Stroke and TIA Awareness and Response to Symptoms Study (S.T.A.R.S.S.)

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Background

• Thrombolysis rates for stroke are lower in Sheffield than national avg
• Most common reason for ineligibility = late arrival
• FAST campaign launched in 2009
  • Mass media advertising
  • Cost many millions
  • Resulted in increased 999 calls for stroke
  • OXVASC; improved call times for major stroke
Sustained impact of FAST-education on response to stroke: a population-based time-series study

A) Frequency (%) of initial non-emergency response throughout study period
B) Hospital arrival within three-hours (%) throughout the study period

The shaded areas reflect episodes of televised FAST campaigning.

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Sheffield HASU

• Sees all stroke/TIA hospital referrals from catchment of c.500,000
• Inpatient stroke service
• 24/7 thrombolysis
• Outpatient TIA (daily one-stop high or low risk clinic)
  • High risk (ABCD2 >=4) – aims to see within 24 hours of onset
  • Low risk (ABCD2 <4) - aims to see within 7 days of onset
S.T.A.R.S.S. Aims

• Understanding our own stroke/TIA population
• Which groups are in need of better education about stroke
• What should the educational messages be?
• Comparison data for future education intervention
S.T.A.R.S.S. Objectives

• Clinical characteristics associated with
  • Call for help < 1 hour
  • Arrival in hospital < 4 hours

• Recall of FAST campaign
  • Awareness of campaign
  • Ability to recall ≥1 or all 4 FAST components (bystanders interviewed also)

• Self reported barriers to help-seeking
  • Attribution of symptoms due to stroke
Clinical characteristics

• Age
• Vascular risk factors
• Sociodemographic group (MID score)
• Educational level
• Presenting symptoms
Timings

• Onset of symptoms
• First call for medical help
• First seen by medic
• Arrival in hospital
• Arrival on stroke unit
• Ambulance data
  • Call originated
  • Time on scene
  • Time left scene
  • Time arrival in hospital
Confounding variables

- Symptom severity
- Which agency was first contacted (GP or 999)
- Who made the call for help (patient or bystander)
  - If bystander were they acting independently of patient?
Barriers to help-seeking

• Answer yes/no to (e.g.)
  • Waiting to see if symptoms will improve on their own
  • Embarrassed to call ambulance
  • Worried about troubling others
  • Did not think symptoms were serious
  • Other?
Recruitment Protocol

- Participants recruited from daily HASU admissions
- 64 weeks spread across 5 sampling periods (2013-2016)
- Consecutive cases with confirmed stroke/TIA
- Interviewer administered questionnaire
- Within 72 hours of admission
- Hospital records and ambulance sheets reviewed
- Next of kin asked for corroborative information on timings
Results (1) Clinical characteristics

• N= 508 (368 (72.4%) stroke, 140 (27.6%) TIA)
• 281 (55.4%) male
• Mean (SD) age =72 (14)
• Past History
  • Hypertension 57.9%
  • Diabetes 20.5%
  • Ever Smoker 56.6%
  • Atrial fibrillation 23.6%
  • Prior stroke/TIA 39%
Results (2) Event characteristics

- 368 (72.4%) stroke, 140 (27.6%) TIA
- Mean (SD) NIHSS 5.2 (5.7)
- 72.6% had FAST symptom/s at onset
Multiple-Index Deprivation (MID) in Sheffield

Income
Crime
Living environment
Health
Disability
Employment
Education
Housing services
Multi-deprivation Index in S.T.A.R.S.S. population

Frequency of social deprivation quintiles (n=500)
FAST Awareness

- Heard of FAST
- Could name all FAST letters
- Could name one or more of FAST letters
- Could name symptom letters (FAS)
- Knew F
- Knew A
- Knew S
- Knew T

[Bar chart showing the percentage of people who answered 'yes' or 'no' to each question.]
MID and FAST Awareness in S.T.A.R.S.S.

P = 0.59

P = 0.17

P = 0.06
Educational level reached and FAST Awareness

P trend = 0.02

P trend = 0.02

P trend = 0.04
Age and FAST Recall

- Had heard of FAST
- Could name 1 or more FAST symptoms
- Could name 4 FAST symptoms
Results (2) Timings and who made call

• Caller was
  • Patient themselves 22.6%
  • Bystander with patients input 32.7%
  • Bystander Independent 44.7%

• Route of referral
  • Rang 999 46.9%
  • Called /saw GP 32.7%
  • Attended A and E 6.1%
  • Rang NHS direct 7.3%

• 50.2% first call for help within 1 hour
• 41.3% arrived in hospital within 4 hours
## Factors Associated with call medical help < 1 hour

<table>
<thead>
<tr>
<th>Factor</th>
<th>&lt; 1 hour (n=232)</th>
<th>&gt; 1 hour (n=230)</th>
<th>OR (95% CI)</th>
<th>P</th>
<th>Adj OR (95% CI)</th>
<th>Adj P</th>
</tr>
</thead>
<tbody>
<tr>
<td>IMD Quintile 4-5 (most deprived)</td>
<td>108 (47.5)</td>
<td>111 (48.9)</td>
<td>0.94 (0.65-1.36)</td>
<td>0.74</td>
<td>1.02 (0.61-1.73)</td>
<td>0.93</td>
</tr>
<tr>
<td>Age &gt;75</td>
<td>132 (57.1)</td>
<td>94 (40.9)</td>
<td>1.93 (1.13-2.79)</td>
<td>0.001</td>
<td>2.46 (1.45-4.17)</td>
<td>0.001</td>
</tr>
<tr>
<td>Male sex</td>
<td>125 (54.1)</td>
<td>130 (56.5)</td>
<td>0.91 (0.63-1.31)</td>
<td>0.60</td>
<td>0.68 (0.43-1.06)</td>
<td>0.09</td>
</tr>
<tr>
<td>NIHSS &gt;5</td>
<td>79 (49.7)</td>
<td>41 (28.1)</td>
<td>2.53 (1.57-4.07)</td>
<td>&lt;0.01</td>
<td>2.12 (1.21-3.72)</td>
<td>0.009</td>
</tr>
<tr>
<td>FAST symptoms</td>
<td>186 (81.2)</td>
<td>154 (67.0)</td>
<td>2.14 (1.39-3.28)</td>
<td>&lt;0.01</td>
<td>2.00 (1.03-3.91)</td>
<td>0.04</td>
</tr>
<tr>
<td>Bystander called independently</td>
<td>200 (86.6)</td>
<td>157 (68.3)</td>
<td>3.00 (1.88-4.80)</td>
<td>&lt;0.01</td>
<td>1.37 (0.80-2.32)</td>
<td>0.25</td>
</tr>
</tbody>
</table>
The bystander effect

- **EMS**: 11.7%
- **Family doctor**: 55.1%
- **A&E**: 6.8%
- **111**: 8.5%
- **Walk-in Centre**: 2.1%
- **Other**: 11.7%

**Legend**
- Blue: Patient was solely responsible for seeking medical help (n=95)
- Orange: Patient was responsible for seeking medical help in collaboration with a bystander (n=133)
- Gray: Bystander was solely responsible for seeking medical help (n=182)
## Prevalence (%) of barriers to help seeking

<table>
<thead>
<tr>
<th>Barriers</th>
<th>Patient made or contributed to call (n=278)</th>
<th>Bystander called independently (n=114)</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>Did not occur to them it could be a stroke</td>
<td>47.5%</td>
<td>25%</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Previous similar episodes which resolved</td>
<td>14.9 %</td>
<td>4.5 %</td>
<td>0.009</td>
</tr>
<tr>
<td>Symptoms were low priority</td>
<td>12.6 %</td>
<td>1.1 %</td>
<td>0.001</td>
</tr>
<tr>
<td>Did not think symptoms were serious</td>
<td>56.1 %</td>
<td>15.2 %</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Thought fate will decide outcomes</td>
<td>14.4 %</td>
<td>1.1 %</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Worried about troubling others</td>
<td>38.3 %</td>
<td>4.3 %</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Waited to see if symptoms would resolve</td>
<td>56.3 %</td>
<td>13 %</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Embarrassed to call 999</td>
<td>18%</td>
<td>3.3%</td>
<td>0.001</td>
</tr>
<tr>
<td>≥1 of the above barriers reported</td>
<td>83.8%</td>
<td>45.7%</td>
<td>&lt;0.001</td>
</tr>
</tbody>
</table>
## Knowledge and Barriers to Help seeking: Effects on delay (call for help < 1 hour)

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<th>P</th>
<th>Adj OR (95% CI)*</th>
<th>Adj P</th>
</tr>
</thead>
<tbody>
<tr>
<td>≥ 1 barrier to help-seeking</td>
<td>141 (64.4)</td>
<td>203 (90.2)</td>
<td>5.10 (3.04-8.58)</td>
<td>&lt;0.001</td>
<td>2.77 (1.43-5.37)</td>
<td>0.003</td>
</tr>
<tr>
<td>Caller suspected a stroke</td>
<td>72 (31.4)</td>
<td>42 (18.5)</td>
<td>2.02 (1.31-3.12)</td>
<td>0.001</td>
<td>2.00 (1.01-3.95)</td>
<td>0.049</td>
</tr>
<tr>
<td>Can name all 4 FAST components</td>
<td>31 (14.6)</td>
<td>27 (12.3)</td>
<td>1.21 (0.70-2.11)</td>
<td>0.50</td>
<td>1.93 (0.97-3.85)</td>
<td>0.06</td>
</tr>
</tbody>
</table>

* Adjusted for age, NIHSS>5, FAST symptoms at onset
Discussion

• Bystander behaviour may be key
• FAST recall poor compared to overall campaign awareness
  • Reduced awareness with increased age and poor educational level
  • Knowledge of FAST associated to improved help seeking behaviour
• 41.3% all stroke/TIA arrived within 4 hours
  • cf OXVASC 40.9% from 2011-2014 (n=665 all stroke/TIA)
• Proportion of strokes thrombolysed in 2014
  • SSNAP Sheffield Teaching Hospitals 5.7%
  • National median 11.4%
  • Oxford John Radcliffe 21.1%
• Barriers highly prevalent and assoc. with delays in help-seeking
Limitations

• Tip of iceberg cases?
• Case enrolment not 100%
• Barriers data semi-quantitative
• Post event measure of premorbid FAST awareness
• FAST recall not necessarily a measure of exposure
• Confounding by symptom severity
Conclusion

• Addressing psychosocial barriers to help seeking may speed OTA
• Mass media approach prudent to reach potential bystanders
• Targetted education programmes should include spouse/child
• In-hospital pathways in Sheffield key to increasing thrombolysis rates
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