

High School Student CPR Training in Kuwait: A Cross-Sectional Study of Teacher Perspectives, Willingness, and Perceived Barriers

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Background: School cardiopulmonary resuscitation (CPR) training has not been previously implemented nor studied in the Arabian Peninsula, and this is due to the challenges that this training imposes. This study aims to determine high school teacher perspectives, willingness, and barriers as related to CPR student training in high schools.

Methods: An anonymous, voluntary, cross-sectional electronic questionnaire, primarily based on the theory of planned behavior (TPB) was distributed to high school principals and teachers from 20 local (public and private) high schools between October and December 2021. The questionnaire was a 4-part (demographics, willingness, barriers, implementation approach), 23-variable tool.

Results: Eighty-four out of 88 participants were included in the analysis from 20 high schools. The overall willingness to teach CPR to students was 4.2 ± 0.9 , and this willingness was significantly associated with being a female ($p = 0.019$), being a teacher ($p = 0.036$), having a family history of cardiovascular disease ($p = 0.007$), previous school CPR campaigns ($p = 0.02$), and all TPB factors: attitude ($p = 0.001$), subjective norms ($p = 0.011$), and perceived behaviour control ($p = 0.007$). As for perceived barriers, there was moderate concern regarding the absence of the Good Samaritan law (3.8 ± 1.1) and CoVID-19 transmission (3.5 ± 1.3). High school teaching staff recommended formal legislation of CPR training from the Ministry of Education (MoE) and favoured CPR training delivery by healthcare professionals. However, they were willing to conduct CPR training themselves with regular training, material integration into the curriculum, and online teaching material access.

Conclusion: High school teachers are willing to teach students CPR. They need MoE legislation, appropriate training, online material, and a standardized database. Teaching staff also recommend specific training session settings. CoVID-19 and Good Samaritan law are moderate barriers. A number of factors influence teaching staff willingness to conduct CPR training. From this analysis, we recommend piloting CPR training in Kuwait high schools with consideration to the identified influential factors and barriers.

Keywords: high school, cardiopulmonary resuscitation, training, willingness, theory of planned behavior, Kuwait

Introduction

Cardiac arrest is a life-threatening condition with a very low survival rate in Kuwait (<1%).¹ One key component of the chain of survival is bystander cardiopulmonary resuscitation (CPR). Early Bystander CPR is associated with 3–4 times higher rates of survival and the use of Automated external defibrillator (AED) is associated with 4–5 times higher survival in some studies.²

In real life, strengthening the bystander CPR link can be achieved by more than one approach. For instance, the Republic of Korea implemented mandatory CPR education for first responders and students, modified good Samaritans' law and activated telephone assisted – CPR to amplify bystander CPR rate in its' community. This resulted in high bystander CPR rate 63%, survival rate of 26.9% and 21% of good neurological outcomes.³

Nationally, Kuwait is unique for both its legislations and culture. For a person in cardiac arrest in Kuwait, CPR can only be provided by a healthcare provider or a person holding a valid first-aid license. The absence of Good Samaritan law and lack of bystanders' recognition of cardiac arrest signs and symptoms are major obstacles in improving bystander CPR rates in Kuwait.¹ In response, the Ministry of Health runs regular CPR campaigns to enhance bystander CPR rates in Kuwait.⁴ Despite that, the national bystander CPR rate remains low, 8.7%.¹ Therefore, there is a national need to optimize existing methods and/or pursue new, more effective ones in order to enhance bystander CPR rates in this community.

Just like the republic of Korea, Kuwait can follow the World Health Organization (WHO) and *American Heart Association (AHA) recommendations*. In 2015, the WHO endorsed "kids Save Lives", a project to reduce cardiac arrest mortality, where children were taught CPR in schools, this led to higher rates of CPR and thus higher survival rates.⁵ Similarly, the *AHA guidelines for Cardiopulmonary Resuscitation and Emergency Cardiovascular Care (2020)* highlighted CPR training in schools as an effective approach to improve bystander CPR rates.⁶ The AHA brands this approach as the golden tool to improve the number of trained lay rescuers in future communities; but CPR training in school systems is not without its challenges.⁶ Looking at developed countries who implemented CPR training in their school systems, it seems that mandating CPR training is not enough to implement CPR training in schools.⁷⁻⁹ There were many challenges that hindered the integration of CPR training into school curricula. Teachers' acceptance and beliefs about CPR education appears to be the main challenge, followed by training teachers, legal obligations, funding, and resources.⁷ School principals on the other hand addressed; course time restriction, finding a trainer, inadequate funding and support, students and parents disapproval are perceived difficulties in implementing CPR training in their schools.¹⁰

Given the very limited number of regional studies on CPR training in schools^{11,12} and the aforementioned challenges highlighted from the experiences of communities who have pioneered the implementation of CPR training,⁸⁻¹⁰ this study aims to survey the willingness of teaching staff in Kuwait to embark on such a project, in addition to perceived barriers and other factors influencing CPR training in high schools. Also, this study attempts to explore teaching staff views on the best approach to implement CPR training in high schools.

Method

Setting and Design

There are 198 high schools in Kuwait.¹³ A cross-sectional electronic questionnaire was distributed to principals and teachers from twenty (public and private) high schools in Kuwait via email. Emails were retrieved from school websites between October 1st and December 31st of 2021. The email recipients were invited to voluntarily complete the anonymous survey. Completion of the questionnaire implied consent to participate. It took about five minutes to complete the questionnaire; and no compensation was given to survey respondents for completing it.

Instrument Development

The developed questionnaire "Grade 11 CPR Training" consisted of four distinct parts: demographics, willingness, barriers and approach to implementation. The final questionnaire includes twenty-three variables.

The nine demographic subsection variables focused primarily on: (a) the school's previous experience with CPR training (binary: yes/no), (b) the number of 11th grade students (free text), and (c) the number of physical exercise teachers (free text).

The willingness subsection was structured using the Theory of Planned Behavior (TPB) model. This model has been used previously to understand the implementation of CPR training^{14,15} and is useful in discerning the human behavior aspect of that. According to TPB, a teacher's intention, and consequently behavior, in implementing CPR is influenced by three variables: (a) attitude towards the behavior: whether teachers are in favor of teaching their students CPR, (b) subjective norms: whether teachers feel obliged to teach their students CPR, and (c) perceived behavior control: whether teachers feel capable of teaching their students CPR. These three variables were measured twice: directly and indirectly using a 5-point Likert scale from 1 to 5. Willingness was assessed by asking participants to respond to the following statement: "after I complete my CPR training, I am willing to teach my students CPR?" using a 5-point Likert scale.

In the barriers to implementation section, provider liability and legal protection (the Good Samaritan law) and CoVID-19 concerns were highlighted using a 5-point Likert scale.

Lastly, the implementation approach subsection included six variables: (a) CPR training course mandatory legislation (5-point Likert scale), (b) course teaching staff (multiple choice questions), (c) regularity of training course delivery (5-point Likert scale), (d) method of course delivery (multiple choice questions), (e) training session details (multiple choice questions), (f) resources (5-point Likert scale), and (g) data handling and registry (5-point Likert scale).

Both Arabic and English versions of the study questionnaire were available in order to optimize user-friendliness and thus the response rate. To avoid compromising content validity and ensure content appropriateness for the purpose of the study, the two versions were structured by one author and then revised by three researchers. Content clarity to the audience was also assured by sending a sample questionnaire to one teacher who pursued correct understanding of the language. We also evaluated the questionnaire reliability using the initial ten responses and Cronbach alpha α was kept equal to 0.704, this ensured the internal consistency of the questionnaire.

Participants

High school principals and physical exercise teachers in Kuwait are the only eligible participants for this analysis. The reason for including physical exercise teachers is that first aid is part of the physical exercise syllabus in some countries.^{16,17} The study includes all completed forms from the targeted participants and excludes all form teachers of other subjects, uncomplete forms and duplicated forms.

Ethical Approval

The study protocol was reviewed by the ministry of health independent ethical committee granted an IRB approval on 17 May 2021 (No. 1951).

Outcomes

The primary outcome is high school staff willingness to train their students in CPR. Respondents who scored 3–5 on the relevant 5-point Likert scale were categorized as willing to teach, and those who scored 1 and 2 were categorized as not willing.

Sample Size

The target sample size was analyzed using G power software (Version 3.1.9.4). We estimated using a *priori power analysis* that a minimum of 74 participants would be adequate for the purpose of this study, with an α error of 0.05, a power of 0.9, an effect size of 0.15 and attrition rate less 0.05.

Statistical Method

Participant demographics were reported as mean \pm standard deviation. For age Shapiro–Wilk test was performed to evaluate normality. Barriers and recommended approaches to implement a CPR training program were reported as frequencies (percentages) for continuous and categorical variables.

To correlate the TPB factor direct and indirect measures, Pearson correlation was performed to identify whether or not there was a significant correlation. The results again were expressed in mean \pm standard deviation. The value of $p < 0.05$ was considered statistically significant.

Logistic regression was used to identify factors that influence teaching staff willingness to implement CPR training in their schools. A p value of < 0.05 was designated as significant.

All analyses were performed using Excel (version 23 for Windows) and Statistical Package for Social sciences (SPSS Version 23, IBM, USA, NY).

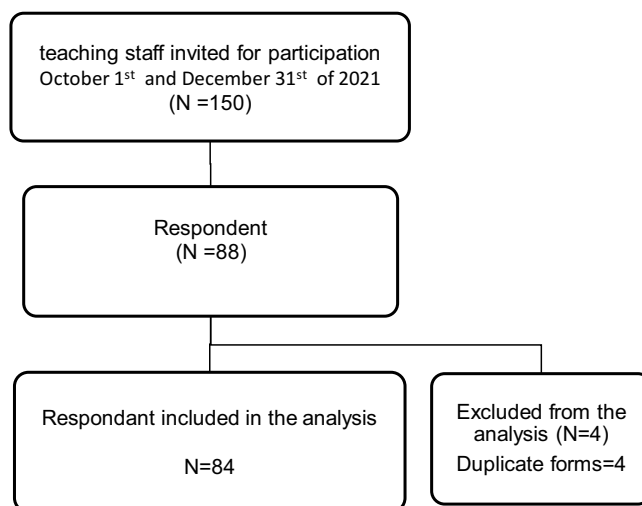


Figure 1 Flow chart of study population.

Results

84 out of 88 participants were included in the analysis from 20 high schools, [Figure 1](#). High school teaching staff were willing to teach their students CPR, 4.2 ± 0.9 ([Table 1](#)).

In terms of barriers, there is a moderate concern regarding Kuwait's Good Samaritan law, 3.8 ± 1 and CoVID-19 transmission, 3.5 ± 1.3 ([Table 1](#)).

Table 1 Descriptive Analysis of Teaching Staff Characteristics, Willingness and Barriers

Variable	N=84 (%)	P-value
1. Gender		
a. Male	23 (27.4)	
b. Female	61 (72.6)	
2. Role		
a. School principal	6 (7)	
b. Teaching staff	78 (93)	
3. Age (mean \pm std.)	37 \pm 10.7	0.000
4. Previous training on CPR or first aid	48 (57)	
5. Family member with cardiac disease	20 (24)	
6. School category		
a. Government school	60 (71.4)	
b. Private school	24 (28.6)	
7. The school have carried CPR training course	31 (37)	
8. Number of grade 11 students (mean \pm std.)	88 \pm 81	
9. Number of PE teachers (mean \pm std.)	6 \pm 2.4	
10. Willingness	4.2 \pm 0.9	
11. Barriers		
a. Good Samaritan law	3.8 \pm 1.1	
b. COVID 19 transmission	3.5 \pm 1.3	

Table 2 Descriptive Analysis Teaching Staff Perspective for Implementing CPR in High School and Barriers to Implementing CPR

Variable	N=84
1. CPR training course mandatory legislation	
“MOE should legislate mandatory CPR training in high schools.”	4.1± 1.2
2. Teaching staff	
Student should be taught by:	
a. professional BLS instructors.	43 (51.2)
b. volunteering teachers from the school	13 (15.5)
c. physical exercise teachers.	5 (6)
d. science teachers.	7 (8.3)
e. Science teachers and physical exercise teachers.	16 (19)
3. Training Course delivery	
I. Regularity of training Course delivery (mean±std.) “It is best to assign a CPR training week in the school academic calendar to teach CPR to all 11 grade students”.	3.7± 1.2
II. Method of course delivery	
a. Taught in science subject (theoretical part) and physical exercise subject (practical) as part of the curriculum.	58 (69)
b. Taught online (theoretical part) and hands-on session (practical part) in school.	26 (31)
4. Training session details	
I. Training session period (mean±std.)	
a. “Training session should be 2–3 hours.”	3.5± 1.4
b. “Training session should be no longer than 50 minutes.”	4.2± 1.1
II. Location	
a. Gymnasium.	55 (65.5)
b. Assigned classroom.	29 (34.5)
III. Number of students per session:	
a. 12 students.	58 (69)
b. 30 students.	19 (22.6)
c. 50 students.	7 (8.3)
5. Resources	
I. Teachers training as instructors (mean±std.) “I am willing to get regular training every 2 years”	4.2± 0.9
II. Equipment (mean±std.) “I can store 12–30 trainings manikin appropriately in my school”.	3.5 ±1.2
III. Material	
a. Teaching material as a hard copy	33 (39)
b. teaching material through an internet website.	51 (61)
6. Creating database and registry	
I. Data sharing (mean±std.) “I am willing to provide a list of all teachers (CPR instructor) and trained students on a regular basis to project leaders.”	3.8 ±.9
II. Data handling (mean±std.) “I don’t mind entering trained students details to your registry every year.”	4± 0.82
III. Follow up (mean±std.) “As a principal or a instructing teacher I a willing to inform you about my school allocations.”	4 ±.9

Table 3 Pearson Correlation of TPB Factors

Variable	Mean \pm STD	R	P-value
1. Attitude (mean \pm std.)			
a. Direct measure: "CPR training should be mandatory."	4.5 \pm 1	0.595	<0.01
b. Indirect measure: "CPR training empowers students to take action in emergency situations."	4.5 \pm 0.8		
2. Subjective norms (mean \pm std.)			
a. Direct measure: it is the teacher responsibility to ensure student receive proper training?	3.4 \pm 1.7	0.330	0.108
b. Indirect measure: "not all students should be trained for CPR before their graduation"	3.72 \pm 0.13		
3. Perceived control behavior (mean \pm std.)			
a. Direct measure: "do you feel you have the skills to train students in CPR?"	4.2 \pm .11	0.923	<0.01
b. "Indirect measure; I can teach and keep records of the trained students in my class"	4.3 \pm .9		

About half of high school teaching staff recommend formal legislation of CPR training implementation by MoE and are more in favour of healthcare professionals' provision of CPR training. However, they are willing to conduct the CPR training themselves after; a) receiving regular training b) Integrating the material into the school curriculum (science and physical exercise) c) having access to online teaching material [Table 2](#). In terms of data handling, the majority of participants welcomed database sharing and handling, 3.8 \pm .9 and 4 \pm 0.82, respectively, [Table 2](#).

At last significant correlation of TPB factors direct and indirect measures was observed except for subjective norms, [Table 3](#).

Thus, we included all TPB factors in willingness logistic regression. Teaching staff willingness was significantly associated with being a female ($P=0.019$), being a teacher ($P=0.036$), family History with cardiovascular disease ($P=0.007$), school previous CPR campaigns ($P=0.02$) and all the TPB factors; attitude ($P=0.001$) subjective norms ($P=0.011$), perceived behaviour control ($P=0.007$), [Table 4](#).

Table 4 Logistic Regression Analysis: Influence of Demographic Variables, Training and Theory of Planned Behavior on the Willingness of Teaching Staff to Train Their Students on CPR

Variable	P-value	OR (95% CI)
Gender	0.001	1.4 (-20-22)
Age	0.086	0.08 (1.9-10)
A family member with cardiovascular disease	0.007	2.1 (18-35)
Role of participant	0.036	1.2 (-21-14)
Trained on CPR	0.078	0.2 (13-52)
School runs regular CPR campaigns	0.027	1.4 (64-101)
Attitude (direct)	0.001	1.4 (17-89)
Attitude (indirect)	0.001	2 (-17-2)
Subjective norms (direct)	0.011	0.6 (10-65)
Subjective norms (indirect)	0.012	1.1 (8-95)
Perceived control behavior (direct)	0.007	0.4 (6.2-77)
Perceived control behavior (indirect)	0.042	0.5 (38-84)

Discussion

During this study, we evaluated the willingness of educators in Kuwait to teach CPR to high school students. We also evaluated factors, barriers and the teaching staff's viewpoint on implementing CPR training. Findings were: a) teaching staff were willing to educate their students about CPR. b) Factors associated with staff willingness to teach CPR include; gender, family member with cardiovascular disease, school with regular CPR campaigns, role of participants, teaching staff favourability to train on CPR (attitude), teaching staff feel obliged to teach CPR (subjective norms) and teaching staff capability to teach CPR (perceived control behaviour). c) In Kuwaiti high schools, CoVID-19 and legal liability were moderate barriers to implement CPR training. d) The teachers recommend that CPR training be formalized in Kuwaiti high schools, that instructors receive proper training, integrate CPR into curriculum, have access to online material, train students in small groups, hold classes in gyms, and maintain their own databases and registries.

In order for a CPR training program to be successful, the teaching staff must be willing to participate in the program.¹⁸ We reported a willingness level that was within the range of current literature levels (32–91.8%). Several demographic factors and TPB factors were also identified in this study as influencing teaching staff willingness.

In terms of demographical factors, our findings were partially consistent with the present literature. According to previous studies:^{8,19–21} gender, and family member with cardiovascular disease. New demographic factors have been added, such as the role of participants and schools with regular CPR campaigns.

Among the TPB factors, attitudes, subjective norms, and perceived behaviour control were all associated with teaching staff willingness. This is somewhat consistent with the recent literature.^{9,11,20,22} Many studies documented a positive association with teachers' willingness levels^{10,20,23,24} and only one study found a link between perceived control behaviour and CPR implementation in school.⁹

As for CPR training barriers, legal liability seems to be a worldwide concern. Not only has our research illustrated concerns regarding Good Samaritan law, Fan et al, Mpotos et al and Ojifinni et al have recorded high legal liability concerns among their participants, 80–83.5%. Collectively, we recommend clarifying the legal liability of CPR provision during CPR training in schools.

Furthermore, in barriers, this research is the first to document moderate concerns of COVID-19 transmission among teaching staff. Once again, this finding is of substantial value for structuring a new module of school CPR training campaigns. To enhance school CPR campaigns implementation, leaders of CPR training campaigns should consider complete or partial distance learning to train on CPR in schools.^{25–29}

Our findings also indicate that the national teaching staff had a similar perspective to Danish teachers regarding CPR training implementation in high schools.⁸ Receiving qualified training, having access to relevant training material and integrating CPR training to school curriculum were supported by both teaching staff.

The setting of CPR training sessions should be clear,²⁶ yet only a few studies have evaluated the setting of CPR training sessions. One British study found that teaching staff are more in favour of training CPR in small groups.²⁷ We have added a week in the academic calendar, 50 minutes duration, and a gym to our list of details on CPR training.

Lastly, to ensure CPR training program implementation and outcomes measurement, databases should be established and accessed on a regular basis. In the United States, The Family Educational Rights and Privacy Act (FERPA) protects student educational records.²⁸ Other countries have similar laws.^{29,30} Therefore, it is very common that CPR training program databases will be maintained by teaching staff. Given the load of teaching academic curriculum along with CPR training, it is vital to know whether teaching staff are willing to handle databases and can disclose anonymous data on a regular basis or not. The study is the first to examine teachers' willingness to handle and share training data.

The findings of this study should be viewed in the context of its limitations. First, although we have identified significant *P*-values for the analysed independent variables, the *CI* interval was wide for all the variables. This could be due to the presence of outliers or the need to repeat the analysis with a larger sample size. Second, voluntary participation and self-reporting were potential sources of bias. Bias can be eliminated with random participation. Third, our findings cannot be generalized to non-regional communities; this is because non-Gulf communities have different school structures, student capacities, legislation and culture. In high schools, our instrument can be used to

determine teaching staff willingness, factors, barriers, and preferred CPR training methods. Furthermore, limiting the eligible participants to principals and physical exercise teachers imposes obvious limitations to the sample size, and significantly limits the generalizability of the results to these two high school staff subsets. We intentionally opted to limiting the survey to high schools at the outset of this project with the intent of eventually expanding to encompass middle, and eventually primary, schools because success with the higher level schools would pave the way to said expansion on legislative, educational, and community levels. Finally, we did not evaluate the staff's knowledge of CPR. Lack of CPR knowledge can be a barrier to implement CPR training.^{18–20}

Conclusion

High school teachers are willing to teach their students CPR. They need MOE legislation, appropriate training, an adequate source of online material, and a standardized database. Teaching staff also recommend specific training session settings. COVID 19 and Good Samaritan law are moderate barriers. There are a number of factors that influence teaching staff's willingness to train on CPR. From this analysis, we recommend piloting CPR training in Kuwait high schools with consideration to the identified influential factors and barriers.

Abbreviation

CPR, cardiopulmonary resuscitation; TPB, theory of planned behavior; MoE, Ministry of Education.

Data Sharing Statement

The datasets during and/or analysed during the current study available from the corresponding author on reasonable request.

Ethical Approval

The study received IRB approval from the Kuwait Ministry of Health independent ethics committee on 17 May 2021 (No. 1951). No administrative permission were need to acquire the collected data.

Informed Consent

Informed consent was sought for the present study from all participants prior participation.

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Author Contributions

All authors made a significant contribution to the work reported, whether that is in the conception, study design, execution, acquisition of data, analysis and interpretation, or in all these areas; took part in drafting, revising or critically reviewing the article; gave final approval of the version to be published; have agreed on the journal to which the article has been submitted; and agree to be accountable for all aspects of the work.

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References

1. Al Hasan D, Yaseen A, El Sayed M. Epidemiology and outcomes from out-of-hospital cardiac arrest in Kuwait. *Emerg Med Int.* 2020;2020:1–6. doi:10.1155/2020/9861798
2. Wissenberg M, Lippert FK, Folke F, et al. Association of national initiatives to improve cardiac arrest management with rates of bystander intervention and patient survival after out-of-hospital cardiac arrest. *JAMA.* 2013;310(13):1377–1384. doi:10.1001/jama.2013.278483
3. Lim K, Ahn K, Park J, Park C, Lim J, Lee K. Bystander cardiopulmonary resuscitation in public locations before and after the coronavirus disease 2019 pandemic in the Republic of Korea. *Am J Emerg Med.* 2022;56:271–274. doi:10.1016/j.ajem.2021.07.012
4. Emergency Medical Services. Out of hospital cardiac arrest Report; Spring-Summer 2016 report. Audit Department. Emergency Medical services, Ministry of health. State of Kuwait; 2016.
5. Parisis C, Bouletis A, Ntaliani M, et al. The impact of kids save lives program on knowledge, skills and attitude of students, preliminary results from 2 years of implementation. *Eur Heart J.* 2020;41(2). doi:10.1093/ehjci/ehaa946.1822.
6. Metchant R, Topjian A, Panchal A, et al. Part 1: executive summary: 2020 American Heart association guidelines for cardiopulmonary resuscitation and emergency cardiovascular care. *Circulation.* 2020;142:337–357.
7. Yu Y, Meng Q, Munot S, Nguyen T, Redfern J, Cho C. Assessment of community interventions for bystander cardiopulmonary resuscitation in out-of-hospital cardiac arrest: a systematic review and meta-analysis. *JAMA network open.* 2020;3(7):e209256. doi:10.1001/jamanetworkopen.2020.9256
8. Hansen C, Zinckernagel L, Ersbøll A, et al. Cardiopulmonary resuscitation training in schools following 8 years of mandating legislation in Denmark: a nationwide survey. *J Am Heart Assoc.* 2017;6(3):4128.
9. Allen K, Jefkins T, Oniel E, Dorian P, Lin N. Mandating training is not enough: the state of cardiopulmonary resuscitation and automated external defibrillator training in Ontario schools. *Can J Cardiol.* 2021;3(6):822–826.
10. Yim VWC, Ip CM-L, Siu AYC, et al. Cardiopulmonary resuscitation training in secondary education: a prospective cross-sectional survey of 110 Hong Kong secondary schools. *Hong Kong J Emerg Med.* 2021;28(1):30–36. doi:10.1177/1024907920971159
11. Al Enizi B, Saquib N, Zaghloul M, Alaboud M, Shahid M, Saquib J. Knowledge and attitudes about basic life support among secondary school teachers in Al-Qassim. Saudi Arabia. *Int J Health Sci.* 2016;10(3):415–422. doi:10.12816/0048736
12. Alharbi M, Horaihoqab Y, Almutairi M, Alghoraibi M, Alhadeedi F, Alrowithi A. Exploring the extent of knowledge of CPR skills among school teachers in Riyadh, KSA. *J Taibah Univ Med Sci.* 2016;11(5):497–501. doi:10.1016/j.jtumed.2016.07.007
13. Ministry of education. Education [Online]. Available from: <https://www.e.gov.kw/sites/kg0Arabic/Pages/CitizensResidents/Education/SchoolsPrivate.aspx>. Accessed October 11, 2022.
14. Wati S, Wihastuti T, Nasution T. Application of the theory of planned behavior to identify nursing student's intention to be a bystander cardiopulmonary resuscitation. *Nurs J.* 2021;1(1):24–30.
15. Magid KH, Ranney ML, Risica PM. Using the theory of planned behavior to understand intentions to perform bystander CPR among college students. *J Am Coll Health.* 2022;69(1):47–52. doi:10.1080/07448481.2019.1651729
16. Mao J, Chen F, Xing D, Zhou H, Ling J, Zhang Y. Knowledge, training and willingness to perform bystander cardiopulmonary resuscitation among university students in Chongqing, China: a cross-sectional study. *Br Med J.* 2021. doi:10.1136/bmjopen-2020-046694
17. Bakke HK, Schwebs R. First-aid training in school: amount, content and hindrances. *Acta Anaesthesiol Scand.* 2017;61(10):1361–1370. doi:10.1111/aas.12958
18. Brown LE, Lynes C, Carroll T, Halperin H. CPR instruction in U.S. high schools: What is the state in the nation? *J Am Coll Cardiol.* 2017;70(21):2688–2695. doi:10.1016/j.jacc.2017.09.1101
19. Dumcke R, Wegner C, Böttiger B, Kucknata L, Rahe-meyer N. The process of implementing cardiopulmonary resuscitation training in schools: a review of current research. *J Innov Psychol Educ Didact.* 2019;23(2):141–166.
20. Mpotos N, Vekeman E, Monsiers K, Derese A, Valcke A. Knowledge and willingness to teach cardiopulmonary resuscitation: a survey amongst 4273 teachers. *Resuscitation.* 2013;84(4):496–500. doi:10.1016/j.resuscitation.2013.01.023
21. Winkelman J, Fischbach R, Spinello E. Assessing CPR training: the willingness of teaching credential candidates to provide CPR in a school setting. *Educ Health J.* 2009;22(3):81.
22. Fan M, Leung L, Leung R, Hon S, Fan K. Readiness of Hong Kong secondary school teachers for teaching cardiopulmonary resuscitation in schools: a questionnaire survey. *Hong Kong J Emerg Med.* 2019;26(3):174–178. doi:10.1177/1024907918797532
23. Chen Z, Wang H, Yan Y, et al. Knowledge and attitude on cardiopulmonary resuscitation education of primary and secondary schoolteachers in China. *Chin Med J.* 2019;132(10):1244–1246. doi:10.1097/CM9.0000000000000236
24. Smedt L, Depuydt C, Vekeman E, et al. Awareness and willingness to perform CPR: a survey amongst Flemish schoolchildren, teachers and principals. *Acta Clin Belg.* 2019;74(5):297–316. doi:10.1080/17843286.2018.1482087
25. Ojifinni K, Motara F, Laher AE. Knowledge, attitudes and perceptions regarding basic life support among teachers in training. *Cureus.* 2019;11(12):6302.
26. Han S, Park H, Nah S, et al. Instructor-led distance learning for training students in cardiopulmonary resuscitation: a randomized controlled study. *PLoS One.* 2021;16(5):0251277.
27. Chien C, Fang S, Tsai L, et al. Traditional versus blended CPR training program: a randomized controlled non-inferiority study. *Sci Rep.* 2020;10(1):10032. doi:10.1038/s41598-020-67193-1
28. Nas J, Thannhauser J, Vart P, et al. Effect of face-to-face vs virtual reality training on cardiopulmonary resuscitation quality: a randomized clinical trial. *JAMA Cardiol J.* 2020;5(3):328–335. doi:10.1001/jamacardio.2019.4992
29. Whiteman L, Gibbons M, Smith W, Stewart R. Top 10 things you need to know to run community health worker programs: lessons learned in the field. *South Med J.* 2016;109(9):579–582. doi:10.14423/SMJ.0000000000000504
30. Lockey A, Barton K, Yoxall H. Opportunities and barriers to cardiopulmonary resuscitation training in English secondary schools. *Eur J Emerg Med.* 2016;23(5):381–385. doi:10.1097/MEJ.0000000000000307

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