

Assessment of population knowledge on out-of-hospital care for cardiac arrest

Avaliação populacional do conhecimento sobre atendimento extra-hospitalar da parada cardíaca

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ABSTRACT: *Introduction:* Mortality from cardiopulmonary arrest depends on the effectiveness of care. The success of resuscitation increases if initiated early in the site. Uninformed and untrained individuals can provide inadequate care increasing damage. *Objective:* Register if sex, age, graduation and profession influence the knowledge and the attitudes of the rescuer. *Method:* Applied research, with open and closed questionnaire, qualitative and quantitative. Cross-sectional study by convenience sample, used as a reflection of a population, not probabilistic. *Result:* There were 319 questionnaires applied in August 2015. Men 36%. Mean age 34.3 ± 14.7 years. University level 55% and middle school 40%. Men and Women say they know how to recognize an event, but men feel more fit ($36\% \times 21.6\%$ $p = 0.01$), know what to do ($51.2\% \times 38.2\%$ $p = 0.02$), ask for less help ($27.9\% \times 40.4\%$) and check more vital signs ($27.9\% \times 12.5\%$). Regarding the age group, there was no difference in knowing what to do, but those between 20 and 60 years recognized fewer events ($40\% \times 24\%$ $p = 0.02$) and few knew how to ask for help correctly. People with higher graduation time had a greater capacity to recognize a situation (45%), but this did not differentiate them in other steps. Health professionals call less for help, but half of them do not know the number to call. *Conclusion:* Men, older people and younger people are better prepared to attend a arrest, regardless of graduation. And health professionals have a better knowledge than the lay person.

Keywords: Cardiopulmonary Resuscitation; Cardiorespiratory Arrest; Health Education; Basic Life Support; Skills Training; Personal Characteristics.

RESUMO: *Introdução:* A morbimortalidade da parada cardiorrespiratória depende da eficácia do atendimento. O sucesso da ressuscitação aumenta se iniciada precocemente no local. Indivíduos desinformados e não capacitados podem prestar um atendimento inadequado aumentando os danos. *Objetivo:* avaliar se sexo, idade, escolaridade e profissão influenciam no conhecimento e nas atitudes do socorrista. *Método:* Pesquisa aplicada, com questionário do tipo aberto e fechado, quantitativo. Estudo transversal por amostra de conveniência, utilizada como reflexo de uma população, não probabilística. *Resultado:* Foram 319 questionários aplicados entre agosto e outubro de 2015. Homens 36%. Idade média $34,3 \pm 14,7$ anos. Nível superior 55% e médio 40%. Homens e Mulheres dizem que sabem reconhecer um evento, mas os homens se sentem mais aptos ($36\% \times 21,6\%$ $p=0,01$), sabem o que fazer ($51,2\% \times 38,2\%$ $p=0,02$), pedem menos ajuda ($27,9\% \times 40,4\%$) e checam mais sinais vitais ($27,9\% \times 12,5\%$). Em relação à faixa etária aqueles entre 20 e 60 anos reconhecem menos eventos ($40\% \times 24\%$ $p=0,02$) e poucos sabiam como pedir ajuda corretamente. Pessoas com nível superior tinham maior capacidade de reconhecer uma parada (45%), mas isso não os diferenciou nos demais itens. Profissionais da área da saúde chamam menos por ajuda, e metade deles não sabe para qual número ligar. *Conclusão:* Homens, as pessoas mais velhas e as mais jovens estão mais bem preparados para atender uma parada, independente da escolaridade. E profissionais da área da saúde possuem um conhecimento pouco melhor que a população leiga.

Palavras-chave: Ressuscitação Cardiopulmonar, Parada Cardiorrespiratória, Educação em Saúde, Suporte Básico de Vida, Treinamento e Características da População.

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INTRODUCTION

Cardiovascular diseases (CVD) are the leading cause of death in Brazil and worldwide¹. Cardiopulmonary arrest (CPA) corresponds to a tragic event that anticipates the end of life and is one of the mechanisms of death in CVD². Basic life support (BLS) comprises steps that can be initiated and performed by laypersons, outside the hospital environment, to increase survival and decrease the sequelae of CPA victims^{3,4}.

Reducing the mortality and sequelae of a CPA victim depends on early⁴ and effective care⁵. Hence it is important that certain steps are initiated as the event takes place. A properly informed and trained layperson is essential to recognize and manage a CPA⁶. Unfortunately, most of the population does not have adequate first aid knowledge and training, although laypersons are most often the first to attend to CPA victims. Training the general population avoids rescuers' inertia affecting care and provides the necessary knowledge and confidence for them to decide on the steps to take⁸.

According to a review by Pergola and Araujo⁹, some studies also suggest that laypersons can provide incorrect care to the victim, hindering resuscitation by not presenting adequate information and justification for BLS stages. In addition to the lack of knowledge that can delay adequate help, many laypersons are also unaware that external chest compression, even in isolation, can contribute to a favorable result, if performed properly¹⁰. This is important, as one of the reasons laypersons do not

want to provide first aid¹⁰ is that they do not want to perform mouth-to-mouth resuscitation.

It is not known how prepared people are or their level of knowledge about cardiopulmonary resuscitation (CPR) maneuvers. Nevertheless, this knowledge can influence the outcome of CPA care¹¹. According to another review by Pergola and Araujo¹², some studies have highlighted that the population is largely uninformed or thinks that they know what to do. The population's knowledge in handling emergency situations is greatly important for the survival of a CPA victim. Therefore, this study aimed to understand whether certain population characteristics may impact the knowledge and, consequently, the outcome of an event in which a layperson tries to help in solidarity.

METHOD

The study was based on a semi-structured quantitative-qualitative questionnaire with open- and close-ended questions, completed by the interviewer. A script was designed to direct the open questions (Table 1). The questionnaire also included questions about demographic characteristics, CPA, and emergency procedures. The more technical questions (about CPA) were adapted, based on assessments used in courses that teach resuscitation to laypersons or healthcare professionals^{8,13}. The questionnaires were completed with the interviewer. The participants were from the state of São Paulo and of varying age, sex, education level, and occupation. Most participants were a part of the researchers' social circle.

Table 1 – Questionnaire used in the individual interviews.

Name (initials)	
Age (years)	
Sex	MALE/ FEMALE
Health professional	YES/ NO
Education	Elementary /High school /Superior
Have you ever witnessed a CPA?	YES/ NO
If yes, location?	Home/ Public/ Work
Do you know someone who had a CPA?	YES/ NO
Would you know how to recognize a CPA?	YES/ NO
Do feel capable of providing care in a CPA?	YES/ NO
Would you know what to do in a CPA?	YES/ NO
What action would you take when faced with a CPA?	
Would it be different if it was in a family member or acquaintance?	YES/ NO
Who would you ask for help?	
Do you know what an AED is?	YES/ NO
Do you think it is important to train people to provide care in a CPA?	YES/ NO
Would you participate in this training?	YES/ NO

This was a cross-sectional study with a convenient sample used as a reflection of a population and not probabilistic. The sample size was justified by the accessible number of people interviewed to meet the purpose of the study, since the data were collected from a heterogeneous population.

The questionnaire contained mostly yes-no questions. The results of open questions were grouped by the type of answers and categorized. Regarding how to call for help, the correct answers were: call SAMU, call rescue (firefighters), and call 192 or 193. Other answers were considered incorrect. The correct actions taken by the individual were as follows: any kind of request for help, check vital signs (circulation and breathing), and the intention to perform chest compressions and/or artificial ventilation. Moreover, a group was established to consider actions other than those described above. The following age groups were considered: <20, 20–29, 30–39, 40–49, 50–59, and >60 years. A health professional was defined as any participant who works in the health field or attending a medical, nursing, physical therapy, pharmacy, or nutrition school. The level of education was defined as the level finished (complete) or the current level of studies (incomplete).

The data were analyzed using Microsoft Office 365 Excel™ package. Categorical variables (presented in absolute values and percentages) were subjected to descriptive analysis. Pearson's chi-squared or Fisher's exact tests were also used. The confidence level was set at 95%. A p-value <0.05 was considered statistically significant.

RESULTS

A total of 319 questionnaires were administered between August and October 2015. The profile of the respondents is shown in Table 2. The mean age of the respondents was 34.3 ± 14.7 years. Of all participants, 199 (62.4%) responded that they knew someone who had a CPA.

Most respondents were women but more men had witnessed a CPA event (25.4% vs. 14.7%, $p = 0.02$). Twenty-eight percent (28.2%) of respondents said they can recognize a CPA. Men generally considered themselves more capable (36% vs. 21.6%, $p = 0.01$) and to have greater knowledge about what should be done during a CPA (51.2% vs. 38.2%, $p = 0.02$) than women. Although few participants responded they would act differently if the victim was someone they knew, this percentage was higher for women (24% vs. 11.4%, $p = 0.01$). As for the actions they would take in the face of a CPA event, it is noteworthy that few

would perform maneuvers such as chest compression or mouth-to-mouth resuscitation. Women were most likely to call for help (40.4% vs. 27.9%). However, men took more initiative to check vital signs, such as the presence of a pulse (27.9% vs. 13.5%) and breathing (23.2% vs. 12.5%). More than half (60.6%) of those interviewed indicated that they would call for help and knew correctly to whom and how to request this help (Table 3).

Table 2 – General characteristics of the interviewed group

Characteristics	N (%)
Male	114 (35.8%)
Age group (years)	<20 45 (14.9%)
	20–29 96 (31.9%)
	30–39 46 (15.3%)
	40–49 50 (16.6%)
	50–59 49 (16.3%)
	>60 15 (4.9%)
Education	Elementary school 14 (4.4%)
	High school 128 (40.3%)
	Superior education 176 (55.3%)
Healthcare professional	52 (16.6%)

None of the individuals aged <20 years had witnessed a CPA. In contrast, more than half of the respondents aged >60 years had witnessed a CPA. This rate was higher than that found in the other age groups ($p < 0.01$). As for age groups, individuals aged <20 years or >60 years knew to recognize a CPA event better than those in the other age groups. However, there were no significant differences in “feeling capable” or “what to do in the face of a CPA event” (Table 4).

Of the participants who answered that they would know what to do in the face of a CPA event (it could be more than one answer), there was a significant difference between the actions among the different age groups (Table 5). Younger individuals (aged <30 years) were more concerned about calling for help ($p = 0.004$). However, only individuals aged <30 or >60 years knew how to correctly call for help ($p = 0.02$) (Table 5).

Table 3 – Response pattern related to the sex of the respondents

		Men % (n)	Women % (n)	p-value
Witnessed at least one CPA		25,4 (29)	14.7 (30)	0.02
Location	Public	50 (15)	45.2 (14)	0.93
	Work	30 (9)	32.2 (10)	
	Home	20 (6)	22.6 (7)	
Would you know how to recognize a CPA?		32.5 (37)	26 (53)	0.22
Do feel capable of providing care in a CPA?		36 (41)	21.6 (44)	0.01
Would you know what to do?		51.7 (59)	38.2 (78)	0.02
Would you act differently if it was someone you know?		11.4 (13)	24 (49)	0.01
What would you do (104 responses by women and 86 responses by men - it could be more than one)	Call for help	27.9 (24)	40.4 (42)	0.02
	Check pulse	23.2 (20)	13.5 (14)	
	Check breathing	27.9 (24)	12.5 (13)	
	Chest compression	11.6 (10)	17.3 (18)	
	Mouth-to-mouth resuscitation	1.2 (1)	2 (2)	
	Others	8.1 (7)	14.4 (15)	
How would you call for help?	Correct	70.8 (17)	54.7 (23)	0.2
	Incorrect (or incomplete)	20.8 (5)	14.3 (6)	
	Does not know	8.3 (2)	31 (13)	

Table 4 – Response pattern related to the age of the respondents expressed as percentage rates within each age group

Action/Age group (years)		<20	20–29	30–39	40–49	50–59	>60	p-value
Witnessed at least one CPA		0	16.7	17.4	26	22.4	53.3	<0.01
Location	Home	0	25	12.5	13.3	27.3	25	0.36
	Work	0	18.7	62.5	20	45.4	37.5	
	Public	0	56.2	25	66.6	27.3	37.5	
Knows how to recognize a CPA		42.2	26	21.8	28	20.4	46.6	0.02
Feels capable of providing care in a CPA		22.2	29.2	19.6	24	30.6	46.6	0.35
Would know what to do		44.4	39.6	32.6	48	42.8	60	0.45
Would act differently with someone you know		22	17.9	17.4	18	14	6.6	0.81

Table 5 – Spontaneous answers about what actions would be taken by those who answered that they would know what to do in a CPA situation. Values in absolute numbers or as a percentage in the case of how to call for help

Action/Age Group (years)		<20	20–29	30–39	40–49	50–59	>60
Call for help		15	22	8	6	7	3
Call for help	Correct form	67%	77%	37%	50%	43%	67%
	Incorrect form	0%	14%	37%	17%	57%	0%
	Does not know	23%	9%	26%	33%	0%	33%
Check breathing		2	6	7	9	11	1
Check pulse		1	5	5	9	10	1
Chest compression		3	7	1	7	6	4
Mouth-to-mouth resuscitation		0	0	0	2	1	2
Others		3	8	1	4	3	3

The education level did not significantly affect the answers. Regarding the recognition of a CPA, respondents with a higher level of education were more able to recognize a CPA than those with elementary education ($p = 0.042$). There was no difference in terms of whether they would be able to provide care during a CPA or not. When asked “if they knew what to do in the face of a CPA”, 44.8%

answered “yes”. The most frequent answer (51%) was to call for help and check vital signs. However, only 36.9% knew how to ask for help correctly (e.g., call SAMU and request an Automatic External Defibrillator [AED]). As for the other actions, the most frequent responses were checking the pulse, ventilation, and starting chest compressions (Table 6).

Table 6 – Response pattern related to the education level of the respondents expressed as percentage rates within each level.

		Elementary school	High school	Superior education	p-value
Witnessed at least one CPA		7	13.3	22.7	0.081
Location	Home	0	33.3	16.6	0.32
	Work	0	16.6	38.1	
	Public	100	50	45.2	
Knows how to recognize a CPA		0	27.3	31.3	0.042
Feels capable of providing care in a CPA		21.4	25.4	29	0.7
Knows what to do		21.4	41.7	46.5	0.16
What action would you take (three answers for elementary education, 73 for high school, and 124 for superior education - it could be more than one)	Call for help	66.6	41.1	26.6	0.89
	Check pulse	0	16.4	20.2	
	Check breathing	33.6	20.5	19.4	
	Chest compression	0	9.6	17.7	
	Mouth-to-mouth resuscitation	0	2.7	2.4	
	Others	0	9.6	13.7	
How to call for help	Correct	50	22	50	0.98
	Incorrect (or incomplete)	0	22	23.5	
	Does not know	50	56	26.5	

The questionnaires were also separated and analyzed by profession. Health professionals (52 participants) or non-health professionals (262 participants) were considered. Health professionals witnessed more CPA events than those who do not work in health (Table 7). Moreover, more health professionals knew how to recognize and provide care during a CPA than non-health professionals. Regardless of profession, 18.5% of respondents would act differently if the CPA victim was someone they know or a family member. Fewer health professionals would call for help. The knowledge on how to call for help was similar among health professionals and non-health professionals (Table 7).

Of the 180 people who indicated that they do not know what to do when confronted with a CPA, 143 would

ask for help but only 70 (49%) would do so correctly, regardless of age, sex, education, and whether or not they were health professionals. Of the others, 17 would take other actions and 38 would try to check vital signs and/or perform some resuscitation maneuvers.

In terms of CPA care, respondents were asked if they knew what an AED was. About 80% of the participants knew what an AED was, regardless of age, sex, education, and whether or not they were health professionals.

Regarding the importance of first aid training for CPA, there was no difference among the respondents regardless of sex, age, education level, or profession. More than 95% respondents thought that training is important, and about 90% said they would participate in training.

Table 7 – Response pattern related to the profession of the respondents regarding being health professionals HP HP = Health Professional; NHP = Non-health professional

		HP % (n)	NHP % (n)	p-value
Witnessed a CPA		53.8 (28)	12.7 (34)	<0.001
Location	Public	39.3 (11)	52.9 (18)	0.006
	Work	50 (14)	14.7 (5)	
	Home	10.7 (3)	32.4 (11)	
Knows how to recognize a CPA		63.5 (33)	21.3 (57)	<0.001
Feels capable of providing care in a CPA		57.7 (30)	20.6 (55)	<0.001
Would know what to do		67.3 (35)	38.9 (104)	0.002
Would you act differently if it was someone you know?		19.2 (10)	18.7 (49)	0.9
What action they would take (104 responses by women and 35 responses by men - it could be more than one)	Call for help	37.2 (13)	36.9 (55)	0.49
	Check pulse	37.1 (13)	18.1 (27)	
	Check breathing	28.6 (10)	18.1 (27)	
	Chest compression	22.9 (8)	14.8 (22)	
	Mouth-to-mouth resuscitation	2.9 (1)	2.7 (4)	
	Others	25.7 (9)	9.4 (14)	
How to call for help	Correct	38.5 (5)	62.3 (33)	0.86
	Incorrect (or incomplete)	7.7 (1)	18.9 (10)	
	Does not know	53.8 (7)	18.9 (10)	

DISCUSSION

The fact that more than 60% of respondents said they know someone who had a CPA shows how prevalent CPA is, and thus, it is important to analyze what people know and what strategies can be implemented to improve first aid for CPA victims. Raising awareness regarding the importance of first aid among the general public to decrease morbidity and mortality in emergency situations is crucial^{3,7}.

Corroborating the study by Pergola and Araujo⁹, this study sample also had a predominance of women, a mean age of 34 years, and a greater number of high school graduates and those with higher education levels. The similarity with other studies increases the credibility of the results of this study. Together, the available data can help in the implementation of measures to enable laypersons to provide first aid correctly in a CPA situation^{7,14}.

Although not significant, women tended to call for help more frequently. In contrast, men were more likely to have witnessed CPA events, felt capable of helping, and knew what to do during a CPA. However, this number is still small. A low rate of recognition and not knowing what to do can significantly delay the CPA victim's access to specialized care. The chance of survival of a CPA victim is compromised by laypersons not being trained in

recognizing a CPA and calling or help⁶.

The participation of the population in CPA care is important for reducing the time between onset and the commencement of interventions¹⁵, regardless of age or education level. In this study, there were few differences regarding behaviors including recognition, actions, and how to proceed rates, in a case of a CPA.

In an emergency, younger people were more likely to call for help than older people but few do so correctly, which corroborates with a study in which only 47% of respondents recognized that they should ask for help immediately⁸. Pergola and Araujo¹² also highlighted that only 31% of lay respondents knew who to call to ask for specialized help (34.8% with higher education).

This study also reported a low number of people who said they would initiate ventilation. Most would call for help and initiate chest compression maneuvers. This type of situation is in accordance with what is recommended in cardiopulmonary resuscitation guidelines regarding the non-performance of mouth-to-mouth resuscitation by laypersons, which is different from the guidelines for health professionals, as long as they can use devices that block direct contact with the victim, such as a face mask or a pocket mask¹⁶. In the case of non-health professionals, the recommendation is to promptly start chest compressions as soon as the CPA situation is identified and call for help¹⁷,

corroborating the responses in the present study. The need to guide laypersons correctly in terms of how to recognize, how to call for help, and how to initiate care is highlighted. First aid training and public policies are very important in this regards. Another equally important strategy is to enhance the awareness among young people and provide training in schools¹⁸.

The successful rescue of a CPA victim depends on the presence of someone capable of starting resuscitation as soon as indicated. This justifies the importance of educating the lay community in the early detection of cardiovascular emergencies⁴. However, this study shows that, although the health professional recognized more CPA events and responded that they would know what to do, only 38.5% knew the correct number to call for help. These results corroborate other published data, confirming that even healthcare professionals may not be able to provide appropriate first aid for CPA².

There was also a large number of people who said they did not know what to do when faced with a CPA situation. Regardless of age, sex, education level, or profession, the vast majority would call for help, but only 49% knew how to do it correctly. According to Eisenburg et al., even if a person does not feel prepared to provide care, not calling for specialized help characterizes omission of help¹⁴. This reinforcing the thesis that training the population in first aid is essential for initial care in emergency situations¹⁵.

When witnessing an out-of-hospital CPA and an AED is readily available onsite, the rescuer should initiate CPR with chest compressions and use the AED as soon as possible¹⁹. One study that evaluated the use of AED in public places, in this case at airports, demonstrated that the population with minimum orientation and information was able to operate an AED and improve the morbidity and

mortality rates of CPA victims²⁰. In the present study, the number of people who said they knew what an AED was 80%; this could be considered low, given the importance of this device in a CPA event.

There are some limitations to this study. The number of respondents and the non-probabilistic sample, despite representing a part of the population is unideal. The fact that the study only examined theoretical knowledge and does not assess practical skills can be considered a limiting point. However, one of the factors that we wanted to observe was how much people were concerned about the CPA situation and how they would react to one. More than 90% of respondents indicated that training is important and that they would participate in training.

The results of this study, combined with data from other studies^{1,21}, reinforced the need for training and qualifying laypersons, regardless of profession, sex, or age, and avoiding rescuer paralysis when deciding what to do³. The care system for CPA must include public policies that implement programs not only for training the population, but also in providing the necessary resources so that the care can be continued in a specialized center²². This would prevent untrained people who try to help from harming a CPA victim^{9,12}.

CONCLUSION

In the studied sample, men were better prepared than women for assisting in a CPA. The level of education was irrelevant to the care provided. People aged under 30 years or over 60 years had a better knowledge of how to handle a CPA. Health professionals were able to describe a better care approach than the layperson. However, health professionals did not know how to correctly call for help.

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