Mass Media Intervention in Western Norway Aimed at Improving Public Recognition of Stroke, Emergency Response, and Acute Treatment

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Background: This study evaluates the effect of a mass media intervention (MMI) on the number of admissions to the emergency room (ER) with a suspected acute-onset stroke and on the number of patients treated with intravenous thrombolysis (IVT). The MMI was run for 1 month, with a precampaign month, priming the treatment chain and raising in-hospital awareness. *Methods:* This study conducted a prospective analysis of all patients admitted to the ER before, during, and after the MMI to assess changes in admission rate and IVT treatment rate. The primary end point was to assess any change in the IVT treatment rate, and the secondary end point was to determine the number of acute stroke admissions to the ER within 4.5 hours of symptom onset. *Results:* The MMI resulted in an increased IVT treatment rate from 7.3 to 11.3 patients per month, an increment of 54% ($P = .002$). This also resulted in IVT treatment percentages as high as 42%. The number of suspected acute stroke admissions to the ER increased from 37.3 to 72.8 patients per month, a 97% increase ($P < .0001$). The Epinion interviews showed that stroke symptom recognition increased from 66% to 75%. *Conclusion:* The MMI produced a significant increase in IVT treatment rate. This increased treatment rate is largely due to the increase in the number of acute stroke admissions to the ER. Targeting the treatment chain before the MMI led to unprecedented IVT treatment percentages. The effect of our MMI lasted for approximately 6 months before tapering off; repeated campaigns are a prerequisite for sustained IVT treatment rates. **Key Words:** Stroke—thrombolysis—IVT—acute treatment—awareness campaign—treatment rates.

Introduction

Stroke is the most frequent cause of permanent disability in the industrialized world and one of the most frequent causes of death.[1,2] The past 2 decades have seen a revolution in the treatment of acute stroke, initially with the use of intravenous thrombolysis (IVT)[3,4] and more recently with the advent of endovascular thrombectomy.[5] Both treatment modalities and their potential outcomes are time dependent, the key factor being the delay from symptom onset to treatment.

Streamlining the treatment chain starting with the emergency medical service (EMS) response and the emergency room (ER) has resulted in a reduction in treatment delay,[6] thus resulting in more patients receiving treatment and

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improved patient outcomes.[7] These models have been so successful that their implementation in other hospitals has reduced treatment delay.[8]

Despite the emphasis on reducing treatment time in-hospital, there is a significant prehospital delay[9] and it is this prehospital delay that contributes most to prolonged treatment times.[10] To this end there have been several mass media interventions (MMIs) to increase awareness and encourage a rapid response to acute-onset stroke symptoms.[11-13] These campaigns have been shown to have some immediate effect on awareness but no lasting effect on patient behavior.[14,15] A recent study evaluating the effect of one such public awareness campaign suggests repeated campaigns may be the key to changing such behaviors.[16]

We aimed to run an MMI canvassing social media, newspapers, and television over a period of 1 month. The campaign also included the use of leaflets and advertising space at local hospitals, GP surgeries. The campaign was contracted out to a national advertising agency based in Oslo, Norway.

The MMI was run across Western Norway, a region with a population of 1.2 million and 4 treatment centers. We have analyzed and now present the data from our center, Stavanger University Hospital (SUS), in this paper.

At the start of the campaign, we monitored 2 end points: the primary end point, the number of patients with acute-onset ischemic stroke treated with IVT; and the secondary end point, the number of patients admitted directly to the ER by the EMS with a possible acute stroke within 4.5 hours of symptom onset. In addition to our 2 main data end points, we tested the awareness of stroke symptoms in the general population to determine if there were any changes attributable to the campaign.

Materials and Methods

In May 2014, we launched the Face, Arms, Speech, Time, (FAST) campaign in Western Norway. The campaign was designed to raise public awareness of stroke and its specific symptoms, with the aim of encouraging a rapid response. In April 2014, we had several precampaign events for the entire treatment chain involved in stroke triage, transport, and treatment to promote the upcoming campaign.

Campaign Design

The MMI comprised advertising on television, posters, and advertising on social media and healthcare trust websites. The posters and advertisements were based on the FAST mnemonic and focused on the primary symptoms of stroke: facial drooping, arm weakness, speech difficulties, and the crucial element of time. However, the use of acronyms was avoided; both the posters and television advertisements used vivid imageries of actors acting out the above-mentioned symptoms (Fig 1). The imageries were reinforced by text calling for action on the part of the stroke victim or the stroke witness: a call to action.

The importance of a prompt response to the onset of symptoms was further emphasized by the caption "Call the EMS and save the brain" appearing on all aspects of the MMI. The campaign used a bold black font to emphasize the FAST mnemonic.

With regular intervals, the advertising was reinforced by using blogs on the healthcare trust website and links from social media sites.

The campaign ran for 1 month, May 2014, as a pilot for a potential nationwide campaign later on. The total cost of the MMI was 1.5 million NOK, around 160,000 EUR (October 2015).

Campaign Effect Evaluation

Using International Classification of Diseases—10 diagnosis codes and the Nordic Medico-Statistical Committee Classification of Surgical Procedures codes, we determined the number of patients treated with IVT for an acute-onset ischemic stroke. At SUS we went through patient records to double check that no patients were overseen due to arbitrary coding. The ER database at SUS was used to determine how many patients were admitted to the ER with a suspected acute-onset stroke and to further identify those admitted directly by the EMS without being seen by a prehospital physician. These numbers were compiled month by month and collated into a separate stroke research database.

Epinon Investigation

Telephone surveys conducted by a market research company based in Stavanger, Norway, were used to ascertain the awareness of stroke symptoms in the local population. A total of 1400 telephone interviews were carried out before and after the MMI to look for any increased awareness. The 1400 interviews were carried out on adults (over 18 years of age) with an age and sex distribution in congruence with the population of the surrounding area. The population characteristics were males (51%) aged 18-19 years old (4%), 20-39 years old (36%), 40-54 years old (27%), 55-66 years old (17%), 67-79 years old (11%), and over 80 years old (6%).

Statistics

Using the stroke research database, the data for the above-mentioned end points were collected and analyzed. Statistical analyses were conducted to determine any changes in the number of EMS admissions as well as in the number of treatments with IVT. Statistical analysis was conducted using IBM SPSS version 19 (IBM Corporation, Armonk, NY). P values were determined using 1-way analysis of variance and Pearson's chi-square test as appropriate. P values less than .05 were considered significant.