

Knowledge and perceptions of cardiopulmonary resuscitation amongst New Zealand physiotherapists

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ABSTRACT

Cardiopulmonary resuscitation (CPR) is an essential life-saving skill shown to save lives and improve outcomes of survivors. Physiotherapists are ethically obliged to ensure the safety of patients and to assist in an emergency if required. The purpose of this study was to explore the knowledge and perceptions of CPR amongst New Zealand physiotherapists. Chi-square statistics were used to test associations between the independent variables of age, sex, years of experience, scope and place of work, and postgraduate qualification against CPR training, beliefs and knowledge. A total of 688 physiotherapists completed the online survey. Only half of respondents (56%) had received formal CPR training in the previous year. One-fifth had used CPR in an emergency, with most applications being successful. Physiotherapists working in private practice, public hospitals and community settings were more likely to have CPR certification compared to other settings ($p = 0.004$). Significant CPR knowledge gaps existed in older (>39 years) physiotherapists ($p < 0.001$). The current low frequency of CPR training and the likelihood of having to perform CPR in an emergency (1 in 5) is a risk for physiotherapists. Future research should focus on a practical assessment of physiotherapists' CPR skills to assess competency.

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Key Words: Physiotherapy, Cardiopulmonary Resuscitation, Patient Care, Regulation and Compliance, First Aid

INTRODUCTION

Cardiopulmonary resuscitation (CPR) is an essential life-saving skill that aims to maintain a circulation sufficient to preserve life until specialised treatment becomes available (Australian and New Zealand Committee on Resuscitation, 2016). Early, high-quality CPR has been shown to save lives and improve outcomes for survivors (Pearn, 2000; Perkins et al., 2015). Health

professionals play a vital role in ensuring all links of the cardiac arrest *Chain of Survival* (Figure 1) are performed in a timely and proficient manner (Nolan, Soar, & Eikeland, 2006).

The Physiotherapy Standards Framework states that physiotherapists are ethically obliged to incorporate safety and risk management strategies within their practice to ensure the safety of patients (Physiotherapy Board of New Zealand,

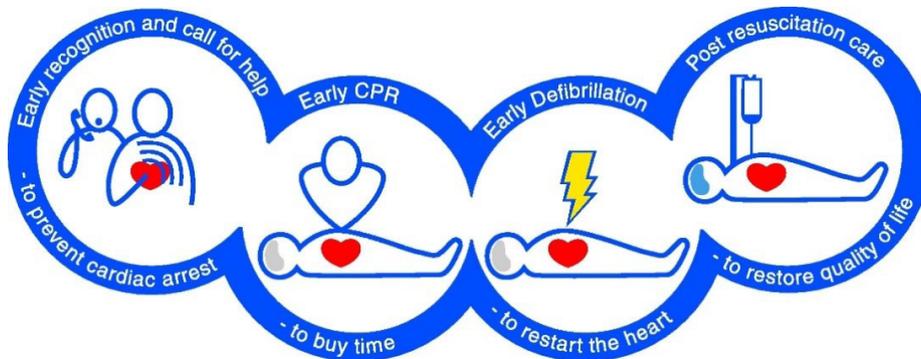


Figure 1: The cardiac arrest Chain of Survival

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2018a). The Australian and New Zealand Committee on Resuscitation (ANZCOR) believes that all health professionals have a duty of care and legal obligations under the Crimes Act 1961 (s151) and the Health and Disability Commissioner Act 1994 (Right 4s2 of the Code of Health and Disability Services Consumers' Rights) to attend to a medical emergency (Australian and New Zealand Committee on Resuscitation, 2015). The Sports Physiotherapy Code of Conduct states that in an emergency, New Zealand sports physiotherapists will assist with the care of others if required (Sports Physiotherapy New Zealand, 2013). The code recommends that when providing physiotherapy services at sports events, physiotherapists should hold up-to-date competencies in basic life support including use of an automated external defibrillator (AED), CPR, airway management and first aid.

In New Zealand, five people per day are treated by St John Ambulance Service for out-of-hospital cardiac arrest, and 74% of patients receive bystander CPR (St John New Zealand, 2018). The incidence of cardiac arrest in a large New Zealand hospital was calculated as one event every 2.65 days (Jones, Miles, & Mitchell, 2011). In an emergency, the median ambulance response time is six minutes to urban areas and nine minutes to rural/remote locations where St John is the ambulance provider (St John New Zealand, 2018). Physiotherapists encounter patients with different general health backgrounds in a variety of locations ranging from community settings such as sports fields to private practice and hospital (Physiotherapy Board of New Zealand, 2018b). In these settings, physiotherapists may work with patients in conjunction with medical, nursing or ambulance personnel, or be the only recognised health professional providing care. Therefore, physiotherapists should have adequate CPR knowledge and training to respond appropriately in an emergency situation. Previous research has investigated the attitude, knowledge and practice of CPR amongst doctors (Chew et al., 2011; Ong, Yap, Chan, Sultana, & Anantharaman, 2009), nurses (Saramma, Suja Raj, Dash, & Sarma, 2016), surf lifeguards (Moran & Webber, 2012a; Moran & Webber, 2012b; Webber, Moran, & Cumin, 2019), paramedics (Roshana, Batajoo, Piryani, & Sharma, 2012), radiographers (Edomwonyi & Egbagbe, 2006), dental students (Devishree, Mahesh, & Jain, 2018) and medical students (Tsegaye, Tesfaye, & Alemu, 2015). There is limited research, however, investigating the practice of CPR amongst physiotherapists.

Only two published studies about physiotherapists' attitudes towards CPR were identified in the literature (Kallested, Berglund, Herlitz, Leppert, & Endlund, 2012; Mbada, Hakeem, Adedoyini, Awotidee, & Okonji, 2015). One was a study of 140 hospital-based physiotherapists in South-Western Nigeria that investigated their knowledge, attitude and practice of CPR (Mbada et al., 2015). The authors found that 64% of the respondents had poor to average theoretical knowledge of CPR, and only 45% of the respondents demonstrated a positive attitude towards the importance of CPR.

The second study was of 2,614 healthcare professionals from two Swedish hospitals in which participants completed a questionnaire about physical/mental discomfort and attitudes to CPR before and after training (Kälstedt et al., 2012). A

total of 228 allied health professionals were included in the sample, including physiotherapists, occupational therapists, psychologists, social workers and biomedical analysts. All groups of healthcare professionals felt more confident in CPR knowledge after training; however, a limitation was that they did not conduct pre- or post-practical CPR skills testing. Unfortunately, as the physiotherapist group was an undefined subset of the 228 allied health professionals in the study, the applicability of the findings was limited.

The purpose of this study was to survey New Zealand physiotherapists to determine their CPR knowledge and qualifications, beliefs about CPR use in an emergency, and perceptions of CPR competency. We hypothesised that there would be CPR knowledge gaps, low levels of perceived CPR competency and negative beliefs about CPR use amongst New Zealand physiotherapists.

METHODS

Study design

This was a cross-sectional study, and the data were collected between September 2018 and December 2018 using an Internet-based anonymous questionnaire. The Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) statement informed the study design and reporting (Vandenbroucke et al., 2014). Ethics approval was obtained prior to the commencement of data collection from the Auckland University of Technology Ethics Committee (ref: 18/343).

Research questionnaire

The research instrument used to gather data was a self-administered questionnaire (Appendix 1) consisting of 31 closed questions divided into three sections: 1) demographics (questions 1-7); 2) CPR practice/attitudes (questions 8-20); and 3) CPR knowledge (questions 21-31). The questions utilised several aspects of surveys conducted on Nigerian physiotherapists (Mbada et al., 2015) and New Zealand surf lifeguards (Moran & Webber, 2012a; Moran & Webber, 2012b; Webber, Moran & Cumin, 2019).

The first section sought information on sex, age, years of experience, postgraduate qualification, work setting and primary work type. The second section focussed on CPR background, including questions on last formal CPR training, current CPR certification, previous use of CPR and its outcomes, estimated success rates of CPR in out-of-hospital cardiac arrest, and beliefs about CPR certification for physiotherapists. Six questions using Likert-type scales asked respondents about their perceptions of CPR. A five-point scale ranging from *poor* to *highly effective* was used to assess self-estimated ability to perform CPR. Other questions used a five-point scale ranging from *strongly disagree* to *strongly agree* in relation to confidence to use CPR at work; the sense of duty to perform CPR at work; confidence to use CPR in a public domain; the necessity for self-protection before performing CPR; and mouth-to-mouth ventilation. The final section on the theoretical knowledge of CPR used true/false responses to 11 statements on CPR protocols from the ANZCOR guidelines, for example *stop CPR if the patient has not recovered after 15-20 minutes of resuscitation* (Australian and New Zealand Committee on Resuscitation, 2016).

A pilot test of the draft survey was conducted using a convenience sample of 10 New Zealand registered physiotherapists who were independent of the current research. They were asked to complete the questionnaire, and to provide feedback about the items and their understanding of them. Minor changes were made to the questionnaire following this review to improve the structure and flow of questions.

Participants

Clinicians were eligible to take part if they were registered and practising in New Zealand as a physiotherapist at the time of data collection, and had English language skills to complete the questionnaire.

The final questionnaire was hosted on the Internet-based survey site SurveyMonkey®, which enabled anonymous data collection. Informed consent was gained by the participant having to read information about the questionnaire and acknowledge their understanding before completing the questions. The survey site created a web-based questionnaire link which was posted with an invitation on the New Zealand Physiotherapy Jobs and Physio Stand Up Facebook pages. Questionnaire links were also emailed to the secretaries of the 12 Physiotherapy New Zealand special interest groups (SIGs), including Sports and Exercise Physiotherapy New Zealand, the New Zealand Manipulative Physiotherapists Association, and Hand Therapy New Zealand. Additionally, participants were encouraged to forward the link within their physiotherapy networks.

Data analysis

Data from the completed questionnaires were entered in SPSS Version 25 (Armonk, NY: IBM Corp) for statistical analysis. Descriptive statistics described or characterised all numeric variables using frequency and percentages. The characteristics of the physiotherapist population were reported. Continuous variables, including CPR training and the perception of its value, beliefs about CPR use, and knowledge of current ANZCOR CPR protocols were reported using numbers and percentages.

Chi-square statistics were used to test associations between the independent sociodemographic variables of age, sex, years of physiotherapy experience, scope and place of work, and postgraduate qualification against CPR training, beliefs and knowledge. A Bonferroni correction to reduce the chance of type I errors was not undertaken because this increases the likelihood of type II errors (Perneger, 1998).

RESULTS

Sample

At the start of the study, there were 5,064 New Zealand registered physiotherapists who held an annual practising certificate. During the three months when the online survey was open, 700 respondents completed the questionnaire. Twelve individuals who enrolled in the survey were excluded from the study because these respondents did not answer any questions relating to CPR, leaving a sample of 688 registered physiotherapists.

Physiotherapist demographics

The sample included more female than male physiotherapists (female 81%), while half (50%) were aged less than 40 years and had less than 15 years' experience (Table 1). More than

half (54%) worked in private practice, and the most frequently reported scope of work was musculoskeletal practice (49%). These demographics are consistent with national data obtained from the regulatory body, which reported that the New Zealand physiotherapy profession is mainly female (76%), aged less than 45 years (60%) and had fewer than 20 years of experience (62%) (Physiotherapy Board of New Zealand, 2018b). The sample is also consistent with the professional sources which report that 68% of physiotherapists worked in private practice and musculoskeletal was the most common type of work (Physiotherapy New Zealand, 2018).

Table 1: Characteristics of sample population (n = 688)

	Number	%
Sex		
Female	554	80.5
Male	134	19.5
Age (years)		
20-29	132	19.2
30-39	208	30.3
40-49	165	24.1
50-59	138	20.1
Over 60	43	6.3
Experience (years)		
0-15	341	49.6
16 or more	347	50.4
Postgraduate qualification		
Yes	368	53.5
No	320	46.5
Main work setting		
Private practice	374	54.4
Hospital/outpatient clinic	150	21.8
Community	73	10.6
Other (sports team, university)	89	13.0
Main scope of work		
Musculoskeletal	337	49.2
Aged care	58	8.4
Neurology	56	8.2
Paediatrics	49	7.2
Cardiorespiratory	44	6.4
Other (e.g. women's health, hand therapy, mental health)	141	20.6

CPR training and perceptions of its value

Many respondents (56%) reported having received formal CPR training in the previous year; most (81%) held current CPR certification; and almost one-third (31%) had a qualification above basic life support (BLS) (Table 2). One-fifth of respondents (19%) had used CPR in an emergency, with the majority of applications being successful (56%). Most physiotherapists (61%) suggested a success rate of $\leq 25\%$ for CPR in out-of-hospital cardiac arrest. When asked about the role of CPR training, most (76%) favoured mandatory inclusion of CPR training as part of their annual practicing certificate or in their continuing professional development portfolio.

Significant differences were found in current CPR certification by work setting, with those in private practice (83%), public hospitals (85%) and community settings (81%) more likely than physiotherapists in university (70%), sports teams (64%) and other settings (63%) ($\chi^2 (5) = 17.068, p = 0.004$) to have current certification. No significant differences were evident when currency of CPR training was analysed by age, sex, years

of experience, scope of work, work setting and postgraduate qualification.

When asked whether they had used CPR in an emergency, significant differences were found when analysed by age, sex and years of experience. Significantly, more males than females (males 28%, females 17%) had used CPR in an emergency ($\chi^2 (1) = 8.134, p = 0.004$). Significantly, more older respondents had used CPR in an emergency (>39 years 24%, 20-39 years 14%) ($\chi^2 (1) = 11.288, p = 0.001$). Those with 16 years or more of physiotherapy experience (≥ 16 years of experience 22%, 0-15 years 16%) also had significantly greater experience of CPR in an emergency ($\chi^2 (1) = 4.961, p = 0.026$).

There were significant differences in response to the question about the status that should be given to CPR training in the physiotherapy profession. More females (26%) than males (21%) opted for voluntary status (status quo) of CPR training ($\chi^2 (3) = 12.748, p = 0.005$), more older than younger physiotherapists opted for voluntary status (> 39 years 28%, 20-39 years 16%) ($\chi^2 (3) = 24.148, p = <0.001$), and more

Table 2: Cardiopulmonary resuscitation training and perceptions of its value

		Number	%
Last formal CPR training	< 3 months	120	17.5
	3-12 months	265	38.6
	1-2 years	214	31.2
	> 2 years	87	12.7
Current CPR certificate	Yes	556	81.0
	No	130	19.0
Qualification above BLS	Yes	210	30.7
	No	475	69.3
Used CPR in emergency before	Yes	130	19.0
	No	556	81.0
If yes, was it successful?	Yes	73	56.2
	No	54	41.5
	Don't know	3	2.3
Estimates of success rate of CPR in out-of-hospital cardiac arrest	0-25%	420	61.3
	26-50%	183	26.7
	51-75%	70	10.2
	76-100%	12	1.8
CPR training for physiotherapists	Mandatory for APC	193	28.1
	Mandatory for CPD portfolio	331	48.3
	Voluntary (status quo)	151	22.0
	Don't know	11	1.6

Notes: APC, annual practicing certificate; BLS, basic life support; CPD, continuing professional development; CPR, cardiopulmonary resuscitation

physiotherapists with 16 years or more of experience opted for continuation of voluntary status (≥ 16 years 29%, 0-15 years 15%) ($\chi^2 (3) = 11.024, p = 0.012$).

Beliefs about CPR use

Of those surveyed, 92% said their ability to perform CPR was at least *satisfactory*, with one half (53%) of all participants rating their ability as *very effective* or *effective* (Table 3). No significant differences were found when this self-estimated ability was analysed by work setting, main scope of work and postgraduate qualification.

Significant differences were evident when the self-estimation of CPR ability was analysed by age and work experience. Older respondents (> 39 years) were more likely than younger respondents to estimate effective CPR capacity (> 39 years of age 60%, 20-39 years 47%) ($\chi^2 (4) = 13.453, p = 0.009$). Similarly, those with 16 years or more of experience were more likely to estimate effective CPR ability (≥ 16 years of experience 60%, 0-15 years 46%) ($\chi^2 (4) = 17.129, p = 0.002$).

No significant differences were found when questions relating to the use of CPR in work and public settings were analysed by age, years of experience, work location and type. Some

differences were evident when the data related to the use of CPR was analysed by sex. Significantly, more females than males (females 48%, males 35%) indicated that they would prefer not to do mouth-to-mouth ventilation during CPR ($\chi^2 (4) = 19.102, p = 0.001$).

Knowledge of CPR principles and practice

Table 4 shows in descending order the number (and percentage) of participants who correctly answered each true/false statement from the ANZCOR CPR protocols. Most respondents (94%) reported the correct ratio of compressions to ventilations, the correct depth of cardiac compressions (84%) and the correct length of time to stop CPR (after 15 to 20 minutes of resuscitation) if the patient had not recovered (88%). Approximately two-thirds of participants responded correctly on statements relating to the first step at a medical emergency (70%); length of breathing check in an unresponsive patient (67%); automated external defibrillators (AED) not advising a shock for all victims of cardiac arrest (67%); and seeking help first when alone with a patient needing CPR (65%). Less than half correctly responded to statements on reassessing the patient every two minutes (37%) and the compression rate during CPR (22%), which should be between 100 to

Table 3: Beliefs about cardiopulmonary resuscitation use

		Number	%
How would you rate your CPR ability	Very effective	95	14.0
	Effective	266	39.2
	Satisfactory	265	39.1
	Fair/poor	52	7.4
I would be unsure how to react at work if CPR was needed	Strongly disagree/disagree	569	83.2
	Neutral	77	11.3
	Strongly agree/agree	38	5.5
At work it is my duty to intervene and perform CPR in an emergency	Strongly disagree/disagree	19	2.8
	Neutral	55	8.0
	Strongly agree/agree	610	89.2
I would be unsure how to react in public if CPR was needed	Strongly disagree/disagree	559	81.7
	Neutral	76	11.1
	Strongly agree/agree	49	7.2
I would need gloves, a face mask and other protective items to perform CPR	Strongly disagree/disagree	422	61.8
	Neutral	143	20.9
	Strongly agree/agree	118	17.2
I would prefer not to do mouth-to-mouth during CPR	Strongly disagree/disagree	187	27.7
	Neutral	183	27.1
	Strongly agree/agree	306	45.3

Note: CPR, cardiopulmonary resuscitation

120 compressions per minute (Australian and New Zealand Committee on Resuscitation, 2016).

No significant differences were evident in knowledge of protocols when data were analysed by sex, with the exception of the statement relating to time taken to assess breathing, where more females than males (69% v 59%) gave the correct response ($\chi^2(1) = 4.592, p = 0.032$). Some differences were evident in knowledge when data were analysed by age, with older respondents (> 39 years) more likely to be incorrect than younger respondents with regard to the AED advising a shock for all victims of cardiac arrest (> 39 years 41%, 20-39 years 26%) ($\chi^2(1) = 18.409, p = <0.001$), AED use on infants and children (> 39 years 43%, 20-39 years 33%) ($\chi^2(1) = 18.409, p = <0.001$), and the correct compression to ventilation ratio (> 39 years 10%, 20-39 years 2%) ($\chi^2(1) = 196.531, p = <0.001$). More physiotherapists engaged in musculoskeletal work were incorrect in responses relating to seeking help if alone (musculoskeletal 39%, other 31%) ($\chi^2(1) = 4.865, p = 0.027$), and length of time taken to check breathing in an unresponsive patient (musculoskeletal 40%, other 26%) ($\chi^2(1) = 13.220, p = <0.001$).

DISCUSSION

The current study was the first to investigate the knowledge and perceptions of CPR amongst New Zealand registered

physiotherapists, and the first outside a hospital only setting. The methodology of the New Zealand study differed from the previous physiotherapy studies by sampling anonymously using an online survey format which allowed a larger sample, and physiotherapists across different work scopes and settings to participate. Physiotherapists, in general, had sound theoretical knowledge of CPR, with the percentage of correct answers for seven of the total CPR statements ranging from 62% to 94%. Some differences were evident in CPR knowledge when the statements were analysed by age, with physiotherapists older than 39 years more likely to be incorrect than younger physiotherapists with regard to the AED advising a shock for all victims of cardiac arrest, AED use on infants and children, and the correct compression to ventilation ratio. The majority of physiotherapists (92%) believed that their CPR ability was satisfactory or better, with respondents over 39 years and those with 16 years or more of experience more likely to estimate effective CPR ability.

In contrast to the current findings, the Nigerian study had a high percentage of poor knowledge and a negative attitude towards CPR (Mbada et al., 2015). This could be explained by the fact there is no requirement for CPR accreditation for Nigerian physiotherapists and very few physiotherapists in the study had actually received any previous CPR training. It would appear that CPR practice in Nigeria still falls under the domain of a medical

Table 4: Knowledge of current 'Australian and New Zealand Committee on Resuscitation' protocols

Statement	True/false	Correct		Incorrect	
		Number	%	Number	%
The correct ratio of compressions to ventilations on an adult patient is 30:2	True	613	94.0	39	6.0
Stop CPR if patient not recovered after 15-20 min of resuscitation	False	576	88.2	77	11.8
The recommended compression depth for adults during CPR is > 5 cm	True	549	84.2	103	15.8
The first step at a medical emergency is to check if the victim is responsive	False	458	70.1	195	29.9
Take no longer than 10 seconds to check for breathing in an unresponsive patient	True	439	67.2	214	32.8
The AED will advise a shock for all victims of cardiac arrest	False	433	66.5	218	33.5
If alone with adult patient go for help before starting CPR	True	422	64.8	229	35.2
The AED can be used on infants and children under 8 years of age	True	405	62.0	248	38.0
Each rescue breath (during CPR) should be given over 1 second	True	329	50.2	326	49.8
Reassess the victim after every 2 minutes of CPR to see if they have recovered	False	244	37.4	409	62.6
The compression rate during CPR is 100 per minute	False	144	22.1	509	77.9

Notes: AED, automated external defibrillator; CPR, cardiopulmonary resuscitation

physician, compared to Western countries that emphasise CPR training to members of the public, including school-age students.

One-fifth of New Zealand physiotherapists had used CPR in an emergency, with the majority of applications being successful. The result is similar to the study of Nigerian physiotherapists, with 27% having performed CPR (Mbada et al., 2015). Surprisingly, physiotherapists in the Nigerian and current study reported higher use of CPR compared to a CPR rate of less than 10% for New Zealand surf lifeguards (Moran & Webber, 2012a; Moran & Webber, 2012b; Webber, Moran & Cumin, 2019). Given that one in five New Zealand physiotherapists reported they had performed CPR during their career and that they may be the only recognised health professional available in an emergency before an ambulance arrives, CPR training should be current and frequent. A recent study showed that nurses' chest compression psychomotor skill quality is only retained for six months after training (Niles et al., 2017).

Despite the ethical and code of conduct recommendations, current CPR certification is not mandatory for New Zealand physiotherapists. In the current study, significant differences were found by work setting, with physiotherapists in private practice, public hospitals and community settings more likely to have current CPR certification than those in university, sports teams and other settings. It is concerning that physiotherapists in sports team settings are less likely to have CPR certification than other non-sports settings, despite the clear recommendations from the Sports Physiotherapy Code of Conduct (Sports Physiotherapy New Zealand, 2013).

Many respondents (76%) supported CPR certification as a mandatory part of their continuing professional development or annual practising certificate. In Nigeria, 92% of physiotherapists believed CPR certification should be mandatory at graduation, and 69% of physiotherapists believed the best method to increase awareness of the importance of CPR was to encourage training as part of the continuing professional development requirements (Mbada et al., 2015). Although CPR certification is not mandatory, 81% of respondents in the New Zealand study had CPR certification and 31% had additional qualifications above basic life support.

If CPR certification became mandatory for New Zealand physiotherapists, the potential benefits for patients would need to be weighed up against the cost, time off work for training, the system required for regulatory monitoring and the frequency of recertification. The Midwifery Council requires annual CPR certification for midwives (Midwifery Council of New Zealand, 2017), while the New Zealand Dental Council has biennial mandatory CPR certification requirements for oral health professionals (Dental Council of New Zealand, 2016). The Medical Council of New Zealand requires CPR certification for the initial registration of doctors only (Medical Council of New Zealand, 2019).

Our study had four identified limitations. First, because of the cross-sectional nature of the study, only associations rather than causality can be determined. Second, the use of self-reported data on CPR may have introduced bias that may

not reflect actual behaviour (Mickalide, 1997; Nelson, 1996; Robertson 1992). Third, the survey was conducted online, eliciting an undefined sample and an unknown response rate, and preventing the ability to follow up with non-responders. Only 14% of the total practising physiotherapists responded to the survey. Whilst the demographic characteristics of the study appeared generalisable, it is unknown if the questionnaire responses are representative of the New Zealand physiotherapy population. To address this shortcoming, it is recommended further studies should use a predefined population with a representative sample that is capable of generating a high response rate. Fourth, knowledge of CPR protocols in written responses was used as a proxy indicator of CPR competence; no practical assessment of competency was undertaken. To better inform New Zealand physiotherapy practice, future research should examine the actual CPR competency of physiotherapists with a practical assessment on a manikin rather than a theoretical assessment.

CONCLUSION

This study provides the first insight into New Zealand physiotherapists' CPR knowledge and perceptions. The current sports physiotherapy practice guidelines recommend up-to-date basic life support competencies. However, in the present study, physiotherapists who worked in a sports team setting were less likely to have current CPR certification. These findings suggest that an educational campaign may be required by key professional and regulatory bodies on the ethical, legal and safety obligations of physiotherapists in an emergency.

Older and more experienced physiotherapists were more likely to rate their CPR ability as either *effective* or *very effective*. However, significant differences in CPR and AED knowledge were present in older physiotherapists, indicating the need for improved CPR knowledge and more frequent CPR training within the profession. The current low frequency of CPR training and the likelihood of having to perform CPR in an emergency (1 in 5) is a risk for physiotherapists in their care of patients.

KEY POINTS

1. Only 56% of New Zealand physiotherapists had undergone CPR training in the last year, and one in five had used CPR in an emergency.
2. Significant CPR and AED knowledge gaps existed in older (> 39 years) New Zealand physiotherapists.
3. Physiotherapists working in the sports setting were less likely to have CPR certification compared to those in non-sports settings, despite the clear recommendations from the Sports Physiotherapy Code of Conduct.
4. 76% of New Zealand physiotherapist respondents believe CPR certification should be mandatory via their annual practicing certificate or three yearly continuing professional development portfolio.

DISCLOSURES

No funding was obtained for this study. There are no conflicts of interest which may be perceived to interfere with or bias this study.

PERMISSIONS

This study was approved by the Auckland University of Technology Ethics Committee (ref: 18/343). Written permission for reproduction of Figure 1 in the New Zealand Journal of Physiotherapy was obtained from Laerdal Medical.

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Appendix 1

Self-administered questionnaire: What is the knowledge, attitude and practice of cardiopulmonary resuscitation among New Zealand physiotherapists?

Introduction

Hello and welcome to this survey exploring the knowledge, attitude and practice of cardiopulmonary resuscitation (CPR) among New Zealand physiotherapists. The survey contains questions about your current knowledge of CPR and your attitude about how and when you would use CPR.

The survey will take approximately 5-10 minutes to complete. Please make sure you answer all the questions.

There are three sections: demographic, CPR practice/attitude and CPR knowledge.

Please read each question carefully and only click the appropriate box.

Demographic section

1. Sex?	<input type="checkbox"/> Male <input type="checkbox"/> Female
2. Age?	<input type="checkbox"/> 20-29 <input type="checkbox"/> 30-39 <input type="checkbox"/> 40-49 <input type="checkbox"/> 50-59 <input type="checkbox"/> 60+
3. Years of physiotherapy experience?	<input type="checkbox"/> 0-5 <input type="checkbox"/> 6-10 <input type="checkbox"/> 11-15 <input type="checkbox"/> 16+
4. Postgraduate qualification?	<input type="checkbox"/> Yes <input type="checkbox"/> No
5. Current employment status?	<input type="checkbox"/> Employed <input type="checkbox"/> Self-employed <input type="checkbox"/> Employer <input type="checkbox"/> Other
6. What is your main work setting?	<input type="checkbox"/> Private practice <input type="checkbox"/> Public hospital/clinic <input type="checkbox"/> Community <input type="checkbox"/> University <input type="checkbox"/> Sports team/institute <input type="checkbox"/> Other
7. What is your main scope of work?	<input type="checkbox"/> Musculoskeletal <input type="checkbox"/> Sports <input type="checkbox"/> Women's health <input type="checkbox"/> Aged care <input type="checkbox"/> Hand therapy <input type="checkbox"/> Neurology <input type="checkbox"/> Cardiorespiratory and/or cardiovascular <input type="checkbox"/> Occupational health <input type="checkbox"/> Paediatrics <input type="checkbox"/> Mental health <input type="checkbox"/> Academic <input type="checkbox"/> Other

CPR practice/attitude section

1. When was your last formal CPR resuscitation training?	<input type="checkbox"/> <3 months <input type="checkbox"/> 6-12 months <input type="checkbox"/> 1-2 years <input type="checkbox"/> >2 years
2. Do you have a current CPR certificate?	<input type="checkbox"/> Yes <input type="checkbox"/> No
3. Do you have a current first aid qualification above basic life support/CPR level?	<input type="checkbox"/> Yes <input type="checkbox"/> No
4. Have you ever used CPR in an emergency?	<input type="checkbox"/> Yes <input type="checkbox"/> No
5. If you have ever used CPR, did the patient survive?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Don't know <input type="checkbox"/> Not applicable
6. What do you believe the success rate of CPR is in out-of-hospital cardiac arrest?	<input type="checkbox"/> 0-25% <input type="checkbox"/> 26-50% <input type="checkbox"/> 51-75% <input type="checkbox"/> 76-100%
7. Do you think CPR certification for New Zealand physiotherapists should be:	<input type="checkbox"/> Mandatory as part of your APC <input type="checkbox"/> Mandatory as part of your CPD portfolio <input type="checkbox"/> Voluntary (status quo)
8. How would you rate your current CPR ability?	<input type="checkbox"/> Poor <input type="checkbox"/> Fair <input type="checkbox"/> Satisfactory <input type="checkbox"/> Effective <input type="checkbox"/> Highly effective <input type="checkbox"/> Don't know
9. I would feel unsure of how to react at work, if I was presented with an emergency situation requiring CPR:	<input type="checkbox"/> Strongly disagree <input type="checkbox"/> Disagree <input type="checkbox"/> Neutral <input type="checkbox"/> Agree <input type="checkbox"/> Strongly agree
10. At work, I would consider it my duty to intervene in an emergency situation and perform CPR:	<input type="checkbox"/> Strongly disagree <input type="checkbox"/> Disagree <input type="checkbox"/> Neutral <input type="checkbox"/> Agree <input type="checkbox"/> Strongly agree
11. I would feel unsure of how to react if I was presented with an emergency situation in public (outside of work) requiring CPR:	<input type="checkbox"/> Strongly disagree <input type="checkbox"/> Disagree <input type="checkbox"/> Neutral <input type="checkbox"/> Agree <input type="checkbox"/> Strongly agree
12. I would need gloves, face mask and other items relevant to self-protection to perform CPR:	<input type="checkbox"/> Strongly disagree <input type="checkbox"/> Disagree <input type="checkbox"/> Neutral <input type="checkbox"/> Agree <input type="checkbox"/> Strongly agree
13. I would prefer not to perform mouth-to-mouth ventilation during CPR:	<input type="checkbox"/> Strongly disagree <input type="checkbox"/> Disagree <input type="checkbox"/> Neutral <input type="checkbox"/> Agree <input type="checkbox"/> Strongly agree

CPR knowledge section

1. The compression rate during CPR is 100 per minute:	<input type="checkbox"/> True <input type="checkbox"/> False
2. Each rescue breath (during CPR) should be given over 1 second:	<input type="checkbox"/> True <input type="checkbox"/> False
3. If alone with an adult patient, go for help before starting CPR:	<input type="checkbox"/> True <input type="checkbox"/> False
4. Stop CPR if the patient has not recovered after 15-20 minutes of resuscitation:	<input type="checkbox"/> True <input type="checkbox"/> False
5. The automated external defibrillator will advise a shock for all victims of cardiac arrest:	<input type="checkbox"/> True <input type="checkbox"/> False
6. Take no longer than 10 seconds to check for breathing when assessing an unresponsive patient:	<input type="checkbox"/> True <input type="checkbox"/> False
7. Reassess the victim after every two minutes of CPR to see if they have recovered:	<input type="checkbox"/> True <input type="checkbox"/> False
8. The automated external defibrillator can be used on infants and children under 8 years of age:	<input type="checkbox"/> True <input type="checkbox"/> False
9. The first step at the scene of a medical emergency is to check if the victim is responsive:	<input type="checkbox"/> True <input type="checkbox"/> False
10. The correct ratio of compression to ventilations on an adult patient during CPR is 30:2:	<input type="checkbox"/> True <input type="checkbox"/> False
11. The recommended compression depth for adults during cardiopulmonary resuscitation is >5cm:	<input type="checkbox"/> True <input type="checkbox"/> False

Notes: APC, annual practicing certificate; CPD, continuing professional development; CPR, cardiopulmonary resuscitation