



Short communication

Defibrillation in the movies: A missed opportunity for public health education[☆]



Ofole U. Mgbako^{a,b,1}, Yoonhee P. Ha^{a,b,d,1}, Benjamin L. Ranard^{a,b}, Kendra A. Hypolite^b, Allison M. Sellers^b, Lindsay D. Nadkarni^b, Lance B. Becker^c, David A. Asch^{b,d}, Raina M. Merchant^{b,c,d,*}

^a Perelman School of Medicine, University of Pennsylvania, Philadelphia, PA, USA

^b Social Media and Health Innovation Lab, Penn Medicine Center for Health Care Innovation, Philadelphia, PA, USA

^c Department of Emergency Medicine, University of Pennsylvania, Philadelphia, PA, USA

^d Penn Medicine Center for Health Care Innovation, Philadelphia, PA, USA

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ABSTRACT

Aim: To characterize defibrillation and cardiac arrest survival outcomes in movies.

Methods: Movies from 2003 to 2012 with defibrillation scenes were reviewed for patient and rescuer characteristics, scene characteristics, defibrillation characteristics, additional interventions, and cardiac arrest survival outcomes. Resuscitation actions were compared with chain of survival actions and the American Heart Association (AHA) Emergency Cardiovascular Care (ECC) 2020 Impact Goals. Cardiac arrest survival outcomes were compared with survival rates reported in the literature and targeted by the AHA ECC 2020 Impact Goals.

Results: Thirty-five scenes were identified in 32 movies. Twenty-five (71%) patients were male, and 29 (83%) rescuers were male. Intent of defibrillation was resuscitation in 29 (83%) scenes and harm in 6 (17%) scenes. Cardiac arrest was the indication for use in 23 (66%) scenes, and the heart rhythm was made known in 18 scenes (51%). When the heart rhythm was known, defibrillation was appropriately used for ventricular tachycardia or ventricular fibrillation in 5 (28%) scenes and inappropriately used for asystole in 7 (39%) scenes. In 8 scenes with in-hospital cardiac arrest, 7 (88%) patients survived, compared to survival rates of 23.9% reported in the literature and 38% targeted by an AHA ECC 2020 Impact Goal. In 12 movie scenes with out-of-hospital cardiac arrest, 8 (67%) patients survived, compared to survival rates of 7.9–9.5% reported in peer-reviewed literature and 15.8% targeted by an AHA ECC 2020 Impact Goal.

Conclusion: In movies, defibrillation and cardiac arrest survival outcomes are often portrayed inaccurately, representing missed opportunities for public health education.

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1. Introduction

Defibrillation with manual defibrillators in the health care setting and automated external defibrillators (AEDs) in public areas can decrease mortality from cardiac arrest.¹ Public knowledge of how to use AEDs is limited and prior work has demonstrated that the public has concerns about using AEDs.^{2,3} Communicating

accurate messages about defibrillation could improve bystander response and save lives.

Movies impact viewers' perspectives and behaviors,^{4,5} and with an annual global box office of more than \$32 billion, have significant reach worldwide.⁶ This entertainment medium also represents an opportunity for educating the public about defibrillation.

In this study, we sought to (1) characterize defibrillation and cardiac arrest survival outcomes in movies, (2) compare resuscitation actions performed in movies with actions outlined for the public to follow in the chain of survival and targeted by the American Heart Association (AHA) Emergency Cardiovascular Care (ECC) 2020 Impact Goals, and (3) compare cardiac arrest survival outcomes in movies with survival rates reported in the literature and targeted by the AHA ECC 2020 Impact Goals.

[☆] A Spanish translated version of the summary of this article appears as Appendix in the final online version at <http://dx.doi.org/10.1016/j.resuscitation.2014.09.005>.

* Corresponding author at: University of Pennsylvania, 423 Guardian Drive, Philadelphia, PA 19104, USA.

E-mail address: raina.merchant@uphs.upenn.edu (R.M. Merchant).

¹ These authors are joint first authors and contributed equally to this work.

2. Methods

2.1. Study design

Movies released during 2003–2012 containing ≥ 1 defibrillation scenes were identified by searching the Internet Movie Database (IMDb) (<http://www.IMDb.com>) and Google (<http://www.google.com>) with the following terms: defibrillator, defib, defibrillation, automated external defibrillator, AED, cardiac arrest, and defibrillation in movies.

Scenes were included if defibrillation was performed using a manual defibrillator, AED, or electrical wires. Scenes were excluded if a patient was not human (e.g., alien) or if a defibrillator was shown but not used.

The University of Pennsylvania Institutional Review Board exempted this study.

2.2. Movie characteristics

Movie characteristics were collected from the IMDb and The Numbers (<http://www.the-numbers.com>).

2.3. Coding and comparisons to real life and targeted goals

Utstein style guidelines for cardiac arrest reporting were used to identify coding variables for patient and rescuer characteristics, scene characteristics, defibrillation characteristics, additional interventions, and cardiac arrest survival outcomes.⁷

Two authors (OM and BR) coded each scene and a third author adjudicated discrepancies (RM). If a movie had >1 scene, each scene was coded independently.

Resuscitation actions performed in movies were compared with actions outlined for the public to follow in the chain of survival and targeted by the AHA ECC 2020 Impact Goals.^{8,9} Cardiac arrest survival outcomes in movies were compared with survival rates reported in the literature and targeted by the AHA ECC 2020 Impact Goals.⁹

2.4. Statistical analysis

Summary statistics were calculated to describe coding variables.

3. Results

3.1. Movie characteristics

Thirty-five scenes were identified in 32 movies (Appendix 1).

The estimated worldwide gross for the movies ranged from \$8,243,567–\$890,875,303 (USD).^{10,11} The mean and median estimated worldwide gross were \$221,268,363 (USD) [s.d. \$268,680,653 (USD)] and \$95,989,590 (USD), respectively.

Scenes were from several movie genres (many scenes had >1 genre as categorized by the IMDb):¹⁰ 22 (63%) action/adventure, 8 (23%) comedy/romance, 8 (23%) drama, 10 (29%) horror, 22 (63%) mystery/thriller, 9 (26%) sci-fi, 4 (11%) crime, and 1 each (3%) from biography, fantasy, and musical.

3.2. Patient and rescuer characteristics

Twenty-five (71%) patients who received defibrillation were male, and 29 (83%) rescuers who performed defibrillation were male. Of the rescuers, 22 (63%) were health care providers.

Table 1

Scene characteristics, defibrillator use, and additional interventions by patient survival outcomes.

	Survived n (%)	Died n (%)
Scene characteristics ^a		
Location	N=21	N=12
Inside hospital	9 (64%)	5 (36%)
Outside hospital	12 (63%)	7 (37%)
911 called/EMS arrival	N=21	N=12
Yes	7 (78%)	2 (22%)
No	14 (58%)	10 (42%)
Bystanders present	N=21	N=12
Yes	13 (62%)	8 (38%)
No	8 (67%)	4 (33%)
Defibrillator use ^b		
Defibrillator type	N=18	N=11
Manual defibrillator	15 (60%)	10 (40%)
AED	3 (75%)	1 (25%)
Intent of use	N=18	N=11
Harm	1 (20%)	4 (80%)
Help	17 (71%)	7 (29%)
Cardiac arrest	N=18	N=11
Yes	17 (81%)	4 (19%)
No	1 (13%)	7 (87%)
Rhythm ^{b,c}	N=10	N=5
Asystole	5 (83%)	1 (17%)
Ventricular fibrillation	3 (67%)	1 (33%)
Ventricular tachycardia	1 (100%)	0 (0%)
Other	1 (25%)	3 (75%)
Number of shocks delivered	N=18	N=11
<2	4 (40%)	6 (60%)
≥ 2	14 (74%)	5 (26%)
Additional interventions ^b		
CPR	N=18	N=11
Yes	6 (55%)	5 (45%)
No	12 (67%)	6 (33%)
Medications	N=18	N=11
Yes	9 (75%)	3 (25%)
No	9 (53%)	8 (47%)

EMS, emergency medical services; AED, automated external defibrillator; CPR, cardiopulmonary resuscitation.

^a Two scenes in which patient survival outcomes following resuscitation were unknown were excluded from analysis.

^b The following scenes were excluded from analysis: 2 scenes in which patient survival outcomes following resuscitation were unknown, and 4 scenes in which a substitute defibrillator (e.g., wires) was used.

^c Eight rhythms were unknown in scenes in which the patient survived, and 6 rhythms were unknown in scenes in which the patient died. In 4 “other” scenes, defibrillation was inappropriately used for atrioventricular block, atrial fibrillation, normal sinus rhythm, and an unrecognized rhythm.

3.3. Scene characteristics

Cardiac arrest took place inside a hospital in 15 (43%) scenes and outside a hospital in 20 (57%) scenes.

3.4. Defibrillation characteristics

The intent of defibrillation was resuscitation in 29 (83%) scenes and harm in 6 (17%) scenes (Table 1).

Cardiac arrest was the indication for use in 23 (66%) scenes, and the heart rhythm was made known in 18 scenes (51%). Of the scenes with a known heart rhythm, defibrillation was appropriately used for ventricular tachycardia or ventricular fibrillation in 5 (28%) scenes and inappropriately used for asystole in 7 (39%) scenes. In 2 (11%) scenes, a character stated aloud that the patient was in ventricular fibrillation, but the monitor demonstrated asystole. In 4 (22%) scenes, the patient was found to be in atrial fibrillation, AV block, normal sinus rhythm, or an unrecognizable rhythm (Table 1).

In 31 scenes in which a defibrillator was used, the device was a manual defibrillator in 27 (87%) scenes and an AED in 4 (13%)

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