Assessment of the Efficiency of Stroke Awareness Campaigns in Hungary

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Background: The critical period of stroke management lies between the disease onset and the time of the emergency call, relying on stroke-related knowledge of the population. Public campaigns play a role in spreading relevant health information. Due to the substantial expenses of these campaigns, the assessment of their efficiency is reasonable. *Methods:* We assessed the number of thrombolytic treatments performed in Hungary, subjected to national media coverage and in particular in Budapest, being the location of the Stroke Day campaign, in the period between 2008 and 2015. We compared the change in the daily mean number of thrombolytic treatments performed during the preceding and following day, week, and month. Data were also compared with annual means. *Results:* No meaningful changes can be seen in the number of thrombolytic treatments on the days immediately following Stroke Days, and casual differences can be seen in the following week. The comparison of the numbers of thrombolytic treatments performed in the postcampaign months with the monthly means in the corresponding years revealed a positive effect in each year except for 2012, 2014, and 2015. Regarding the whole examined period, however, the effect is not statistically significant, neither for data obtained from Hungary nor from Budapest. *Conclusions:* Better outcomes were observed 1 month after a campaign than more immediately. This can be partly explained by ongoing media coverage in a given period rather than exposure of the public on a single Stroke Day. **Key Words:** Campaign efficiency—stroke awareness—thrombolytic treatment—stroke day.

Introduction

Stroke is one of the leading causes of death worldwide and predominates among the factors resulting in disability. On the basis of the physiological features of the brain, prevention would be the most effective approach in reducing disease burden, whereas in cases where the event has already occurred, the earliest possible initiation of therapy could provide the best outcome. At present, thrombolysis is the only therapy with proven efficacy in ischemic stroke. However, this approach is characterized by a narrow therapeutic time window. Accordingly, the major pitfall of patient management lies within the prehospital phase.[1] If the cooperation between the stroke center and the ambulance service is close, only one critical period remains, which is the period between the onset of the disease and the time of the emergency call. The length of this period is dependent on the health

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awareness of the population, which can only be relied upon in the presence of sufficient knowledge. Recognizing this necessity, public campaigns are underway, disseminating relevant health information via written and electronic media, advertising spaces, posters, and public forums. Professionals together with popular artists and media figures jointly present relevant stroke-related information in a comprehensible way on Stroke Days. Through the presentation of risk factors and the promotion of a health-conscious lifestyle, these approaches are expected to provide more efficient prevention. Conversely, emphasizing the first symptoms of stroke improves the knowledge of the significance of the disease as well as the importance of emergency care, creating the conditions for an increasing number of patients to reach the hospital in time and receive thrombolysis if indicated. Public health awareness campaigns are, however, associated with substantial expenses, and the assessment of their efficiency may highlight the need for seeking other approaches. Hungary holds an undesirable position in the international lists of the incidence of stroke and stroke-related mortality, further increasing the relevance of effective stroke campaigns. This study aimed to assess the efficiency of stroke awareness campaigns over an 8-year period in Hungary.

Methods

We analyzed the number of thrombolytic interventions conducted in Hungary in the period between 2008 and 2015, assessing changes in frequency based on the proximity of Stroke Days. The choice of 2008 as the starting point of the assessed period was based on the fact that only few thrombolytic treatments were performed in the country before this year, being insufficient for data processing. The last year involved (where we could use 11 months for calculation) was determined by the funding characteristics of the Hungarian health insurance system: sufficient amount of data was only available until that year due to ex-postaccounting. The time point and daily number of thrombolytic treatments performed were provided by the National Health Insurance Fund of Hungary, transferring an anonymous dataset from the national registry. This enabled the evaluation of a longer period with a high number of patients involved. Characteristically of the Hungarian financing scheme, the expenditures related to a certain treatment are funded in the same way for all hospitals, the accounting is independent of the time point of the treatment, and there is no monthly or annual upper limit of the number of treatments. However, the time of the intervention is precisely recorded, providing exact data on the number of treatments performed each day.

Events of Stroke Days in Budapest were first organized in popular green leisure areas and subsequently in busy malls. The campaign was organized in October in 2008, in May between 2009 and 2013, and again in the autumn in 2014 and 2015 (in November and October, respectively). The event is advertised on posters and via radio and TV advertisement. The day is hosted by a well-known media personality. Experts in cerebrovascular disease hold presentations to the public alternating with cultural performances by popular artists. In parallel, doctors, nurses, and medical students perform medical screening and risk assessment, including cholesterol level and blood pressure measurement as well as ultrasound examination of the cervical vessels.

Furthermore, media campaigns reaching the whole country (such as national and regional radio and television broadcasts, and publications in daily newspapers) were also frequent in these indicated months; however, they were not presented on the same particular day. Therefore, we conducted our analysis both in the Budapest region and nationally. We assumed that the effect of the public Stroke Day campaign held in Budapest only reached the local region on the basis of the fact that participants were mainly either locals or came from the vicinity of the capital. In contrast, we considered the national data as a source primarily useful for the assessment of the effect of media coverage available in a larger region.

We compared the change in the daily number of thrombolysis on the Stroke Day and the days, weeks, and months immediately before and after the Stroke Day. The corresponding periods were compared and were related to the annual mean. The statistical analysis was performed by *t*-tests. Statistics were calculated at 5% significance level ($P = .05$) using the GraphPad Prism 5 software (La Jolla, CA).

Results

The number of thrombolytic treatments in Hungary and Budapest showed an increasing tendency in the examined period year by year. This is apparently not secondary to public awareness campaigns but to the professional development that made the procedure widely known and available in an increasing number of stroke centers (Fig 1). The number of thrombolytic treatments performed on and around Stroke Days in Hungary and Budapest is presented in Tables 1 and 2. We did not find consequent changes on the days immediately before and after the Stroke Day. On comparison of the data obtained from the weeks preceding and following the Stroke Days, casual differences can be seen across the years. On the national level, we observed increases in the number of treatments performed in the week after the campaign in 5 occasions in the analyzed 8-year period. The ratio was 4 out of 8 in Budapest. Evaluating the data obtained during the month after with that before the Stroke Days, we found favorable results in 6 occasions whereas unfavorable in 2 occasions (with the same ratio observed in Budapest).