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Perception among family members and physicians about the recommendation for family members to learn cardiovascular resuscitation in patients at high risk for sudden cardiac arrest

Percepción de familiares y médicos sobre la recomendación de aprender reanimación cardiopulmonar para familiares de pacientes con alto riesgo de parada cardiaca súbita

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Keywords: cardiopulmonary resuscitation learning, heart disease, out-of-hospital cardiac arrest, layperson cardiopulmonary resuscitation, survey.

Palabras clave: *aprendizaje de reanimación cardiopulmonar, cardiopatía, paro cardiaco extra-hospitalario, reanimación cardiopulmonar por personas sin entrenamiento médico profesional, encuesta.*

ABSTRACT

Introduction: most out-of-hospital cardiac arrests (OHCA) in patients with cardiovascular disease occur at home or in the vicinity of relatives. Someone in the patient's entourage should be able to administer cardiopulmonary resuscitation (CPR). We conducted two surveys to evaluate if CPR learning is suggested to patients and relatives by their physician and to the patients to know their perception in that regard. **Material and methods:** two surveys were conducted among physicians (cardiologists) and patients (heart disease). All were voluntary and anonymous. Physicians were contacted through an internet survey tool that included both private and public practices, and patients responded in the waiting room of private practices located in private hospitals. Responses were analyzed as categorical variables with the χ^2 test and, when necessary, Student's t-test. **Results:** one hundred and eighty-four cardiologists and 432 patients responded. Among physicians, 95.7% see high-risk OHCA patients, and 97.8% consider «important» or «very important» that someone close to them is able to perform CPR. Physicians think that less than 5% of family members are able to do so, and 59% suggest always, or almost always, the need for someone to learn CPR. Among patients, 95.1% consider «important» that «somebody» knows how to perform CPR in their vicinity, 32.8% think someone close knows how to do so, and in 65.5% of them, someone (friends and family 73.6%, their physician 14.1%) has suggested CPR learning. **Conclusions:** there is

RESUMEN

Introducción: *la mayoría de los paros cardiacos extrahospitalarios (PCEH) en enfermos cardiovasculares ocurren en casa o cerca de familiares. Alguien en el entorno del paciente debería poder administrar maniobras de reanimación cardiopulmonar (RCP) básicas y activar a los servicios médicos de emergencia (SME). Se hicieron encuestas para evaluar si se sugiere a los pacientes y familiares aprender RCP y a los pacientes para conocer su percepción.* ***Material y métodos:*** *se aplicaron dos encuestas sencillas de comprensión y aplicación rápidas, una a médicos (cardiólogos) y otra a pacientes con enfermedad cardiovascular. Todas fueron anónimas y voluntarias. A los médicos con práctica privada y pública se les aplicó con una herramienta de internet y a los pacientes en la sala de espera de prácticas privadas en hospitales privados. Las respuestas se analizaron como variables categóricas con χ^2 y t de Student en caso necesario.* ***Resultados:*** *se obtuvieron 184 respuestas de cardiólogos y 432 de pacientes con enfermedad cardiovascular. El 95.7% de los médicos dijo ver pacientes con alto riesgo de PCEH y el 97.8% consideran importante o muy importante que alguien cercano sepa dar RCP; creen que en menos del 5% de los casos ocurre esto y el 59% de ellos sugieren siempre o casi siempre que alguien aprenda. El 95.1% de los pacientes cree importante que «la gente» sepa dar RCP. El 32.8% de ellos cree que alguien cercano sabe hacerlo. Al 65.5% alguien (familiares y amigos 73.6%, su médico 14.1%) le ha sugerido que aprendan RCP.* ***Conclusiones:*** *aparentemente existe una percepción generalizada sobre la importancia de la RCP*

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a generalized perception of the importance of CPR learning in the proximity of heart patients, but apparently, few people actually know how to do it. Patients consider that their main sources of information are family and friends.

en el entorno del enfermo cardiovascular, sin embargo, en apariencia, poca gente está capacitada para realizarla. La mayoría de los pacientes considera que su principal fuente de información y sugerencias son amigos y familiares.

Abbreviations:
CPR = Cardiopulmonary Resuscitation
EMS = Emergency Medical Services
OHCA = Out-of-Hospital Cardiac Arrests

INTRODUCTION

Out-of-Hospital Cardiac Arrests (OHCA) is a health problem: more than 350,000 occur each year in the US, most of them at home (73.4%), 16.3% in a public space, and 10.3% in nursing homes.[1] Although some older people or heart disease patients might live alone, many others in different age or disease groups have relatives or care-takers with them, and it would be desirable that someone in that environment could administer cardiopulmonary resuscitation (CPR) and alert the emergency medical services (EMS) to treat an OHCA when the patient is not terminal.[2] Several efforts have been made to improve CPR learning and performance by family members or relatives. Nevertheless, several barriers persist: some of them might be cultural, and others come from concerns about the patient's welfare. Paradoxically, there seems to be a high awareness about the usefulness of CPR in the general population.

In Mexico, this has not been explored, and there is no knowledge about the public's perception concerning CPR performance as a layperson, nor about the importance of CPR as a life-saving intervention or the obstacles a layperson might encounter to perform it. In the same way, there are very few studies about prehospital cardiac arrest in Mexico, so epidemiological information is scarce as well.[3,4] It has been estimated that there are 33,000 to 55,000 sudden cardiac death events in Mexico each year,[5,6] and most of them happen out of a medical facility. It is well proven that the earlier CPR and defibrillation are applied in an OHCA, the better the survival odds for the patient.[7,8] It also has to be pointed out that about 10% will survive hospital discharge, but once this point is attained, approximately 90% of patients survive the first year.[9] Hence, a relative or care-taker close to the cardiovascular patient with a high-risk disease should be able to timely detect cardiac arrest, start CPR, activate the EMS, and ask for a defibrillator in an attempt to increase survival rates.

We decided to make an initial approach to these issues in a group of persons at high risk of OHCA, such as cardiac disease patients and the physicians who treat them on an outpatient basis. We sought if physicians (Cardiologists) who treat these individuals suggest that patients' relatives learn CPR maneuvers on a regular basis and what perception patients have on the subject. To this purpose, we designed a simple questionnaire for physicians and another survey for patients.

MATERIAL AND METHODS

Two different surveys were developed to investigate if CPR learning is considered relevant for cardiovascular patients' relatives and if it is suggested in an outpatient setting. Both surveys and the protocol were approved by the Hospital H+'s Querétaro Bioethics committee (Approval letter sent to the publisher).

The survey intended for physicians was designed to be completed online. It was tested for clear language, easy response, and short duration on ten cardiologists within a private practice setting. It included seven questions. Some of them were multiple choice (3), and others were a scale (4) of percentages («How many of your patient's relatives do you consider know how to perform CPR?» for example) or attitudes («How important do you believe it is for family members and relatives of people with heart disease to learn CPR?» with a five-points grading from «not important at all» to «very important»). After testing, the survey was presented to the president of one of the

Table 1: Main characteristics of the physicians that participated in the survey.

Participants' main activity	N = 184 n (%)	Main age group	Gender male n (%)	Do you see people with SCD high-risk? (YES) n (%)	I always (5) / Almost always recommend CPR learning (4) n (%)
Clinical cardiology	124 (67.4)	55 to 65 years-old (58 subjects)	104 (83.8)	116 (93.5)	69 (55.6)
Echocardiography	20 (10.9)	45 to 55 years-old (9 subjects)	10 (50)	20 (100)	11 (55)
Cardiac imaging	1 (0.5)	35 to 45 years-old	0 (0)	1 (100)	1 (100)
Interventional cardiology (hemodynamics)	18 (9.8)	55 to 65 years-old (8 subjects)	18 (100)	18 (100)	11 (61.1)
Interventional cardiology (electrophysiology)	12 (6.5)	55 to 65 years-old (5 subjects)	10 (83.3)	12 (100)	10 (83.3)
Heart failure	1 (0.5)	45 to 55 years-old	0 (0)	1 (100)	1 (100)
Cardiac rehabilitation	8 (4.3)	35 to 45 years-old (4 subjects)	4 (50)	5 (100)	4 (50)

CPR = CardioPulmonary Resuscitation. SCD = sudden cardiac death.

largest cardiological societies in our country, which has 2,200 members (according to 2022 membership records). He kindly helped us to submit the voluntary questionnaire through their mailing list as a web link to the Google Formularies app (Google, California, USA). All the surveys were anonymous: the investigators had no means to reach the answering physician or to find their contact or personal information since the mailing list was not managed by the research team, and there was no record of personal data on the survey webpage. The anonymous answers were concentrated in the «Formulary» app of Google Surveys and collected in an Excel Microsoft database as categorical variables for further statistical analysis.

We also designed a short questionnaire to evaluate the perception of cardiovascular patients attending private practice cardiology groups in Queretaro, San Miguel de Allende, and Aguascalientes. The survey was tested on twenty-five patients attending outpatient offices in Queretaro, San Miguel de Allende, and San Juan del Rio to explore and adjust language, clarity, and extension of the interview. Once validated, the survey was handed to patients before their consultation turn, on a single piece of paper without any identification markings. If they agreed to participate, their anonymous answers were collected by the administrative assistant as they entered the office, prior to any contact with their physician. Questions included their gender and age group (less than 18 years old to more than 65 in 10-year age groups). The main questions («Do you think it is important for people to know how to perform CPR?», «Has somebody told you about the importance of CPR learning in your entourage?», and «Does someone close to you know how to perform CPR?») included three options (yes, no, I don't know). The fourth question was, «Who has told you about the need to have someone near you who can perform CPR?». The answers included friends, relatives, your physician, others, and I don't know. The data were also captured in a Microsoft Excel database and analyzed as categorical variables.

In this prospective, transversal, and descriptive study, the main results are expressed as totals and percentages and were analyzed with a χ^2 test to evaluate differences between age and gender groups among the patients or a Student's t-test when necessary.

Results

We received 184 physicians' answers (8.36% of the disclosed society's membership). The responder's main characteristics are depicted in *Table 1*. Most colleagues (n = 76, 41.3%) were in the 55 to 65 age range, 39 (21.2%) in the 35 to 45 age range, and 37 (20.1%) in the 45 to 55 age range. Three physicians were in the 25 to 35 age range (1.6%). Responders were predominantly male subjects.

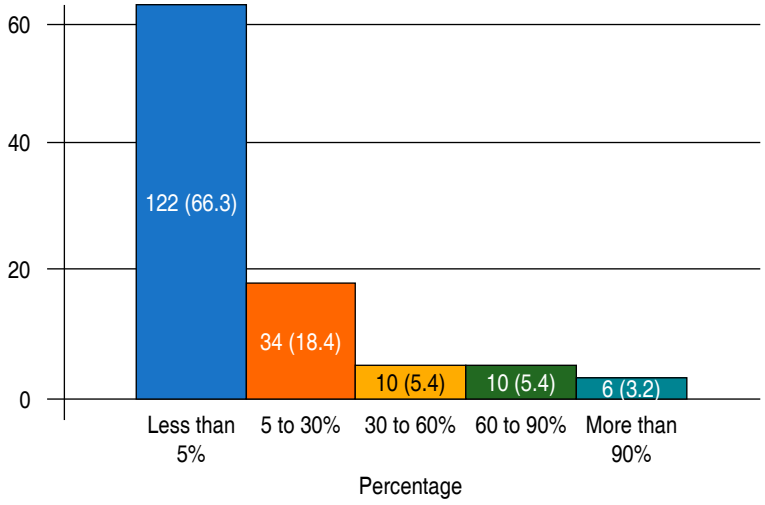

Figure 1: Response to the question: What proportion of your high-sudden-cardiac-death-risk patients' relatives do you consider are able to perform cardiopulmonary resuscitation?

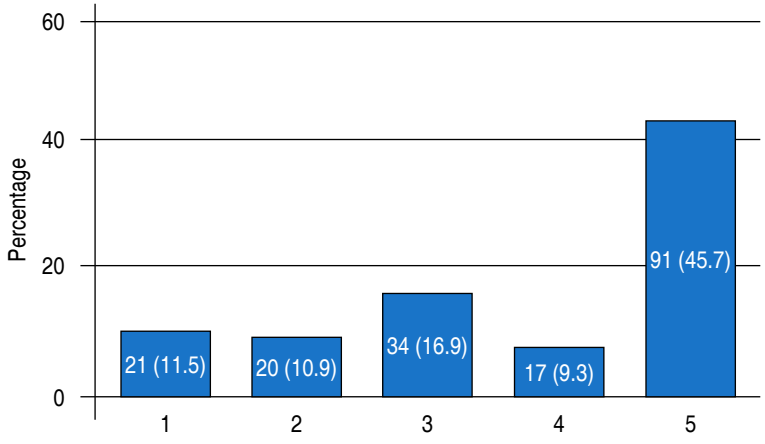

Figure 2: Responses to the question: Do you suggest that the family or close relatives of a sudden-cardiac-death-risk patient learn Cardiopulmonary resuscitation (CPR)?
Number 1 indicates «Never», and number 5 indicates «Always».
Digital material (file number)

Among the specialists surveyed, 176 (95.7%) stated that they care for high-sudden cardiac death risk patients. In the same group of physicians, 179 (97.8%) considered that it is important or very important for a patient's family member to learn CPR maneuvers.

In this regard, 108 (59%) cardiologists mentioned that they «always» or «almost always» suggest to a family member or a care-taker to learn CPR *(Figure 1)*. There were some differences according to the physician's specialty. For example, 10 out of 12 electrophysiologists (83.3%) stated that they recommend their high-risk patient's families to learn CPR, while among the general cardiology practitioners, 69 of 124 (55.6%) stated the same *(Table 1)*. When asked what proportion of the family or caregivers of their high-risk patients they thought could perform CPR, 122 (66.3%) responded that less than 5%, and 34 (18.47%) said that probably 5 to 30% of family members would be able to do so *(Figure 2)*.

The survey was presented to 540 patients, and only 432 (80%) agreed to answer it. There were 234 (54.16%) male and 198 (45.8%) female subjects. Most of them were in the 65 or more years old group *(Table 2)*, and 411 (95.13%) considered it important for «people» to know how to perform CPR. In 284 cases (65.5%), someone has told them about the relevance of a close relative or care-taker to be able to perform CPR. In this group, the recommendation came from a family member (145, 51.06%), a friend (64, 22.5%), or their physician (40, 14.08%). *Table 3* summarizes the main findings by gender and *Table 4* by age group. There were no significant differences between sex or age groups regarding the general patient population. Elderly patients (more than 65 years old) received significantly fewer recommendations for people around them to learn CPR, as well as the younger age group (less than 18 years old).

DISCUSSION

Layperson-provided CPR has been studied from several angles to promote its learning and wide community application with variable

Table 2: General findings in 432 patients' surveys.

	n (%)
Gender	
Male	234 (54.16)
Female	198 (45.8)
Age group (years)	
18 or less	14 (3.24)
18-35	47 (10.88)
35-45	79 (18.29)
45-55	90 (20.83)
55-65	69 (15.97)
More than 65	132 (30.56)

	Yes n (%)	No n (%)	I don't know n (%)
Do you believe it is important that people know how to perform CPR?	411 (95.13)	7 (1.6)	14 (3.2)
Has someone told you about the need for someone close to you to know how to perform CPR?	284 (65.51)	127 (29.17)	16 (3.7)
Does someone close to you know how to perform CPR?	142 (32.87)	208 (47.69)	82 (18.98)

Who has told you that it would be useful to have someone near you that knows how to perform CPR?	n (%)
Friend	64 (22.54)
Family	146 (51.06)
Physician	40 (14.08)
Other	38 (13.38)
I don't know	16 (5.03)

CPR = CardioPulmonary Resuscitation.

degrees of success. Although CPR guidelines emphasize the need for layperson-provided CPR (Class I recommendation), they do not mention high-risk patients' close relatives or family as a specific training target.[10-13] Since the 1980s, different groups identified the need to promote CPR by relatives of patients with heart disease.[7,8] Training this subset of individuals should probably be a class IIA recommendation since most OHCA happen at home, but it has not been emphasized. Specific limitations and directed assistance must be regarded, but a general recommendation should be envisaged and explored.

The present survey shows a positive attitude of physicians towards CPR learning, and apparently, a significant number of them suggest it to families and patients. Fifty-nine percent of the surveyed cardiologists mention that they always or almost always do it, a higher percentage than the one found 40 years ago in King County (one of the places in the world with higher bystander CPR rates and OHCA survival) by St Louis P. et al.[10]

On the other hand, physicians consider that few family members or at-home caretakers are able to do so. This goes in line with the findings by Cariou et al.,[14] who interviewed 153 cohabitants of 127 patients and found that 3.5% of the patients' relatives learned CPR because of the new household circumstance. A study by Sato N et al.,[15] found that in the case of an OHCA, it is less likely for the patient to receive CPR from a relative as opposed to a non-family bystander. The authors advance several reasons: families can suffer from emotional stress and psychological barriers to performing CPR on a known victim, the rescuer might be alone at home with the victim (because of aging couples without support), and have her/his own aging and disease issues. In Mexico, there might be some other reasons, such as legal and safety concerns, but the present survey was not designed to explore this.

A major issue seems to be the lack of availability of low-cost or no-cost training courses or facilities; thus, several options have been devised: A recent study evaluated CPR learning among patient's families through a self-learning CPR kit that included usual tools - a 20-minute video and a practice manikin - compared to a mobile device application. They found non-significant differences between both methods when measuring learning interest, although there was a trend towards better skill retention and performance among people with the «traditional» learning kit over the app.[16,17]

Another group explored what happened when MDs were prescribed to learn CPR maneuvers by either purchasing an inflatable manikin and video at the physician's office for self-training at home or by attending a presential CPR course. They found that patients and relatives can be motivated to purchase a training kit (9 to 24% of patients) but not to take a CPR lesson from a written prescription.[17]

Patients seem aware of the importance of CPR training, and most of them consider it important for «people» to learn CPR. This issue should be addressed with other tools since it raises the question: Who is to learn CPR if not people who are aware of its relevance? Many barriers seem to entangle the relative's decision to learn and apply CPR while respecting the patient's desires and condition,[15] but it was not the purpose of this survey to evaluate that question, which deserves local evaluation to consider idiosyncratic aspects.

An important proportion of subjects in this series have received suggestions about having someone close to them learn CPR, and the suggestion came mainly from family and friends. The lower proportion of physician-recommended CPR training referred by patients is more in line with the findings by St Louis, Mandel, and Goldberg.[10-12] Cardiologists surveyed in the present study are aware of the potential benefits of patients' relatives knowing CPR and make the recommendation to a proportion of their high-risk patients.

These results suggest that there is a mismatch between physicians' and patients' perceptions regarding «CPR learning

Table 3: Main findings according to patients' gender.

	Age range						Is it important people know CPR?		
	18 or less	18 to 35	35 to 45	45 to 55	55 to 65	More than 65	Yes	No	I don't know
Male, n (%)	4 (1.71)	21 (8.97)	46 (19.66)	49 (20.94)	37 (15.81)	77 (32.91)	226 (96.58)	4 (1.71)	5 (2.14)
Female, n (%)	10 (5.05)	26 (13.13)	32 (16.16)	41 (20.71)	32 (16.16)	57 (28.79)	187 (94.44)	3 (1.52)	9 (4.55)
p M vs. F	0.030	0.087	0.172	0.476	0.461	0.178	0.145	0.437	0.086

	Has somebody told you?			Who?					Someone close know to perform CPR?		
	Yes	No	I don't know	Friend	Family	Physician	Other	I don't know	Yes	No	I don't know
Male, n (%)	158 (67.52)	68 (29.06)	5 (2.14)	42 (17.95)	72 (30.77)	22 (9.40)	21 (8.97)	9 (3.85)	80 (34.19)	105 (44.87)	49 (20.94)
Female, n (%)	126 (63.64)	59 (29.80)	11 (5.56)	22 (11.11)	74 (37.37)	18 (9.09)	17 (8.59)	7 (3.54)	62 (31.31)	103 (52.02)	33 (16.67)
P M vs. F	0.199	0.434	0.035	0.021	0.075	0.456	0.444	0.432	0.263	0.070	0.128

Gender distribution: Male (M) and Female (F). Comparisons are made between genders.
CPR = CardioPulmonary Resuscitation.

Table 4: Main findings according to patients' age group.

	Age group (**years**)											
	≤ 18 n = 14	**p***	**18-35 n = 47**	**p***	**35-45 n = 78**	**p***	**45-55 n = 90**	**p***	**55-65 n = 69**	**p***	**≥ 65 n = 134**	**p****
Male gender	4 (28.6)	NS	21 (44.7)	NS	46 (58.97)	NS	49 (54.4)	NS	37 (53.6)	NS	77 (57.5)	0.02
Is it important for people to know how to perform CPR?												
Yes	13 (92.8)	NS	47 (100.0)	NS	76 (97.44)	NS	85 (94.4)	NS	62 (89.8)	0.03	130 (97.0)	NS
No	1 (7.2)	0.08	0 (0.0)	NS	2 (2.56)	NS	2 (2.22)	NS	1 (1.45)	NS	1 (0.75)	NS
I don't know	0 (0.0)	NS	0 (0.0)	NS	0 (0.0)	0.02	3 (3.33)	NS	7 (10.14)	0.02	3 (2.2)	0.04
Has somebody told you about the need to have someone near you able to administer CPR?												
Yes	5 (35.7)	0.02	32 (68.09)	NS	62 (79.49)	NS	64 (71.1)	NS	48 (69.6)	0.017	73 (54.5)	NS
No	8 (57.14)	0.045	14 (29.79)	0.05	13 (16.67)	NS	20 (22.2)	NS	17 (24.6)	0.008	55 (41.0)	NS
I don't know	1 (7.14)	NS	1 (2.13)	NS	1 (1.28)	NS	3 (3.33)	NS	4 (5.8)	NS	6 (4.5)	NS
Who has told you?												
Friend	0 (0.0)	0.001	9 (19.1)	NS	16 (20.51)	NS	14 (15.56)	NS	7 (10.1)	NS	18 (13.4)	0.0001
Family	4 (28.6)	NS	16 (34.04)	NS	33 (42.31)	0.05	27 (30.0)	NS	27 (39.1)	NS	39 (29.1)	NS
Physician	1 (7.14)	NS	5 (10.6)	NS	8 (10.26)	NS	7 (7.78)	NS	8 (11.6)	NS	11 (8.2)	NS
Other	3 (21.43)	NS	2 (4.26)	NS	3 (3.85)	0.003	15 (16.67)	0.03	5 (7.25)	NS	10 (7.5)	NS
I don't know	0 (0.0)	NS	2 (4.26)	NS	0 (0.0)	0.001	9 (10.0)	0.008	1 (1.45)	NS	4 (3.0)	0.02
Does someone near you know how to perform CPR?												
Yes	2 (14.3)	0.02	19 (40.4)	NS	27 (34.62)	NS	37 (41.1)	NS	25 (36.23)	0.03	32 (23.9)	NS
No	8 (57.1)	NS	18 (38.3)	0.006	48 (61.54)	0.001	34 (37.78)	NS	31 (44.9)	NS	69 (51.5)	NS
I don't know	4 (28.6)	NS	10 (21.3)	0.004	3 (3.85)	0.001	19 (21.1)	NS	13 (18.8)	NS	33 (24.6)	NS

p* = between adjacent columns. p** = between less than 18 years-old and more than 65 years-old. NS = Non-Significant.

prescription». Apparently, patients feel that their physician is not the primary source for such a recommendation.

It seems that there is a lack of clarity in the communication between physicians and families: 59% of physicians say that they recommend CPR learning, but patients who receive that recommendation mention that only in 14% of cases, it came from their doctor in a general cardiology practice. This phenomenon seems in line with an «optimism bias»,[18] from either the physician or the patient himself, that is, a false perception of the real risk level. If the whole interviewed population is considered, only 9% of the patients received the suggestion from their physician.

Another difference is that most cardiologists consider that less than 5% of their patients have someone near them able to perform CPR, while 32.8% of patients feel that a relative might perform CPR on them. That somehow confident perception might be a deterrent for laypersons, in this case, close relatives of a diseased person, to learn CPR, EMS activation, and automated external defibrillator use. In any case, 32% seems a low proportion of subjects able to perform CPR in high-risk populations. A recent report by CARES in the US shows that 41.2% of people with OHCA received bystander CPR, and 11.7% were treated with an AED by laypersons.[19]

Present results suggest that several educational components, such as poor availability and promotion of CPR courses directed to the public, cost limitations for some families, installation limitations, and poor diffusion of a «CPR culture», among others, may jeopardize CPR learning in developing countries.[20] Physicians have an important role in promoting CPR training, but in some instances, they do not have the necessary information to direct the family members to a specific course or training activity, sometimes even to a proper facility able to provide information and courses. Another issue could be the lenient attitude of physicians towards CPR learning in the same manner that many times we do not insist on smoking cessation, physical activity, or weight control, for example.[6,11]

An alternative explanation could be that physicians answered the question with fear of criticism and thus biased the result. A clear instruction to learn CPR from a trusted physician might have a significant impact on high-risk patients' survival, but that recommendation must be assertively done and followed, no matter if the physician practices in a private or public institution. Steps need to be taken to provide better information to both physicians and family members in order to increase the safety of high-risk patients in a setting that should be safer: the home.

Study limitations

The surveys were conducted in a medical setting, either through a medical office. All participants freely decided to respond to or not to the questionnaire, but the context in which it was applied might have biased some of the data obtained. Regarding the cardiological society, the participation seems low, and it can be interpreted as a lack of interest in the matter, making the people who did participate the concerned ones about it, an element that can also bias some of the results. The number of surveyed people might be another limitation, along with the fact that some of the surveyed physicians either have a mixed practice (public and private) or exclusively private or exclusively public practice.

CONCLUSIONS

There seems to be a high level of awareness among physicians and patients about the need for layperson CPR training – AED use, and there also seems to be several opportunity areas to improve how and how often physicians transmit the need for CPR learning among patients and their families. An improvement in the number of persons able to perform CPR, especially around high-risk patients, might improve survival. Establishing protocols that facilitate physicians and other health personnel to transmit information and eliminate perceived barriers to performing layperson CPR in high-risk populations is a starting point in developing countries. Those protocols should be the result of collaborative actions between society, medical associations, and policy-makers.

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