Royal College of Surgeons in Ireland
e-publications@RCSI

School of Physiotherapy Articles

School of Physiotherapy

4-19-2011

Stroke Knowledge in an Irish Semi-Rural Community-Dwelling Cohort and Impact of a Brief Education Session.

Geraldine O'Callaghan
Midland Regional Hospital, Co. Westmeath

Sean Murphy
Midland Regional Hospital, Co. Westmeath

Dorothy Loane
Midland Regional Hospital, Co. Westmeath

Evelyn Farrelly
Midland Regional Hospital, Co. Westmeath

Frances Horgan
Royal College of Surgeons in Ireland, fhorgan@rcsi.ie

Citation

O'Callaghan G, Murphy S, Loane D, Farrelly E, Horgan F. Stroke knowledge in an Irish semi-rural community-dwelling cohort and impact of a brief education session. Journal of Stroke and Cerebrovascular Disease. 2011 Apr 19. [Epub ahead of print]

This Article is brought to you for free and open access by the School of Physiotherapy at e-publications@RCSI. It has been accepted for inclusion in School of Physiotherapy Articles by an authorized administrator of e-publications@RCSI. For more information, please contact epubs@rcsi.ie.

— Use Licence —

Attribution-Non-Commercial-ShareAlike 1.0
You are free:
• to copy, distribute, display, and perform the work.
• to make derivative works.
Under the following conditions:
• Attribution — You must give the original author credit.
• Non-Commercial — You may not use this work for commercial purposes.
• Share Alike — If you alter, transform, or build upon this work, you may distribute the resulting work only under a licence identical to this one.
For any reuse or distribution, you must make clear to others the licence terms of this work. Any of these conditions can be waived if you get permission from the author.
Your fair use and other rights are in no way affected by the above.

This work is licenced under the Creative Commons Attribution-Non-Commercial-ShareAlike License. To view a copy of this licence, visit:
URL (human-readable summary):
• http://creativecommons.org/licenses/by-nc-sa/1.0/
URL (legal code):
• http://creativecommons.org/worldwide/uk/translated-license

This article is available at e-publications@RCSI: http://epubs.rcsi.ie/sphysioart/4

Stroke Knowledge in an Irish Semi-Rural Community-Dwelling Cohort and Impact of a Brief Education Session

Geraldine O'Callaghan, MSc,* Sean Murphy, MD, FRCPI, FRCP (Edin), FACP, FAHA, MRCP (London)† Dorothy Loane, BSc,‡ Evelyn Farrelly, BA,§ and Frances Horgan, MSc, PhD¶

Poor knowledge of stroke risk factors and failure to recognize and act on acute symptoms hinders efforts to prevent stroke and improve clinical outcomes. Levels of stroke knowledge are poorly established within Ireland. This study was conducted to establish levels of knowledge among men and women aged >40 years in an Irish community, and also to determine the impact of a single education session on stroke knowledge. Subjects from 2 separate geographical locations were allocated to an intervention group (n = 200), who received stroke information over a 90-minute session, or a control group (n = 200). Both groups completed a stroke knowledge questionnaire at baseline and at 4 weeks after the educational session. Overall, the initial response rate was 70% (280/400); 52% of the respondents knew that the brain is affected by stroke, 58% could list 2 or more risk factors but only 27% could list 2 or more warning signs, 50% would call 999 (emergency number in Ireland) in response to stroke, 17% had heard of thrombolytic therapy, but only 1% knew the time frame for receiving thrombolytics. The response rate to the resurvey following the educational session was 57%, with 47 of 117 subjects in the intervention group (40%) attending the session. Stroke knowledge scores improved by 50% in the intervention group ($P < .001$). Overall, the knowledge of stroke risk factors, warning signs, and thrombolytic therapy was poor in this Irish community-dwelling cohort. Our study demonstrates that a single educational session can improve short-term knowledge of stroke symptoms and thrombolytic therapy. **Key Words:** Risk factors—signs and symptoms—survey—Ireland—thrombolysis—health—education.
© 2011 by National Stroke Association

Stroke is the third most common cause of death and the leading cause of long-term disability in Ireland.[1] Up to 50% of all strokes are preventable,[1] and a greater understanding by individuals of their personal risk profile could lead to improved control of modifiable risk factors and, consequently, a reduced incidence of stroke.[2-6] However, international studies have revealed that the public's knowledge of stroke risk factors is modest at best.[3,7,8]

Despite advances in stroke treatment, particularly in thrombolytic therapy, as few as 1.8%-2.1% of ischemic stroke patients receive this treatment.[9,10] Poor knowledge regarding the significance of and appropriate emergency response to stroke symptoms is a major factor leading to delayed presentation to hospital, which is the most common reason why stroke patients do not receive thrombolytic therapy.[10-13]

Stroke education programs using mass media have proven effective in increasing the public's awareness of

From the *Physiotherapy Department, †Department of Medicine, ‡Community Nutrition and Dietetic Service, §Department of Nursing, Midland Regional Hospital, Mullingar, County Westmeath, Ireland; and ¶Physiotherapy Department, Royal College of Surgeons in Ireland, Dublin, Ireland.

Received November 29, 2010; accepted February 15, 2011.

Supported by the Irish Heart Foundation.

Address correspondence to Geraldine O'Callaghan, Ballymore, Granard, County Longford. E-mail: geraldineocallaghan@hotmail.com.

1052-3057/$ - see front matter
© 2011 by National Stroke Association
doi:10.1016/j.jstrokecerebrovasdis.2011.02.006

stroke,[9,14-17] reducing time delays for hospital presentation,[17,18] and increasing the rate of thrombolytic therapy in stroke patients.[19] Such media programs require substantial resources, and their cost-effectiveness is uncertain. Moreover, they may not target certain key at-risk groups,[16] and the newly acquired knowledge might not be sustained after media blackout/ when education is discontinued.[17]

Less resource-intensive small community-based education projects have been used to deliver health promotion information in the United States.[20-22] However, previous studies evaluating the value of lower-cost interventions have been criticized due to methodological concerns.[23,24]

When implementing an appropriate educational strategy, it is important to establish the target population's baseline knowledge of risk factors, warning signs, response to stroke, and available treatments. Community awareness of stroke appears to be poor overall in Ireland, and there is no published evidence on the impact of small community-based stroke education programs.

The goals of the present study were to assess the knowledge of stroke among middle-aged community-dwelling men and women in a semi-rural Irish population, and to evaluate the impact of a single 90-minute educational session on knowledge of stroke risk factors, warning signs, proper course of action, and available treatments.

Methods

A community-dwelling convenience sample of men and women aged >40 years was identified from 2 general practitioner computer registers (designated centers 1 and 2) located 25 miles apart in a semi-rural area of Ireland. Subjects from center 1 were allocated to the intervention group, whereas those from center 2 were allocated to the control group. In total, 200 subjects at each location were identified. Each potential subject was sent a letter soliciting participation in the study and explaining that it involved completing an initial and follow-up standardized pro forma telephone questionnaire addressing stroke knowledge. For the intervention group, each subject was offered the opportunity to attend a single multidisciplinary stroke education session lasting 90 minutes. The study was a quasi-experimental preintervention and postintervention design. For the intervention phase of the study, a sample size calculation determined that 200 participants were required per group to allow for up to 20% dropout and yield a difference of 15% between the control and intervention groups at a 5% significance level. The primary outcome of the intervention arm of the study was the change in stroke knowledge as assessed by the follow-up questionnaire. All participants were free to withdraw from the study at any time. Ethical approval for the study was obtained from the relevant regional Health Services Ethics Committee before study commencement.

The study questionnaire was generated from 2 previously published questionnaires.[7,25] It consisted of 21 questions divided into 3 sections—knowledge of stroke (symptoms, signs, treatment), cardiovascular risk factors, and demographic data—and took approximately 7 minutes to complete (Appendix 1). The final questionnaire was piloted with a convenience sample of 20 subjects. A reminder letter was sent out 1 week before the educational session to the subjects in the intervention group. A multidisciplinary steering committee consisting of a stroke consultant, senior dietician, registered nurse with an interest in stroke, and a senior physiotherapist designed and delivered the 90-minute educational intervention session in a local community hall for ease of access (Appendix 2). Statistical analyses were performed using SPSS version 15.0 (SPSS, Chicago, IL) and Stata version 9.2 (StataCorp, College Station, TX). Significance was set at $P \leq .05$.

The data analysis included descriptive statistics of baseline knowledge. Group comparisons were performed using logistic regression analysis, the χ^2 test, and Fisher's exact test. A Stroke Knowledge Score was calculated as the sum of the correct answers to 6 questions in Section 1 Appendix 1 with scores ranging from 0 (no knowledge) to 21 (complete knowledge). A negative binomial regression model was used to investigate the effect of the educational intervention on the Stroke Knowledge Score. McNemar's test was used to assess the significance of the mean change between preintervention and postintervention within the groups for each individual question, and the χ^2 test was used to test the significance of the differences between group proportions. A sensitivity analysis investigated the effect of missing data on the results. Poisson regression was used to analyze changes in Stroke Knowledge Scores in those who attended the educational session and those who did not attend compared with controls.

Results

The consort flowchart shown in Figure 1 provides a breakdown of participation and reasons for dropout at each stage of the study. A total of 280 participants completed the baseline knowledge questionnaire (a 70% response). Of these, 229 (82%) completed the follow-up questionnaire. Forty-seven respondents in the intervention group (40%) attended the stroke education session.

The 280 respondents included 134 men (47.9%), and the mean respondent age was 57 ± 11.4 years (range, 40-88 years). The majority of the participants were Irish (93.6%) and married (76.1%). The geographical distribution was 141 subjects (50.4%) from center 1 and 139 (49.6%) from center 2.

Preintervention Analysis

In terms of analysis of baseline knowledge of stroke (Table 1), 146 of the 280 respondents (52.1%) identified

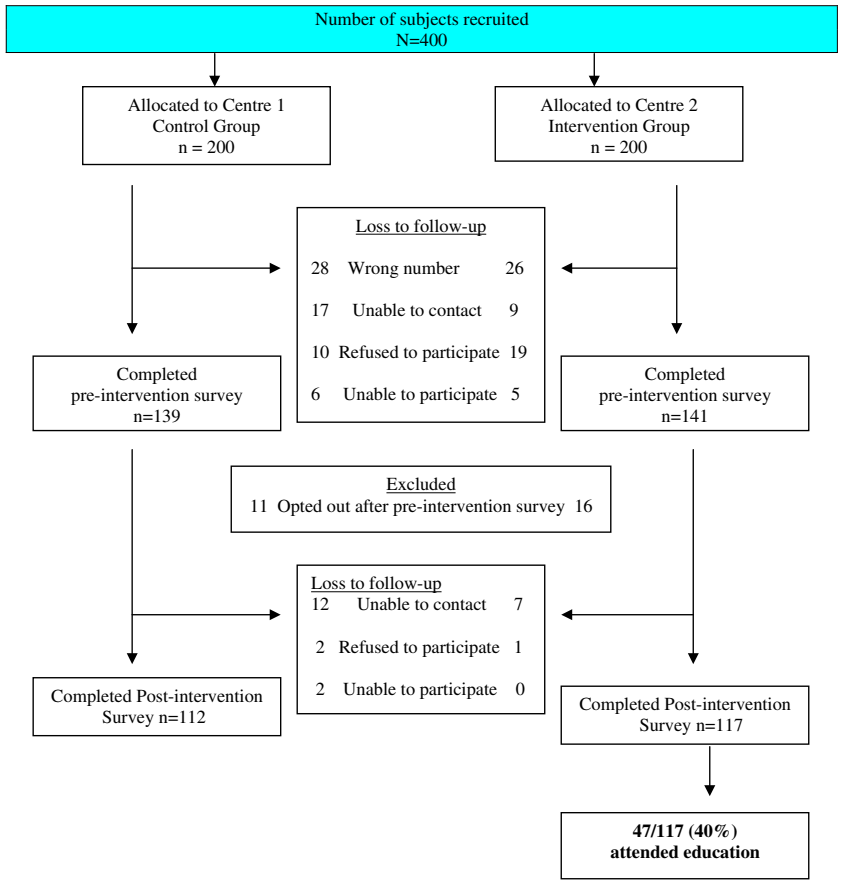

Figure 1. *Consort flow chart.*

the brain as the organ affected by stroke. Hypertension (46.1%) and obesity (29.6%) were the most commonly listed risk factors, with face/limb weakness (37.1%) and slurred speech (28.2%) the most commonly cited warning signs. Approximately half (50.7%) of the respondents would call 999 in response to stroke, 16.8% had heard of a "clot busting drug"/tissue plasminogen activator (t-PA), and 1.4% knew that t-PA is a time-sensitive drug. More than half of the respondents (58.2%) could list 2 or more risk factors for stroke, but only 27.1% could name 2 or more warning signs. The most common sources of knowledge were family members experiencing a stroke, but 34% of the respondents had never received any information about stroke.

Postintervention Analysis

Analysis was carried out on an intention-to-treat basis on the 229 respondents (82%) who completed the postintervention survey. Baseline characteristics were similar in the intervention and control groups, except for more frequent university-level education in the control group ($P = .032$). As shown in Table 2, baseline Stroke Knowledge Scores were higher in the control group (4.4 vs 3.7). After the stroke educational session, Total Stroke Knowledge Scores remained unchanged in the control group but improved in the intervention group as a whole (4.4 vs 5.5). After adjustment for differences in baseline knowledge and educational attainment, Stroke Knowledge Scores improved by 50% (95% CI, 31%-72%) after the educational session in the intervention group ($P < .001$). After sensitivity analysis on the 253 subjects who agreed to reeducation using the last value carried forward method, with the missing postintervention total score for an individual replaced with his or her preintervention total score, the difference between groups remained statistically significant.

Regarding the 6 individual Stroke Knowledge Score questions, there were significant postintervention increases in the proportions who would call 999 in the event of stroke ($P = .005$) and who had heard of thrombolytic therapy ($P = .002$) and notable (albeit statistically insignificant) trends in the proportions who could name at least 2 stroke warning symptoms and could state the correct time window for thrombolytic therapy (Table 3).

Attendance at Education

Not surprisingly, a subgroup analysis of changes in Stroke Knowledge Score between control and intervention group subjects subdivided into those who attended the education session and those who did not, demonstrates that the positive impact on knowledge was confined to the latter subgroup (Table 4). Although preintervention mean Stroke Knowledge Scores differed significantly between education attenders and nonattenders

Table 1. *Baseline knowledge of stroke*

	n	%
Q1. Brain identified as organ affected by stroke	146	52.1
Q2. Risk factors identified		
Hypertension	129	46.1
Obesity	83	29.6
Smoking	72	25.7
High cholesterol	71	25.4
Stress	54	19.3
Excess alcohol	41	14.6
Lack of exercise	40	14.3
Hereditary	21	7.5
Diabetes	11	3.9
Increasing age	9	3.2
Q3.Warning signs identified		
Weakness side of face/body	104	37.1
Slurred speech	79	28.2
Severe headache	22	7.9
Dizziness	17	6.1
Numbness side of face/body	14	5.0
Visual disturbance	12	4.3
Difficulty understanding	2	0.7
Q5. Correctly identified calling 999 in case of stroke	142	50.7
Q6. Heard of tPA	47	16.8
Q7. Correct time frame for t-PA to be effective	4	1.4
Source of stroke knowledge		
Never learned about stroke	96	34.3
Family member had stroke	53	18.9
Newspaper/magazine	46	16.4
Television	25	8.9
Medical books	22	7.9

(P = .037), this baseline imbalance was adjusted for in regression analysis. The results of Poisson regression analysis (n = 229) reveal a statistically significant difference ($P < .001$) in postintervention Stroke Knowledge Scores between the intervention group education attenders and controls (Table 5). Stroke Knowledge Scores did not differ between intervention group nonattenders and controls on the follow-up questionnaire (P = .169). For all of the individual Stroke Knowledge questions, there were statistically significant differences between attenders and nonattenders in changes from preintervention to postintervention (Table 6). Logistic regression was used to investigate differences in demographics or stroke risk factors between attenders and nonattenders. Univariate analysis showed that education session attendance was significantly greater in females, those with a higher educational level, and married subjects and significantly lower in subjects with diabetes, subjects with hypertension, and current smokers. However, after adjusting for other variables in the model, only smoking status remained a statistically significant predictor of attendance at an educational session. Compared with nonsmokers, current smokers were significantly less likely to attend an education session (OR, 0.27; 95% CI, 0.07-0.96).

Discussion

Efforts to prevent stroke rely on an individual's knowledge of personal risk, whereas optimal acute stroke outcomes depend on an awareness of and timely response to stroke symptoms. Our study cohort's knowledge of risk factors, warning signs, and proper response to stroke was moderate at best. This poorer awareness of stroke warning signs relative to risk factors is consistent with previous reports.[7,26-28] Half of the respondents would call 999 in the event of witnessing or experiencing a stroke, comparable with previous findings in Northern Ireland, Brazil, and the Czech Republic.[3,10,29] The California Acute Stroke Pilot Registry study suggested that 28% of their study population (n = 344) would have been eligible for thrombolysis had they contacted emergency medical services immediately after the onset of stroke.[30] Consequently, based on a 50% response rate, 11% of this current study population might be eligible for thrombolysis. However, rates of thrombolytic therapy are as low as 1.8%,[9] suggesting that action in response to stroke might not be related to knowledge of stroke. Outcomes might be more closely associated with an awareness of the treatments available for acute stroke.[9,10] The poor awareness of stroke thrombolytic therapy found in this study is disturbing. It might be related to the poor availability of this treatment in Ireland, as noted in the First Irish National Audit on Stroke Care.[31]

The present study also assessed the impact of a single 90-minute educational session on stroke knowledge and the short-term (4 weeks) retention of this knowledge. Numerous previous public stroke education programs have taken

Table 2. *Comparative preintervention and postintervention knowledge scores*

	Group	n	Mean (SD) stroke knowledge score	Median (IQR) stroke knowledge score	Minimum	Maximum
Preintervention	Intervention	117	3.7 (2.0)	4 (2-5)	0	9
	Control	112	4.4 (2.3)	4 (3-6)	0	11
Postintervention	Intervention	117	5.5 (3.5)	5 (3-8)	0	17
	Control	112	4.4 (2.3)	4 (3-6)	0	9

Table 3. *Participants knowledge of individual questions preintervention and postintervention*

	Intervention (n = 117), n (%)	Control (n = 112), n (%)	*P* value‡
Correctly identified the brain as the organ affected by stroke			.429*
Preintervention	58 (49.6)	60 (53.6)	
Postintervention	72 (61.5)‡	70 (62.5)	
Correctly identified at least 2 risk factors for stroke			.077*
Preintervention	64 (54.7)	71 (63.4)	
Postintervention	72 (61.5)*	64 (57.1)	
Correctly identified at least 2 warning signs for stroke			.052*
Preintervention	32 (27.4)	32 (28.6)	
Postintervention	45 (38.5)	28 (25.0)	
Would call 999/ambulance in case of stroke			.005*
Preintervention	49 (41.9)	68 (60.7)	
Postintervention	86 (73.5)‡	75 (67.0)	
Heard of new clot-busting drug tPA			.002*
Preintervention	17 (14.5)	26 (23.2)	
Postintervention	56 (47.9)‡	31 (27.7)	
Gave the correct time frame in which thrombolytic drug is effective			.158†
Preintervention	0 (0.0)	4 (3.6)	
Postintervention	32 (27.4)‡	5 (4.5)	

*From the χ^2 test based on the change cells.
†Due to small expected counts, Fishers exact test was used rather than the χ^2 test.
‡$P < .05$ from McNemars test.

a multifaceted approach, combining mass media and other techniques to educate the public, as well as to train paramedics and physicians.[17-19,26,32,33] The high cost of mass media campaigns limits their availability, however. Television viewing habits vary among demographic groups,[34,35] and it is possible that mass media campaigns might not reach the population as a whole. Evidence suggests that the groups at greatest risk (age >65 years) might not be targeted by this approach.[16]

Small single-session community education projects introduced over the last decade, although limited in number, demonstrate this approach has a place in community stroke education programs.[14,20,22] Our program included educational slide-show presentations on stroke risks factors and risk modification, stroke symptoms and response, and treatments available for acute stroke; a video link to the UK television stroke symptom education campaign: Face Arm Speech Time (FAST); a quiz to facilitate immediate recall, stroke education information packs to take away; and adequate time for questions and answers. After the educational session, the intervention group's overall stroke knowledge improved significantly($P < .0001$).

The significant postintervention improvement in knowledge of the appropriate response to stroke symptoms ($P = .005$) and available treatments ($P = .002$) is noteworthy. However, statistically significant improvements in the postintervention Stroke Knowledge Scores were seen only in those intervention group subjects who actually attended the educational session ($P < .001$), not in those who did not attend ($P = .487$). Various factors might account for the low uptake for education (47/117; 40%), including the time of year (October/November, with dark evenings and a late hour 7 pm), and limitation of the sessions to one day of the week (Monday).

Table 4. *Comparative preintervention and postintervention knowledge scores by treatment group*

	n	Mean (SD)	Median (IQR)	Minimum	Maximum
Preintervention					
Control	112	4.4 (2.3)	4 (3-6)	0	11
Intervention: nonattenders	70	3.4 (2.2)	3 (2-4)	0	9
Intervention: attenders	47	4.1 (1.7)	4 (3-5)	0	9
Postintervention					
Control	112	4.4 (2.3)	4 (3-6)	0	9
Intervention: nonattenders	70	3.4 (2.1)	3 (2-5)	0	9
Intervention: attenders	47	8.7 (2.7)	8 (7-10)	3	17

Table 5. *Comparison of mean postintervention knowledge scores in education attenders/nonattenders and controls*

Attenders (n = 47)	Controls (n = 112)	*P* value	Nonattenders (n = 70)	Controls (n = 112)	*P* value
8.7	4.4	<.001	3.4	4.4	.169

Although our findings indicate that it is possible to increase the public's awareness of stroke in the short term, whether this knowledge will be sustained, translate into appropriate behavior in response to stroke, promote timely access to emergency stroke care, or affect the rate of thrombolytic therapy is uncertain. Follow-up for this small community-based project may be difficult, given that a national multimedia stroke education campaign is now underway in Ireland.[36]

The uptake to attendance at the education session in this study was only 40% (47/117), compared with 72%-83% in previous similar studies.[20,22,37] However, the participants in 2 of those previous studies were stroke survivors,[20,37] and in one study the group received education in the hospital environment.[20] Both of these factors increase the potential for selection bias, and thus the results and response rates must be interpreted with caution. Little is known about the uptake to general community information evenings/sessions.

This study has some flaws and limitations. There was a potential for selection bias as well as for dropout bias; however, this was controlled for in the sensitivity analysis. The repeat questionnaire should have addressed risk modification, given that this was part of the education package. A focus group would have provided the opportunity to explore educational content, and a cost analysis would have allowed for comparisons with other education campaigns.

In conclusion, this study demonstrates that knowledge of risk factors, warning signs, and response to stroke in a rural Irish community is moderate at best, whereas knowledge of treatment available and its time sensitivity is poor. The study's stroke survey component should help bridge the gap in the Irish public's knowledge of stroke, whereas the postintervention results suggest that a single educational session can improve short-term stroke knowledge. This study encourages local health care professionals in primary or acute care settings to educate the

Table 6. *Change in participants knowledge in attenders and nonattenders preintervention and postintervention*

	Attenders (n = 47)	Nonattenders (n = 70)	*P* value*
Identification of brain as the organ affected by stroke			
Got worse†	0 (0.0)	7 (10.0)	.004
No change‡	34 (72.3)	55 (78.6)	
Improved§	13 (27.7)	8 (11.4)	
Identification of at least 2 risk factors for stroke			
Got worse	3 (6.4)	17 (24.3)	.001
No change	26 (55.3)	43 (61.4)	
Improved	18 (38.3)	10 (14.3)	
Identification of at least 2 warning signs for stroke			
Got worse	5 (10.6)	8 (11.4)	<.001
No change	21 (44.7)	57 (81.4)	
Improved	21 (44.7)	5 (7.1)	
Would call 999/ambulance in case of stroke			
Got worse	1 (2.1)	6 (8.6)	.008
No change	22 (46.8)	44 (62.9)	
Improved	24 (51.1)	20 (28.6)	
Heard of new clot-busting drug, tPA			
Got worse	0 (0.0)	6 (8.6)	<.001
No change	10 (21.3)	56 (80.0)	
Improved	37 (78.7)	8 (11.4)	
Gave the correct time frame in which thrombolytic drug is effective			
Got worse	0 (0.0)	0 (0.0)	<.001
No change	16 (34.0)	69 (98.6)	
Improved	31 (66.0)	1 (1.4)	

*From chi-squared test for trend.
†Question correctly answered at pre-intervention and incorrectly answered post-intervention.
‡No difference between pre- and post-intervention.
§Question answered incorrectly at pre-intervention and correctly answered post-intervention.

public within their own community, actively engage them in the health promotion process, and empower them to take responsibility for their role in stroke prevention and management. Although our findings show that it is possible to increase the public's awareness of stroke in the short term, whether this knowledge will be sustained, will lead to risk modification, will translate into appropriate behavior in response to stroke, will promote more timely access to emergency stroke care, or will affect the rate of thrombolytic treatment is unknown. Future studies should explore the uptake of community information sessions.

References

1. Irish Heart Foundation. Stroke manifesto 2009. Available from: www.irishheart.ie/iopen24/pub/strokereports/irish_heart_foundation_stroke_manifesto.pdf. Accessed March 2010.
2. Gorelick PB, Sacco RL, Smith DB, et al. Prevention of a first stroke: A review of the guidelines and a multidisciplinary consensus statement from the National Stroke Association. JAMA 1999;281:1112-1120.
3. Parahoo K, Thompson K, Cooper M, et al. Stroke: Awareness of the signs, symptoms and risk factors. A population-based survey. Cerebrovasc Dis 2003;16:134-140.
4. Romero JR. Prevention of ischemic stroke: Overview of traditional risk factors. Curr Drug Targets 2007;8:794-801.
5. Hickey A, O'Hanlon A, McGee H, et al. Stroke awareness in the general population: Knowledge of stroke risk factors and warning signs in older adults. BMC Geriatr 2009;9:1-8.
6. National Institute of Neurological Disorders and Stroke. Brain Basics: Preventing Stroke. Available from: www.ninds.nih.gov/disorders/stroke/preventing_stroke.htm. Accessed November 2009.
7. Pancioli AM, Broderick J, Kothari R, et al. Public perception of stroke warning signs and knowledge of potential risk factors. JAMA 1998;279:1288-1292.
8. Neau J, Ingrand P, Godeneche G. Awareness within the French population concerning stroke signs, symptoms, and risk factors. Clin Neurol Neurosurg 2009;8:658-664.
9. Kleindorfer D, Lindsell CJ, Brass L, et al. National US estimates of recombinant tissue plasminogen activator use: ICD-9 codes substantially underestimate. Stroke 2008; 39:924-928.
10. Mikulik R, Bunt L, Hrdlicka D, et al. Calling 911 in response to stroke: A nationwide study addressing definitive individual behaviour. Stroke 2008;39:1844-1849.
11. Williams LS, Bruno A, Rouch D, et al. Stroke patients' knowledge of stroke: Influence on time to presentation. Stroke 1997;28:912-915.
12. California Acute Stroke Pilot Registry Investigators. Prioritizing interventions to improve rates of thrombolysis for ischemic stroke. Neurology 2005;64:654-659.
13. Deng YZ, Reeves MJ, Jacobs BS, et al. IV tissue plasminogen activator use in acute stroke: Experience from a statewide registry. Neurology 2006;66:306-312.
14. Stern EB, Berman ME, Thomas JJ, et al. Community education for stroke awareness: An efficacy study. Stroke 1999;30:720-723.
15. Becker KJ, Fruin MS, Gooding TD, et al. Community-based stroke education improves stroke knowledge. Cerebrovasc Dis 2001;11:34-43.
16. Silver F, Rubini F, Black D, et al. Advertising strategies to increase public knowledge of the warning signs of stroke. Stroke 2003;34:1865-1968.
17. Hodgson C, Lindsay P, Rubini F. Can mass-media influence emergency department visits for stroke? Stroke 2007;38. 2115-2112.
18. Alberts MJ, Perry A, Dawson DV, et al. Effects of public and professional education on reducing the delay in presentation and referral of stroke patients. Stroke 1992;23:352-356.
19. Morgenstern LB, Staub L, Chan W, et al. Improving delivery of acute stroke therapy: The TLL Temple Foundation stroke project. Stroke 2002;33:160-166.
20. Green T, Haley E, Elisziw M, et al. Education in stroke prevention: Efficacy of an educational counselling intervention to increase knowledge in stroke survivors. Can J Neurosci Nurs 2007;29:13-20.
21. Hodgson C. Community outreach for stroke education. Stroke 2008;39:2189-2190.
22. Kleindorfer D, Miller R, Sailor-Smith S, et al. The challenges of community-based research: The Beauty Shop Stroke Education Project. Stroke 2008;39:2331-2335.
23. Kwan J, Hand P, Sandercock P. Improving the efficiency of delivery of thrombolysis for acute stroke: A systematic review. QJM 2004;97:273-279.
24. Muller-Nordhorn J, Wegscheider K, Nolte C, et al. Population-based intervention to reduce prehospital delays in patients with cerebrovascular events. Arch Int Med 2009; 169:1484-1490.
25. Anderson BE, Rafferty AP, Lyon-Callo S, et al. Knowledge of tissue plasminogen activator for acute stroke among Michigan adults. Stroke 2009;40:2564-2567.
26. Yoon SS, Heller RF, Levi C, et al. Knowledge of stroke risk factors, warning symptoms, and treatment among an Australian urban population. Stroke 2001;32:1926-1930.
27. Reeves MJ, Hogan JG, Rafferty AP. Knowledge of stroke risk factors and warning signs among Michigan adults. Neurology 2002;59:1547-1552.
28. Pandian JD, Jaison A, Deepak SS, et al. Public awareness of warning symptoms, risk factors, and treatment of stroke in Northwest India. Stroke 2005;36:644-648.
29. Pontes-Neto OM, Silva GS, Feitosa MR, et al. Stroke awareness in Brazil: Alarming results in a community-based study. Stroke 2008;39:292-296.
30. California Acute Stroke Pilot Registry Investigators. Prioritizing interventions to improve rates of thrombolysis for ischemic stroke. Neurology 2005;64:654-659.
31. Irish Heart Foundation. Irish national audit of stroke care. Available from: www.irishheart.ie/iopen24/pub/strokereports/stroke_report.pdf. Accessed November 2009.
32. Kothari R, Sauerbeck L, Jauch E, et al. Patients' awareness of stroke signs, symptoms, and risk factors. Stroke 1997; 28:1871-1875.
33. Kleindorfer D, Miller R, Moomaw C, et al. Designing a message for public education regarding stroke: Does FAST capture enough stroke? Stroke 2007;38:2864-2868.
34. Nielsen : what people watch. Available from: http://en-us.nielsen.com/tab/industries/media/television. Accessed October 2009.
35. Nowak GJ. TV viewer characteristics and "results beyond response." J Direct Market 1992;6(2):18-31.
36. Irish Heart Foundation, FAST Campaign. Available from: www.stroke.ie. Accessed January 2010.
37. Sit J, Yip V, Ko S, et al. A quasi-experimental study on a community-based stroke prevention program for clients with minor stroke. J Clin Nurs 2005;16:272-281.

APPENDIX 1: Questionnaire

ROYAL COLLEGE OF SURGEONS, IRELAND SCHOOL OF PHYSIOTHERAPY MSc NEUROLOGY AND GERONTOLOGY

COMMUNITY KNOWLEDGE OF STROKE RISK FACTORS AND WARNING SIGNS, PRE AND POST AN EDUCATION SESSION

Data Collection period: Pre-intervention _____

Phone script:

"Hello, my name is Geraldine O'Callaghan".

A.

"Your GP contacted you on my behalf regarding a survey on stroke awareness. Did you get this letter?"

Yes ____ No ____

If yes ….skip to C, If no….continue to B.

B.

"I am a physiotherapist and I am calling to request your participation in a research study that I am conducting about stroke awareness."

C.

"The study is part of a Masters degree I am completing at the Royal College of Surgeons in Ireland. It involves answering a couple of questions about stroke, is completely confidential, and should not take more than 5 minutes of your time."

"Are you willing to participate?" Yes ____ No ____

If yes, response as follows, "Thank you very much! Please note that you can choose not to answer any question and end this phone conversation at any time"

"We will be talking about stroke. Firstly we will complete part 1."

Part 1: Knowledge of stroke risk factors, warning signs and what to do in event of stroke.

1. Which organ of the body is affected by stroke?

01. Brain _____ 00. Other _____

2. In your opinion, what are the main causes of a stroke? What are the risk factors associated with stroke?
(CIRCLE RESPONSES, Encourage "any more", All correct responses are scored as 1 in excel)

PRE-CODES

01. STRESS
02. HIGH BLOOD PRESSURE
03. HIGH CHOLESTEROL
04. SMOKING
05. DIABETES
06. OBESITY
07. EXCESS ALCOHOL
08. LACK OF EXERCISE
09. INCREASING AGE
10. HEREDITARY-FAMILY HISTORY

98. DK (Pause, Probe …anything at all….)
99. NA

3. In your opinion, what are the warning signs of a stroke? I.e. What signs would you see if you thought someone was having a stroke?
(CIRCLE RESPONSES, Encourage "any more", All correct responses are scored as 1 in excel)

PRE-CODES

01. DIZZINESS
02. DIFFICULTY UNDERSTANDING
03. SEVERE HEADACHE
04. PROBLEMS WITH VISION
05. SLURRED SPEECH
06. WEAKNESS OF SIDE OF BODY/ FACE
07. NUMBNESS ON SIDE OF BODY/FACE

98. DK (PAUSE, PROBE: ''Anything at all . . . .'')
99. NA

[IF DK TO Q. 2 AND Q. 3–SKIP TO Q. 5]

4. Where did you learn about the risk factors or the warning signs of stroke?
(CIRCLE FIRST RESPONSE)

PRE-CODES

01. FAMILY MEMBER HAD STROKE
02. FRIEND HAD STROKE
03. TV
04. RADIO
05. NEWSPAPERS/ MAGAZINES
06. INTERNET
07. MEDICAL BOOKS
08. DOCTOR

98. DK (PAUSE, PROBE: ''Anything at all ….'')
99. NEVER

5. If you thought you, or someone you were with, appeared to be having a stroke . . . what would you do first?" (CIRCLE RESPONSE. Correct answer (01) scored as 1 in excel, all other answers scored as 0)

01. CALL 999/AMBULANCE
02. TAKE INDIVIDUAL TO EMERGENCY DEPARTMENT/HOSPITAL
03. TAKE INDIVIDUAL TO HIS/HER DOCTOR
04. CALL HIS/HER DOCTOR
05. WAIT A WHILE TO SEE IF SYMPTOMS GO AWAY
06. OTHER _____

98. DK (PROBE: REREAD QUESTION) 99. NA

6. Have you heard of a new "clot-busting" drug that can be used to treat some persons who have had a stroke? This drug is called tPA.

1. YES
0. NO ….**skip to Q8**

98. DK (DO NOT PROBE)….skip to Q8
99. NA

7. Do you know specifically how soon after the onset of stroke do thrombolytic drugs need to be given to be effective?

1. YES Record Answer _____hours
0. NO ….**skip to Q8**

98. DK (DO NOT PROBE)….skip to Q8
99. NA

Part 2: To determine respondent's risk factors.

8. Has your GP/ doctor EVER told you that you have diabetes?

1. YES [NOTE: "STRESS OR BORDERLINE"; DIABETES CODE AS: 1. YES]
2. NO

98. DK (DO NOT PROBE)
99. NA

9. Has your GP/doctor EVER told you that you have hypertension or high blood pressure?

1. YES
2. NO

98. DK **(DO NOT PROBE)**
99. NA

10. Has your GP/doctor EVER told you that your blood cholesterol level is high?

1. YES
2. NO

98. DK **(DO NOT PROBE)**
99. NA

11. Has your GP/doctor EVER told you that you have had a heart attack?

1. YES
2. NO

98. DK **(DO NOT PROBE)**
99. NA

12. Have you ever smoked at least 100 cigarettes or 5 packs of cigarettes during your entire life?

1. YES
2. NO

98. DK
99. NA

13. Do you smoke now?

1. YES
2. NO

98. DK
99. NA

14. On average, how many units of alcohol would you drink (per week/ month/ year)? (One unit = 1/2 pint of beer/lager, small glass of wine, pub measure of spirits)

____ Units per
1. WEEK
2. MONTH
3. YEAR
4. NEVER

98. DK
99. NA

15. Has your doctor ever told you that you have had a stroke or TIA?

1. YES
2. NO

[NOTE: TIA-TRANSIENT ISCHEMIC ATTACK SYMPTOMS OF A STROKE THAT GO AWAY COMPLETELY WITHIN 24 HOURS.]

98. DK (**DO NOT PROBE**)
99. NA

16. Regular exercise is any planned physical activity (e.g. brisk walking, aerobics, jogging, bicycling, swimming, rowing, etc) that would cause you to be slightly out of breath and is performed to increase physical fitness. On average how many days per week would you partake in exercise of this kind?

_____ # days

17. How long would you spend exercising on each occasion?

_____mins

Part 3: Demographics

18. Next, what is your current age?

___ ___ (CODE EXACT NUMBER OF YEARS OLD – E.G., 55)

95. NINETY-FIVE YEARS OF AGE OR OLDER
97. REFUSED
98. DK

19. What level of schooling did you complete?

01. PRIMARY
02. SECONDARY
03. COLLEGE/POST LEAVING CERT COURSE
04. UNIVERSITY

97. REFUSED
98. DK

20. What Nationality do you consider yourself to be?

01.IRISH
02.OTHER ____

ARTICLE IN PRESS

97. REFUSED
98. DK

21. Are you Married?

1. Yes 2. No

FINISH:

"These are all the questions I have. You have been very helpful. Thank you for your co-operation".
The next step in this project is to hold an education session on stroke. Dr Murphy, consultant geriatrician with an interest in stroke, and a team including a nurse, physiotherapist and dietician, are going to provide some education sessions on stroke.

❑ **Would you find it beneficial to attend a session to gain a better understanding of stroke?**
Yes _____ No _____

❑ **Which session would best suit you to attend?**

Circle:

Intervention Group		Control Group	
Session 1:	Oct 5th at 8pm	Session 1:	
Session 2:	Oct 12th at 8pm	Session 2:	TBA – will contact nearer the time
Session 3:	Oct 17th at 8pm	Session 3:	

❑ **Would you be happy for me to contact you again … in the week after the education session (intervention group)….. at some time in the future (control) , to ask another set of similar questions?**
Yes _____ No _____

Goodbye

INTERVIEWER SUPPLEMENT
Circle SEX of respondent

1. MALE 2. FEMALE

Did respondent request additional health information during this survey?

1. YES 2. NO

RECORD RESPONDENT QUESTIONS ABOUT SURVEY

Record Date Interview Completed: ___ ___ - ___ ___ - ___ ___ (DD-MM-YY)

APPENDIX 2: Education Format Outline

1. A **power-point slide show** provided information on stroke risk factors, warning signs, response to, and treatment available. This section lasted approximately **20** minutes.
2. Key health professionals of a dietician, nurse with a special interest in stroke and a physiotherapist offered advice on primary and secondary **preventative measures** for stroke. This section lasted approximately **21** minutes (7 minutes per speaker)
3. A **mini-quiz** helped to consolidate knowledge. Participants were seated in groups of 4 / 5, provided with a small work sheet and facilitated by the health professionals to recall vital aspects of the information presented. This workshop lasted approximately **15** minutes.
4. Facilitation of questions and answers **(Q&A)** lasted up to **20** minutes.
5. **Resource packs** provided on leaving the talk included the presentation on stroke, a leaflet on stroke prevention from the stroke association, leaflets from the Irish Heart Foundation on cholesterol and hypertension, and information on facilitating weight loss and smoking cessation, and promoting physical activity at a local level.