

ORIGINAL ARTICLE

Knowledge of and attitudes towards resuscitation in New Zealand high-school students

M M Parnell, J Pearson, D C Galletly, P D Larsen

Emerg Med J 2006;23:899–902. doi: 10.1136/emj.2006.041160

Background: Introducing cardiopulmonary resuscitation (CPR) training in the high-school curriculum has been widely recommended as a long-term strategy to educate the wider community. Although CPR has been included in the New Zealand school curriculum, it is listed as an optional subject only.

Aim: To assess the attitude towards and knowledge of CPR in 16–17-year-old high-school students in New Zealand.

Methods: Questionnaires were administered to 494 students aged 16–17 years across six high schools in Wellington, New Zealand. Both knowledge and attitude were evaluated in the questionnaire.

Results: Students showed poor theoretical knowledge, with a mean (SD) score of 5.61 (2.61) out of a maximum score of 18. Although there was no difference between male and female students, those who had received previous first-aid training (70%) showed greater knowledge (6.04 (2.56)) than their untrained counterparts (4.91 (2.24); $p=0.001$). Those students with a positive attitude towards CPR and first-aid training (63%) acquired a higher knowledge score (6.12 (2.4)) than those with a negative attitude (17%; 4.65 (2.5); $p=0.001$). Students with negative associations were also less likely to want to learn more about CPR and first aid (11%) when compared with those with positive associations (92%), and indicated less willingness to perform CPR on a stranger (negative v positive, 47% v 70%).

Conclusions: These findings suggest that although most high-school students are willing and motivated to learn CPR, a smaller percentage of students had a negative attitude towards CPR that would act as a barrier to future learning or performance of resuscitation. Introducing CPR training to high schools is still recommended; however, this study shows the need to associate this training with positive references in an attempt to assist those for whom negative attitude may present as a barrier to learning and retaining CPR knowledge.

See end of article for authors' affiliations

Correspondence to:
P Larsen, Department of Surgery and Anaesthetics, Wellington School of Medicine, PO Box 7343, Wellington 6015, New Zealand;
Peter.Larsen@otago.ac.nz

Accepted 15 August 2006

Survival from out-of-hospital cardiac arrest is dependent on the rapid institution of bystander cardiopulmonary resuscitation (CPR), and the early arrival of advanced rescuers and equipment. Bystander CPR, combined with rapid activation of emergency medical services, increases survival rates from sudden cardiac arrest 2–3-fold.¹

The importance of CPR and basic emergency care is recognised in New Zealand by the inclusion of these subjects in the school curriculum, albeit as an optional subject,² and by the Department of Occupational Health and Safety in the aspect of workplace first-aid training. In a previous study of an adult population in Wellington, New Zealand, we found that 74% of the general population had received CPR training, although for most this was more than 5 years previously, and the level of knowledge retained on how to perform CPR was extremely low. Despite low levels of knowledge, we found that most subjects had an extremely positive attitude regarding the importance of CPR.³

Previous international studies have shown that children of school age are more likely to accept CPR training than older citizens,⁴ are motivated to learn, and do so quickly and easily.^{5,6} The importance of first-aid education in the school context has often been emphasised, both as a means of educating a wide cross section of society,⁷ and as a way of imparting a positive attitude towards CPR that may lead to an increased value of CPR as a skill later in life.

Given the potential importance of training high-school students, we conducted this study to investigate the level of knowledge of CPR in 16–17-year-old school students, and to examine their attitudes towards CPR.

METHODS

In 2001 and 2002, a four-page questionnaire was distributed to year 11 (aged 16–17 years) students of six secondary schools in the Wellington region. No identifying data were collected, with sex and ethnicity obtained for statistical purposes. The university ethics committee approved the questionnaire and study protocol.

The questionnaire was sent to each school for distribution during class time. It was designed to be completed in 15 min, and for the questions to be answered in the order given, so that prompting of answers from later questions would not influence the results. No help was provided in completing the questionnaire and an answer sheet was provided after collection of the questionnaires, considering students' interest.

The 26 questions were a combination of open answer, yes/no and categorical questions. The first section consisted of knowledge-based questions, and participants were asked what CPR and ABC were acronyms for, the rate and position of chest compressions, the ratio of breaths to compressions, the first action in adult and child collapse, the emergency phone number, and the first action for a burn and choking. On the basis of the answers to knowledge-based questions, we calculated a knowledge score, with one mark given for each correct answer. The maximum possible score for the knowledge component of the questionnaire was 18. The next section assessed the participants' attitude to first aid and CPR. Questions included their confidence in performing CPR in a real-life situation, whether they would perform

Abbreviation: CPR, cardiopulmonary resuscitation

mouth-to-mouth CPR on a member of their family or stranger, how widely CPR should be taught in the community, whether it should be made a compulsory part of drivers or gun licensing, listing things and identifying words they feel are associated with first aid, their previous first-aid education, and whether they think their best friend or parents would like to learn first aid. The final section asked the participants about sex and ethnicity.

Data from the attitude component of the questionnaire were collated in several ways. Phrases the students were asked to select were given a positive, negative or neutral attitude rating. Students selecting positive or neutral words or phrases were given a positive attitude rating, those selecting negative words or phrases were given a negative attitude rating. Those who selected two or more of both negative and positive phrases were given a mixed attitude rating, and those who did not select any words or phrases were omitted from analysis. This omission may have excluded a wider group of negative students who did not bother answering the questions; those with a positive attitude towards CPR are more likely to have answered these questions.

The answers to each questionnaire were entered into a database in SPSS (V.11.0 for Macintosh). Descriptive statistics and analysis of variance were carried out, and a value of $p < 0.05$ was considered to be significant. Results are shown as mean (standard deviation (SD)), unless otherwise specified.

RESULTS

In all, 494 questionnaires were collected from year 11 (age range 16–17 years) students from six schools in the Wellington region. The schools were comprised of single-sex, coeducational, public and private schools. Of them, 51% were female, 44% male and 5% did not indicate their sex. Most students (72%) identified themselves as of New Zealand European ethnicity, with the remaining consisting largely of students of Maori or Chinese ethnicity (table 1).

Knowledge

Students had a poor understanding of the acronyms used for first aid and resuscitation. Only 22% knew what CPR stood for, and 32% understood the meaning of ABC. Students selected a variety of hand placements for chest compressions, with only 153 (31%) identifying the correct position for hand placement. When asked at what rate chest compressions should be performed, a wide variety of answers were given (mean 29 (SD 37), range 1–500 compressions/min), with 112 students not answering the question. This confusion was more marked when the compression rate for a CPR in a child was asked (33 (90), range 1–1000 compressions/min, $n = 364$). Only 6% of student responses were within an acceptable range (80–120 compressions/min). The percentage of students who correctly identified the ratio of compressions

to breaths was 9% and 8% for an adult and a child, respectively.

Only 15% of students correctly identified that the main contributor for out-of-hospital cardiac arrest survival was the time taken for an ambulance to arrive. This is despite the fact that 76% of students were first-aid trained, and this concept is theoretically emphasised during first-aid training courses. The students could not differentiate between chain of survival for adults and children, with initiation of CPR deemed the most appropriate first response in both adult and child collapse.

A score for the questionnaire was derived from the students' answers to the knowledge questions (maximum score 18). Students' mean (SD) knowledge score of 5.61 (2.61) indicated a poor level of knowledge of first aid and CPR. There was no difference in score between male and female students (table 2); however, those who had previously attended a first-aid course (70%) scored significantly higher than those who had not ($p = 0.001$, unpaired *t* test; table 2). Those students attending a public single-sex school attained a higher score than those in private single sex and public coeducational schools ($p = 0.016$, analysis of variance; table 2).

Attitude

Most students (63%) had a strong positive attitude towards first aid and CPR. A smaller proportion of the students (17%) selected negative words when asked to select words or phrases from a list that they associated with first aid and CPR. The remainder of students selected both positive and negative words or phrases from the list. There was a significant difference in knowledge score between these groups ($p = 0.001$, analysis of variance), with those students with a negative attitude towards CPR scoring significantly lower than those with a positive attitude (table 3). 70% of students with a negative attitude had received prior first-aid training, compared with 80% of positive student (NS).

Interestingly, the top four words selected to associate with resuscitation and first aid were all positive. "Saving lives" was selected 56% of the time, with "important" (55%), "helpful" (49%) and "essential" (45%) also commonly selected. "Pain" (43%) was the fifth most selected term.

Students were more willing to perform CPR including mouth-to-mouth resuscitation on a family member (84%) than on a complete stranger (63%). There were no sex differences in response to these questions. There was no difference between students with a positive or a negative attitude in willingness to perform CPR on a family member (86% compared with 81%, respectively); however, only 47% of those with a negative attitude indicated a willingness to perform CPR on a stranger, compared with 70% of positive students ($p < 0.001$, χ^2 test).

Seventy percent of students had received some form of first-aid training in the past, and of these 75% indicated that they would like to learn more about first aid. A similar proportion of students who had never been educated in first aid also thought that they would like to learn more (70%). Females (81%) were more interested in learning more about first aid than males (64%, $p < 0.001$, χ^2 test). A great majority of students wanted as many people as possible trained in first aid, rather than only those likely to use the techniques, and this did not differ by sex (male 94% and female 96%).

DISCUSSION

Our study shows a poor understanding of CPR principles in high-school students. Although there was a greater level of knowledge in those who had been previously trained, understanding of resuscitation principles was still poor in this group (mean 6.04 (SD 2.56), maximum score 18). Of

Table 1 Ethnicity of Wellington students

Ethnicity	n (%)
NZ European	300 (72)
Maori	20 (5)
Chinese	20 (5)
Indian	17 (4)
Samoaan	8 (2)
Niuean	6 (1)
Tongan	2 (0.5)
Cook Island Maori	1 (0.2)
Other	41 (10)
Total	415 (100)

NZ, New Zealand

Table 2 Characteristics of survey respondents and knowledge score

Characteristic	Sample size, n (%)	Knowledge score, mean (SD)	p Value
Sex			
Male	218 (44)	5.66 (2.78)	0.99
Female	250 (51)	5.66 (2.39)	
(Missing)	26 (5)	4.65(3.02)	
Training			
Previous training	347 (70)	6.04 (2.56)	0.001
No training	108 (22)	4.91 (2.24)	
(Missing)	38 (8)	3.74 (2.80)	
School			
Private single sex	110 (22)	5.05 (2.42)	0.016
Public single sex	330 (67)	5.84 (2.57)	
Public coed	54 (11)	5.33 (3.00)	

particular interest was that students with a positive attitude towards CPR (63%) had higher levels of knowledge than those with a negative attitude. Few students with a negative attitude were interested in learning more about CPR and first aid, and more than half of these students indicated that they would not perform bystander CPR on a stranger. Although these findings suggest that most high-school students are willing and motivated to learn and perform CPR, there is a small group of students with negative associations for whom CPR training may need a tailored approach.

Although 70% of students surveyed had received prior training in CPR and first aid, the knowledge of basic principles was weak. This finding, however, was not unexpected. A recent New Zealand telephone survey found a low level of knowledge among an adult population, despite 74% previously being trained in first aid.³ Previous research looking at retention of knowledge in high-school students found that no more than 6 months after training only 52% could correctly explain the ABC acronym,⁸ compared with 33% in the present study. We did not examine what type of training students in the current survey had received, or how long it was since their training, both of which may have been highly variable, and may have altered retention of knowledge. However, we did show that students nearing the end of their high-school education lacked adequate knowledge of basic life saving first aid.

Despite low levels of knowledge, most students indicated that they would be willing to perform CPR both on a collapsed family member (84%) and on a stranger (64%). Willingness to perform CPR was higher than has been reported in other countries—for example, in comparison to a study of Japanese high-school students where 53% would perform CPR on a collapsed family member and only 13% on a stranger.⁹ Several other studies have reported high rates of willingness to perform CPR, which generally decline the longer the period since attending a first-aid course.^{10 11} Interestingly, however, one study has reported that 50% of school children trained once in first aid believed that they would be scared to attempt CPR.⁸ This fear after one training session did not considerably decrease after a second training.

Most high-school students in the present study had a positive attitude towards CPR and first aid. The most commonly selected words or phrases the students associated with resuscitation were positive: “important”, “helpful” and “essential. In addition, “saving lives” was the phrase the students thought sounded most interesting, which has wider implications in terms of first aid and CPR education and promotion to this age group. The small group of students who associated negative words with resuscitation were also less likely to be willing to perform bystander CPR on a stranger, and less likely to want to learn more about CPR. Thus, it is possible that negative experiences, possibly from previous CPR courses, the media or life experiences, have created a barrier that may prevent resuscitation skill acquisition. The factors contributing to this negative attitude warrant further investigation. If these factors can be isolated and remedied, high-school education of CPR could be accessed and enjoyed by almost all the student population.

Study limitations

We did not investigate all aspects of the first-aid training the students received. Although most students were educated by the larger training agencies, the time elapsed since training, age when received first-aid training, type of training course attended and number of times trained were not investigated. However, the findings that although previous training did increase the students’ theoretical knowledge above those who were untrained, the knowledge was still deficient provides us with strong evidence to support the need of yearly training while in high school, to educate a broader community, and reinforce the concepts so that confidence and knowledge will no longer be barriers in an emergency situation.

Although in this study we did not test students on practical CPR skills, it could be assumed that the students’ low level of knowledge would equate to a poor CPR. In light of the finding that students felt confident in performing CPR, it could be suggested that in an out-of-hospital collapse, the students would attempt some action towards the resuscitation of the patient, but that the attempt may not be appropriate.

Table 3 Comparison of knowledge scores in those who had negative and positive associations with first aid and cardiopulmonary resuscitation

Attitude	Knowledge score, mean (SD)	n (%)	p Value
Negative	4.65 (2.5)	68 (17)	0.001
Positive	6.12 (2.4)	258 (63)	
Mixed	5.68 (2.4)	85 (21)	

In summary, we have found that most 16–17-year-old high-school students had a positive attitude towards first aid and CPR. They wished to learn more, and believed that as many people as possible should be trained in first-aid techniques. However, their enthusiasm is coupled with a poor theoretical knowledge of CPR and first aid. A small group of students displayed a negative outlook on CPR. These students had less knowledge, were less likely to attempt to resuscitate a stranger, and were less motivated to learn more about CPR than those with positive attitudes. For these students, an annual, revised first-aid curriculum included in all high schools may act to increase involvement and subsequent interest. Dealing with specific barriers to their learning may appeal to more students and consequently increase the wider community knowledge of resuscitation and first aid.

Authors' affiliations

M M Parnell, J Pearson, D C Galletly, P D Larsen, Department of Surgery and Anaesthesia, Wellington School of Medicine, Wellington, New Zealand

Competing interests: None.

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