DOI: https://doi.org/10.11144/Javeriana.umed64-1.rced

Medical School Students' Perception of PCR Survival Rate: A Descriptive Study

Percepción de los estudiantes de pregrado de medicina frente a la tasa de éxito de la reanimación cardiopulmonar: un estudio descriptivo

Received: 26 august 2022 | Accepted: 06 december 2022

Paula Arbeláez Gutiérrez
Semester 12 intern, Clinical Ethics Service, Medicine, Pontificia Universidad Javeriana, Bogotá, Colombia
ORCID: https://orcid.org/0000-0003-1118-1866
Gabriel Salim Rezk Schuler[a]
Anesthesiology Resident, Pontificia Universidad Javeriana-Hospital Universitario San Ignacio, Bogotá, Colombia
ORCID: https://orcid.org/0000-0001-6499-9325
Fritz E. Gempeler
Anesthesiologist, Clinical Ethics Service, Hospital Universitario de San Ignacio. Associate Professor, School of Medicine, Pontificia Universidad Javeriana, Bogotá, Colombia
ORCID: https://orcid.org/0000-0002-6036-9155
Diana Carolina Moreno
Head Nurse, Clinical Ethics Service, Hospital Universitario de San Ignacio, Bogotá, Colombia
ORCID: https://orcid.org/0000-0002-3419-3635

[a]Correspondence author: rezk.gabriel@javeriana.edu.co

How to cite: Arbeláez Gutiérrez P, Rezk Schuler GS, Gempeler FE, Moreno DC. Medical school students' perception of PCR survival rate: a descriptive study. Univ Med. 2023;64(1). https://doi.org/10.11144/Javeriana.umed64-1.rced

ABSTRACT

Introduction: According to the American Heart Association, the survival rate after cardiopulmonary resuscitation (CPR) performed at a hospital is 25.8%. In both medical staff and the general population, multiple factors cause an overestimation of the effectiveness of CPR maneuvers. **Methods**: Observational cross-sectional study. Through an online survey, the perception of medical students about the survival rate after receiving CPR in an in-hospital setting was inquired. Additionally, it was asked if they would accept CPR in case of presenting a cardiac arrest. Participants were then informed of the actual survival rates and asked again if they would accept receiving CPR. **Results**: 692 students were surveyed (78.9% of the target population). 61% of the participants stated that the survival rate after CPR was greater than 30%. Before knowing the actual survival rates, 95.5% would accept CPR maneuvers, and after knowing the actual survival rates, only 75.3% would accept them. **Discussion**: The results confirmed that the perception of the survival rate after in-hospital CPR maneuvers is overestimated by medical students. This could affect their medical criteria and shared decision-making process with patients. Additionally, having adequate information about the result of an intervention changes the decision towards receiving it or not.

Keywords
cardiopulmonary resuscitation - ethics; clinical - education; medical - bioethics.

RESUMEN

Introducción: Según la Sociedad Americana del Corazón, la sobrevida tras una reanimación cardiopulmonar (RCP) al egreso hospitalario es del

25,8%. En población médica y general, múltiples factores causan una sobrestimación de su efectividad. **Métodos**: Estudio de corte transversal observacional. Usando una encuesta en línea, se indagó sobre la percepción de los estudiantes de medicina acerca de la sobrevida tras recibir RCP intrahospitalariamente. Además, se preguntó si se someterían a ellas. Después se les informó a los participantes las tasas reales de sobrevida y, de nuevo, se preguntó si se someterían a ellas. **Resultados**: Se encuestaron 692 estudiantes (78,9% de la población objetivo), de los cuales el 61% refirió que la sobrevida al egreso hospitalario era mayor del 30%. Antes de conocer las tasas reales de sobrevida, el 95,5% se sometería a maniobras de RCP, y después de conocer las tasas reales, solo el 75,3% las aceptaría. **Discusión**: Evidentemente, los estudiantes de medicina sobrestiman la tasa de sobrevida tras una RCP intrahospitalaria, lo cual puede llevar a afectar su criterio médico y la toma de decisiones compartidas con los pacientes. Se confirmó que tener una información adecuada acerca del resultado de una intervención, cambia la decisión de aceptarla.

Palabras clave
reanimación cardiopulmonar; ética clínica; educación médica; bioética.

Introduction

According to management guidelines, cardiopulmonary resuscitation (CPR) is indicated in all cases of cardiorespiratory arrest, unless there are clinical signs of irreversible death such as rigor mortis, lividity, or decapitation, the existence of advance directives, or DNR orders, or if the cardiopulmonary arrest occurs in a situation in which the safety of the personnel performing the resuscitation maneuvers is not guaranteed (1).

According to the American Heart Society, by 2020, the survival rate at hospital discharge for 209,000 people who suffered in-hospital cardiac arrest was 25.8%. In addition, between 20% and 60% of survivors suffered permanent cognitive deficits, reflected in impaired memory, attention, and executive functions, secondary to cerebral hypoxia. Less than 5% of the survivors reached a cognitive level close to the premorbid state one month after resuscitation. (2).

It has been seen that the general population, including physicians, tends to overestimate this survival rate and perceive the post-event recovery to be higher than the actual figures, which directly influences the desire to be subjected at some point to CPR maneuvers and apply them to patients. Such misperceptions are caused by a lack of adequate information, an overestimation of the curative capacity of medicine, and the influence of the media, including movies, which play a key role in this regard. Studies by Harris and Willoughby (3) and Diem et al. (4) have shown that television series such as Casualty, ER, Holby City, and Grey's Anatomy overestimate in their episodes the survival rate of CPR maneuvers (42% to 77%), which has thus conditioned viewers' perception of CPR survival and, possibly, their desire to undergo them.

Several authors have reported that knowing the actual data on survival to hospital discharge and the functionality of those who survive makes many unwilling to receive CPR maneuvers. (5).

As far as the medical profession is concerned, factors such as the fear of lawsuits, the perception of professional failure, the difficulty of establishing conversations with the patient and his or her family, and the lack of adequate information and training on the reality of CPR condition the actions and willingness of physicians to perform CPR maneuvers on others and to allow themselves to perform them if necessary (6).

In an uncontrolled randomized observation by the authors, it was perceived that there is a lack of information among medical students on this subject since a significant discrepancy was found between the perception of CPR survival at hospital discharge and the actual rates.

The main objectives of this study were to describe and compare the personal perceptions of undergraduate medical students at the Pontificia Universidad Javeriana (Bogotá campus) regarding the survival rate at hospital discharge after in-hospital CPR, as well as their willingness to undergo such maneuvers. In addition, we sought to evaluate whether knowing the real information about the survival rate at hospital discharge after in-hospital CPR maneuvers generated a change in the decision of the participants to undergo or not undergo these maneuvers.

Materials and methods

A cross-sectional observational study was designed through a voluntary and anonymous face-to-face survey. The survey population consisted of undergraduate medical students over 18 years of age who were studying between the first and tenth semesters. The survey was structured through Google Forms (see appendix). The survey consisted of an initial consent form for participation and was divided into three parts. The first collected demographic data on the respondents. The second part asked what they believed to be the survival rate at hospital discharge after in-hospital CPR (in percentage ranges of 10% to 10%) and whether they would agree to undergo CPR maneuvers in the event of in-hospital cardiac arrest. Subsequently, respondents were provided with the actual information about survival rates after in-hospital CPR, information with which they were to proceed to the third and final section, where they were asked if, after learning the actual survival rates, they would still agree with which CPR maneuvers were best for them.

Results

Out of 877 undergraduate medical students from the first to tenth semesters, a total of 692 (78.9% of the target population) participated. The number of students per semester who responded to the survey can be seen in Table 1. Of the total respondents, 468 (67.2 %) were female, 223 (32.2 %) were male, and 1 (0.1 %) was of unspecified gender. The age range was between 18 and 31 years, with a mean of 20 years.

Table 1
Data by the semester of the surveyed population.

Semester	Students by semester (percentage of total surveyed)
First	91 (13.2)
Second	96 (13.9)
Third	88 (12.7)
Fourth	70 (10.1)
Fifth	64 (9.2)
Sixth	82 (11.8)
Seventh	58 (8.4)
Eighth	56 (8.1)
Ninth	40 (5.8)
Tenth	47 (6.8)
Total students surveyed	**692 (100)**

As the survey asked about survival grouped in percentage ranges (see appendix), to have a better understanding of the results, and taking into account that survival is less than 30%, it was decided to group these results into three groups: less than 30% (low survival); 31%-60% (medium survival), and 61%-100% (high survival), according to table 2. Out of the total number of students surveyed, 39% considered the survival rate after in-hospital CPR to be low, 37% considered it to be medium, and 24% considered it to be high (Table 2). For 61% of all respondents, survival to hospital discharge is greater than 30%.

Table 2
Perception of all student respondents on the success rate of in-hospital cardiopulmonary resuscitation.

Survival rate (in percentages)		Percentage of students	Total percentage of students
0-10	Low	6.0	39
11-20		12.0	
21-30		21.0	
31-40	Medium	14.6	37
41-50		9.0	
51-60		13.4	
61-70	High	13.9	24
71-80		8.2	
81-90		1.9	
91-100		0.0	

Out of the students in the basic medical sciences semesters (first to fifth), 34% considered the survival rate after in-hospital CPR to be low, and 66% thought it was greater than 30%. On the other hand, 55% of the students in the clinical application semesters (sixth to tenth) considered it to be higher than 30%.

Regarding whether participants would perform CPR in the hypothetical case of in-hospital cardiopulmonary arrest, 95.5% of all students surveyed would do so, while 4.5% would not. After providing the respondents with information on the actual success rate of CPR, they were asked again whether or not they would undergo these maneuvers. Of those surveyed, 75.3% said they would, while 24.7% said they would not. The desire to receive CPR went from 95.5 % to 75.3 % when knowing the in-hospital survival from CPR with a p-value < 0.0001, when using McNemar's test for difference in proportions of matched samples. In this case, the same individual before and after (Figure 1).

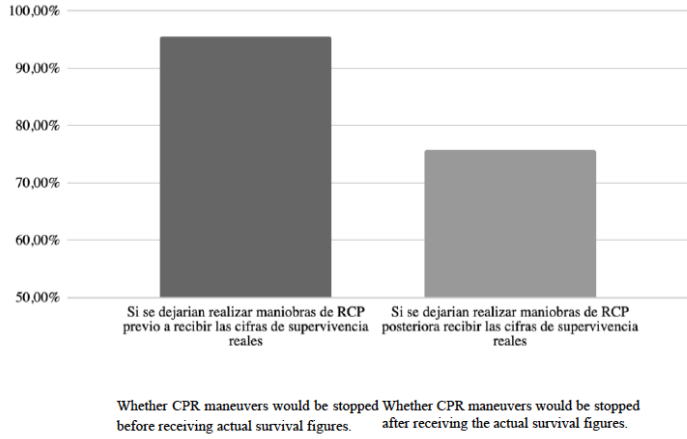

Figure 1
Desire to receive cardiopulmonary resuscitation before and after receiving actual survival figures

Discussion

Although the in-hospital CPR survival rates reported by the American Heart Society and the European Resuscitation Council (2,7) are less than 30%, some studies have shown that people greatly overestimate the likelihood of a possible positive outcome (8,9), suggesting that there is an obvious discrepancy between the actual success rate and the perception of the general population, including physicians. Very optimistic perceptions of the success of CPR would probably lead to the general population often demanding it, and physicians applying it indiscriminately, even though it is a costly, morbid, often unsuccessful, and often unindicated endeavor (1,10).

The results obtained are consistent with these studies (11-14) and show that more than 60% of medical students overestimate the success of CPR, considering it to be greater than 30%, which is far from the real figures. This overestimation is more evident in students of basic medical sciences semesters, and this is similar to the perception of the general population, which can be attributed to the lack of clinical practice and the lack of appropriation of concepts. Surprisingly, more than 55% of students with more exposure to clinical practice had an unrealistic perception of CPR success,

which may lead them to omit critical information about actual CPR success rates when they graduate, thus affecting their medical judgment and introducing their own bias into shared decision making with patients.

Within the undergraduate medical curriculum, it is worth noting that CPR classes begin in the first semester. In that order of ideas, all respondents had already received this knowledge, although it is not clear whether they were provided with the basics of CPR ethics and actual survival rates in this cathedra. It should be noted that, generally, basic or advanced life support courses or classes focus on how to save a life or perform CPR maneuvers, but the actual survival statistics are omitted (15).

In addition, although medical students are considered a population in training with access to updated and verified knowledge, they are not exempt from the information transmitted by the media (3,4), which tends to overestimate the survival rates of CPR maneuvers. Additional factors that would condition students' responses, such as lack of exposure to CPR maneuvers or follow-up of cardiorespiratory arrest cases, as well as personal beliefs with social or religious foundations, should be taken into account.

Unrealistic expectations of CPR success would have a direct effect on a patient's expectation of personal survival and preference for CPR. The personal desire to receive CPR in the event of cardiac arrest may change when individuals receive adequate information. In a study by Murphy et al. (16), a group of people was initially surveyed about their preference to receive CPR in the event of cardiac arrest, then educated about their actual survival probability after CPR, and finally asked again about their desire to receive CPR in the event of cardiac arrest. The percentage change before and after learning the actual rates was found to be 19% (16). This value is similar to that reported in this study, where the percentage of change was 20.2%. This is evident and statistically significant, so the probability that it is due to chance is very low. This means that knowing the real survival rate of CPR maneuvers changes the willingness to accept them, which would also lead to changes in the physician's desire to administer these maneuvers to his or her patients.

The present study had some limitations, such as the fact that it was conducted at a single institution and the sample did not include students in the last two semesters, who have had greater clinical exposure, which limits the generalizability of the findings.

Conclusions

This study highlights the need to introduce and intensify education in clinical ethics in medical schools, and to initiate conversations on CPR in these courses from the first semester, educating about the real rates of in-hospital and out-of-hospital survival, as well as the clinical and ethical indications for CPR, given that there is a significant lack of this information. A rupture has been detected between technique and ethics in the clinical practice of CPR, a necessary integration to offer patients adequate, integral medical care.

This study should be taken into account by other faculties in the country and in other countries, to question and rethink, if necessary, the approach given to these topics throughout the curriculum established by the institutions, to train ethically responsible health professionals.

References

1. Olmos N, Gempeler FE. Reanimación cardiopulmonar: cuando el corazón para. ¿Reanimar o acompañar? Univ Méd. 2022;63(1):1-8. https://doi.org/10.11144/Javeriana.umed63-1.rcra

2. American Heart Association (AHA). ACLS: introduction. AHA; 2020.

3. Harris D, Willoughby H. Resuscitation on television: realistic or ridiculous? A quantitative observational analysis of the portrayal of cardiopulmonary resuscitation

in television medical drama. Resuscitation. 2009;80(11):1275-9. https://doi.org/10.1016/j.resuscitation.2009.07.008

4. Diem S, Lantos J, Tulsky J. Cardiopulmonary resuscitation on television: miracles and misinformation. N Engl J Med. 1996;334(24):1578-82. https://doi.org/10.1056/NEJM199606133342406

5. Marco C, Larkin G. Cardiopulmonary resuscitation: knowledge and opinions among the U.S. general public. State of the science-fiction. Resuscitation. 2008;79(3):490-8. https://doi.org/10.1016/j.resuscitation.2008.07.013

6. Gempeler FE. Bioética de la reanimación cardiopulmonar. En Anestesiología: apuntes para el médico general. Bogotá: Editorial Pontificia Universidad Javeriana; 2020. p. 89-102.

7. Gräsner J, Herlitz J, Tjelmeland I. European resuscitation council guidelines 2021: epidemiology of cardiac arrest in Europe. Resuscitation. 2021 abr;161:61-79. https://doi.org/10.1016/j.resuscitation.2021.02.007

8. Jones G, Brewer K, Garrison H. Public expectations of survival following cardiopulmonary resuscitation. Acad Emerg Med. 2000;7:48-53.

9. Van den Bulck J. The impact of television fiction on public expectations of survival following inhospital cardiopulmonary resuscitation by medical professionals. Eur J Emerg Med. 2002;9:325-9. https://doi.org/10.1097/00063110-200212000-00006

10. Bandolin N, Huang W, Beckett L. Perspectives of emergency department attendees on outcomes of resuscitation efforts: origins and impact on cardiopulmonary resuscitation preference. Emerg Med J. 2020;0(1):1-6. https://doi.org/10.1136/emermed-2018-208084

11. Adams D, Snedden D. How misconceptions among elderly patients regarding survival outcomes of inpatient cardiopulmonary resuscitation affect do-not-resuscitate orders. J Am Osteopath Assoc. 2006;106:402-4.

12. Kerridge I, Pearson S, Rolfe I. Impact of written information on knowledge and preferences for cardiopulmonary resuscitation. Med J Aust. 1999;171:239-42. https://doi.org/10.5694/j.1326-5377.1999.tb123629.x

13. Miller D, Jahnigen D, Gorbien M. Cardiopulmonary resuscitation: how useful? Attitudes and knowledge of an elderly population. Arch Intern Med. 1992;152:578-82. https://doi.org/10.1001/archinte.152.3.578

14. Marco C, Schears R. Societal opinions regarding CPR. Am J Emerg Med. 2002;20(3):207-11. https://doi.org/10.1053/ajem.2002.32626

15. American Heart Association. Basic life support training manual: American Heart Association provider manual; 2016.

16. Murphy D, Brurrows D, Sara S, Kemp A, Tener S, Kreling B. The influence of the probability of survival on patient's preferences regarding cardiopulmonary resuscitation. N Engl J Med. 1994;330(8):545-9. https://doi.org/10.1056/NEJM199402243300807

Measurement tool

Part one:

Semester being attended:-____.
Age (years of age): ____.
Gender: Female:__ Male:___ Not specified: __

First question

1. What do you think is the survival rate* at hospital discharge after in-hospital cardiopulmonary resuscitation (CPR)? *Out of 100 patients who present with cardiac arrest and undergo CPR maneuvers, how many leave the hospital alive:

    A) 0% to 10% ___
    B) 11% to 20% ___
    C) 21% to 30%___
    D) 31% to 40%___
    E) 41% to 50%___
    F) 51% to 60% ___
    G) 61% to 70%___
    H) 71% to 80% ___
    I) 81% to 90% ___
    J) 91% to 100% ___

2. If you suffer an in-hospital cardiac arrest, would you agree to have CPR maneuvers performed?

    A) Yes:___
    B) No:____

Part two

Knowing the actual survival rates after CPR, if you were to suffer an in-hospital cardiac arrest, would you agree to have CPR maneuvers performed?

A) Yes: ___
B) No: ___