

# Evaluation of Slovenian Occupational Therapists' Theoretical Knowledge and Stress Levels Connected With Providing Cardiopulmonary Resuscitation

INQUIRY: The Journal of Health Care  
Organization, Provision, and Financing  
Volume 57: 1–8  
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DOI: 10.1177/0046958020963683  
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## Abstract

This was the first study that evaluated cardiopulmonary resuscitation (CPR) knowledge in a sample of occupational therapists and investigated whether the knowledge of CPR parameters affected their perceived stress levels related to providing CPR. A questionnaire, consisting of 4 clusters of questions, was pretested and used in an online survey of Slovenian occupational therapists. The survey was sent to all electronic addresses obtained from the Association of Occupational Therapists of Slovenia and the Faculty of Health Sciences at the University of Ljubljana. It was completed by 201 occupational therapists, which represented about 40% of all Slovenian occupational therapists. Data were analyzed using independent-samples *t*-test, 1-way ANOVA, and Pearson's correlation coefficient. On average, the participants scored 5.44 points (SD = 2.96) on the CPR knowledge test that had a maximum of 9 points. A weak negative correlation existed between the perceived level of stress and scores on the knowledge test ( $r = -0.151$ ;  $P = .05$ ). Scores on the knowledge test were also negatively correlated with age ( $r = -0.409$ ;  $P < .001$ ) and work experience ( $r = -0.388$ ;  $P < .001$ ) and positively correlated with self-evaluation of knowledge of CPR ( $r = 0.366$ ;  $P < .001$ ). The majority of the participants (92.3%) felt that they needed to update their CPR knowledge. There was no statistically significant difference in the CPR knowledge between occupational therapists working in different clinical areas ( $P = .85$ ). Our sample of occupational therapists was not optimally prepared to apply CPR. Older and more experienced therapists demonstrated less theoretical knowledge and were particularly vulnerable to stress. To improve knowledge and confidence, regular CPR training is recommended for this group of health professionals.

## Keywords

cardiac arrest, resuscitation, occupational therapist, questionnaire, self-evaluation

### What do we already know about this topic?

Although health professionals are usually trained in cardiopulmonary resuscitation (CPR), they experience significant stress when faced with emergency situations. First aid techniques and CPR are continually developing, requiring regular training to be able to perform CPR efficiently and according to the latest guidelines.<sup>22</sup>

### How does your research contribute to the field?

This was the first study that looked at the CPR knowledge of occupational therapists and linked it to stress levels related to providing CPR.

### What are your research's implications toward theory, practice, or policy?

Our findings suggest that health professionals who are not in regular contact with emergencies need to update their CPR knowledge more frequently. CPR training should be mandatory for occupational therapists at regular intervals.

## Introduction

A medical emergency is a stressful event for all involved. Some studies show that those who participate in the resuscitation attempts can experience severe stress,<sup>1</sup> occasionally requiring professional help to cope afterward.<sup>2</sup> Although health professionals are usually trained in cardiopulmonary

resuscitation (CPR), they, too, experience significant stress when faced with life-or-death situations,<sup>3,4</sup> especially if the outcome is imminent death.<sup>5</sup> Different factors can influence the rescuers' levels of stress, including the success of the resuscitation attempt, personal experience, debriefing possibilities, and work experience.<sup>1,2,6</sup>



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In hospital settings, doctors and nurses are the most likely first responders. However, allied health professionals can also participate in an emergency that requires a fast response in order to save a life or reduce the consequences of a sudden deterioration in health. For example, health professionals performing home visits are exposed to different risks, including medical emergencies that require advanced skills and experience.<sup>7</sup> This risk can be particularly pronounced in the work of occupational therapists who frequently perform their assessment and treatment sessions in the patient's home environment and the community where assistance is not readily available.

Furthermore, like any other person, health professionals can encounter an emergency event also in their day to day life, when off duty. However, unlike a layperson, they have a potentially greater moral and a legal obligation to act, which can increase their sense of pressure and responsibility. Therefore, it is particularly pertinent for them to be up-to-date with their CPR training.<sup>8</sup>

Our study focused on occupational therapists. This group of health professionals can encounter emergency situations in many areas of their work, including when visiting patients in their homes. However, no occupational therapy-specific study has been undertaken to date that considered CPR skills and stress levels of occupational therapists.

The objective of our study was 2-fold. First, we sought to evaluate the CPR knowledge in a sample of Slovenian occupational therapists working with different groups of patients. In addition, we investigated whether the knowledge of CPR parameters and current guidelines affected the perceived stress levels of occupational therapists in a hypothetical emergency.

## Background

### *Importance of CPR*

Cardiovascular diseases and the associated sudden cardiac arrest are the leading causes of mortality in Slovenia<sup>9</sup> and around the world.<sup>10</sup> The annual incidence of out-of-hospital cardiac arrest in the developed countries is between 19 and 173 events per 100 000 populations.<sup>11</sup> In Slovenia, 2000 people die every year from cardiac arrest, 1500 of those being out-of-hospital incidents.<sup>12</sup> According to one study, fewer than 2% of patients who had a cardiac arrest at home were alive after 1 month, indicating a very vulnerable group of patients.<sup>13</sup>

Survival and quality of life following a cardiac arrest most often depend on early and correctly performed CPR

and timely use of the automated external defibrillator.<sup>14</sup> Every minute delay lowers the chances of successful defibrillation by 7% to 10%.<sup>15</sup> Chances of survival also get significantly lowered if the CPR is of poor quality.<sup>16</sup> Wik et al<sup>17</sup> claim that suboptimal CPR equals receiving no CPR. In contrast, a well-functioning "chain of survival" significantly increases the chances of a positive outcome.<sup>18</sup> Škufca Sterle and Baznik<sup>19</sup> report that in the Ljubljana area (the capital of Slovenia), between 2008 and 2012, bystanders performed CPR in 354 cases (50.6%) prior to the arrival of the emergency medical team. Of these, only 36.5% performed CPR correctly, indicating that there is much scope for improvement in CPR skills.

Basic life support skills often decay within the first few months after the learning.<sup>20,21</sup> Yoldaş et al<sup>22</sup> point out that first aid techniques and CPR are continually developing, requiring regular training to be able to perform CPR efficiently and according to the latest guidelines. For instance, in 2015 and 2017, the European Resuscitation Council (ERC) published the essential treatment algorithms for the resuscitation of children and adults that highlighted the main guideline changes.<sup>23,24</sup> The ERC also decided to maintain a 5-yearly cycle for routine updates to its guidelines and course materials.<sup>24</sup> Therefore, regular knowledge updates are essential.

In Slovenia, several acts stipulate the responsibility of each citizen to provide first aid and assist a person in danger. The third paragraph of the second article of the Act on Health Care and Health Insurance<sup>25</sup> states that "everyone is obliged to provide first aid within their powers and abilities to the injured or ill in an emergency and enable them access to emergency medical assistance." According to the Slovenian law, the greater the need for assistance, the more severe the legal consequences if not aiding. The law also considers the level of a person's professional competence.<sup>26</sup> All health professionals are considered equal here, the law stating that a doctor or any other health professional who fails to assist in a life-threatening situation can be punished with up to 1-year imprisonment.<sup>27</sup>

### *Occupational Therapy and Emergency Situations*

Occupational therapy is a health profession that focuses on the promotion of health and well-being by enabling people to participate in different activities and occupations throughout their lives regardless of their abilities. Occupational therapists help individuals participate in daily life and perform valued occupations as independently as possible.<sup>28</sup> During

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Received 13 January 2020; revised 12 August 2020; revised manuscript accepted 4 September 2020

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occupational therapy interventions, occupational therapists are responsible for all the aspects of their treatment, including safety and efficiency.<sup>29</sup>

In 2019, the number of occupational therapists in Slovenia was estimated at 512.<sup>30</sup> According to a survey by Bratun and Galof that included 56% of the population of occupational therapists in Slovenia, about 35% work in geriatrics, 17% in pediatrics, 13% in neurology, 13% in mental health, 10% with musculoskeletal disorders, 4% in education and 3% in vocational rehabilitation, and 5% in other areas.<sup>31</sup> During their work, they can encounter different unexpected situations. As health care workers, they are obliged to offer first aid at a level that surpasses the obligations of other citizens.<sup>26</sup> Also, the Health Services Act stipulates in article 56 that they are not allowed to decline basic life support in a life-threatening situation.<sup>32</sup> In addition, their professional code of ethics implores them to act in emergency situations.<sup>33</sup> All health professionals, including occupational therapists, are now legally required to update their CPR skills at least every 7 years.<sup>34</sup> However, there is no data about whether this has been implemented in practice yet. In contrast, in many European countries and North America, the updates are more regular, for instance, every 2 years according to the European Resuscitation Council and American Heart Association.<sup>35</sup>

All in all, CPR skills are an important part of an occupational therapist's knowledge base. Therefore, it is essential to understand how proficient their knowledge of CPR is and what might affect their performance. Consequently, the purpose of the present study was to evaluate the CPR knowledge of Slovenian occupational therapists and explore whether the knowledge of CPR parameters and current guidelines affected their perceived stress levels in a hypothetical emergency situation.

## Methods

This was a quantitative method, based on online survey, conducted in the period between October 8, 2018 and November 15, 2018. An anonymous questionnaire of the authors' design on the principles of CPR and perceived levels of stress linked with the implementation of CPR was used. The study was conducted according to the ethical standards of the Declaration of Helsinki and the Occupational Therapy Code of Ethics.<sup>33</sup> Participation in the study was voluntary and no incentives were provided for completing the survey. By submitting their survey for analysis, the participants gave their consent.

## Assessment Instrument

The questionnaire was developed based on the previous empirical work of one of the authors and colleagues<sup>36,37</sup> and considered the newest guidelines of European Resuscitation Council (ERC).<sup>23,24</sup> Reliability was checked for the 9 questions included in the analysis and Cronbach's  $\alpha$  for the

questionnaire was .798, which shows that the instrument can be considered reliable.<sup>38</sup>

To design and distribute the questionnaire an open source application developed by the Centre for Social Informatics, at the Faculty of Social Sciences, University of Ljubljana was used. This is an online service (SaaS—Software as a Service) that is the intellectual property of the University of Ljubljana and is commonly used in Slovenia for the purposes of online surveys. The application's designation is EnKlikAnketa (1KA), which translates as "One click survey."

The questionnaire included 4 clusters of questions. The first cluster contained 9 multi-choice questions that tested the participants' knowledge of CPR and basic life support. This cluster has been referred to as "the knowledge test." The second cluster asked the respondents to self-evaluate, on a scale of 1 to 10, firstly, their theoretical and practical knowledge of first aid and secondly, their perceived level of stress should they be in a situation that required them to perform CPR. Score 1 indicated no knowledge/no stress, while score 10 was indicative of excellent knowledge/the highest possible level of stress. The third cluster inquired whether the respondents felt they should update their knowledge of first aid and CPR (yes/no/I do not know). The last cluster collected the participants' demographic data.

The questionnaire was pre-tested on a group of 10 expert evaluators (emergency doctors, methodologists, experienced occupational therapists). Since we received no negative feedback, the questionnaire was administered in its original form.

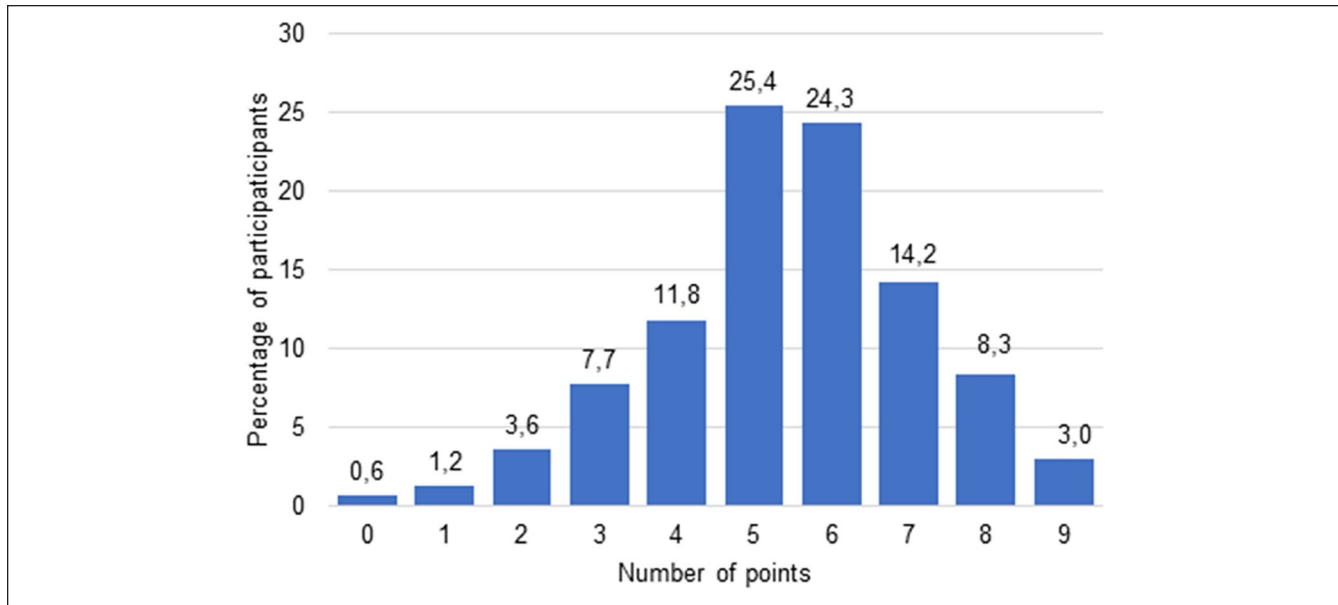
## Participants and Data Collection

The aim was to include all occupational therapists working in Slovenia at the time of the study, which was estimated at 500 therapists.<sup>39</sup> Occupational therapists who were in the database of the Faculty of Health Sciences, University of Ljubljana (the only institution that currently educates occupational therapists in Slovenia) and the Association of Occupational Therapists of Slovenia were contacted by email and asked to participate in a survey about their knowledge of CPR. The survey was opened by 237 people; 201 completed it partially and 169 completed it in full.

The participants were instructed to answer the questions independently, without consulting any exterior sources. Participation was voluntary and represented a convenience sample.

## Analysis

Dependent variables (questions relating to the knowledge of CPR) were expressed as percentages (%) of correct answers. To calculate statistically significant differences in the mean levels of perceived stress between the group that answered the questions correctly and the group that did not answer the questions correctly, the independent-samples *t*-test was used.



**Figure 1.** Percentage of participants who received each score (0-9) on the knowledge test.

The level of statistical significance was determined as  $\alpha = .05$ .

Statistically significant differences between different groups of occupational therapists according to their field of practice and the average score on the knowledge test were calculated using 1-way ANOVA. The level of statistical significance was determined as  $\alpha = .05$ .

The correlations between the perceived levels of stress, age, work experience, self-evaluation of knowledge and the score on the knowledge test were calculated using Pearson's correlation coefficient.

The analysis was performed in IBM SPSS Statistics 24.0. and Microsoft Excel 2010.

## Results

### Sample Description

The sample consisted of 201 occupational therapists. Of these, 169 (84%), answered all the questions. Most of the sample were women. The participants were between 22 and 60 years of age ( $M = 36.47$  years;  $SD = 10.21$  years). They had between 0 and 39 years of work experience ( $M = 12.53$  years;  $SD = 10.73$  years). The sample characteristics are presented in Table 1.

### Knowledge of CPR

On the CPR knowledge test that included 9 questions, each correct answer was worth 1 point. The minimum score was 0 and the maximum was 9. On average, the participants scored 5.44 points ( $SD = 2.96$ ). Figure 1 shows what percentage of participants achieved each score on the knowledge test. The

**Table 1.** Demographic Data.

Variable	Categories	N (%)
Gender	Male	7 (4.1)
	Female	162 (95.9)
Age (years)	22-30	59 (34.9)
	31-50	89 (52.7)
	51-60	21 (12.4)
Work experiences (years)	<5	62 (36.7)
	6-25	81 (47.9)
	>25	26 (15.4)
Work area	Rehabilitation	33 (19.5)
	Geriatrics	57 (33.7)
	Mental health	25 (14.8)
	Pediatrics	19 (11.2)
	Adults with special needs	19 (5.3)
	Vocational rehabilitation	10 (5.9)
	Other areas	16 (9.6)

best scores were achieved for the question referring to the ratio between chest compressions and breaths, and the question referring to the option of performing CPR without mouth-to-mouth ventilation, where 82.2% and 84.6%, respectively answered the question correctly. In contrast, the lowest score was recorded for the question referring to the depth of compressions, where only 14.8% answered correctly.

The majority of the participants (92.3%) felt that they needed to update their CPR and first aid knowledge. There was no statistically significant difference in the CPR knowledge between occupational therapists working in different clinical areas ( $P = .85$ ).

**Table 2.** Comparison of stress levels between the group that answered CPR-related questions correctly, and the group that answered incorrectly.

Question	Correct answer			Incorrect answer			P-value
	%	Stress level		%	Stress level		
		M	SD		M	SD	
Q1 What would you do if somebody collapsed in front of you and remained unresponsive?	75	7.06	2.11	25	7.43	1.87	.160
Q2 What is the correct ratio between chest compressions and mouth-to-mouth ventilation for an adult?	82	7.10	2.12	18	7.40	1.73	.236
Q3 When doing CPR on an adult, what is the depth of chest compressions?	15	6.84	2.48	85	7.21	1.98	.205
Q4 What is the correct hand placement for chest compressions in an adult?	78	7.01	2.04	22	7.66	2.03	.043*
Q5 When resuscitating an adult, what do we do first: 2 breaths or chest compressions?	62	6.94	2.23	38	7.49	1.68	.036*
Q6 If we have reservations, can we perform CPR without mouth-to-mouth ventilation?	85	7.10	2.06	15	7.46	2.00	.204
Q7 Will the AED (defibrillator) allow an electric shock if there is no need for it?	72	7.12	2.05	28	7.23	2.07	.377
Q8 Do we place an immobile person who has occasional breaths (agonal breathing) in a recovery position?	25	6.98	2.28	75	7.21	1.98	.263
Q9 What would you do if, following a car accident, a driver was leaning on the steering wheel, was unconscious and was not breathing?	52	7.13	2.20	48	7.18	1.89	.430

\*Statistically significant ( $P < .05$ ).

### Perceived Levels of Stress and Knowledge of CPR

When asked to self-evaluate their knowledge of CPR and first aid, the participants' scores ranged from 2 to 9 ( $M=7.20$ ;  $SD=1.88$ ). None of the participants scored themselves with a 10 (excellent knowledge). The scores for perceived stress levels were between 1 and 10 ( $M=7.90$ ;  $SD=2.52$ ), with 32 participants (19%) marking their stress level as 10 and another 23 (13%) as 9. Only 17% of the participants marked their perceived stress lower than 5.

Table 2 shows the differences in perceived stress between the group that answered the CPR-related questions correctly and the group that did not answer correctly.

### Stress, Age, Work Experience, Self-Evaluation of Knowledge, and Test Scores

A weak negative correlation that was statistically significant existed between the perceived level of stress and scores on the knowledge test ( $r=-0.151$ ;  $P=.05$ ). The results indicated that those who had more correct answers on the CPR knowledge test reported lower levels of stress when imagining having to resuscitate a person. The level of perceived stress was also connected with the self-evaluation of knowledge of CPR and first aid. Those more confident about their knowledge reported lower levels of perceived stress; the correlation being weak ( $r=-0.207$ ;  $P=.007$ ). A weak correlation also existed between the age of the participants and reported levels of stress ( $r=0.162$ ;  $P=.036$ ), older participants on average reporting slightly higher levels of stress.

Score on the knowledge test showed moderate negative correlation with age ( $r=-0.409$ ;  $P<.001$ ) and work experience ( $r=-0.388$ ;  $P<.001$ ) and moderate positive correlation correlated with self-evaluation of knowledge of CPR and first aid ( $r=0.366$ ;  $P<.001$ ). Table 3 shows the results of the analysis of the correlations between different variables.

### Discussion

To the best of our knowledge, this was the first study that examined the theoretical knowledge of CPR among occupational therapists, their self-evaluation of knowledge, and perceived stress levels connected with the implementation of CPR. On average, our participants answered less than two-thirds of the questions on the test correctly. Therefore, it is not surprising that most of them felt they needed to update their CPR skills and were critical of their knowledge. The retention of basic CPR knowledge is a common issue among occupational therapists, which has been observed in other groups of health professionals as well, for instance, nursing and chiropractic students,<sup>40</sup> nurses<sup>6,41</sup> and medical students.<sup>42</sup> It has been suggested that within the first 12 months, over 50% of basic life support skills degrades.<sup>41</sup>

Theoretical knowledge of CPR is also important. Burkhardt et al,<sup>16</sup> for example, found that CPR knowledge affects the performance of effective compressions during a simulated cardiac arrest. We might, therefore, assume that our sample was most likely not optimally prepared to apply CPR. On the other hand, Burkhardt et al<sup>16</sup> also asserted that in some cases, poor knowledge of theoretical guidelines does

**Table 3.** Correlations Between Different Variables.

	Test score	Age	Work experience	Self-evaluation of knowledge
Level of stress	-0.151*	0.162*	0.135	-0.207**
Test score		-0.409**	-0.388**	0.366**
Age			0.969**	-0.330**
Work experience				-0.328**

\*Correlation is significant at the 0.05 level (2-tailed).

\*\*Correlation is significant at the 0.01 level (2-tailed).

not reflect practical performance. For instance, they found that despite poor knowledge of guidelines for hand placement, this component was performed unexpectedly well in their sample of medical students and ER personnel.

Most occupational therapists included in our study answered the question about the depth of compressions incorrectly. This component was also the least well performed in the study by Burkhardt et al,<sup>16</sup> which might suggest that this segment of CPR requires specific attention during CPR training, theoretically and practically.

Occupational therapists included in our study generally expressed high levels of stress when asked to imagine having to resuscitate a person. We do not know if those who had low confidence about their CPR knowledge and felt stressed would actually initiate a resuscitation attempt if in an emergency. For instance, a study by Kozamani et al<sup>6</sup> showed that nurses were less likely to begin with the CPR if they were not confident about it. The authors of that study concluded that a systematic, repeated training was required to address knowledge as well as confidence. We do not know yet the role confidence plays in the success of the resuscitation. However, our study implies that self-evaluation improves with better theoretical knowledge, while stress reduces. Therefore, an individual with good CPR knowledge might be in a better mental state to assist a person experiencing a sudden cardiac arrest. Future studies could examine the correlations between CPR knowledge and practical CPR performance of occupational therapists as well as the effect confidence has on their performance.

Kozamani et al<sup>6</sup> also noted that years of work experience usually relate to the number of times a person has been trained in CPR. Their study found that nurses with more years of work experience were more likely to initiate CPR compared to less senior colleagues because they were more confident. Contrary to their findings, our study found that age did not appear to be a supporting factor when it came to knowledge and confidence. In our sample, a negative correlation was found between scores on the knowledge test, years of work experience and age, as well as between self-evaluation of knowledge, work experience and age. Furthermore, the age of the participants had a negative correlation with perceived levels of stress, older therapists reporting more stress. This suggests that older and more experienced occupational therapists were not as well trained in CPR as their

younger colleagues, felt less competent in CPR, and were more stressed about the possibility of having to resuscitate a person. This is interesting, considering that older and more experienced therapists would usually be expected to undergo more CPR training compared to younger occupational therapists. CPR and first aid have been taught as a part of occupational therapy university curriculum since at least 1982.<sup>43</sup> Therefore, senior staff and beginners have both been exposed to CPR training during their formative years. Younger therapists might have retained their CPR knowledge from the university course, whereas older therapists have forgotten it since the renewal courses are scheduled only every 7 years and there is no information on compliance. Furthermore, in Slovenia, occupational therapists who get promoted to managerial positions usually continue working (at least part time) with patients face-to-face, hence, they could require CPR skills in their daily work environment and should have these skills.

Our findings suggest that there might be a need for more intense training of CPR of occupational therapists in Slovenia at regular intervals (eg, yearly), which would ideally be mandatory to achieve better compliance. A similar conclusion was reached when testing the knowledge of CPR among a sample of Slovenian physiotherapists.<sup>44</sup> Furthermore, in order to better prepare potential first responders, CPR training should also include the psychological aspect of the first aid response.

We are aware that the limitation of our study is that the questionnaires only captured the participants' theoretical knowledge and subjective assessment of stress. Therefore, the answers might not represent the objective situation. We do not know how the participants would have performed on a practical test and what their level of stress would have been in a real-life situation. Future studies could assess both theoretical and practical knowledge of CPR among occupational therapists in different countries. It would be interesting to examine whether the frequency of CPR refresher courses influences the confidence and knowledge of occupational therapists. Most of the correlations we found were either weak or moderate. This suggests that the relationship between the studied variables might not be very strong and we should consider some other factors that were not included in our study, such as motivation, personality and previous experience with CPR. We have to consider that emergency

situations are stressful, regardless of a person's knowledge and self-efficacy.

## Conclusion

Good quality CPR can improve cardiac arrest survival rates and reduces the risk of permanent injury. Therefore, basic CPR knowledge is vital. Our study indicates a weak negative association between the knowledge of CPR and resuscitation-connected stress in a sample of Slovenian occupational therapists. Older and more experienced occupational therapists were found to have inferior knowledge of CPR and reported more stress compared to younger therapists, which implies that all therapists in Slovenia should be encouraged to update their training more frequently than every 7 years in order to improve retention of skills and knowledge. Our findings suggest that systematic and recurring training in CPR should be made more important for this professional group and might reduce their stress levels.

## Declaration of Conflicting Interests

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

## Funding

The author(s) received no financial support for the research, authorship, and/or publication of this article.

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