



## Simulation and education

# Resuscitation on television: Realistic or ridiculous? A quantitative observational analysis of the portrayal of cardiopulmonary resuscitation in television medical drama ☆

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## ABSTRACT

**Introduction:** Patients' preferences for cardiopulmonary resuscitation (CPR) relate to their perception about the likelihood of success of the procedure. There is evidence that the lay public largely base their perceptions about CPR on their experience of the portrayal of CPR in the media. The medical profession has generally been critical of the portrayal of CPR on medical drama programmes although there is no recent evidence to support such views.

**Objective:** To compare the patient characteristics, cause and success rates of cardiopulmonary resuscitation (CPR) on medical television drama with published resuscitation statistics.

**Design:** Observational study.

**Method:** 88 episodes of television medical drama were reviewed (26 episodes of Casualty, Casualty, 25 episodes of Holby City, 23 episodes of Grey's Anatomy and 14 episodes of ER) screened between July 2008 and April 2009. The patient's age and sex, medical history, presumed cause of arrest, use of CPR and immediate and long term survival rate were recorded.

**Main outcome measures:** Immediate survival and survival to discharge following CPR.

**Results:** There were a total of 76 cardio-respiratory arrests and 70 resuscitation attempts in the episodes reviewed. The immediate success rate (46%) did not differ significantly from published real life figures ( $p=0.48$ ). The resuscitation process appeared to follow current guidelines. Survival (or not) to discharge was rarely shown. The average age of patients was 36 years and contrary to reality there was not an age related difference in likely success of CPR in patients less than 65 compared with those 65 and over ( $p=0.72$ ). The most common cause of cardiac arrest was trauma with only a minor proportion of arrests due to cardio-respiratory causes such as myocardial infarction.

**Conclusions:** Whilst the immediate success rate of CPR in medical television drama does not significantly differ from reality the lack of depiction of poorer medium to long term outcomes may give a falsely high expectation to the lay public. Equally the lay public may perceive that the incidence and likely success of CPR is equal across all age groups.

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## 1. Introduction

Patients' preferences for cardiopulmonary resuscitation (CPR) appear to relate to their perception of the likelihood of success of the procedure: if patients understand the "real" likelihood of success they are far less likely to request it.<sup>1,2</sup> Many studies have demonstrated that the general public have a poor knowledge of cardiopulmonary resuscitation outcomes and often grossly over-

estimate the likely success, in some cases overestimating the probability of survival to discharge by more than 200%.<sup>3–5</sup>

There is further evidence that the lay public largely base their perceptions about CPR on their experience of the depiction of CPR in the media<sup>3,5–9</sup> which has led to criticism by the medical profession of the portrayal of cardiopulmonary resuscitation on programmes such as ER, Casualty and Holby City.<sup>10–12</sup> Medical television drama programmes such as Casualty are often screened on prime-time television, Casualty for example at 8 pm on Saturday evening.

Historically, doctors have only involved 6–10% of patients and 36–84% of patient's families or carers in discussions when "do not attempt resuscitation" decisions have been made.<sup>13,14</sup> Whilst the relative benefits and burdens of discussing resuscitation decisions with patients has been controversial<sup>15–19</sup> it is becoming increas-

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ingly encouraged,<sup>20</sup> particularly with introduction of the Mental Capacity Act 2005 and other recent developments to proactively involve patients in advance statements and advance decisions to refuse treatment.<sup>21</sup> Recent research has indicated that the majority of patients do wish to be involved in end of life decisions such as resuscitation and would also wish their relatives to be involved should they become unable to competently participate in such discussions.<sup>4,22</sup>

In order for patients and their relatives to have informed discussions about CPR with medical professionals they need to have a realistic understanding of the procedure, its risk and the probability of likely benefits. As television media may potentially influence the perceptions of the general public about CPR, we sought to appraise the depiction of CPR in prime-time medical television drama and review not only the survival rates these programmes depict but also the demographics of the patients who are resuscitated and the underlying causes of cardio-respiratory arrest. Earlier research (now over 10 years old) has found variable “realism” of television resuscitation although the majority of television dramas previously studied no longer exist.<sup>6,23</sup>

In reality, immediate survival following cardiopulmonary resuscitation in hospital is on average around 40–47% with 10–21% surviving to discharge.<sup>9,24–28</sup> For out-of-hospital arrests immediate survival is around 26.8% with survival to discharge hospital 13.7%.<sup>9,24,25</sup> These figures represent published results of all arrests grouped together, in certain groups the survival rates may be even lower e.g. for patients whose initial rhythm was not ventricular tachycardia (VT) or ventricular fibrillation (VF) immediate survival is reported to be around 37% with survival to discharge only 6.2%.<sup>24</sup>

## 2. Method

We monitored weekly television listings on terrestrial and satellite television between July 2008 and April 2009 and reviewed sequential new episodes of four television medical dramas screened during this period: Casualty (26 episodes screened on BBC1 July 2008–December 2008), Holby City (25 episodes screened on BBC 1 July 2008–November 2008), Grey’s Anatomy (23 episodes screened on LIVING October 2008–April 2009) and ER (14 episodes screened More4 on January 2009–April 2009).

Casualty is the longest running emergency medical drama series in the world<sup>29</sup> and is based around the accident and emergency department of a fictional hospital (Holby City Hospital). The programme is screened on BBC1 and runs for most of the year. Holby City is set on the surgical wards of the fictional Holby City Hospital. Series of the programme are screened on BBC1. Grey’s Anatomy is an American prime-time television medical drama based at the fictional Seattle Grace Hospital and set around the professional and personal lives of surgical interns and their supervising mentor physicians.<sup>30</sup> It is screened on LIVING. ER is an American medical drama series set primarily in the emergency room (ER) of the fictional County General Hospital in Chicago.

We identified occurrences of CPR in each episode, for the purposes of this study and in order to compare the results with previous work on CPR in television drama, CPR was defined as “any situation

in which chest compressions were performed on a patient, a patient was said to be having “an arrest”, or an unconscious patient was defibrillated for ventricular fibrillation or ventricular tachycardia”.<sup>6,23</sup>

For each resuscitation event we noted: the patient’s age and sex, any underlying medical history disclosed in the programme, whether the arrest was in hospital or in the community, the cardiac rhythm the patient was said to be in, whether CPR was performed (and whether the use of chest compression, breathing and defibrillation followed current resuscitation guidelines), the underlying cause of the arrest (if stated or apparent), the immediate survival, and whether the patient appeared to survive to discharge.

To test inter-observer variability, 12 episodes (4 of each programme) were reviewed independently by two different observers blinded to each others findings and the data collection of each was then compared. As the observer’s estimated patient ages were all within 5 years of each other and as there was 100% agreement between the other recorded results only one rated each of the remaining episodes reviewed.

A sample size of 64 (cardio-respiratory arrests) was required in order to have an 80% power (at a 5% level of significance) of detecting a difference in success rates of 25% between the television dramas and actual CPR statistics (based on a success rate of 40% in “actual” CPR). Fisher’s exact test was used to compare the difference in the observed rate of successful CPR compared with what would be expected from known survival statistics.

## 3. Results

A total of 88 episodes of medical television drama were reviewed during which there were a total of 76 cardio-respiratory arrests and 70 resuscitation attempts were shown (Table 1).

### 3.1. Success rates

Of the 70 resuscitation attempts, immediate survival was 46% (42% in Casualty, 57% in Holby City, 46% in Grey’s Anatomy and 41% in ER). Survival to discharge from hospital or intermediate to long term outcomes were rarely shown and it was therefore not possible to collect any meaningful data on survival rates other than immediately post-resuscitation. The overall immediate survival rate was not significantly different from actual resuscitation survival figures ( $p=0.48$ ). Clearly real survival rates and television survival rates are not directly comparable, however, the general public viewing these programmes may perceive they are.

### 3.2. Cause of cardio-respiratory arrest

Causes of cardio-respiratory arrest are shown in Table 2, note that some patients (5 in total) were shown to have more than 1 arrest and therefore the total number of causes and total number of arrests differ. The most common cause of cardio-respiratory arrest in television drama appears to be major trauma, accounting for around a third of cases (Table 2). This contrasts to published figures of hospital cardiac arrests where major trauma is directly implicated in less than 5% of cases.<sup>25,26</sup> In reality around 85% of cardio-respiratory arrests result from underlying cardiac or respi-

**Table 1**  
Incidence and immediate success of cardiopulmonary resuscitation.

Programme	No. of episodes	No. of cardio-respiratory arrests	No. of resuscitation attempts shown	Male:female ratio of patients	Average age (years) and [age range] of patients	No. (%) immediate survivors
Casualty	26	26	26	18:7	35.43 [8 months–75 years]	11 (42%)
ER	14	18	17	13:5	28.88 [6–80]	7 (41%)
Grey’s Anatomy	23	17	13	11:4	42.26 [14–85]	6 (46%)
Holby City	25	15	14	8:7	38.77 [7–80]	8 (57%)
Total/average	88	76	70	50:23	36.34 [8 months–85 years]	32 (46%)

**Table 2**  
Causes of cardio-respiratory arrest.

	Casualty	ER	Grey's Anatomy	Holby City	Total (%)
Blast injury/explosion		1			1 (1.4)
Cardiomyopathy	1			1	2 (2.7)
Chronic obstructive pulmonary disease				1	1 (1.4)
Disseminated intravascular coagulation	1				1 (1.4)
Drug overdose	2	1			3 (4.1)
Gunshot wound		3			3 (4.1)
Haemopneumothorax	1		1		2 (2.7)
Hypothermia		1	1	2	4 (5.5)
Intra-operative during brain surgery			4		4 (5.5)
Major haemorrhage (not related to trauma)	1	1	1	1	4 (5.5)
Myocardial infarction	2		1	2	5 (5.5)
Pericardial effusion with cardiac tamponade following trauma	2		1		3 (4.1)
Pulmonary embolism	1		1	1	3 (4.1)
Self-defibrillation	1			1	2 (2.7)
Sepsis		1			1 (1.4)
Smoke inhalation	2				2 (2.7)
Stroke		1			1 (1.4)
Trauma	8	7	4	4	23 (31.5)
Unclear/unknown	3	2	2	1	8 (10.9)

ratory disease<sup>9,25,26</sup> but causes such as myocardial infarction are infrequent in the accident and emergency departments and wards of Casualty, Holby City, Grey's Anatomy and ER. However, placed in the context that the programmes studied are based on surgical wards and emergency departments a higher proportion of young patients with trauma related cardiac arrest may be reasonably anticipated.

### 3.3. Patient age and sex

Surprisingly, the average age of patients having a cardio-respiratory arrest (36 years) was relatively young in television drama compared with an average of around 65–75 in reality.<sup>9,25,28</sup> The overall age range was 8 months to 85 years. There was a male predominance in patients arresting on television (50:23) which is consistent with published figures.<sup>9,25,27</sup> There was no difference in the likelihood of immediate survival following CPR in patients aged 65 or more compared with those aged under 65 ( $p = 0.72$ ).

### 3.4. Accuracy of resuscitation procedure

As only parts of the resuscitation sequence were shown it was not possible to establish whether the 70 resuscitation attempts accurately followed current resuscitation guidelines.<sup>31</sup> However, in all cases the authors noted that each cardiac arrest rhythm was managed in the appropriate way, i.e. defibrillation and chest compressions/assisted ventilation for ventricular fibrillation/ventricular tachycardia and chest compressions/assisted ventilation for asystole and pulseless electrical activity.

## 4. Discussion

Perhaps surprisingly, and contrary to previous criticism from the medical profession, the immediate success rate of CPR in television medical drama does not significantly differ from published results of actual resuscitation survival figures. Much of the published medical literature regarding CPR survival rates is now several years old which may have now gradually influenced television script writers and medical advisors and therefore improved correlation between television medical drama and actual outcomes.

However, there may remain some concerns about the portrayal of resuscitation on television and the influence this may have on public perception of the likely outcomes in reality. Firstly, there is rarely any portrayal of the intermediate to long term outcomes, including the fact that a significant proportion of those

who survive the immediate event will not survive to be discharged from hospital.<sup>9,25,32</sup> Secondly, outcomes are generally portrayed as either full recovery or death and therefore television viewers may not appreciate that a proportion of those surviving will be left with long term sequela such as hypoxic brain damage. Thirdly, the patient group portrayed in television drama differs from what would be a representative sample of patients encountered in real life and whilst documented figures showing a significant age related decline in likely success of CPR,<sup>28</sup> television drama may give the perception that a 75-year-old patient is as likely to recover from the procedure as somebody aged 25. Finally, impressive examples of success might be more important to the lay public perception than the overall success rate (for example, an elderly patient with metastatic cancer may believe that CPR is as likely to be successful for him or her as it was in a young road traffic accident victim).

However, there is currently no evidence to support (or refute) the above concerns about public interpretation of resuscitation events seen on television and how they perceive that they may relate to CPR in their own circumstances other than the previously published, and perhaps now dated, studies correlating overestimation of CPR success rates by lay people who cite television media as their main source of knowledge about CPR.<sup>3,7,8</sup> Qualitative research exploring these issues with lay people would therefore be valuable to ascertain whether the above concerns are accurate, particularly as healthcare professional's prediction of patient's understanding and preferences and patient's actual understanding and preferences do not always correlate.<sup>33</sup>

Studies which have evaluated the source of knowledge of the lay public about CPR (discussed earlier) are now becoming dated and it is therefore possible that television is no longer the major influence on public perception. Current resuscitation guidelines recommend that written patient information about CPR should be available to patients<sup>20</sup> and many hospitals now use patient education leaflets. Patient information leaflets on CPR have been found to be acceptable to patients and not caused undue distress.<sup>34–36</sup> However, patient interpretation of such leaflets is variable and not necessarily a reliable method alone of communicating resuscitation decisions and policy.<sup>34</sup>

Equally there are a vast number of resources available on the internet, many of which describe the CPR process in clear and simplified terms but do not necessarily provide information relating to actual success rates.<sup>37–40</sup> Equally it is difficult to gauge how the lay public may interpret statements such as “performing CPR buys time and more than doubles the chances of survival”<sup>37</sup> if not accompanied by any information about the absolute likely success with

or without immediate bystander CPR. The vast numbers of internet resources means that the internet potentially may improve but also confound patient perceptions and there is currently no research to qualify how the lay public interprets them.

Despite the availability of accurate sources of information about the reality of CPR, television continues to have potential for strongly influencing patients' knowledge and attitudes. Addressing misconceptions about CPR can be challenging and this study highlights the necessity for doctors engaging in resuscitation discussions with their patients to seek prior perceptions and expectations and provide information about likely actual outcomes. Indeed, doctors leading such discussions should themselves have adequate training to enable them to effectively facilitate and communicate as well as an accurate knowledge of actual CPR outcomes, there is some evidence that the later is not always the case for junior doctors.<sup>41,42</sup>

Furthermore, none of the episodes reviewed showed in detail the process of making "Do not attempt resuscitation decisions" or clarified the medico-legal difference between a competent patient refusing resuscitation and demanding it in a clinical situation where it was felt to be clinically inappropriate.

Whilst added suspense, drama and action make medical television drama highly popular with the general public we would hope that the producers and medical advisors for these programmes would sense a level of responsibility to maintain a level of accuracy. Particularly as in many ways the programmes do accurately depict the hospital medical environment and the distinction between fact and fiction for the general public may therefore become less clear.

## 5. Study limitations

There are several limitations to this study, firstly, CPR is depicted in a variety of fictional programmes on television and this study has on specifically reviewed medical dramas, secondly we cannot assume that the general public is unable to distinguish fact from fiction. Equally, making direct comparison between the depiction of CPR in current television medical drama and actual survival rate statistics has further limitations and research is needed to explore how patients balance a wealth of information, with variable accuracy, from the television, internet, relatives, and perhaps even from overoptimistic junior doctors.

## 6. Conclusion

The portrayal of cardiopulmonary resuscitation in fictional medical television programmes adds drama, suspense and excitement for the viewer.

Whilst the immediate success rate of resuscitation on television is comparable to reality, the age distribution, difference in outcome by age and lack of intermediate and long term outcomes have the potential to be misleading to the lay person.

When discussing cardiopulmonary resuscitation with patients and their families, healthcare workers should be aware of potential influences relating to experience from viewing television medical drama and seek to address misconceptions so that patients and carers have a realistic understanding of the process of cardiopulmonary resuscitation and its likely success specific to their individual circumstances.

## Conflict of interest

None.

## Ethical approval

Not required.

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