The Effect of Patient Characteristics, Presenting Symptoms and Media Campaigns on Prehospital Delay in MI Patients: A Prospective Cohort Study

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The Team

Investigators

- Dr Linda Coventry, Post-Doctoral Research Fellow, SCGH & ECU
- Dr Alexandra Bremner, Adjunct Senior Lecturer, UWA
- Ms Johanna W. van Schalkwyk, Clinical Research Nurse, SCGH
- Prof Desley Hegney, Professorial Research Fellow, Central Queensland University
- Prof Peter Thompson, School of Population Health, UWA

Funding

This project was supported by a research grant from the Sir Charles Gairdner Health Care Group Research Advisory Council
Conflict of Interest

Professor Peter Thompson has received:

Research funding: Astra Zeneca, Pfizer, Amgen, Boehringer Ingelheim, Amarin, St Jude

Conference travel: Amgen

Speaker fees: Astra Zeneca, Pfizer
Background – CV disease

- Cardiovascular disease is the leading cause of death in Australia\(^1\) and worldwide\(^2\)
  - In Australia (2012-13) over 46,000 patients were hospitalised with a myocardial infarction (MI)\(^3\)
  - MI in 2015, claimed 8,433 lives, an average of 23 each day\(^1\)
  - Rapid reperfusion of an obstructed coronary artery is associated with improved survival
  - This intervention is time-critical and delays to treatment must be minimised

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Background – Prehospital Delay

- Prehospital delay
  - Or patient decision delay, the time from symptom onset to arrival in ED

- Median prehospital delays among patients with MI are between 2 – 4.25 hours

- Studies have shown improved survival for STEMI and survival for very high risk NSTEACS is greatest if reperfusion is early (90 to 120 minutes) after symptom onset.
Background – Symptoms of MI

• Symptom profile and correct identification of symptoms are early important early indicators of the need to seek care

• MI warning signs
  – Chest pain / discomfort, light headedness, N & V, jaw / neck / back / arm / shoulder pain, SOB & collapse

• If these warning signs are experienced, the ambulance should be called immediately
  – Usually the quickest mode to hospital
  – Paramedics can treat life-threatening arrhythmias if they occur
  – Arriving by ambulance → faster treatment in the ED
Background – National Mass Media Campaigns

• A recent review\(^4\) showed 2/7 studies that used a national mass media campaign reduced pre-hospital delay.

• The National Heart Foundation of Australia has a long history of conducting mass media campaigns
  
  – The most recent campaign was the ‘warning signs of heart attack’

  – It focused on reducing delay in responding to the warning signs of MI and the importance of calling an ambulance

The primary aims were:

1. Describe the prehospital delay time of patients diagnosed with MI who arrived by private transport or ambulance;

2. Identify patient characteristics and presenting symptoms of MI that contribute to this delay;

3. Assess the impact of the Australian NHF media campaign with prehospital delay.
Methodology

• Study design, participants & setting

• Prospective cohort study

• Participants
  • MI patients (diagnosis confirmed by medical chart review and abnormal elevation in troponin)
  • ≥ 18 years
  • Fluent in English
  • Cognitive capacity to provide consent

• Setting
  • SCGH hospital
Data sources

- EDIS
- iSoft
- Medical chart (Comorbid conditions, previous PCI, CABG, type of MI)
- Symptoms of Acute Coronary Syndromes Inventory (SACSI)
  - Based on extensive literature review, reliable and valid instrument
  - Symptom of MI
  - Health history
  - Risk factors
  - Annual income was adjusted to the Australian context based on ABS 2011 census data
- An additional question: Are you familiar with any advertising campaigns related to MI and, if so, how did the campaign influence your decision to go to hospital?
• Continuous data were described with means, SD, medians & IQR
• Discrete data as frequencies & percentages
• Patient responses to familiarity with mass media campaigns and if the campaign influenced their decision to go to hospital
  – Analysed using content analysis
  – To enhance credibility and auditability data was categorized independently by two members of the research team. Disagreement were resolved with discussion until consensus was reached.
• Prehospital delay time
  – Subtracted ED arrival time from self-reported symptom onset time
  – Times were log-transformed
  – Multivariable linear regression
Results

Confirmed diagnosis of MI (n=367)
July 2013 to January 2014
- Excluded (n=9)
- Not first admission

Eligible participants approached (n=358)
Excluded (n=101)
- Unable to consent (n=43)
- Refused (n=38)
- Unable to contact (n=17)
- Died (n=3)

Participants recruited (n=257)
Excluded (n=2)
- Loss of telephone recorded consent
- Male (n=180)
- Female (n=75)
Results

- Arrived to hospital by ambulance (n=111, 44%)

<table>
<thead>
<tr>
<th>Prehospital delay</th>
<th>Median (IQR)</th>
<th>Mean (SD)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>3.8 hrs (1.8 – 12.2)</td>
<td>18.8 hrs (40.7)</td>
</tr>
</tbody>
</table>

| < 1 hour | 10 | (3.9) |
| 1-2 hours | 37 | (14.5) |
| >2-6 hours | 58 | (22.7) |
| >6-24 hours | 39 | (15.3) |
| >1-3 days | 17 | (6.7) |
| >3-7 days | 9 | (3.5) |
| >1 week | 6 | (2.4) |
| Missing | 79 | (31.0) |
## Results

<table>
<thead>
<tr>
<th>Are you familiar with media campaigns and if so how did they influence your decision to go to hospital?</th>
<th>n (%)</th>
<th>Prehospital delay (hrs) Median (IQR)</th>
<th>Univariable linear regression</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>Exp (B)</td>
</tr>
<tr>
<td>Aware, they influenced the decision to go to hospital</td>
<td>16 (6.3)</td>
<td>2.2 (2.0-9.8)</td>
<td>0.91</td>
</tr>
<tr>
<td>Aware, had no influence, however, had past experience influenced decision</td>
<td>16 (6.3)</td>
<td>2.9 (1.3-4.2)</td>
<td>0.58</td>
</tr>
<tr>
<td>Aware, they slightly influenced the decision</td>
<td>15 (5.9)</td>
<td>10 (1.1-27)</td>
<td>1.55</td>
</tr>
<tr>
<td>Aware, they had no influence on decision, as symptoms experienced were different</td>
<td>13 (5.1)</td>
<td>5.7 (3.0-10.5)</td>
<td>1.42</td>
</tr>
<tr>
<td>Aware, they had no influence on the decision</td>
<td>63 (24.8)</td>
<td>4.9 (1.7-18.5)</td>
<td>1.15</td>
</tr>
<tr>
<td>Unaware of media campaign about heart attack</td>
<td>52 (20.4)</td>
<td>3.9 (1.8-11.6)</td>
<td>1</td>
</tr>
</tbody>
</table>
## Results

<table>
<thead>
<tr>
<th>Variable</th>
<th>n (%)</th>
<th>Prehospital delay (hrs) Median (IQR)</th>
<th>Multivariable linear regression</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Median (IQR)</td>
<td>Exp (B)</td>
<td>95% CI</td>
</tr>
<tr>
<td>Marital status</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Never married</td>
<td>13 (5.1)</td>
<td>2.6 (1.6-4.3)</td>
<td>0.82</td>
<td>0.38-1.73</td>
</tr>
<tr>
<td>Widowed</td>
<td>19 (7.4)</td>
<td>10 (3.3-12.5)</td>
<td>3.53</td>
<td>1.82-6.88</td>
</tr>
<tr>
<td>Divorced</td>
<td>21 (8.2)</td>
<td>2.5 (1.9-7.2)</td>
<td>1.08</td>
<td>0.58-2.02</td>
</tr>
<tr>
<td>Separated</td>
<td>10 (3.9)</td>
<td>5.3 (3.7-24)</td>
<td>1.61</td>
<td>0.71-3.66</td>
</tr>
<tr>
<td>Defacto</td>
<td>8 (3.1)</td>
<td>6.2 (2.5-12)</td>
<td>0.92</td>
<td>0.37-2.32</td>
</tr>
<tr>
<td>Married</td>
<td>104 (41)</td>
<td>3.5 (1.6-12)</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Symptom onset</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Weekday</td>
<td>124 (71)</td>
<td>4.4 (1.9-15)</td>
<td>1.63</td>
<td>1.09-2.44</td>
</tr>
<tr>
<td>Weekend</td>
<td>51 (29)</td>
<td>2.8 (1.3-5.9)</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Combined previous MI and CABG</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Neither previous MI or CABG</td>
<td>137 (78)</td>
<td>3.9 (1.9-12)</td>
<td>2.83</td>
<td>1.51-5.31</td>
</tr>
<tr>
<td>Both previous MI and CABG</td>
<td>15 (9)</td>
<td>4.1 (2-27)</td>
<td>4.64</td>
<td>1.99-11</td>
</tr>
<tr>
<td>Previous MI only</td>
<td>22 (13)</td>
<td>2.8 (1.3-8)</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td></td>
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<tr>
<td></td>
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<td></td>
<td>Exp (B)</td>
</tr>
<tr>
<td>Mode of transport to hospital &amp; ± transfer</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>RFDS → tertiary hospital</td>
<td>36 (21)</td>
<td>6.3 (1.4-16)</td>
<td>1.77</td>
</tr>
<tr>
<td>Private → small metro hospital → transfer</td>
<td>22 (13)</td>
<td>5.1 (1.7-10)</td>
<td>1.45</td>
</tr>
<tr>
<td>Ambulance → small metro hospital → transfer</td>
<td>18 (10)</td>
<td>2.3 (1.5-7.3)</td>
<td>1.01</td>
</tr>
<tr>
<td>Private → tertiary hospital</td>
<td>37 (21)</td>
<td>8.4 (3.3-51)</td>
<td>4.14</td>
</tr>
<tr>
<td>Ambulance → tertiary hospital</td>
<td>61 (35)</td>
<td>2.9 (1.8-4.4)</td>
<td>1</td>
</tr>
<tr>
<td>Sweating</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>88</td>
<td>2.8 (1.6-6.6)</td>
<td>0.46</td>
</tr>
<tr>
<td>No</td>
<td>87</td>
<td>6.4 (2.5-23)</td>
<td>1</td>
</tr>
<tr>
<td>Weakness</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>79</td>
<td>3.6 (2.0-16)</td>
<td>1.58</td>
</tr>
<tr>
<td>No</td>
<td>96</td>
<td>4.2 (1.8-12)</td>
<td>1</td>
</tr>
</tbody>
</table>
Original Article

Myocardial infarction, patient decision delay and help-seeking behaviour: a thematic analysis

Linda L Coventry RN, MS, PhD, Johanna W van Schalkwyk RN, DipNsg, MTechNsg,
Peter L Thompson MD, FRACP, FACC, Scott A Hawkins RN, BSc, PG CCC,
Desley G Hegney RN, PhD, FACN

First published: 15 March 2017  Full publication history
Strengths and limitations

Strengths
- Interviewed all patients over a 7-month period
- Analyses adjusted for age, sex, comorbidity

Limitations
- Limited sample size
- Single hospital
- Familiarity with media campaigns
- Self-reported symptom onset time
- Health insurance status and reluctance to call an ambulance
Implications for future research

• Large sample sizes

• Target family members and friends and their awareness of media campaigns

• Investigate if reluctance to call ambulance is associated with the cost of ambulance
This study found in multivariable analysis that the variables associated with prehospital delay were:

- Marital status
- Symptom onset weekday or weekend
- Past medical history of MI and CABG
- Mode of transport to hospital
- Sweating
- Weakness

Patient awareness of media campaigns about heart attack was not associated with prehospital delay.
Acknowledgements

- Patients participating in the study
- Research nurse Wendy Jones for data collection
- Research assistant Michelle Sin for data cleaning and transcribing
Any Questions??
Thank you
Thank you