Knowledge of Guidelines for Cardiopulmonary Resuscitation among Brazilian Medical Students

Conhecimento das Diretrizes de Ressuscitação Cardiopulmonar por Estudantes do Curso de Medicina

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ABSTRACT

Introduction: *Sudden death is a substantial public health problem, representing a major cause of mortality worldwide. Suitable initial care is essential for a good prognosis of these patients.* **Objectives:** *To assess the knowledge of the 2010 guidelines for cardiopulmonary resuscitation (CPR) among medical students in their final year of undergraduate training.* **Methods:** *This was a cross-sectional study with a sample of 217 medical students enrolled in the sixth year of accredited medical schools in Brazil. A structured questionnaire with 27 items was used to record the sociodemographic characteristics of the participants and to assess their knowledge base of the 2010 ILCOR guidelines for CPR.* **Results:** *Only fifty (23.04%) out of 217 students achieved results considered as satisfactory in the written evaluation. The average score obtained was 56.74% correct answers. Seventeen percent of the students had never performed CPR maneuvers and 83.80% had never performed cardioversion or defibrillation.* **Conclusions:** *The knowledge base of medical students regarding cardiopulmonary resuscitation is low. Considering these medical students are in their final year of medical school, this study reveals a worrisome scenario.*

RESUMO

Introdução: *A morte súbita representa um problema substancial de saúde pública, sendo causa importante de mortalidade. O atendimento inicial adequado é essencial para o bom prognóstico desses pacientes.* **Objetivo:** *Avaliar o conhecimento dos estudantes de Medicina no último ano da graduação sobre as diretrizes de ressuscitação cardiopulmonar (RCP) publicadas em 2010.* **Métodos:** *Estudo de corte transversal com amostra de 217 estudantes do sexto ano de cursos de Medicina de universidades brasileiras credenciadas pelo Ministério da Educação. Um questionário estruturado com 27 itens foi utilizado para registrar as características sociodemográficas dos participantes, bem como avaliar o conhecimento das diretrizes de RCP do ILCOR publicadas em 2010.* **Resultados:** *Apenas 50 (23,04%) dos 217 alunos obtiveram resultado considerado satisfatório na avaliação teórica. A média geral na avaliação foi de 56,74% de acertos. Dezessete por cento dos estudantes nunca realizaram manobras básicas de RCP e 83,8% nunca realizaram cardioversão e/ou desfibrilação.* **Conclusão:** *O nível de conhecimento dos estudantes sobre as diretrizes de RCP é baixo. Considerando que a população estudada se encontra no último ano de sua graduação, revela-se um cenário preocupante.*

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INTRODUCTION

Sudden death represents a substantial public health problem, being a major cause of mortality worldwide[1]. It is estimated that there are 200,000 victims of sudden death with cardiopulmonary arrest occurring each year in Brazil and that half of those occurs outside the hospital[2]. Given the size and relevance of this problem, even small incremental improvements in survival can translate into thousands of lives saved each year[1].

Estimative point that, for each minute of delayed assistance to a patient in cardiac arrest the chances of survival are decreased by approximately 10%[3] and that data from the American Heart Association (AHA)[4] showed that proper and immediate performance of cardiopulmonary resuscitation (CPR) techniques can double or triple a victim's chance of survival. So, it becomes inarguably essential that medical students must be well trained and required to pursue updated knowledge on CPR maneuvers in order to provide a satisfactory care. This is especially true since the recommendations are that basic training must be provided even for the lay population who are the most likely bystander in these situations. In this effort the AHA[4] trains more than 12 million people in CPR annually, including both the lay population and health professionals. Therefore, medical schools must provide adequate opportunity for acquisition of this competence by its medical students.

The latest recommendations of the International Liaison Committee on Resuscitation (ILCOR) were released in October 18th, 2010 and were based on a process involving 356 international resuscitation experts from 29 countries who reviewed, discussed, debated, and produced 411 scientific papers supporting their final recommendations[5]. The changes on previously recommended care during CPR, published in 2010,[5] includes changes on the minimum heart compression rate and depth, the sequence of maneuvers, the different recommendations for lay people and health professionals, the use of automatic defibrillators in all victims, the use of capnography during CPR, and also changes in the medication protocols and a set of recommendations for care of these patients upon returning of spontaneous circulation (Rosc)[6].

Since an updated knowledge base of the rescuer is essential for the success of the care of a cardiac arrest victim, this study proposed to analyze medical student's knowledge base of the updated 2010 ILCOR Guidelines[5] in their last year of medical school, as well as their confidence level and experience realizing these maneuvers, besides looking into possible variables interfering with the results.

METHODS

This was a descriptive cross-sectional study with medical students enrolled in the last year of the four medical schools of the state of Piaui, Brazil. We highlight that one institution had maximum score in National Examination of Students' Performance (ENADE), two had grade 4 and another institution had grade 3[7]. Enade constitutes an important instrument created by Ministry of Education in Brazil for measuring and promoting quality for undergraduate programs and policies of higher education in the country. Their first application occurred in 2005 and their maximum frequency of review is triennial for each area of knowledge. The last medicine schools' review occurred in 2010. The scores used in ENADE range from 1 to 5, the score 3 represents the national average score and higher values represents better performances[7-10].

All Brazilian medical schools have a six-year (12 semesters) curriculum, which includes necessarily two years (semesters 9, 10, 11 and 12) of clerkship rotations. In broad terms, the curriculum of most Brazilian medical schools may be described as comprising: two years (semesters 1 – 4) of studies of fundamentals in biomedical sciences and introduction to patient-doctor communication; two years (semesters 5 – 8) of further education in patient-doctor communication, clinical and surgical learning; and two years (semesters 9 – 12) of clerkship rotations. After successful completion of the medical school curriculum, the individual obtains his/her MD and is eligible for application to a residency program and for MSc and PhD programs. The Ministry of Education also establishes as a minimum curriculum of 30% of course load expected for clerkship rotations must be performed in Emergency Departments of Brazilian National Health System and Primary Care[10].

Of the total of 293 medical students regularly enrolled in the last year of Piaui's medical schools, 217 students (74.06%) participated in the study. Two of the students did not participate of the data collection since they were co-authors of this study, four students refused to participate, and 70 students were absent from the sites where the questionnaires were applied, in at least, two visits to their classes.

Inclusion criteria required the student to be regularly enrolled in the last year of medical school. The lists of eligible students were obtained with their respective deans and the participants were visited at the sites of their clerkships. After informed consent, the students completed anonymously the questionnaires and returned the sealed envelopes immediately upon completion.

For data collection a structured questionnaire (Supplement 1) was developed and subsequently validated by five

ACLS certified physicians also known for their scientific knowledge and leadership in the field.

The questionnaire consisted of 27 items divided into three parts. The first part included sociodemographics data; in the second part, the students level of confidence on performing CPR maneuvers was accessed through questions presented in a 5 point Likert scale (-2: very low; +2; very high), and also evaluated the student's experience in performing specific procedures during CPR in real clinical scenario. The third part consisted often multiple-choice questions with only one correct answer and one true-or-false question with six statements that assessed the student's knowledge base on the 2010 CPR guidelines published by ILCOR[5]. It assessed the student's knowledge about the new guidelines recommendations for healthcare professionals; the correct sequence of procedures to be adopted by healthcare professionals; the maximum time for pulse checking; the importance of non-interruption of chest compressions; the correct ratio between compressions and ventilation; the rate of chest compressions per minute; the indication of shock in defibrillation mode; the action indicated after each shock application; the indication of atropine use; the application of ventilation maneuvers after intubation; the recommended actions after Rosc and the identification of essential electrocardiographic tracings for correct CPR management.

According to the level of difficulty of the questions applied in the questionnaire, the researchers considered a result of 70% of correct answers as a satisfactory score, meaning a score reflective of minimal competence on the evaluated area.

The study was approved by the Ethics on Research Committee and was conducted in compliance with the recommendations of Resolution 196/96 of the National Health Council on studies involving humans[11]and the Declaration of Helsinski[12]. Informed consent was obtained from all participants. In order to ensure the confidentiality of study participants, the institutions had their names omitted and were identified by the letters A, B, C and D.

An exploratory and descriptive analysis was performed in the sociodemographic variables. For continuous variables, data were presented as mean and standard deviation, and categorical variables with measures of absolute and relative frequencies. In addition, comparisons of the results obtained in the different areas of expertise desired were made using the chi-square test. For the evaluation of scores in relation to qualitative variables, it has been used the nonparametric Mann-Whitney and Kruskal-Wallis tests, since such variables did not followed the normal distribution, according assessment through the Kolmogorov-Smirnov test. A significance level of $p < 0.05$ was used in all analyses.

RESULTS

Among the 217 students who participated in the survey, the average age of participants was 25 years, and 112 of them were males (51.61%). There was no statistically significant difference related to age or gender. Most respondents (91.71%) had not concluded any extracurricular course in CPR, and only 23.04% of the participants obtained a result considered as satisfactory in the applied study's questionnaire. 171 students (78.80%) considered as insufficient the time devoted to teaching medical students CPR techniques during medical graduate courses and only 153 students (70.51%) reported having received formal lectures on CPR training up to that point in their medical training (Table 1).

TABLE 01 Sociodemographic and academic features of the students in their last year of medical school (six year college-combined program) in Teresina, Piauí		
	N	%
Gender		
Male	112	51.61
Female	105	48.39
Age (years)		
< 25	165	76.39
≥25	51	23.61
Education institution		
A	71	32;87
B	61	28.24
C	32	14.81
D	52	24.07
Bearer of other graduation	16	7.37
Failures during the graduation	39	17.97
Extracurricular courses in CPR		
ACLS	8	3.69
Others	10	4.61
None	199	91.71
Results of the Theoretical Evaluation		
Satisfactory*	50	23.04
Unsatisfying	167	76.96
Specific class on CPR, guidelines during the graduation	153	70.51
Assessment of the time devoted to teaching CPR in the medical school		
Not enough	171	78.80
Appropriate	46	21.20
Intership in urgency/emergency department	127	58.53
Total	217	100.00

• *Satisfactory result: 70% of correct answers in the questionnaire*

The overall average score obtained by the students was of 56.74% correct answers. A statistically significant difference on test performance was observed among students of different medical schools (p < 0.001); and among the students who performed ACLS and students who performed other extracurricular courses or no course (p = 0.01). Students who atten-

Table 2
Distribution of the students according to the percentual of correct answers in the questionnaire and the assessment of the final result according to the sociodemographic and academic features

	Final Result			Final Result Assessment (%)	
	Mean	Standar Deviation	Statistic	Satisfactory*	Statistic (x)
Gender					
Male	57,70	19.17	p=0.63**	24.11	p=0.70
Female	55.71	19.52		21.90	
Age (years)					
<25	57.27	18.97	p=0.36**	23.64	p=0.76
≥25	54.78	20.60		21.57	
Education Institution					
A	58.80	17.31		21.13	
B	46.41	17.80	p=0.000***	9.84	p=0.005
C	68.55	15.43		40.62	
D	58.41	20.52		28.85	
Extracurricular Courses in CPR					
ACLS	75.00	14.94		62.50	
Others	45.00	13.76	p=0.01***	0	p=0.007
None	56.60	19.24		22.61	
Bearer of other Graduation					
Yes	54.30	17.34	p=0.60**	6.25	p=0.097
No	56.93	19.49		24.38	
Exercise of Professional Activity					
Yes	56.25	13.98	p=0.89**	9.09	p=0.26
No	56.77	19.59		23.79	
Medical area in which the student intends to act					
Anestesiology	55.68	18.89	p=0.598***	22.73	p=0.63
General Surgery	61.21	19.44		31.03	
Internal Medicine	59.80	18.64		27.45	
Obstetrics and	48.66	19.17		7.14	
Gynecology					
Orthopedics	58.22	18.64		21.05	
Pediatrics	56.25	22.82		26.32	
Other	54.07	18.96		19.05	
Failures during the graduation	54.33	19.46	p=0.39**	15.38	p=0.21
General	56.74	19.32		23.00	

• *Satisfactory result: 70% of correct answers in the questionnaire* ** *Main-Whitney Test* *** *Kruskal-Wallis Test*

ded an ACLS course had a better performance on the applied questionnaire, which 62.5% had a satisfactory result versus only 22.61% of the students who had not attended any CPR training course (p = 0.007) (Table 2)

Formal lectures on CPR training varied among the medical schools. The percentage of students declaring that had received a formal CPR training varied from 28.8% (institution D) to 90.6% (institution C).

Almost half of the students (47.47%) considered their level of confidence in performing CPR maneuvers as "regular". Only two students (0.92%) reported having a "high" level of confidence and seven students (3.23%) reported their confidence level as being "very high". The students who had attended an ACLS course reported a higher self-confidence level in the

performance of CPR maneuvers than those who underwent other courses or did not attend any extracurricular courses in CPR (p = 0.007). The male students (p = 0.000) and those with no failures during graduation (p = 0.042) also reported greater safety in performing the CPR maneuvers (Table 3).

Seventeen participants of this survey had never performed CPR maneuvers, 19.44% reported having participated in CPR maneuvers once, and 34.72% between two and five times. Regarding then performance of orotracheal intubation, 35.65% of the students had never performed, and 21.76% reported having performed it once. Additionally, 83.8% reported that they had never performed a defibrillation or cardioversion maneuver (Table 4).

More than half of the students identified the correct answer for appropriate care after Rosc (62.21%) and the limit of time

Table 03
Confidence of the students in performing the CPR maneuvers, according to the sociodemographic and academic data

	Very Low		Low		Regular		High		Very High		Not Informed		Statistic
	N	%	N	%	N	%	N	%	N	%	N	%	x
Gender													
Male	7	6.25	18	16.07	62	55.36	19	16.96	2	1.79	4	3.57	p=0.000
Female	14	13.33	41	39.05	41	39.05	6	5.71	0	0.00	3	2.86	
Age (years)													
<25	15	9.09	47	28.48	78	47.27	17	10.30	1	0.61	7	4.24	p=0.47
≥25	6	11.76	12	23.53	24	47.06	8	15.69	1	1.96	0	0	
Education institution													
A	5	7.04	15	21.13	40	56.34	10	14.08	0	0.00	1	1.41	
B	5	8.20	15	24.59	31	50.82	7	11.48	0	0.00	3	4.92	p=0.53
C	3	9.38	12	37.50	11	34.38	4	12.50	1	3.12	1	3.12	
D	8	15.38	16	30.77	21	40.38	4	7.69	1	1.92	2	3.85	
Extracurricular Courses in CPR													
ACLS	0	0.00	1	12.50	2	25.00	5	62.50	0	0.00	0	0.00	
None	21	10.55	56	28.14	94	47.24	19	9.55	2	1.01	7	3.52	p=0.007
Others	0	0.00	2	20.00	7	70.00	1	10.00	0	0.00	0	0.00	
Bearer of Other Graduation													
No	21	10.45	53	26.37	96	47.76	23	11.44	2	1.00	6	2.99	p=0.069
Yes	0	0.00	6	37.50	7	43.75	2	12.50	0	0.00	1	6.25	
Exercise of Professional Activity													
No	20	9.71	57	27.67	97	47.09	23	11.17	2	0.97	7	3.40	p=0.092
Yes	1	9.09	2	18.18	6	54.55	2	18.18	0	0.00	0	0.00	
Failures During the Graduation													
No	12	6.74	52	29.21	86	48.31	21	11.80	2	1.12	5	2.81	p=0.042
Yes	9	23.08	7	17.95	17	43.59	4	10.26	0	0.00	2	5.13	
Total	21	9.68	59	27.19	103	47.47	25	11.52	2	0.92	7	3.23	

for pulse checking (55.30%) recommended in the 2010 Ilcor CPR Guidelines[5]. Very few students were able to identify the recommended rate for chest compressions per minute (28.11%) and the correct indication for the use of atropine (32.26%).

Most students were able to recognize the importance of minimizing interruptions of chest compressions (91.2%) but only 56.54% was able to identify the appropriate maneuver of rescue ventilation in CPR. Regarding the recognition of common electrocardiographic (ECG) tracings during cardiac arrest, 134 students (61.75%) correctly identified ventricular fibrillation and 133 students (61.29%) identified a monomorphic ventricular tachycardia ECG tracing (Table 05).The

Table 4
Performance of CPR related procedures by students in their last year of medical graduation

Procedures of CPR Performed (Number of times)	Performance of cardiac massage		Checking Pulse		Manual Ventilation withAMBU		Orotracheal Intubation		Cardioverssion and Defibrilation		Presence in CPR Without anyParticipation	
	N	%	N	%	N	%	N	%	N	%	N	%
Never	38	17.59	44	20.37	37	17.13	77	35.65	181	83.80	19	8.80
1	42	19.44	41	18.98	43	19.91	47	21.76	10	4.63	23	10.65
2 to 5	75	34.72	70	32.41	76	15.19	63	29.17	18	8.33	65	30.09
5 to 10	36	16.67	36	16.67	33	15.28	22	10.19	4	1.85	59	27.31
> 10	25	11.57	25	11.57	27	12.50	7	3.24	3	1.39	50	23.15
Total	216	100.00	216	100.00	216	100.00	216	100.00	216	100.00	216	100.00

Of the total sample (217), a student did not report about the performance of CPR related procedures

most common error identified was to confuse the ventricular fibrillation ECG tracing with polymorphic ventricular tachycardia (20.19%) and the monomorphic ventricular tachycardia ECG tracing with atrial flutter (19.72%).

TABLE 05

Distribution of the students according to the correct answers of the evaluation questionnaire based on 2010 CPR Guidelines

	N	%
Multiple Choice Questions		
Time for checking pulse	120	55.30
Relation of frequency between compression and ventilation	116	53.46
Frequency of thoracic compressions per minute	61	28.11
Shockable rhythms in defibrillation mode	109	50.23
Conduct after defibrillation	109	50.23
Atropin use in CPR*	70	32.26
Conduct of the health professional front of an adult in cardiopulmonary arrest	77	35.48
Protocol of conducts after ROSC**	135	62.21
True or False Statement Question		
Duration of ventilation rescue in CPR*	121	56.54
Hyperventilation during CPR*	165	77.10
Cardiac massage interruption during the ventilation	148	69.48
Frequency of ventilation after obtaining an advanced airway	144	67.29
Use of capnography during the CPR*	128	60.09
Importance in minimizing the interruption of cardiac massage	195	91.12
Rhythm Identification		
Ventricular Fibrillation	134	61.75
Ventricular Monomorphic Tachycardia	133	61.29

*CPR – Cardiopulmonary Resuscitation; **ROSC – Return of Spontaneous Circulatio

DISCUSSION

Physicians' poor knowledge base and lack of appropriate skills in basic and advanced life support maneuvers has been identified as a contributing factor to poor outcomes in cardiac arrest victims[13]. Thus, several international medical associations have emphasized the importance of promoting a better education on high-quality CPR to healthcare professionals in order to make possible an increase on survival rates to cardiac arrest victims[14].

The data obtained in this study revealed that almost a third of the students (29.49%) denied having had formal lectures on CPR maneuvers during their graduation classes and that 78.80% of the students considered that the time devoted to CPR teaching during medical school was not enough for achieving minimal competency in the area. Nonetheless, des-

pite recognition of this deficiency in their training, only 8.29% of students sought to compensate this through CPR extracurricular courses of recognized efficiency, as the one offered by the American Heart Association (ACLS). Although the present study did not evaluated the reasons why the students did not seek CPR extracurricular courses, the lack of incentive by medical schools, the costs related to the completion of the courses, and the limited availability of theircould explain this situation.

These findings resemble to the Pillow et al.[15] research conducted at an American Medical Association and Association of American Medical Colleges accredited U.S. medical school with an annual enrollment of 600–700 students, which showed that 29,4% of the medical students in the end of the 4th year still had no formal training in management of sudden cardiac arrest and 48.6% of them entered medical school without any prior Basic Life Support (BLS) or ACLS training. Interestingly, 98.2% of students in Pillow et al.[15] study agreed that BLS training should be a required part of the medical school curriculum.

Only 23.04% of the students of the medical schools of the state of Piaui, Brazil enrolled in the 6th year were able to obtain a score considered as satisfactory with an overall average of only 56.74% of correct answers in the applied questionnaire. These data, unequivocally reveals a serious deficit in the medical education process in a basic and important area of medical knowledge as previously reported in other studies[16-25]. Uribe et al.[20] performed a similar study that enrolled both physicians and medical students in Chile and the average percentage of correct answers in their questionnaire was of 55.8% and 47.4%, respectively.

Most students who had satisfactory results in this study had attended an ACLS course and this finding has also been reported by previous investigators[26,27]. This suggests that a more structured and intensive approach of teaching these skills to healthcare professionals as opposed to occasional lectures on the theme seems more effective.

The observed difference in performance on the test among students from different medical schools of the Piaui state, Brazil, did not correlate with any of the studied variables since the students who had attended an ACLS course were evenly distributed in the institutions and having had occasional lectures on CPR did not affect the student's performance in the overall sample.

The highest level of self-confidence was observed in the students who had attended an ACLS course. This finding is in agreement with the results of the Promes et al.[28] research, which showed greater self-assessed confidence in performing procedures among physicians at the beginning of residency

training who had attended target procedures course during graduation. Students with no class failure and of male gender also had a higher self confidence level, although these two factors were not translated in better performance in the applied questionnaire as opposed to attendance to an ACLS course.

The present results are particularly alarming since 17% of the students had never performed CPR and approximately 20% had done it only once. More than 80% had never performed a defibrillation or cardioversion procedure. These results are even worse than reported by previous studies evaluating CPR knowledge base of Medical students from American Schools. Promes et al.[28] reported that 36% of the 256 students surveyed in the southeastern United States had never performed CPR maneuvers. It is noteworthy, that in Brazil the last year of medical school is equivalent to the internship year in medical training in the United States, where the internship is considered as the first year of medical residency programs.

A few studies had been conducted to evaluate medical school's curriculum. Nelson & Traube[29] study stands out among these researches by assess 60 U.S. universities in a telephone survey and report that 78% of medical schools did not offer formal training skill in performing practical procedures. So, the findings of the present study call attention to the need for greater emphasis on the teaching of practical procedures for medical graduation. Considering this picture, Promes et al.[29] suggests the establishment of a focused curriculum to prepare students and ensure a minimum number of each performing procedure. These concepts are now worldwide accepted and it is one of the important pillars of learning, guiding training programs based on skill acquisition. The student must acquire a minimum standard knowledge base, and acquire skills and attitudes required to be qualified to practice medicine. Initially, they must acquire the theoretical background and have the opportunity to see the observational practice, then they should have the opportunity to participate actively under supervision, and finally they must become qualified to independently practice.

Among the ten multiple-choice questions used in the present study, the lowest percentages of correct answers were in the issues that inquired about the frequency of chest compressions during the CPR (28.11%) and about the appropriateness for atropine use (32.26%). Their answers to these questions were in accordance to the previous 2005 Ilcor CPR Guidelines[30] reflecting clearly the lack of an updated knowledge of these students.

On the other hand, in the study performed by Silva et al.[16], the most prevalent errors were on how to appropriately monitor the cardiac rhythm during CPR and to correctly identify potential reversible causes of Pulseless Electrical Activity (PEA) and asystole. Price et al.[23], in a study conducted in New Zealand, evaluating 245 newly graduated physicians about CPR maneuvers through a questionnaire that included four subjective questions. The wrong answer was considered a fatal error in CPR. The study revealed that knowledge of CPR was considered satisfactory regarding the identification of shockable rhythms (Pulseless Ventricular Tachycardia and Ventricular Fibrillation), knowledge of shock delivery protocols, and the correct use of adrenalin as the first drug of choice. Birnbaum et al.[31], also reported that 78% of physicians and 66% of nurses were able to recognize an ECG tracing of ventricular fibrillation. Similarly, in this study approximately 62% of the students correctly identified ECG tracings of ventricular fibrillation and of monomorphic ventricular tachycardia.

Also, considered as satisfactory was the awareness of the importance of minimizing chest compressions interruption, recognized by 91.12% of the respondents and the awareness of the deleterious effects of hyperventilation during CPR, recognized by 91.12% and 75% respectively.

Limitations

We recognize some limitations of this research. First, ACLS knowledge levels were investigated only on a theoretical basis using a 27-item structured questionnaire. Due to this reason, this study does not fully assess student's practical ACLS skills. In addition, there may be significant recall bias for participants in remembering the number of procedures of CPR performed during graduation. Second, because there are no universal criteria to assess the competency of ACLS training on theoretical and practical bases, the 70% of correct answers cutoff used in theoretical evaluation to determine the knowledge levels as sufficient or insufficient could reduce the accuracy of the assessment. Third, the fact that this research was conducted at universities of only one state of the country limits its generalizability. However, we believe these data can represents the thorough scenario of Brazil's medical schools, since the present study provided cross-sectional information on ACLS knowledge level of medical students at institutions which obtained scores equal or higher than the national average on ENADE.

CONCLUSIONS

The knowledge base of medical students on cardiopulmonary resuscitation techniques as recommended by international guidelines, as well as their exposure to practical training are low. Considering that these medical students are months away from their graduation as medical doctors, the study reveals a worrisome scenario. Students who attended ACLS courses

had a better knowledge base and had a higher self confidence in performing CPR maneuvers than the ones that had not attended extracurricular courses on CPR. This study makes evident an urgent need to review how the CPR teaching should be performed at medical schools in order for having medical professionals adequately prepared to attend these patients.

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DECLARATION OF INTEREST

The authors report no declarations of interest.

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