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ORIGINAL COMMUNICATION

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First aid in acute stroke

Introducing a concept of first action to laypersons

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Abstract *Objective* First aid training is well established to teach the public how to recognize a medical emergency and take appropriate action. Though it is now handled as a high priority emergency stroke is not among the main topics of first aid. We investigated if first aid training may be useful for enhancing stroke awareness. *Methods* We developed a 15–20 minute teaching session about stroke as an emergency including signs and symptoms and first hands-on measures. The session was integrated in standard first aid training of the St John Ambulance of Germany and participants were asked to fill out a questionnaire regarding their knowledge about stroke. Subjects were questioned before the stroke lesson and again at the end of the training. *Results* 532 participants of the training responded to the questionnaire (mean age 28.6 years, 53.6% male). There was a significant increase in proportion of subjects correctly defining what stroke is (28.4% vs. 69.9%, $p < 0{,}001$) and in the mean number of stroke symptoms listed (1.52 vs. 3.35, $p < 0{,}001$) by the participants. The number of participants unable to list at least 1 symptom decreased significantly (12.8 vs. 3.6%, $p<0.001$). *Conclusions* In our study a teaching lesson integrated in first aid training was effective in improving stroke knowledge of participants. First aid training should be used for stroke information complementary to other activities like mass media campaigns as it is effective, could reach younger people that are not primarily interested in stroke and provides connections to other health topics.

Key words acute stroke · knowledge · emergency medical service · first aid · health education

Introduction

First aid is a concept of first hands-on measures performed in a medical emergency by laypersons. The goal is to teach people how to recognize a medical emergency and start qualified action by providing measures of basic life support such as performing cardiopulmonary resuscitation. Other topics are injuries and burns, shock, unconsciousness or heart attack.

In Germany first aid training is mainly offered by charity organizations like the German Red Cross, or the St. John Ambulance. There are various training

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programmess differing in length and depth of information. First aid training was effectively used to teach the public in new methods of life-saving therapy like automated external defibrillation [1].

Stroke or brain attack is not or only marginally included in first aid training. This is in contrast to the fact that management of acute stroke changed as it is now handled as a high priority emergency [2]. Limited knowledge of signs, symptoms and risk factors for stroke was noted as an important factor associated with delay of admission [3–5]. To enhance awareness on stroke, various educational programmess have been initiated [3, 6–8]. The American Stroke Association's Operation Stroke, a huge awareness campaign on stroke, the Coordinated Stroke Programme of Southwestern Ontario and King County's Medic One at seattle are examples of continuous health education programmes using internet, designated courses and mass media. Regular first aid training was never used in a stroke information campaign though it is widely available and well accepted in many countries.

In a prospective study we tried to test the hypothesis that stroke information integrated in first aid training will improve knowledge of laypersons. Additionally a concept of first action will increase motivation and acceptance will be quite high with participants.

Methods

Educational procedure

A teaching sequence was created by stroke neurologists of the University of Erlangen together with senior instructors of the St. John Ambulance (Johanniter-Unfall-Hilfe) in Bavaria. Educational objectives of the session were clearly defined. The sequence was designed for a 15 to 20 minutes audiovisual presentation and provided information basically what stroke means and about stroke risk factors, warning signs and symptoms. Warning signs presented included sudden uni- or bilateral weakness or numbness, facial paresis, speech disturbance, blurred vision, trouble in walking, vertigo/ dizziness, diplopia. Then a concept of first action to be taken in case of stroke was presented (Figure 1 shows a one-slide overview). including check of vital signs and immediate activation of EMS.

The teaching session was presented by first aid instructors integrated in regular first aid training programmes of 8 to 16 hours duration of the St. John Ambulance all over Bavaria. A small booklet was made for the first aid instructors to provide more detailed information about stroke.

Data collection and analysis

To investigate the effect of the teaching, all participants of designated courses were asked to fill out a questionnaire before the stroke lesson. At the end of the training program a similar questionnaire was presented slightly altered in structure and some questions. The overall length of the training courses differed as some courses were presented on a whole day schedule within one weekend while others offered one 90-minute teaching unit once weekly and were therefore scattered over a period of up to 6 weeks. Accordingly the time delay between the stroke lesson and the post-teaching questionnaire varied as well ranging from 1 to 28 days (mean 8.6 d).

Before teaching participants were asked to note in free text and explain what they think that a stroke is, to name signs and symptoms of stroke and to describe how they would act in case of witnessing stroke. Additionally sex, age and profession of participants was recorded as well as their previous information about stroke After the lesson we asked again for a definition of stroke and to list symptoms of stroke. Furthermore we asked how urgent they think that a stroke needs to get therapy. After all subjects were asked for their satisfaction with the training session, how they would rate their own interest in stroke and how they would rate the importance of stroke as a topic in first aid. Therefore a rating scale from 1 to 6 was given with 1 being the best, 6 the worst.

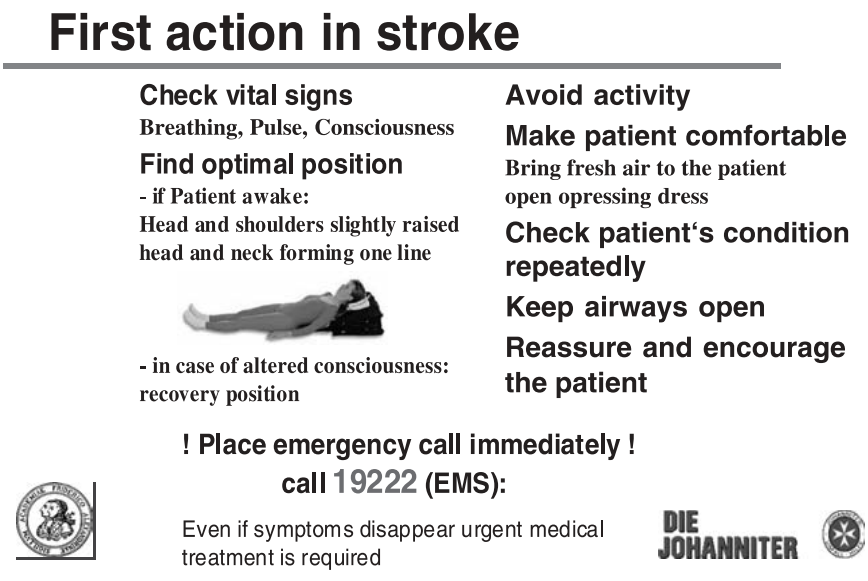

Fig. 1 Concept of first action presented in the stroke lesson (originally presented in German)

Participants with any profession within health care were excluded from the analysis. The questionnaire was not offered in trainings for special groups such as in schools or nursing homes.

Mean values were compared using paired t-tests while χ^2- statistics were used for proportions of nominal data.

Results

In 38 first aid training courses 532 participants (86.6% of 614 subjects attending the training) completed the questionnaire before and after training, 53.6% of those were male, mean age was 28.6 years (+/− 11.1 y, range 15–61 y).

Before training 28.4% of all participants stated a correct description of stroke, another 32.7% gave at least the brain as the location of the disease. The mean number of stroke symptoms named was 1.52 (± 1.1), descriptions listed were mainly "weakness", "motor problems" "disturbance of consciousness" or "speech problems", 12.8% of all respondents did not list at least one correct stroke symptom or warning sign, 40.7% listed symptoms that are not typically suggestive of stroke (coded as incorrect). The mean number of first aid measures named was 1.22 (± 1.0). 78.7% of respondents stated that they had any kind of information about stroke before the training.

After the stroke lesson 69.9% of the participants stated a correct description of stroke, and 20.3% gave at least the brain as the location of the disease. Now the mean number of stroke symptoms named was 3.35 (± 1.4). 58.5 % declared that in case of stroke urgent treatment is needed . See table 1 for an overview of key results.

Most participants were satisfied with the stroke lesson as the mean value in the score (1 = best to 6 = worst) was 1.76 (± 0.6), interest in topics of stroke was rated high (mean 1.56, ± 0,8). Stroke was regarded as an important topic for first aid training. (mean 1.57, ± 0,9). The difference in mean number of symptoms named before and after the lesson was highly significant ($p < 0.001$), as well as the difference in percentage of participants giving a correct definition of stroke ($p < 0.001$) and those naming more than 4 symptoms. In contrast the number of participants not listing at least one symptom and giving none or an incorrect definition of stroke was significantly reduced after the training.

Discussion

To our knowledge this is the first study published reporting about first aid training for public education on stroke. A teaching session was integrated in regular first aid training offered to the public by the St John Ambulance.

From data of this pilot study the teaching session was very effective: Mean number of stroke symptoms and number of participants giving a correct description of stroke more than doubled.

The difference in number of symptoms and portion of participants describing stroke symptoms correctly was highly significant. Nevertheless with a mean delay between teaching and retention test below 10 days these results show only the short-term effect and durability of the information remains unclear. From other studies in teaching medical skills to laypeople we know that knowledge is reduced by about 25% over the first three months and may remain stable thereafter [9]. One year may be critical period for repetition of training [10]. However, participants showed also a high grade of satisfaction with the lesson and its presentation, and ranked importance of stroke as a topic quite high. As a consequence of these results the lesson is now integrated in every first aid training of the St. John Ambulance in Bavaria.

Before this study there was no clear cut concept existing for first action in acute stroke. Despite the fact that calling EMS accelerates admission [11] the effect of all these actions performed by medical laypersons on stroke progression or outcome is not yet proven.

Table 1 Key results from the questionnaire before and after receiving the stroke lesson

n = 532	before stroke lesson	after stroke lesson	
mean number			
no. of stroke signs	1.52	3.35	$p < 0.001$
no. of first measures	1.22	not asked	
% of participants			
correct explanation what stroke means	28.4	69.9	$p < 0.001$
brain affected organ	32.7	20.3	$p < 0.01$
no/incorrect explanation	38.9	9.8	$p < 0.01$
> 4 symptoms listed	2.6	28.4	$p < 0.001$
no symptom listed	12.8	3.6	$p < 0.001$
"immediate medical help required"	not asked	58.5	
prior information about stroke	78.7		

However, it takes about 15 minutes from starting the call to arrival of EMS on scene [12]. During this time a bystander should be able to offer help to the patient. By presenting simple hands-on measures it is also emphasized that something can and must be done in case of acute stroke.

The effect of various educational interventions was already demonstrated in previous studies [3, 6–8].

None of these studies handled information on stroke integrated in general health education campaigns such as routine first aid training. From our viewpoint integrating a stroke lesson in first aid training is not only effective but provides a number of advantages. First an integration makes it clear that stroke or brain attack is an important medical emergency as important as heart attack or trauma.

Connecting brain attack with other medical emergencies also facilitates the demonstration of measures as they could be used for other situations as well and it might help to create a better understanding to stroke and its differences from other related diseases. We linked stroke to other related topics (e.g. "head trauma") and formed a cluster of measures for "all problems in the head" as an effort towards integrative problem-based teaching which was shown to be superior to conventional lessons also in medical education [13].

Second, by using first aid training information on stroke this will reach large numbers of subjects not particularly interested in stroke or sometimes health education at all. According to their annual review the St. John Ambulance, England, issued a first aid training certificate to more than 500000 people in the year 2003 [14], while the American Red Cross trained more than 11 million people in first aid [15]. In Germany within one year a driving license is issued to more than 800000 people mainly in the age of 16 to 21. By legal regulations every one of them must have completed at least an 8 hour first aid training. So first aid training may especially reach younger people that are not interested in stroke awareness campaigns. Furthermore, given the large numbers of people reached, this method of education is extremely cheap.

To summarize we found that a 15 minute presentation on stroke as a medical emergency improves stroke knowledge of participants in first aid training. Furthermore participants seem to appreciate getting information about stroke. Accordingly information on stroke or brain attack should be included in every first aid training thus reaching large numbers of subjects in many countries all over the world. Means of information may differ in their effectiveness [8, 16] but the question is not whether education integrated in training programs may be more effective than mass media campaigns. Both methods of information will rather be complementary as they use different approaches and may reach different target groups. The goal is not to miss any single opportunity to send out the message about stroke as a medical emergency that needs immediate reaction by anyone who is next.

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