



# Epidemiology and outcome of cardiac arrests reported in the lay-press: an observational study

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## DECLARATIONS

### Competing interests

None declared

### Funding

The Resuscitation Council UK provided funding to cover the cost of the service provided by Precise Media (the press cutting agency) to perform the newspaper searches

### Ethical approval

Not applicable

### Guarantor

RAF

### Contributorship

GDP had the idea for the study, supervised its design and conduct, edited and approved the submitted manuscript; RAF contributed to the study design, collected and

## Summary

**Objective** The aims of this study were to evaluate the frequency with which cardiac arrests are reported in newspapers, assess the level of detail reported and ascertain whether this coverage gives a realistic portrayal of cardiac arrest outcomes to the lay-reader.

**Design** Observational study.

**Setting** All UK newspaper articles published between 1 January 2010 and 30 June 2010.

**Participants** Articles containing the words 'cardiac arrest', 'CPR' or 'resuscitation' were screen for eligibility. Any articles not involving reference to a real cardiac arrest were excluded.

**Main outcome measures** Data relating to patient demographics, arrest characteristics, treatment (CPR and defibrillation) and survival using the Utstein template were extracted. The results were then compared with cardiac arrest statistics from epidemiological studies.

**Results** Six hundred and forty-eight articles were reviewed, 203 of which referred to individual cardiac arrest events; 22 events occurred in-hospital and 181 occurred out-of-hospital. In the out-of-hospital cardiac arrest (OHCA) group 32 (17.7%) were reported to survive to hospital discharge, almost all with good neurological outcome. The median age group was 31–45-year-olds, 52 (28.7%) were women and 40 were children. Seventy-five percent of victims received bystander CPR with 13 being attended to by lay-responders using AEDs, eight of which presented with a shockable rhythm of which six made a full recovery.

**Conclusion** Survival to hospital discharge rate among newspaper reports was double that of complete epidemiological studies of OHCA in urban environments. Newspapers may give readers an over-optimistic portrayal of cardiac arrest survival and neurological outcome following successful resuscitation.

analysed the data and wrote the first draft of the manuscript; JS had the idea for the study and contributed to the study design, edited and approved the submitted manuscript; JPN contributed to the study design, edited and approved the submitted manuscript

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## Introduction

Newspapers are a valuable source of information for the lay public. In the UK, over 20 million adults read a printed daily newspaper and this figure is increased with online readership.<sup>1</sup> As such they serve as a potentially valuable medium for communication about issues relating to resuscitation.

Several studies have demonstrated that there is an unrealistic public perception of outcome following cardiopulmonary resuscitation (CPR);<sup>2,3</sup> this has also been shown to be true among medical professionals<sup>4</sup> and surf lifesavers.<sup>5</sup> In the majority of cases, perception of adult survival rates were much higher than realistic outcomes with lay-people estimating survival rates of over 50% whereas survival to discharge is actually less than 15%.<sup>3</sup> Estimates by physicians were lower (24% survival) but still inaccurate.<sup>3</sup> Surf lifesavers estimated a return of spontaneous circulation (ROSC) rate of 55% for out-of-hospital resuscitations which was well above the reported range of 9–36% at time of study.<sup>5</sup>

Public perception of outcome following a cardiac arrest is very important as it has the potential to influence the motivation for learning and performing CPR as well as making and/or supporting do not attempt resuscitation (DNAR) decisions.<sup>2,6</sup> The Resuscitation Council (UK) advocate a joint approach to DNAR decision-making which involves both the patient or those close to the patient and the medical team.<sup>7</sup> It is therefore important that public perception is accurate to ensure correct decisions are made and expectations are realistic. Public expectations of cardiac arrest survival can come from a variety of sources: first-hand experience of resuscitation, CPR and first aid training courses, television shows and newspaper reports. However, in a survey of Londoners, it was found that only 30% (299/1011) had undertaken some form of CPR training course of which only one-third (98/299) had done training in the last 12 months.<sup>2</sup> It is therefore likely that the majority of perceptions are formed through media portrayal of resuscitation rather than formal training. This was noted in a survey of 100 chronic obstructive pulmonary disease (COPD) and 100 newly admitted respiratory patients where 76% reported obtaining information on CPR from the media.<sup>6</sup> Several studies

have explored the outcome of resuscitation events in fictional medical dramas with differing results.<sup>8,9</sup> One study showed a 77% immediate survival rate with 67% surviving to hospital discharge.<sup>8</sup> However, a more recent observational study found that although initial survival was not significantly different to real-life survival figures, there was poor portrayal of age-related survival and long-term outcomes.<sup>9</sup> From these findings the public may be given a falsely high expectation of longer-term outcomes and age-related differences in survival. However, it is unknown whether the same is true of newspaper coverage of real-life resuscitation events.

The aims of this study were: first, to evaluate the frequency with which cardiac arrests are reported in newspapers; second, to assess the level of detail reported; and third, to ascertain whether this coverage gives a realistic portrayal of cardiac arrest outcomes to the lay-reader.

## Methodology

UK newspaper cuttings containing the words 'cardiac arrest', 'CPR' or 'resuscitation' were sourced by Precise Media (London, UK) over a six-month period (January to June 2010). Precise media use a fully automated electronic search engine powered by Autonomy (Autonomy Corporation plc, Cambridge, UK) which uses complex Boolean queries in order to identify relevant keywords within the OCR text of national and regional newspaper articles. This search strategy has an accuracy of 99.8%. Articles were sent electronically to the research team under licence from the Newspaper Licensing Agency. All articles were then screened by RF for eligibility. Articles were eligible for inclusion if they described a case of a person sustaining a cardiac arrest. Articles not involving reference to a real cardiac arrest, e.g. CPR training, fundraising, cardiac arrest equipment, the term cardiac arrest used in another context (e.g. economy in cardiac arrest) were excluded. A one best article approach was used to prevent duplication of cardiac arrest events which were reported more than once. The remaining articles were then reviewed and data relating to patient demographics, arrest characteristics, treatment (CPR and defibrillation) and survival using the Utstein template<sup>10</sup> were extracted.

The annual incidence of cardiac arrest events reported in the press is calculated per 100,000 population.

## Demographics

The articles were scanned to determine the victims' age group which was split into nine categories: 0–1; 1–10; 11–18; 19–30; 31–45; 46–60; 61–75; 76 + ; or not available. The gender of the victim was also recorded as male, female or unknown.

## Location

The arrest location was firstly split into out-of-hospital (OHCA) or in-hospital (IHCA). These categories were then subdivided into home, public place or other location for OHCA, and ward, emergency department, coronary care unit/intensive care unit or other location for IHCA.

## Witnessed and bystander CPR

It was then established if someone was present with the victim when they had their cardiac arrest and, if so, whether they were a lay-person or a healthcare professional. The articles were analysed to see if there was mention of someone starting CPR before advanced help, in the form of the emergency medical services (EMS), arrived.

## Aetiology

Based on the Utstein definition the aetiology of the cardiac arrest is presumed to be of cardiac origin unless it is known or likely to have been caused by trauma, submersion, respiratory or any other non-cardiac cause determined by the rescuers.<sup>10</sup> The aetiology of the of the cardiac arrest was presumed to be of cardiac cause unless otherwise suggested from the history given in the article; for example, if the victim was reported to be rescued from water an aetiology of submersion was given, likewise if it was a stabbing victim, then a traumatic cardiac arrest was suspected. Other categories included respiratory, other non-cardiac and unknown.

## Defibrillation

It was documented whether a defibrillator was reported to be applied to the patient and, if so, whether it was applied by the emergency medical services or by a public access defibrillator/community responder unit. If one was applied, it was documented whether any shocks were reported to be discharged during the resuscitation attempt indicating a shockable rhythm.

## Outcome

Immediate and long-term outcomes were assessed by using a ROSC duration of at least 20 minutes to signify event survival. Survival to hospital discharge was also used as an outcome measure. For those who survived to hospital discharge a measure of cerebral performance category (CPC) was also estimated in which a score of 1 represented neurologically intact and 5 represented brain death.<sup>11</sup>

## Results

A total of 648 articles were received over the six-month period. Two hundred and eleven were duplicated articles and were excluded from the study; of the remaining 437 articles 234 articles did not refer to cardiac arrest events and were placed into categories relating to their topic, this left 203 articles which referred to individual cardiac arrest events and were included in the study (Figure 1). Twenty-two events occurred in-hospital and 181 occurred out-of-hospital. Because there were very few IHCA events, the remainder of the analysis focused on the OHCA group. Assuming a UK population of 61.8 million this gives an event rate of 0.59 per 100,000 inhabitants per year.<sup>12</sup>

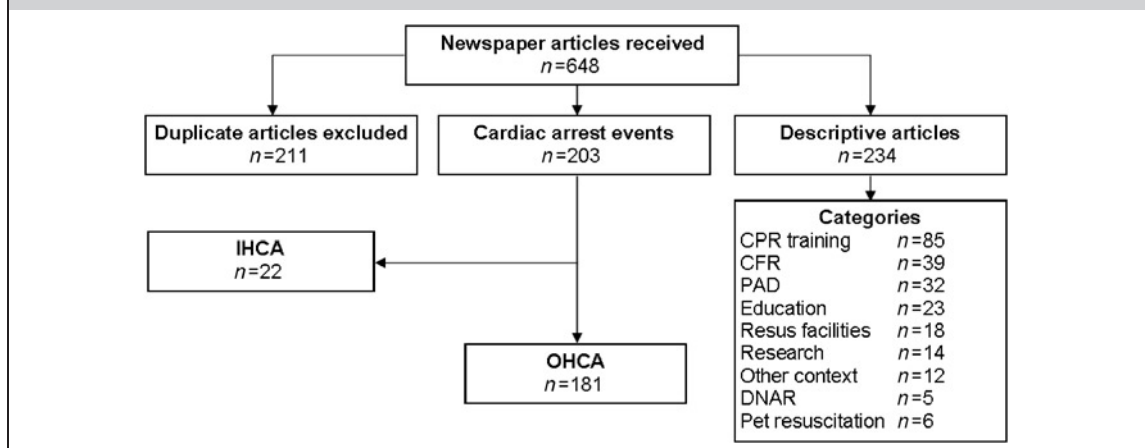
## Demographics

The age of the patients ranged from 3 days to 90 years, the median age group being 31–45-year-olds (Figure 2). There were 40 children. Fifty-two (28.7%) of the patients were female.

Fifty-one (28%) of the arrests occurred at home, 98 (54%) occurred in a public place and the remaining 32 (18%) occurred in non-public

**Figure 1**

**Flow of newspaper articles through the selection process resulting in 181 OHCA for data analysis. CFR = community first responder, PAD = public access to defibrillation, DNAR = do not attempt resuscitation**



non-home environments such as custody cells or at sea.

### Witnessed and bystander CPR

One hundred and thirty (71.8%) were witnessed arrests, four of which were witnessed by healthcare professionals and the remaining 126 (70%) were witnessed by lay-people. Three-quarters of all patients 136 (75%) received bystander CPR.

### Aetiology

Cardiac origin was found to be the most common cause of arrest 68 (38%). Other causes were: trauma, 43 (24%); respiratory, 34 (19%); submersion, 22 (12%); and other non-cardiac, nine (5%). In five cases (3%) very little history was given and therefore the aetiology was classed as unknown.

### Defibrillation

In 21 (12%) cases a defibrillator was reported to be attached to the patient; eight were by the EMS and the remaining 13 were automated external defibrillators (AEDs) made available through public access schemes or community first responders.

Seven out of the eight reported EMS defibrillation uses reported at least one shock being delivered whereas eight of 13 lay-responder AED uses reported a shock being delivered, suggestive of a shockable rhythm.

### Outcome

Of the 181 patients, 108 (60%) were reported to have died, 69 (38%) patients were reported to have some ROSC with 66 (36%) surviving the event (ROSC >20 mins) and 32 (18%) were reported to survive to hospital discharge (Figure 2).

Of the eight arrests in which a shock was advised to lay-responders using an AED, six patients made a full recovery; of the remaining two patients, one died and the other survived the event but no follow-up information was given.

### Discussion

Based on newspaper coverage alone cardiac arrests most often affect persons aged 31–45 years and occur in public places. The majority of these cardiac arrests will be witnessed and bystander CPR will be performed in 75% of cases. These resuscitation attempts will restore circulation in approximately 37% of patients and almost half of these will be discharged alive and neurologically intact from hospital. There is no standard for

Figure 2

## Utstein style report of resuscitation events reported in the newspaper

<b>OHCA Resuscitation attempted</b>	
All cases <i>n</i> =181	
<b>Demographics</b>	
Male	<i>n</i> =129
Female	<i>n</i> =52
<b>Age (years)</b>	
0-1	<i>n</i> =4
1-10	<i>n</i> =16
11-18	<i>n</i> =20
19-30	<i>n</i> =27
31-45	<i>n</i> =33
46-60	<i>n</i> =29
61-75	<i>n</i> =24
76+	<i>n</i> =7
Unknown	<i>n</i> =21
<b>Location of arrest</b>	
Home	<i>n</i> =51
Public Place	<i>n</i> =98
Other	<i>n</i> =32
<b>Arrest witnessed</b>	
By layperson/bystander	<i>n</i> =126
By healthcare personnel	<i>n</i> =4
<b>Arrest not witnessed</b>	<b><i>n</i>=33</b>
<b>Unknown</b>	<b><i>n</i>=18</b>
<b>Bystander CPR <i>n</i>=136</b>	
<b>Defibrillator used <i>n</i>=21</b>	
EMS use	<i>n</i> =8
CFR/PAD AED use	<i>n</i> =13
<b>Rhythm</b>	
Shockable	<i>n</i> =15
Non-shockable	<i>n</i> =1
Unknown	<i>n</i> =5
<b>Outcome</b>	
<b>Any ROSC</b>	
Yes	<i>n</i> =69
No	<i>n</i> =108
Unknown	<i>n</i> =4
Survived event	<i>n</i> =66
<b>Discharged alive <i>n</i>=32</b>	
CPC 1 or 2	<i>n</i> =28
CPC 3 or 4	<i>n</i> =1
Unknown	<i>n</i> =3
<b>Aetiology</b>	
Presumed cardiac	<i>n</i> =68
Trauma	<i>n</i> =43
Submersion	<i>n</i> =22
Respiratory	<i>n</i> =34
Other non-cardiac	<i>n</i> =9
Unknown	<i>n</i> =5

reporting resuscitation in the lay-press and often the detail will vary. For some articles a complete history is given, allowing the full characteristics of the arrest to be elucidated; however, many of the articles did not mention the use of a defibrillator and even fewer whether a shock had been delivered. In addition, newspaper coverage under reports the numbers of cardiac arrests compared with epidemiological estimates.

Of all the articles that contained the search terms, only half of them referred to an actual cardiac arrest event. This implies that the lay-press is involved in communicating a wide range of topics relating to the field of resuscitation. From the categorization of the non-cardiac arrest articles it is evident that CPR training and education as well as public access to defibrillator (PAD) and community first responder (CFR) programs are

often communicated through print media. Indeed a recent meta-analysis of compression-only CPR and its corresponding comment received widespread press coverage.<sup>13-15</sup>

Very few cardiac arrest events are reported by newspapers. Actual estimates of out-of-hospital cardiac arrest incidence attended to by the emergency services in Europe are 81.6 per 100,000 person-years.<sup>16</sup> This indicates that there is major under-reporting of cardiac arrests suggesting that only 1 in every 138 arrests will be published in the press. The survival to discharge data for newspaper reported resuscitations was also quite high (18%). A systematic review of 67 prospective studies found an estimated overall global survival of 7% and more specifically an estimated survival rate of 9% for cardiac arrests in Europe.<sup>16</sup>



The higher survival rate of newspaper reported resuscitation is likely to be multifactorial. Many of the arrests were associated with positive prognostic factors;<sup>17</sup> relatively high proportions occurred in public places, were witnessed, and received bystander CPR; and most of the patients were middle-aged. Furthermore, for the event to be published, the media would have to be alerted to its existence and resuscitations occurring in public and associated with heroic bystander CPR are more likely to attract the attention of the media. In reality around 70% of arrests occur at home and only 36% of patients will receive bystander CPR; these two factors alone are likely to be responsible for the overoptimistic survival rate portrayed by newspapers.<sup>17</sup>

Of those that were reported to survive to discharge, 27/32 had no impaired neurological function. This suggests that there is a bias to reporting events with a good outcome and gives an inaccurate portrayal of the long-term outcomes for post-arrest patients. This is similar to medical TV dramas, in which long-term outcome is often inaccurately portrayed and misleading.<sup>9</sup>

### Limitations

There are several limitations to newspaper reports of resuscitation attempts. The outcome reported often depends on the time the article was published. If the article was published shortly after the event, the outcome reported was often only the patient's status upon admission to hospital. For retrospective reports, data often included hospital discharge status. This time-sensitive reporting will tend to underestimate the number of patients (in these reports) surviving to hospital discharge. There is also likely to be an impact factor bias in which resuscitations which are selected for publication are atypical, for example, those occurring in public, having bystander involvement, and having some factor deemed to be in the public interest.

This study is based on reports from many different UK local and national newspaper sources. It is likely that the lay-reader would be exposed to only a few of these sources and therefore trends in reporting are likely to be influenced by the perceived characteristics of the readership. Further studies would be required to establish

whether the portrayal of resuscitation varies between different newspaper sources.

### Conclusion

There is significant under reporting of cardiac arrest events in the lay press. Of the cases that are reported, survival rates are substantially higher than those reported in the medical literature which may give readers an over-optimistic portrayal of cardiac arrest survival.

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