Ethnicity, Marital Status, and Neighborhood Poverty Influence Resuscitation of Out-of-Hospital Sudden Unexpected Deaths

Brian Simpson², MD; Golsa Joodi¹, MD; MPH; Kyaw Min Khant¹, MB,BS; Sarah Chen¹, BS; Mariya Husain¹,BS; Feng-Chang Lin¹, PhD; Irion Pursell², RN; Ross J Simpson Jr¹, MD, PhD

¹University of North Carolina at Chapel Hill;
²Department of Medicine, East Carolina University

Background

- Out of hospital cardiac arrest outcome varies across communities. While these outcomes are known to be largely dependent on initiation of cardiopulmonary resuscitation (CPR), the effect of individual and neighborhood socioeconomic characteristics on CPR initiation is less clear.
- The Sudden Unexpected Death in North Carolina (SUDDEN) study aims to clarify risk factors and characteristics of out-of-hospital sudden unexpected death (OHSUD) victims.
- Distinct from other definitions of sudden unexpected death (WHO, Oregon SUDS), SUDDEN aims to capture all sudden unexpected deaths, regardless of last time seen normal.
- Our population based registry of OHSUD victims captures a diverse group of victims that may be excluded from other registries.
- We examined the association between socioeconomic characteristics and the initiation of CPR in the SUDDEN cohort.

Methods

- From 2013-2015, all EMS attended out-of-hospital deaths in Wake County, NC (population 974,289) were screened.
- North Carolina residents age 18-64 were included in this study.
- Expected or traumatic deaths or survival to hospital were excluded.
- A committee of three board certified cardiologists adjudicated each case to be included in this study.

Results

- We adjudicated 408 OHSUD cases between 18-64 years old, representing 14% of all deaths in this age range.
- CPR was attempted in 159 victims (39%).
- Whites (OR: 0.61, 95% CI 0.4-0.92) and non-married victims (OR: 0.48, 95% CI 0.32-0.73) were less likely to receive CPR.
- Although not significant, women, higher education, residence in areas with high poverty, and less overcrowding received CPR less frequently.

Table 1: Demographic Characteristics of OHSUD Victims

| Age Group (years) | Number of Cases | White (n (%)) | Non-White (n (%)) | Married (n (%)) | Single (n (%)) | Male (n (%)) | Female (n (%)) | P-value
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;20</td>
<td>52 (13)</td>
<td>31 (59.6)</td>
<td>21 (39.6)</td>
<td>34 (65.4)</td>
<td>18 (34.6)</td>
<td>26 (50)</td>
<td>26 (50)</td>
<td>0.44</td>
</tr>
<tr>
<td>20-34</td>
<td>75 (19)</td>
<td>49 (65.3)</td>
<td>26 (34.7)</td>
<td>59 (78.7)</td>
<td>16 (21.3)</td>
<td>56 (74.7)</td>
<td>29 (38.7)</td>
<td>0.04</td>
</tr>
<tr>
<td>35-45</td>
<td>106 (26)</td>
<td>63 (59.5)</td>
<td>43 (45.3)</td>
<td>91 (85.8)</td>
<td>15 (14.2)</td>
<td>87 (82.1)</td>
<td>24 (22.4)</td>
<td>0.27</td>
</tr>
<tr>
<td>46+</td>
<td>275 (68)</td>
<td>140 (51.1)</td>
<td>135 (48.9)</td>
<td>216 (78.6)</td>
<td>59 (21.4)</td>
<td>220 (80.2)</td>
<td>55 (20.3)</td>
<td>0.15</td>
</tr>
</tbody>
</table>

- In multivariate analysis, being white (OR: 0.58, 95% CI 0.37-0.91), not married (OR: 0.53, 95% CI 0.35-0.82) and living in a poor neighborhood (OR: 0.52, 95% CI 0.29-0.91) were associated with no CPR attempted.

Table 2: Multivariate analysis results for rate of attempted resuscitation

- We further explored whether CPR was attempted in the presence of sudden unexpected death due to cardiac cause or other cause. In multivariate analysis, being white (OR: 0.58, 95% CI 0.37-0.91), not married (OR: 0.53, 95% CI 0.35-0.82) and living in a poor neighborhood (OR: 0.52, 95% CI 0.29-0.91) were associated with no CPR attempted.

Conclusions

- Socioeconomic characteristics are associated with resuscitation attempts in out-of-hospital sudden unexpected death.
- Resuscitation attempts are influenced by delayed identification of cardiac arrest.
- Socioeconomic characteristics such as marital status, race, and living in a poor neighborhood likely impact time to identification of cardiac arrest.

Limitations

- No adjustments were made to our data for co-morbid medical conditions or missing data.
- Though our data finds an association between socioeconomic characteristics and attempted resuscitation, causality cannot be inferred.

References