

Predictors of Noticing Stroke Educational Campaign

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Background: Long-term campaigns to improve stroke awareness, such as the campaign conducted in the Czech Republic since 2006, have not been effective. However, the small subpopulation that noticed the campaign had better stroke awareness than the population that did not. To better understand this awareness campaign responsiveness and to design more successful future campaigns, predictors of noticing campaigns were identified. *Materials and Methods:* This study is a secondary analysis of cross-sectional nationwide survey data of the Czech population older than 40 years, collected in 2009. The survey used a 3-stage random sampling method (area, household, and household member) and personal semistructured interview questionnaires concerning participants' stroke knowledge, demographic characteristics, medical history, and stroke information sources. To identify the association between these variables and whether the campaign was noticed (the primary outcome of the study), multivariate binary logistic regression analysis was used. *Results:* A total of 601 participants were surveyed (90% response rate), 19% of them stated that they noticed the stroke awareness campaign. Primary independent predictors of campaign efficiency were heart disease (odds ratio [OR], 1.8; 95% confidence interval [CI], 1.0-3.2), obesity (OR, 2.4; 95% CI, 1.3-4.7), and current smoking (OR, .4; 95% CI, .3-.7). *Conclusions:* Tobacco smokers in particular should be targeted by stroke awareness campaigns, for example, through health warning labels on cigarette packs. People with some stroke risk factors, such as heart disease and obesity, are responsive to information about stroke. Therefore, educational campaigns should target the groups with increased risk of stroke. **Key Words:** Stroke—awareness—education—educational campaign—smoking—stroke warning signs.

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Introduction

Although treatment with recombinant tissue plasminogen activator (tPA) within 4.5 hours after stroke symptom onset improves outcomes,^{1,2} tPA use is low.³⁻⁶ Low stroke awareness in the population and subsequent late presentation of stroke victims to emergency departments account for the underuse of tPA.^{7,8} Therefore, many national and international campaigns to increase stroke awareness were initiated.⁹⁻¹³ Their goal was to improve the response to stroke symptoms and thus support early presentation of stroke patients to emergency departments.

The efficacy of such campaigns, especially in the long term, is questionable.^{7,13-18} In the Czech Republic, a moderate intensity/moderate budget campaign has been conducted since 2006.¹⁹ After 4 years, the overall results showed no increased awareness, measured both as

stroke knowledge and the response to stroke symptoms. The most plausible explanation of such negative findings is that the campaign was noticed by only 19% of respondents. In this smaller subgroup, however, both stroke knowledge and the response to stroke symptoms were improved after 4 years of the education campaign.¹⁹ If the reasons that people noticed or failed to notice the campaign are understood, then more successful campaigns may be planned in the future. Therefore, the goal of our study was to identify the independent predictors of noticing a stroke education campaign.

Materials and Methods

This study is a secondary analysis of cross-sectional nationwide survey data collected in the Czech Republic in 2009.¹⁹ The purpose of the original study was to detect the change in the public regarding stroke awareness from 2005⁸ after 4 years of an educational campaign.

The detailed methodology of the survey and sampling has been published.^{8,19} In brief, the Czech adult population aged more than 40 years was surveyed using a 3-stage random sampling method: the first stage was selected by systematic random sampling with equal probability for any town, city, or suburban district (for cities with $\geq 100,000$ inhabitants); the second stage of sampling used the random walk method to select households; and the third stage applied the Kish selection procedure to select an adult in multiadult households. The acquired data set is representative for the study population and enables the use of inferential statistical procedures.

Standardized interviewing was chosen as a data collection method. Professional interviewers from the Institute for Analysis of Medical and Pharmaceutical Information (CEGEDIM, Prague, Czech Republic) conducted personal interviews. They were trained in stroke interviewing. The semistandardized questionnaire was composed of 6 sections: the first 4 sections assessed stroke knowledge, including the Stroke Action Test investigating the response to stroke warning signs; the fifth section monitored demographic characteristics, including the health of study participants; and the last section investigated stroke information sources. This last section also explored notice of the stroke awareness campaign, the primary outcome of this study.

Educational Campaign

The educational campaign was also described in a previous study.¹⁹ Since 2006, a nationwide educational campaign aimed at increasing stroke knowledge and improving the response to stroke symptoms has been conducted in the Czech Republic. Campaign activities include (1) press conferences organized 2-3 times a year attended by stroke physicians, emergency services representatives, stroke support groups, and stroke patients, as well as journalists from the main newspapers, journals,

and radio stations; (2) a few nationwide television programs a year with attendance of stroke opinion leaders; (3) information leaflets and posters about stroke for patients and also for the general public; (4) information website <http://www.mozkovaprihoda.cz>; (5) on-line stroke consulting; (6) guided tours for journalists through hospital neurology departments; and (7) participation in stroke support groups. All these intensive media cooperation activities led to approximately 1000 media outcomes¹⁹—articles, reports, and interviews—publicizing important information on stroke, stroke symptoms, and the symptom response of immediately calling 911.

Study Outcomes

The primary study outcome was a binary variable dividing the study participant population into 2 groups according to whether they noticed or missed the stroke awareness campaign. This information was provided by respondents as part of the interview.

Data Analysis and Statistics

Our survey data were processed with SPSS (version 13, SPSS Inc., Chicago, IL) and NCSS (version 2004, NCSS, LLC, Kaysville, UT) software. The study analyzed whether there were any specific subgroups in the studied population, which were affected by the educational campaign. Univariate and multivariate logistic regression analyses were used to assess the associations between the primary outcome and sociodemographic data, respondents' medical history, and sources of information on stroke as its predictors. Independent variables with a Wald statistic significance level P less than .05 in univariate analysis were included in further multivariate logistic regression analysis. The final set of predictors in the multivariate model was also with a statistical significance level P less than .05.

Because not all variables analyzed as predictors in our multivariable model could have a direct effect on campaign effectiveness, we performed an additional analysis to test the mediation effect between predictor variables and outcome measure. When analyzing binary outcome variables, the Sobel test²⁰ is the most widely used estimator of the standard error of the indirect effect. This mediation effect test includes estimations of all 3 hypothesized pathways (predictor to outcome, predictor to mediator, and mediator to outcome) simultaneously.²¹ It also estimates the total, direct, and indirect effects of a predictor variable on the outcome variable through a proposed mediator variable and determines whether the mediation effect is statistically significant.²² When the mediation effect is detected ($P < .05$), the logistic regression model is rerun after excluding mediating variables.

Results

A total of 601 respondents were interviewed in this study, which represents a 90% response rate (there were

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