

FAST enough? The UK general public's understanding of stroke

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ABSTRACT – Good public awareness of stroke symptoms and the need for rapid admission to hospital can improve patient outcomes. However, evidence suggests that this awareness is currently inadequate. Therefore, it is important to identify gaps in public knowledge to target public health campaigns appropriately. This questionnaire study of 356 adults in Birmingham city centre assessed the general public's understanding of stroke, whether demographic factors affect this and the influence of a national campaign (FAST) on knowledge. The mean overall knowledge score was 11.8 out of 15; however, only 54.2% of those questioned knew that diabetes, hypertension and high cholesterol were stroke risk factors. Of those questioned, 60.2% were aware of the FAST campaign. General understanding of stroke was fairly good, although it was found to be worse in the youngest, oldest age and non-white groups. Although there was good awareness of the FAST campaign, many people did not know what the individual letters meant. Based on the results of our study, we conclude that it might take considerable time for public awareness campaigns to achieve their full impact.

KEY WORDS: lay knowledge, stroke, FAST campaign

Introduction

Quick recognition of stroke and rapid admission to hospital vastly improves patient outcomes.^{1,2} Therefore, public awareness campaigns must be used to help people recognise stroke signs quickly and aid fast access to emergency care.³ This was one of the key elements of the UK Government's 2007 National Stroke Strategy.⁴ In February 2009, the Department of Health (DOH) introduced a three-year public stroke awareness campaign based on the FAST acronym, first promoted by the Stroke Association in 2005, 'Face, Arms, Speech and Time to call 999'.^{5,6}

There is conflicting evidence regarding the general population's understanding of stroke symptoms. Two recent international reviews suggested inadequate understanding of the common risk factors and warning signs of stroke.^{7,8} Stroke knowledge varies in different countries, which highlights the need for culturally appropriate national stroke campaigns.^{8,9}

American, Australian and French studies found that knowledge ranged from poor to 'moderate at best'.^{10–12} However, in two UK-based studies, knowledge of stroke was good.^{13,14} A recent systematic review of UK patient and public stroke awareness concluded that knowledge of one-sided weakness and speech problems as symptoms was well understood, as was the need to seek medical help quickly.¹⁵

Differences have been found among general public subgroups. People at highest risk of stroke were those least educated about it and men had lower levels of knowledge than did women.^{1,8} Those at highest risk (ie older people and males) and ethnic minorities might have a poorer stroke understanding than the general population, and one study showed that many were unaware of their own higher risk status. A link was also suggested between a lower level of education and worse understanding.^{7,13,16,17} However, having an existing condition that increased the risk of stroke positively influenced knowledge.^{7,8}

Traditional beliefs about stroke might have a stronger and competing influence than public health campaigns.^{18,19} Only 7.5% of at-risk patients used the medical profession for information and also used friends, family, television and radio.^{13,14} A British paper found that only 15% of stroke patients sought medical help themselves, the remainder relying on those around them and 80% rang their general practitioner (GP) rather than the emergency services.¹³ This suggests that most people are unaware of the benefits of rapid hospital-based care following stroke and highlights the need to educate all members of the general population.

Small-scale interventions improved knowledge in targeted at-risk USA communities involving teaching lay people, beauticians or teachers the FAST acronym, which they passed on to their clientele or pupils in a 'culturally and age-appropriate way'.^{16,20} These showed good short-term knowledge improvement, but were 'one-off' interventions. A recent systematic review of media campaign effectiveness found these are helpful in awareness raising but less so in changing behaviour.²¹ The British campaign is intended to be longer term and is repeatedly reinforced by television adverts, radio broadcasts and street signs.⁵

Given that much of the existing literature focuses on other countries, it might be inappropriate to generalise findings to the UK setting.^{7,8} There is a scarcity of research about UK lay knowledge, and studies that specify whether recruitment was from non-healthcare settings are even more limited.^{15,16,22,23} These studies also took place before the FAST campaign, potentially a major contributor to the UK public's current knowledge.⁵ A commercial organisation survey that suggested 84% of the public were aware

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Table 1. Public knowledge of stroke symptoms

Question: 1 point for correct answer	% of answers correct (No.)
1. A stroke happens in the? (heart/ <u>brain</u> /muscles)	74.7 (266)
2. Are there any current treatments for stroke? (<u>yes</u> / no)	62.6 (223)
3. Nobody makes a full recovery after a stroke (true/ <u>false</u>)	72.5 (258)
4. A quarter of strokes occur in people under the age of 65 (<u>true</u> /false)	77.3 (275)
5. Which of these could help reduce the chance of stroke? (fresh air/vitamin C/ <u>exercise</u>)	87.9 (313)
Which of these conditions increases your chance of stroke?	
6. Diabetes (<u>true</u> /false)	62.4 (222)
7. High blood pressure (<u>true</u> /false)	94.1 (335)
8. Epilepsy (true/ <u>false</u>)	53.1 (189)
9. High cholesterol (<u>true</u> /false)	83.4 (304)
10. Do symptoms of a stroke usually come on gradually or suddenly? (gradually/ <u>suddenly</u>)	77.0 (274)
11. Stroke normally affects both sides of the body (true/ <u>false</u>)	87.4 (311)
Are the following signs of a stroke?	
12. Fever and sweating (true/ <u>false</u>)	64.0 (228)
13. Slurred speech (<u>true</u> /false)	96.9 (345)
14. Weakness in the arms/legs (<u>true</u> /false)	94.4 (336)
15. Rash (true/ <u>false</u>)	90.1 (323)

of the FAST campaign several months after its launch, was mentioned by the DOH as evidence of success.^{5,24} However, there is no published academic research regarding public awareness of FAST.²¹ Several UK-based studies have looked only at older people, so there is also a need to survey younger people. Therefore, this study aimed to assess the stroke understanding in representatives of the UK general public recruited in a city centre. The study also identified demographic variables that significantly affect stroke understanding and ascertained whether understanding differs between people who have seen the FAST campaign, and those who have not.⁵

Method

Population

A street survey using a self-constructed interviewer-assisted questionnaire was carried out in February 2010 in Birmingham, UK, which is a large multicultural city.²⁵

Sampling

To minimise bias, the researchers stood at varied city centre locations on different days and times, including both weekdays and weekends, and aimed to ask every fifth passer-by approaching from the left to participate. People under 18 or with a healthcare background were excluded using two screening questions.

Questionnaire

The 15-item questionnaire covered stroke knowledge, risk factors, symptoms and management (Table 1). Participants were

additionally asked to self-rate their own perceived knowledge on a 0 (no knowledge) to 10 (excellent knowledge) scale; if they were aware of the FAST campaign; and what each letter stood for.⁵ Questioning style and explanation of the study were standardised among the six interviewers.

Demographic variables (age, ethnicity, gender, highest completed level of education and first language) and whether the subject had had a stroke or knew anyone who had, were also collected. A pilot study of 60 subjects was performed on the target population to ensure that the final questionnaire could be clearly understood. Based on Birmingham City Council guidelines, no ethical approval was required but the survey was subject to review by the guidelines for permissions for Public Health projects of the University of Birmingham College of Medical and Dental Sciences.

Analysis

Effects on knowledge (score out of 15) of age, gender, ethnicity, first language, highest educational level, having had a stroke or known someone who had, awareness of the FAST campaign, number of letters correctly recalled by those who had seen the campaign and self-rated knowledge score (out of 10) were analysed. All correlations were tested for significance using the T-test and ANOVA test. Post-hoc analyses were performed using Tukey's HSD test. P values of 0.05 or below were considered significant.

Results

In total, 356/402 people invited participated (88.5%). Table 2 shows there were slightly more males (56.5%) than females

Table 2. Demographic factors and mean stroke understanding scores

Demographic variable		Mean score	T -test value	ANOVA test value (F ratio)	p value
Gender	Male (56.5%)	12.01	1.76	–	0.079
	Female (43.5%)	11.66		–	
Age (years)	18–30 (42.1%)	11.37	–	4.24	0.000
	31–40 (14.3%)	11.65	–		
	41–50 (15.4%)	12.29	–		
	51–60 (14.9%)	12.15	–		
	61–70 (7.58%)	12.70	–		
	71–80 (4.49%)	12.56	–		
	81+ (1.12%)	10.50	–		
Ethnicity	White (75.3%)	12.05	–	5.35	0.000
	Black/Black British (5.89%)	11.38	–		
	Asian/Asian British (11.2%)	11.25	–		
	Mixed (1.97%)	11.00	–		
	Chinese/Other (5.62%)	10.45	–		
First Language	English (88.8%)	12.00	4.29	–	0.000
	Other (11.2%)	10.33		–	
Highest level of education	Pre-GCSE (7.86%)	11.79	–	1.65	0.162
	GCSE/O-level (18.5%)	11.67	–		
	Further Education/A-level (38.2%)	11.57	–		
	Degree (22.8%)	12.15	–		
	Post-graduate (12.6%)	12.16	–		
Aware of FAST campaign	Yes (64.9%)	11.95	1.9	–	0.058
	No (35.1%)	11.55		–	
No. of FAST letters correct (if aware of campaign)	0 (32.5%)	11.51	–	2.81	0.026
	1 (9.52%)	11.36	–		
	2 (13.0%)	12.37	–		
	3 (17.3%)	12.25	–		
	4 (27.7%)	12.30	–		
Self-rated knowledge	0 (3.1%)	10.09	–	1.67	0.087
	1 (3.9%)	11.86	–		
	2 (3.9%)	10.93	–		
	3 (10.4%)	11.59	–		
	4 (11.5%)	11.85	–		
	5 (23.3%)	12.05	–		
	6 (14.3%)	12.02	–		
	7 (14.3%)	12.06	–		
	8 (9.3%)	11.82	–		
	9 (3.7%)	11.77	–		
	10 (2.2%)	11.13	–		
Exposure to stroke	None (55.1%)	11.64	–	1.84	0.161
	Close friend/relative suffered (43.8%)	12.03	–		
	Stroke suffered by participant (1.1%)	12.00	–		

(43.5%). Participants' ages ranged from 18 to over 80, with over half (56.4%) being 40 or under. Of the people questioned, 75.3% were of white ethnicity, with English being the majority

first language of 88.8% of participants. In total, 73.6% had attained at least A-level and/or further education or higher qualifications.

Level of stroke understanding in the general public

Overall, the level of general stroke knowledge was good, (average score 11.8/15; range 3–15). Table 1 shows that the areas where knowledge was lowest regarding the existence of current treatments (62.6%), or that stroke does not cause a fever (64.9%). In total, 54.2% correctly identified all the stroke risk factors. Hypertension was the most commonly understood risk factor (94.1%), followed by high cholesterol (83.4%) and diabetes (62.4%). Over half (53.1%) falsely believed epilepsy was a risk factor. There was no correlation between perceived and actual knowledge. Perceived knowledge scores ranged from 0 to 10 (mean 5.2).

Demographic factors and stroke understanding

Table 2 shows that males were slightly more knowledgeable than females; however, this was not statistically significant. By contrast, age had a statistically significant effect on knowledge. Those aged 61–70 achieved the highest score (12.7/15), followed by people aged 71–80 (12.6), which could be because of increased stroke exposure. The worst-scoring age group were those aged 81+, followed by those aged 18–30. There was a significant difference between mean knowledge scores for the 18–30 and both the 41–50 ($p=0.028$) and 61–70 age groups ($p=0.011$). Thus, those aged 41–50 and 61–70 knew significantly more about stroke than did those in the 18–30 subgroup, but there were no further significant differences between mean knowledge scores in any other age subgroups.

Ethnicity also showed significant results. Generally, non-white participants achieved significantly lower scores. Further analysis to explore the association between English as a first language and mean knowledge score showed that participants who had English as their first language scored significantly higher than those who did not ($p=0.000$). Subgroup analysis focussing only on those with English as a first language showed no significant difference in mean knowledge score (1.43, $p=0.23$). There was a significant difference between mean knowledge scores for those in the white ethnic and Chinese/other ethnic groups ($p=0.002$). Thus, those in the white ethnic group knew significantly more about stroke than did those in the Chinese/other ethnic group, but there were no further significant differences between mean knowledge scores in any other ethnic groups.

Those with a degree or post-graduate qualification knew more about stroke. Scores for people with A-levels and/or further education or below were fairly consistent, with all means being below the overall mean. Scores for degree and post-graduate education fell above the overall mean; however, these results were not significant.

Differences in stroke understanding between people who have seen the FAST campaign, and those who have not

In total, 64.9% said that they were aware of the FAST campaign. Of these, 32.5% could not recall any letters, 9.5% recalled one, 13.0% two, 17.3% three, and 27.7% all four correctly. People who

had heard of the campaign scored higher on the 15 stroke knowledge questions. Although not statistically significant, it was close to being so ($p=0.058$). Those who could recall at least two letters also scored significantly better on the 15 stroke knowledge questions than did all others questioned in terms of general understanding. Of the participants, 58.4% correctly answered all four questions about which symptoms were indicators of stroke. The proportion of participants getting four correct answers in the FAST 'aware' group was higher (60.2%) than in the 'not aware' group (55.2%). There was a significant difference between mean knowledge scores for those who identified no FAST letters correctly and those who identified two letters ($p=0.001$), those who identified three letters correctly ($p<0.001$) and those who identified four letters correctly ($p<0.001$). Thus, participants unable to correctly identify any FAST letters had significantly lower mean knowledge scores than those who identified two or more FAST letters correctly.

Discussion

This study of general public stroke knowledge in Birmingham, UK, carried out following the launch of the FAST campaign, found that overall knowledge was good, with an average knowledge score of 11.8/15.⁵ These results support findings from previous UK studies.^{13,14}

Males appeared to have slightly better stroke understanding than females, but this was not statistically significant, unlike ethnicity, language and age, which appeared to be more important determinants of understanding.

Those participants who were aged 81 years and over tended to score worse for stroke understanding. However, this group only comprised four people. The 18–30 age group was much larger and so a more reliable representation of true knowledge level. The average score of this group was low, which might be because young people have less exposure to stroke. They might also feel that stroke only affects older people and does not apply to them. This is supported by the fact that almost a quarter of people were unaware that 25% of strokes happen to people aged under 65. Existing evidence shows that people who are at risk of stroke have a worse understanding.^{7,10} However, the same conclusion cannot be drawn here because of the small number of people aged 81 and over; in addition, participants aged 61–80 had the best knowledge.

Non-white participants had lower knowledge scores than white participants. Importantly, this is confounded by those without English as a first language. Further evaluation focussing on people with English as a first language was not statistically significant. However, this study supports previous evidence that ethnic minorities have worse understanding of stroke. As some ethnic groups are at higher risk of stroke, this also supports existing research demonstrating that those at higher risk of stroke have worse understanding.^{7,10,17,20}

Previous studies found that lower education levels linked with worse general understanding of stroke.^{7,10,16} The results from this study did not show a similar statistically significant trend. However, post-graduate and degree-level adults did have, on

average, better scores than less-educated individuals.

Results for the other demographic variables measured are supported by those of previous comparable studies, where older age and ethnic minority groups had poorer knowledge.^{7,10} Conversely, Jagadesham *et al* found 'no sex or gender-related differences'.³ Overall, the study results add to the evidence that certain groups have poorer stroke knowledge, particularly those at greatest risk.

Finally, previous studies have highlighted the beneficial impact that small-scale interventions can have on lay stroke understanding.^{17,20} Our data support this, in that self-reported exposure to the FAST campaign seemed to improve stroke knowledge and recognition of signs overall, but specific recall of the acronym was variable.⁵ However, the UK FAST campaign differs from these previous interventions, which were intensive one-off sessions.⁵ The FAST campaign is a longer term three-year initiative involving short, repetitive exposures to information and relies on passive absorption of this material.⁵

Study strengths

The study results were based on a sample size of 356 participants, using varied days, times and locations, to maximise how representative the sample was of the general population. The questionnaire was aimed at a suitably 'lay' level, after research into patient information sources.^{26,27}

Study limitations

Study participants differed from the general population in terms of their ethnicity and gender. In total, 24.7% of respondents were non-white and 43.5% female, compared with 7.9% and 51.4% of the general population.^{25,28} Only individuals in the town centre were sampled, which excluded certain demographic groups and should be considered when interpreting the results. Self-selection bias on a variety of dimensions, including language, is likely to be reflected in street surveys so participants might not be demographically representative of the population.²⁹ The original sampling method of approaching every fifth passer-by proved impractical. Therefore, introduction of an aspect of sampling bias was inevitable, for example, by preferentially approaching certain people. Lower results in the group without English as first language could indicate a lack of understanding of the questions. This has important implications for public health campaign design and delivery.

Conclusion

General stroke knowledge was good, but understanding of risk factors was lacking. Diabetes was particularly poorly recognised as a risk factor, suggesting a need for further public education.

There was a link between age and knowledge. Overall, younger people had a worse level of stroke understanding. This is an important finding as it is not just older people who require knowledge. The general population, including the young, should be well

informed so that they can recognise the signs of stroke. The lack of correlation between perceived and actual knowledge in our study suggest that people think they know more than they do and so could be less responsive to public education campaigns.

There is currently little or no education on stroke in schools; a search of the UK National Curriculum revealed no requirement to teach school children about stroke.³⁰ Introducing basic teaching on stroke into the curriculum could help to improve knowledge and understanding.

This study cannot comment definitively on the overall success of the FAST campaign.⁵ Although the results seem to suggest a positive impact on knowledge, they were not all statistically significant. However, the FAST campaign was due to run over 3 years, and the campaign was only one-third of the way through at the time of the study.⁵ Its impact might well be greater after its conclusion, once exposure has been maximal and this suggests that a study assessing its efficacy would be useful.

In recent years, studies examining UK stroke understanding have mainly been limited to specific population groups. This study looked at general understanding, taking a broad sample from an inner city area. As this study has revealed areas of weakness in public knowledge, it highlights educational areas that need targeting for better stroke prevention and quicker admissions to hospital for stroke victims. It also shows that targeting specific population groups might be necessary, especially those most at risk, as well as the provision of stroke information in different languages to improve the knowledge of vulnerable groups.

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