KNOWLEDGE OF STROKE RISK FACTORS AND WARNING SIGNS AMONG ADULTS IN SLAVONSKI BROD REGION

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SUMMARY – The increased incidence of stroke in Croatia is presumed to be the consequence of low awareness in the general population. Therefore, assessment of the general knowledge of stroke risk factors and warning signs was performed. A randomized sample of symptom-free subjects were administered a multiple-choice questionnaire to assess the knowledge of stroke risk factors, warning signs, planned response and source of information. Statistical analysis was performed by the SigmaStat (Version 2.0) software. All study subjects filled out the complete questionnaire. Between the correct and incorrect answers offered, 42% of subjects identified more than four correct stroke warning signs, mostly speech problems (72.5%); and 41.1% identified more than seven correct stroke risk factors, mostly hypertension (73.5%). Television was the most common source of information identified (73.1%). Study results pointed to inadequate public awareness of stroke risk factors and warning signs, which could be improved through mass media campaigns.

Key words: *Cerebrovascular accident – prevention; Health education; Data collection; Risk factors; Croatia*

Introduction

Acute stroke is the leading cause of disability in the modern society[1]. In industrialized countries stroke is the second or third cause of death[1], whereas in Croatia it is the leading cause of death[2,3]. Preventive actions aimed at risk factor control, launched in the 1970s and 1980s, reduced the stroke risk in industrialized countries[4]. In Croatia, recommendations for risk factor control and management have been published[5], and numerous preventive leaflets widely distributed. There is a big ongoing campaign in Croatia, a part of it being organized as the Week of Brain Awareness. The purpose is to increase the awareness and basic knowledge of stroke. The increased incidence of stroke[6,7] and higher stroke mortality[2] in Croatia have been presumed to be the consequence of poor public stroke awareness, low and inadequate risk factor identification and control, and inadequate action planned.

Therefore, during the Week of Brain Awareness we estimated the basic knowledge of stroke risk factors, warning signs of stroke and myocardial infarction, planned response to them and source of information among adults in the Slavonski Brod region.

Subjects and Methods

A randomized sample of 212 symptom-free subjects from the Slavonski Brod region with a population of 176,765[3] were included in the study performed during the Week of Brain Awareness. A multiple-choice questionnaire offering correct and incorrect answers was used to assess their knowledge of: 1) stroke risk factors; 2) stroke and myocardial infarction warning signs; and 3) planned response to stroke or myocardial infarction warning signs. The questionnaire was so structured as to reveal the source of information on stroke and myocardial infarction. It also included space to fill up demographic

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data (age, sex, level of education), living in urban or rural setting, information on the known risk factors or whether they had experienced a stroke or myocardial infarction, knowledge of the Week of Brain Awareness, and self-perception of their knowledge of stroke and myocardial infarction warning signs. For assessment of stroke risk factors, 14 correct and 4 incorrect answers were offered. The correct answers included: hypertension, smoking, obesity, physical inactivity, sex, age, heredity, cardiovascular disease, hyperlipidemia, atherosclerosis, diabetes mellitus, stress, and alcohol consumption. Incorrect answers included: osteoporosis, problems with cervical vertebrae, irregular diet, and lack of sleep. For assessment of stroke warning signs 8 correct and 5 incorrect answers, and for myocardial infarction 4 correct and 13 incorrect answers were offered. The following answers were classified as correct stroke warning signs: weakness or paralysis on one side of the body or one arm or one leg; tingling sensation on one side of the body; loss of consciousness; speech difficulty; dizziness (vertigo); loss of balance or coordination; impaired vision, diplopia, loss of vision on one eye, and sudden headache[8,9]. Incorrect answers were: headache on several occasions *per* month, only lassitude, only pain in cervical vertebrae, only vomiting, and gradually getting forgetful. Correct answers for myocardial infarction were: chest pain, difficult breathing, pain in the left arm and tingling sensation in the left arm. Incorrect answers included: loss of consciousness, pain in stomach, tingling sensation in the right arm, only heart thumping, leg pain, only lassitude, "buzzing" in the head, loss of balance, only vomiting, and choking.

Table 1. Demographic data of study subjects

Demographic data		n (%)
Age (yrs):	>60	30 (14)
	39-59	118 (56)
	18-38	64 (30)
Sex:	female	116 (55)
	male	96 (45)
Population:	urban	193 (91)
	rural	19 (9)
Education:	university	51 (24)
	two-year college	53 (25)
	secondary	80 (38)
	primary	28 (13)
Knowledge of the Week of Brain Awareness:		
	yes	18 (8)
	no	194 (92)
Known risk factors*:		
	yes	35 (16.5)
	no	177 (83.5)
Positive history of:	myocardial infarction	3 (1.4)
	stroke	2 (0.9)
Self-perception of the knowledge of stroke warning signs:	yes	120 (56.7)
	no	92 (43.3)
Self-perception of the knowledge of myocardial infarction warning signs:	yes	114 (54)
	no	98 (46)

*mostly smoking (93%) and stress (90%)

Descriptive statistics was used for demographic data. Myocardial infarction and stroke warning signs and risk factors were expressed as percentage. The SigmaStat (Version 2.0) software was used for multiple comparisons. We compared the number of correct answers on stroke warning signs, on risk factors according to the level of education, and according to age and sex using Kruskal-Wallis one-way analysis of variance to find the possible statistically significant differences and pair-wise multiple comparison procedures (Dunn's method) to identify groups differing from all others. Statistical significance was set at $p<0.05$. All subjects were categorized in two groups: those who knew more than a half of correct stroke warning signs and those who knew a half or less than a half of correct stroke warning signs. The same statistical analysis was performed for myocardial infarction warning signs. The comparison of warning signs was performed by Mann-Whitney rank sum test.

Results

All 212 study subjects filled out the complete questionnaire. The subjects' demographic data are shown in Table 1. Eighty-nine (42%) subjects identified more than a half of correct warning signs of stroke, and 11 (5%) knew them all. Nine (4.2%) subjects failed to recognize any of these. The stroke warning signs most commonly identified by the study subjects were speech problems (72.6%), followed by hemiparesis (66%), loss of balance (65%) and tingling sensation (61%). The subjects' knowledge of stroke warning signs is illustrated in Table 2.

The most commonly identified incorrect answer on stroke warning signs was headache on several occasions

Tablele 2. Study subjects' knowledge of correct stroke warning signs

Stroke warning sign	n (%)
Speech problems	154 (72.6)
One-sided weakness: 1 leg or 1 arm	140 (66)
Loss of balance or coordination	138 (65)
Tingling sensation – one-sided	131 (61)
Loss of consciousness	101 (47.6)
Dizziness (vertigo)	74 (34.9)
Impaired vision, diplopia, loss of vision on 1 eye	70 (33)
Sudden headache	64 (30)

per month (19%), followed by gradually getting forgetful (15%), pain in cervical vertebrae (11%), lassitude (8%), and only vomiting (6%).

Fifty-six (26.4%) subjects identified more than a half of correct warning signs of myocardial infarction: 24 (11.3%) identified all of these, whereas 13 (6.1%) failed to identify any of these. In general, the subjects identified more warning signs for stroke than for myocardial infarction ($p=0.006$), although more subjects knew all warning signs for myocardial infarction (11.3%) than for stroke (5%). The most commonly identified incorrect myocardial infarction warning signs were only heart thumping (26%), loss of balance (22%), and choking (16%). The others were identified by less than 10% of the study subjects.

The knowledge of stroke risk factors is shown in Table 3. Eighty-seven (41.1%) subjects identified more than a half of correct stroke risk factors, one (0.47%) subject identified all, and one (0.47%) none of them. There was no difference between the subjects' knowledge regarding stroke warning signs and risk factors. The stroke risk factors most commonly identified by the study subjects were hypertension (73.5%) and obesity (70%). The most commonly identified incorrect stroke risk factors included the lack of sleep (12%), irregular diet (11%), problems with cervical vertebrae (7%) and osteoporosis (2%). In response to stroke or myocardial infarction warning signs, most study subjects (85% for stroke and 91.6% for myocardial infarction) would take immediate action: call an ambulance, visit general practitioner, a specialist, or go to hospital. Only a minority would not do anything in case of the warning signs of stroke (5.6%) or myocardial infarction (7.5%). Consultation with inappropriate specialist was indicated in 9.4% of answers to stroke warning signs and 0.9% to myocardial infarction warning signs. Whereas in case of myocardial infarction 2.9% would take aspirin or nitroglycerine, none of the subjects chose this answer in case of stroke.

Table 3. Study subjects' knowledge of correct stroke risk factors

Risk factor	n (%)
Hypertension	156 (73.5)
Obesity	150 (70)
Hyperlipidemia	148 (69.8)
Cigarette smoking	142 (67)
Physical inactivity	140 (66)
Stress	138 (65)
History of stroke or myocardial infarction	108 (50.9)
Cardiovascular disease	106 (50)
Heredity	99 (46.6)
Alcohol	73 (34.4)
Atherosclerosis	56 (26.4)
Older age	46 (21.6)
Diabetes mellitus	40 (18.8)
Male sex	20 (9)

The sources of information on stroke and myocardial infarction were as follows: television (73.1%), family members (62.7%), newspapers (49.5%), radio (25.4%), physicians (25.4%), books (11.7%) and internet (9.9%). Eleven (5.1%) subjects answered that they had no time for new information, and two (0.9%) stated they were not interested. Comparison by one-way analysis of variance in ranks and all pair-wise multiple comparison procedures were performed according to age, sex and level of education. There was no sex difference in the rate of correct answers on stroke warning signs and risk factors (mean 4 for stroke warning signs and 7 for risk factors for both groups). There was a trend of a higher rate of correct answers in younger age groups; however, the difference did not reach statistical significance (mean 4 for stroke warning signs and 7 for stroke risk factors in younger age groups; and 3.5 for stroke warning signs and 6 for stroke risk factors in older age groups). Statistically significant differences according to the level of education were found in the number of correct answers on stroke warning signs: university degree ($p=0.002$), two-year college ($p<0.001$), secondary school ($p=0.005$) and primary school; and on stroke risk factors: university level ($p<0.001$), two-year college ($p<0.001$), secondary school ($p<0.001$) and university degree *vs.* secondary school ($p=0.009$).

Discussion

The main advantage of this study was the method of personal contact on distributing and answering the questionnaire in contrast to the previously published telephone surveys[10-19]. There was only one study that included 35 subjects divided into three groups discussing stroke issues: 11 from general population, 14 subjects with a history of stroke, and ten stroke patient care providers or partners[16]. The present survey showed a moderate yet inadequate level of public knowledge of stroke warning signs and risk factors. Less than a half of subjects (42% for stroke warning signs and 41.1% for risk factors) recognized more than a half of correct stroke warning signs (at least 4 of 8) and risk factors (at least 7 of 14). The respondents' knowledge of stroke warning signs was better than their knowledge of myocardial infarction, although stroke symptoms are much more heterogeneous and therefore more correct answers were offered. We consider it as a reflection of the public engagement of stroke specialist activities during the last decade dedicated to the brain.

The majority of study subjects would respond appropriately to stroke or myocardial infarction warning signs.

There was the lack of knowledge in Slavonski Brod region about the Week of Brain Awareness campaign, and the next one should provoke a more powerful response.

In this study, hypertension was listed as the most common risk, and cigarette smoking was on the fourth place. These findings are in contrast with a previous population based telephone survey in Australian urban population[10]. In this study, cigarette smoking was the most frequently identified risk factor and hypertension ranked fourth, but there is a similarity to some previous population based telephone surveys conducted in Cincinnati, Ohio[11], South Korea[12] and Hong Kong[13], where hypertension was the most frequently reported stroke risk factor. A smaller proportion of respondents (18.8%) identified diabetes as a stroke risk factor. These results suggest that community-based stroke prevention strategies should focus on the established stroke risk factors.

Speech difficulties were the most common stroke warning sign listed by our study subjects, followed by one-sided weakness. A lower proportion of respondents recognized impaired vision, diplopia and loss of vision on one eye as a stroke warning sign. In contrast, Kothari *et al*.[20] report on weakness as the most commonly documented stroke warning sign in their study including acute stroke patients, whereas in a study conducted in Australian urban population blurred and double vision, or loss of vision on one eye was the most common stroke warning sign listed by respondents[10]. In a population-based interview survey, Pancioli *et al.*[11] found dizziness and numbness to be the most common stroke warning signs listed by respondents, whereas in our study these were ranked sixth.

Television was the most common source of knowledge, followed by family members. Therefore, mass media, especially television[17,19], and interpersonal contacts could be a very effective means of spreading medical information[21].

Our subjects with a higher level of education showed better knowledge of stroke. In this randomized study there were 49% of subjects with high education (university and college degree), which is more than usually expected in the general population (11.2%)[3], suggesting an even lower public knowledge than that revealed by this survey.

Our study suffered from some limitations (a lower proportion of subjects with low education levels; subjects were not asked about the known risk factors before offering them the list of correct and incorrect answers). Future studies should include much more participants with a lower level of education.

Our results indicate that improvement is necessary in the awareness of stroke risk factors and warning signs. Community-based educational strategies should be more effective, primarily through mass media, to entail powerful response and to focus on the population as a whole as well as on the groups at high risk. The effectiveness of public awareness of stroke and risk factors should be further monitored.

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Sažetak

POZNAVANJE RIZIČNIH ČIMBENIKA I ZNAKOVA UPOZORENJA ZA MOŽDANI UDAR MEĐU ODRASLIM ŽITELJIMA SLAVONSKO BRODSKE REGIJE

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Smatra se kako je povećana incidencija moždanog udara u Hrvatskoj posljedica niske svijesti u općoj populaciji. Stoga se je provela procjena općeg znanja o rizičnim čimbenicima i znacima upozorenja za moždani udar. Ispitivanje je provedeno u nasumce odabranom uzorku građana bez simptoma moždanog udara. Primijenjen je anketni upitnik s višestrukim odgovorima za procjenu znanja o čimbenicima rizika i znacima upozorenja za moždani udar, te o planiranom odgovoru i izvorima podataka. Statistička obrada je izvedena pomoću statističkog programa SigmaStat (inačica 2,0). Svi su ispitanici ispunili čitav anketni upitnik. Među ponuđenim točnim i netočnim odgovorima 42% ispitanika je navelo više od četiri točna znaka upozorenja za moždani udar, uglavnom govorne probleme (72,5%); 41,1% ih je prepoznalo više od sedam točnih čimbenika rizika za moždani udar, uglavnom hipertenziju (73,5%). Televizija je bila najčešće navedeni izvor informacija (73,1%). Rezultati ovoga ispitivanja ukazali su na nedostatnu svijest o rizičnim čimbenicima i znacima upozorenja za moždani udar, koju se može poboljšati izobrazbom pomoću sredstava javnog priopćavanja.

Ključne riječi: *Moždani udar – prevencija; Zdravstveno obrazovanje; Prikupljanje podataka; Rizični čimbenici; Hrvatska*