaps, M. et al.	2014	5023 acute patients with stroke(aged 18–55 years) patients (96.5% Caucasians) were enrolled in the study between April 2007 and January 2010.	Messaging in public awareness programs	FAST symptoms could be traced in 76.5% of all cases. 35% of those with at least one FAST symptom had all three symptoms. Clustering clinical signs according to FAST lower percentages of strokes in the posterior circulation (65.2%) and patients with TIA (62.3%) were identified.



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(No. 3, 2018)

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5.	Flynn, D. et al.	2014	Data from the SITS-UK database from hospitals in England that submitted data to the register throughout the study period (n= 27) and the patients receiving thrombolytic treatment.	Mass media interventions are promoted as an effective method of improving awareness of health issues and changing behavior, including encouraging appropriate use of services.	Phase one had a statistically significant impact on information seeking behavior and emergency admissions, with the additional impact that may be attributable to subsequent phases of information seeking behavior, emergency admissions via GPs, and thrombolysis activity
6.	Thompson G Robinson, et al.	2012	1300 members of a mixed urban/rural, multiethnic population that was sampled in public areas, places of work and schools.	To ensure consistency, the questionnaire was administered by one individual (AR) and was designed to assess some domains of people's awareness	70% of the public surveyed were aware of the FAST campaign, with the highest penetration in the female, older and white population, However, poor recognition of other important signs, including leg weakness (57%) and visual loss (44%) were seen, and significantly more men were likely to report non-specific symptoms as being associated with stroke.
7.	Dombrowski, et al.	2013	Stroke patients, stroke witness, and primary care clinicians	Interview transcripts were content analyzed to assess, explore and examine the views on 'Act FAST' as the campaign awareness of stroke	Most participants were aware of the Act FAST campaign. Some patients and witnesses reported that the campaign impacted upon their stroke recognition and response, but the majority reported no impact.
8.	Dwi Arianto	2016	The family of stroke patients	Quasy-experiment with pre-test and post-test control group design. (family of stroke patients) Sampling: purposive sampling.	The Act FAST method was effective to increase knowledge of stroke patient's family to recognize stroke
9.	Vo, L.P et all	2017	Community members 18 years of age and older.	Act FAST educational session delivered by student pharmacists	The Act FAST educational intervention delivered by student pharmacists increased knowledge of signs, symptoms, immediate management, and modifiable risk factors for stroke. This suggests that student pharmacists may have a positive impact on community members' preparedness and



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					knowledge of the primary prevention of stroke. The Act FAST campaign may be a useful tool for all training health care professionals.
10.	Miyamatsu, M et all	2013	5,540 randomly selected residents, aged 40–74 years, of 3 cities in Japan	Knowledge of Stroke Symptoms was Surveyed by multiple choice mail-in	As a single method of public education, television could be the most effective strategy. Moreover, the combined approach involving mass media and personal communication source might have a synergistic effect. Less well-known symptoms, such as visual disturbance, should be noted in the public education campaign.
11.	Wolters, F.J, et all	2015	668 consecutive patients with major stroke, in the UK Population	Determined patient behavior after significant incident stroke (NIHSS > 3) in a UK population based study (Oxford Vascular Study) before (2002–2008) and after (2009–2013) introduction of the FAST TV-campaign and assessed any sustained impact of campaign continuation.	Delays in seeking and receiving medical attention after significant stroke in the UK. fell strikingly in 2009, coinciding with the start of the FAST TV campaign. A bystander sought that medical attention in nearly 90% of cases illustrates the importance of mass-media public education rather than focused programs in high-risk groups for significant stroke

Sources: [5,7,9,11–18]

The first research article in the table above is entitled The Stroke ‘Act FAST’ Campaign: Remembered But Not Understood? By Dombrowski, U Stephan Ph.D., et al. This study aimed to test whether providing knowledge of the FAST acronym through a standard Act FAST campaign leaflet increases accurate recognition and response in stroke based scenario measures. The method used a cross-sectional survey of adults in Newcastle upon Tyne, UK, sampled using the electoral register. The researcher selected 5000 individuals at random to receive a questionnaire and ‘Act FAST’ leaflet (n=2500), or a questionnaire only (n=2500) in 2012. The result shows that there was no impact on stroke recognition and response measures, despite participants who received a leaflet showed better campaign recall, since there were no between-group differences for stroke recognition and response to stroke-based scenarios (ps>0.05). In other words, the difference between the two groups of participants was not significant.

The second research article by Aroor, S. et al. are entitled “BE-FAST (Balance, Eyes, Face, Arm, Speech, Time) Reducing the Proportion of Strokes Missed Using the FAST Mnemonic.” This study aimed to evaluate a revised mnemonic of FAST to be BE-FAST since the acute ischemic stroke was not captured by FAST only. The researchers reviewed the records of all patients (n=858) admitted to the University of Kentucky Stroke Center between January and December 2014 with a discharge International Classification of Diseases, Ninth Revision, Clinical Modification code for acute ischemic stroke. The result shows that in the patients with ischemic stroke with deficits potentially amenable to acute intervention, 14% are not identified using FAST mnemonic only. Thus, it is necessary for the public education programs to revise the mnemonic of FAST to be BE-FAST since the inclusion of gait/leg and visual symptoms leads to a reduction in missed strokes.

The third article by Lecouturier et al. is a systematic review of mass media interventions designed to improve public recognition of stroke symptoms, emergency response, and early treatment. This article explains that mass media interventions had been implemented to improve emergency response to stroke given the emergence of effective acute treatments, but their impact was still unclear. This study targeted groups of the general public aged 18 or over. The participants should know stroke symptoms and, awareness of the need for emergency response, rates of acute stroke treatments, and time for a presentation at the hospital. The result shows that campaigns aimed at the public may raise awareness of symptoms/signs of stroke, but have limited impact on behavior. Campaigns aimed at both public and professionals may have more impact on professionals than the public. Thus, new campaigns should follow the principles of good design and be evaluated.

The fourth research article by Kaps, M. et al. is entitled Clinical signs in young patients with stroke related to FAST: results of the sifap1 study. This study investigated the clinical symptoms in young patients with stroke, participants in a unique prospectively collected population of young (18–55 years) stroke victims; there were 5023 acute patients with stroke (Stroke in Young Fabry Patients study; sifap1) between April 2007 and January 2010. A particular focus was the analysis of symptoms included in the (face, arm as well as speech and time) FAST scheme. A FAST message is a tool used in awareness campaigns to propagate clinical sign of stroke; it includes weakness of the face and arm, as well as speech and time. The main finding indicates that the FAST scheme does not target nearly one-quarter of young strokes. However, FAST signs are more frequent in patients with acute stroke eligible for thrombolysis.

The fifth research article by Flynn, D. et al. is entitled A Time Series Evaluation of the FAST National Stroke Awareness Campaign in England. The objective of this study was evaluating the impact of three consecutive phases of FAST using population-level measures of behavior in England. This study assessed the impact of the campaign on: access to a national stroke charity’s information resources (Stroke Association [SA]); emergency hospital admissions with a primary diagnosis of stroke (Hospital Episode Statistics for England); and thrombolysis activity from centres in England contributing data to the Safe Implementation of Thrombolysis in Stroke UK database. It was found that phase one had a statistically significant impact on information seeking behavior and emergency admissions, with the additional impact that may be attributable to subsequent phases on information seeking behavior,

emergency admissions via GPs and thrombolysis activity. Future campaigns should be accompanied by evaluation of the impact on clinical outcomes such as reduced stroke-related morbidity and mortality.

The sixth research article entitled “The face arm speech test: does it encourage rapid recognition of important stroke warning symptoms?” by Thompson G Robinson et al. aimed at assessing public knowledge of stroke and transient ischaemic attack symptoms, and awareness of the content of a recent national health campaign. The participants were 1300 members of a mixed urban/rural, multiethnic population that was sampled in public areas, places of work and schools in Leicester, UK. The researchers investigated the participants about their knowledge of the terms ‘stroke’, ‘stroke risk factors’ and the ‘FAST campaign.’ Awareness of stroke symptoms, and ability to distinguish from non-stroke symptoms using interviewer-administered questionnaire. 70% of the public surveyed were aware of the FAST campaign, with the highest penetration of the female, older and white population. It means that the survey has confirmed the effectiveness of the recent FAST campaign in raising public awareness of stroke and stroke warning signs, though poorest penetration was seen in the black and minority ethnic population. This may lead to delays in presentation, specialist assessment, and secondary prevention, and such stroke warning signs should be included in future public health campaigns.

The seventh research article by Dombrowski, et al. is entitled *The impact of the UK ‘Act FAST’ stroke awareness campaign: a content analysis of patients, witness, and primary care clinicians’ perceptions.* In this study, the researchers examined the perceived impact and views of the campaign in target populations to identify potential ways to optimise mass-media interventions for stroke. The analysis of semi-structured interviews conducted as part of two qualitative studies, which examined factors influencing patient/witness response to acute stroke symptoms (n= 19 stroke patients, n= 26 stroke witnesses) and perceptions about raising stroke awareness in primary care (n= 30 clinicians). Both studies included questions about the ‘Act FAST’ campaign. Interviews were content analysed to determine campaign awareness, perceived impact on decisions and response to stroke, and views of the campaign. The result showed that Act FAST has had some perceived impact on stroke recognition and response in some stroke patients and witnesses, but the majority reported no campaign impact. Primary care clinicians were positive about the campaign, and believed it had impacted on stroke awareness and recognition but doubted impact on response behaviour. Potential avenues for optimising and complementing mass media campaigns such as ‘Act FAST’ were identified.

The research article by Dwi Arianto investigated the family awareness of stroke patients; this study used Quasy-experiment with pre-test and post-test control group design. (family of stroke patients). It was found that the Act FAST method was effective to increase knowledge of stroke patient’s family to recognize a stroke, so that the delay to come to the hospital could be decreased. It is in line with the article of Vo, L.P et al that found The Act FAST educational intervention increased knowledge of signs, symptoms, immediate management, and modifiable risk factors for stroke. This suggests that student pharmacists may have a positive impact on community members’ preparedness and knowledge of the primary prevention of stroke. The Act FAST campaign may be a useful tool for all training healthcare professionals. However, in this study The Act FAST educational intervention delivered by student pharmacists.

In another strategy of delivering knowledge to the public is using mass media. Miyamatsu, M et al. Investigated 5,540 citizens knowledge of Stroke Symptoms were Surveyed by multiple choice mail in Japan. It was found that one of the mass media such as television could be the most effective strategy. Moreover, the combined approach involving mass media and personal communication source might have a synergistic effect. Less well-known symptoms, such as visual disturbance, should be noted in the public education campaign. However it was contradictory with the research findings of Wolters, F.J, et al., they assessed any sustained impact of campaign continuation from television. It was found that mass-media public education through FAST TV campaign did not change anything in the delays of stroke patients at hospitals and receiving medical treatment. The medical attention was sought by a

bystander in nearly 90% of cases illustrates the importance of mass-media public education rather than focused programs in high-risk groups for major stroke.

DISCUSSION

This review has focused on the evaluations of the effectiveness of FAST campaign using various mass media interventions designed and other waves to increase public recognition of stroke symptoms, the emergency response to stroke and early intervention. The professionals claim that FAST campaign has been promoted internationally as a great success, but any studies report that the FAST campaign still do not have any significant impact to make people act fast in calling the EMS. Each study was examined, using the information from all relevant published articles, to determine how the intervention was developed and evaluated to see the effectiveness of FAST campaign; a summary of the intervention of FAST campaign and also the result was recorded into the table. Some different interventions to improve knowledge of stroke symptoms and the appropriate action have been tested, for example, community stroke screening events, patient education programs, and mass media campaigns.

However, five of eleven studies report that the campaigns still do not hit the target. According to some studies of examining the effectiveness of using the FAST method, most of them conclude that FAST method might make people aware of the symptoms, but they do nothing when they face or see the occurrence. Some of the campaigns that have been developed and implemented in some developed countries such as Britain and America are conducted through several mass media such as television and radio channels as this can be easily accessible by the wider community. Unfortunately, its effectiveness in improving community response in action is questionable. Campaigns aimed at the public awareness of symptoms/signs of stroke, but some studies claim that it has limited impact on behavior. Campaigns are intended to both public and professionals, but it may have more impact on professionals than the public.

Thus, new campaigns should survey the principles of good design and be intensely evaluated. In one study the FAST campaign has been proven to be a useful tool in increasing understanding for the signs, symptoms, and management of stroke. However, different populations and demographics have mixed responses to the knowledge and management of stroke. Thus, it is suggested that the campaign should not only provide the characteristics of stroke warning signs before attack or the symptoms, but the new information and knowledge of any diseases that can cause stroke attack is also needed, such as hypertension, diabetes, hyperlipidemia, or coronary artery disease and also the knowledge about level of risk factors of stroke. Also, the participants of the campaign or health promotion must be given the explanation of the stroke prevention that they should check blood pressure, blood sugar, cholesterol, or body weight checked at least once within the past 1-3 months. The explanation should deliver using a clear and easy explanation for anyone or use the appropriate language for the different educational level of the community.

In one study it is stated that in England, the FAST campaign has achieved relatively high retention; around 70% of our survey respondents reported having heard of the campaign previously, and over 90% of respondents reported the intention to call EMS when suspecting a stroke. In one study in the UK the FAST method has been modified since it was found that FAST method cannot detect acute stroke and patients with acute stroke would be missed using FAST alone. Thus, this study claims that a simple modification of the FAST mnemonic (BE-FAST) could reduce the proportion of missed strokes while reinforcing the essential public health message.

The campaign should provide the retention and high levels of knowledge of what to do in the event of stroke lead to better responses and recognition in stroke scenario. Based on several studies it indicates that the public and professional campaigns largely focused on outcomes of time to hospital and thrombolysis rates. In one of the studies enhancing peoples knowledge about stroke symptoms may not only from campaigns but also some trends of time, this study also found the evidence of increasing

public access to stroke-related information (website hits, webpage views, information materials dispatched by the SA, and calls to their helpline), increased overall/A&E emergency admissions, decreased emergency admissions via GPs, and increased thrombolysis activity that were attributable to the FAST campaign over and above underlying trends.

CONCLUSION

FAST campaigns are conducted to increase public awareness of stroke and do the appropriate action, such as calling the emergency medical service. In some research, the campaigns of FAST and some health promotions do not decrease the stroke patient delay in the hospital. However, more articles support FAST campaign raising the communities' awareness on the action of FAST, although they also suggest that the campaigns must be reviewed and improved for the effectiveness of the understanding and implementation. Increasing the implementation of the FAST campaign and providing awareness on the modifiable risk factors are necessary to decrease the incidence of stroke and improve the quality of life of many individuals.

ACKNOWLEDGMENT

This study was self-funded. We acknowledge the contribution of *Prof. Drh. Wiku Bakti Bawono Adisasmito, M.Sc., Ph.D.* and *Dr. Ir. Lilis Heri Mis Cicih, M.Si.* At the Faculty of Public Health, Universitas Indonesia, who gave us valuable guidance on literature searching, journal writing, and the comments of this paper.

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