



# Public Perception and Willingness Towards Bystander Cardiopulmonary Resuscitation (CPR) Training and Performance in Pakistan

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## Abstract

**Background/Aim:** Bystander cardiopulmonary resuscitation (CPR) during out-of-hospital cardiac arrest increases both survival rates and neurological recovery, but in Pakistan, an alarmingly low 2.3 % of these individuals receive bystander CPR. This study was designed to identify the reasons that affect the perception and willingness of the public toward bystander CPR training and performance in Lahore, Pakistan.

**Methods:** A CPR master trainer from the USA visited various organisations from 1 December 2022 to 31 January 2023, to conduct training sessions. Before and after the training, a questionnaire was distributed among respondents to fill in. The subjects were asked to answer questions about their perception and willingness to perform bystander CPR.

**Results:** Out of 401 participants, 240 completed the survey, with a response rate of 59.85 %. The majority of them were males [146 (60.8 %)], 215 (89.6 %) were below the age of 40, 107 (44.6 %) were graduated, 182 (75.8 %) never participated in any CPR training, mainly due to their ignorance towards the importance of bystander CPR (52.8 %) and 152 (63.3 %) were eager to participate in the CPR training course. Furthermore, the leading problem in providing bystander CPR was lack of technique or fear of possible harm that can be proved fatal (48.8 %), followed by concerns related to involvement in any legal procedure (10.0 %).

**Conclusions:** Bystander CPR is still uncommon in Pakistan. Participants were reluctant to perform bystander CPR because of various concerns and fears. Lack of proper skill and causing additional harm were the main reasons associated with this. Hence, while improving CPR training and public education, these findings must be considered.

**Key words:** Cardiopulmonary Resuscitation (CPR); Pakistan; Survey; Questionnaire.

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## Introduction

Sudden cardiac arrest remains one of the most significant health issues and continues to be the leading cause of death despite all the advancements in the medical field.<sup>1,2</sup> Every year, more than 3 million people experience cardiac fatalities worldwide, with the survival rate as low as 8 %.<sup>3</sup>

For some, it is a natural death while for others, it represents an unforeseen episode that occurs before the time. Cardiac arrest can occur both in and out of the hospital. In cases of out-of-hospital cardiac arrest (OHCA), public engagement and immediate intervention from a fellow being,

known as a bystander plays a pivotal role, making rapid resuscitation an urgent imperative. The chance of survival increases two to four times through effective and timely cardiopulmonary resuscitation (CPR).<sup>4</sup> Although OHCA ensures a survival rate of up to 20-70 %, the death rate is high because of insufficient practice of bystander CPR around the world.<sup>5</sup>

The developing countries show the gloomy side of the picture where there is insufficient knowledge related to bystander CPR. The survival rate in those regions, varied from country to country, from as low as 0 % in Mexico to 2 % in Islamabad, Pakistan.<sup>6</sup> It must be noted that all age groups from infants to adults experience OHCA.<sup>7,8</sup> As CPR is considered to be a substantial factor in survival, it is highly recommended to teach and practice this life-saving skill throughout the world because it improves the survival rate when properly managed by an individual before the arrival of medical staff.<sup>9</sup> Globally, many efforts are being made to improve the quality of CPR and develop the interest of people to get trained in resuscitation at the same time.<sup>4</sup> However, the results are quite the opposite and disappointing because insufficiently trained personnel exist.<sup>10</sup>

The data collected from Pakistan also suggests that the public has a poor understanding related to CPR.<sup>11-13</sup> This lack of knowledge can bring serious consequences and give birth to medico-legal complications. On the contrary, unacceptable techniques and insignificant knowledge can become counter-productive as they may cause CPR-related injuries. Through this study, public perception and willingness towards bystander CPR training and performance will be evaluated. Moreover, those factors will be highlighted that caused individuals hesitant to perform CPR or attend CPR training courses.

## Methods

### Study setting and participants

This cross-sectional study was conducted from 1 December 2022 to 31 January 2023 in Lahore, Pakistan. An American Heart Association (AHA)-certified CPR master trainer from the USA visited various organisations in Lahore, Pakistan to conduct CPR training sessions. A total of 401 participants were recruited and selected from the Falah Foundation, Hunar Foundation, Punjab Red

Crescent Society and a random selection of individuals from the general population. The majority were selected from societies because of their nature of work. Their profession demands activation, more specifically, in times of emergencies or crises, they act as first responders. Hence, this training enables them to fit into the real world by equipping them with practical skills and knowledge. Informed consent was obtained from each participant. The inclusion criteria were that individuals had to be between the ages of 15 and 80 years old.

### Sample size

The World Health Organization (WHO) sample size software was used to determine sample size, with a 95 % confidence level, assuming an expected population proportion of 50 % and a margin of error of 5 %. The sample size was 401 but after the exclusion of 161 participants, there were 240 respondents. These subjects were excluded due to the contradictory answers and an incompletely filled questionnaire.

### Data collection tool

A detailed and well-structured questionnaire was designed as per the recent AHA guidelines and distributed to participants. It was available as both a Google form and a hard form. Most of the subjects who were below the age of 30 and at least went to college preferred to fill out online questionnaires with the help of smartphones because they found it easy. There were three sections. Part one included demographic information like age, gender and education; part two was about willingness towards bystander CPR before training and the third section consisted of knowledge and attitude of participants after training.

### Statistical analysis

Data collected from the questionnaire was transferred into using IBM Statistical Package for Social Sciences (SPSS) 28.0.1 version for analysis. Descriptive statistics was used to review, tabulate and statistical analysis of demographic information and presented as frequencies and percentages. For the comparison of different variables, a Chi-square test was employed. The p-value < 0.05 was considered statistically significant. The validity and reliability of the questionnaire were assessed by Cronbach's alpha. The reliability is directly proportional to the number of items. If there were more than ten items, a Cronbach alpha of  $\geq 0.7$  was considered acceptable while  $> 0.5$  was acceptable for scales consisting of less than ten items.<sup>14</sup>

### Ethical approval

The study was conducted after attaining authorisation from the ethical committee of respective organisations. The participants were informed and written consent was obtained from them. The anonymity was ensured by assigning unique numbers to respondents.

## Results

Out of 401 participants, only 240 responses were included and analysed, with a response rate of 59.85 %. The remaining 161 respondents were excluded due to contradictory answers and an incomplete filled questionnaire. The demographic attributes of participants are exhibited in Table 1.

Table 1: Demographic attributes of participants

Demographic characteristics	n	%
<b>Gender</b>		
Male	146	60.8
Female	94	39.2
<b>Age</b>		
< 20	55	22.9
20-29	145	60.4
30-39	15	6.3
40-49	16	6.7
50-59	7	2.9
≥ 60	2	0.8
<b>Educational background</b>		
Primary	9	3.8
Secondary	36	15.0
Intermediate/ A-levels	72	30.0
Graduation	107	44.6
Post-graduation	16	6.7
<b>Association with organisation</b>		
Falah Foundation	66	27.5
Hunar Foundation	74	30.8
Punjab Red Crescent Society	53	22.1
General population	47	19.6
<b>Have you ever participated in CPR training?</b>		
Yes	58	24.2
No	182	75.8
<b>What type of courses have you attended?</b>		
Chest compression and mouth-to-mouth	56	23.3
Never attended	184	76.7
<b>Willing to participate in a free CPR training course</b>		
Definitely yes	152	63.3
Maybe	72	30.0
Refused to answer	16	6.7

CPR, Cardiopulmonary resuscitation;

Among the respondents, there were 146 (60.8 %) males, 94 (39.2 %) were females and 215 (89.6 %) were below the age of 40. Most of the participants 107 (44.6 %) were graduated. The majority of the subjects 193 (80.4 %) were associated with organisations or foundations, mainly from the Falah Foundation 66 (27.5 %), 74 (30.8 %) from the Hunar Foundation and 53 (22.1 %) from the Punjab Red Crescent Society. Furthermore, the test validity was found to be 0.750 (Table 2).

Table 2: Statistics on questionnaire reliability (Cronbach's alpha: α, 0.750; n, 240)

Number of items	Internal consistency	Variance	Mean score
5	0.750	0.404	2.121

For CPR background, 182 (75.8 %) never participated in any CPR training, with 56 (23.3 %) had attended both chest compression and mouth-to-mouth courses. There were some reasons for not participating in CPR training (Table 3), largely because of the unawareness of the significance of bystander CPR (n = 127; 52.8 %). However, participants 152 (63.3 %) stated that they were prepared to participate in the CPR training course.

Table 3: Reasons for not participating in CPR training courses

Reasons	n	%
There is a lack of awareness of the importance of bystander CPR	127	52.8
I have participated in a CPR training course	56	23.3
I feel I do not need to learn this	54	22.4
It should be specific for professionals only	36	14.9
It is too difficult for me	21	8.7
I am not sure when to attend the course	17	7.0
I do not have enough time	5	2.0

CPR, Cardiopulmonary resuscitation;

Before training, when participants were asked about their level of knowledge about CPR training, 68 participants (28.3 %) reported being able to perform CPR. However, a significant number of participants (87 participants; 36.2 %) stated that they did not know anything about CPR training, while 64 participants (36.78 %) reported only knowing the name of CPR. Regarding the perceived permissible delay in initiating CPR for its effectiveness, 80 participants (33.3 %) believed that a delay of 1 minute or less is acceptable. Other responses included a delay of 5 minutes (22 participants; 9.2 %), 10 minutes (29 participants; 12.1 %), 30 minutes (30 participants; 12.5 %) and having no idea (79 participants; 32.9 %). After the training, they not only became confident in performing CPR smoothly but their knowledge was also improved (Table 4).

**Table 4:** Knowledge of the participant pre and post-CPR masterclass

Questions	Answers	Pre-training n (%)	Post-training n (%)
How much do you know about performing CPR?	Call for people or telephone	85 (35.4)	0.0
	Can smoothly perform CPR	68 (28.3)	240 (100.0)
	Do not know at all	87 (36.2)	0.0
What do you think "heart massage" mean?	Have no idea	52 (21.7)	0.0
	To compress the chest strongly	144 (60)	240 (100.0)
	To rub chest	44 (18.3)	0.0
Which one of the following is the most important step during CPR?	Artificial breathing	15 (6.3)	0.0
	Heart massage	63 (26.2)	0.0
	Both heart massage and artificial breathing	106 (44.2)	240 (100.0)
	Have no idea	56 (23.3)	0.0
How much time delay in CPR is permissible in CPR for its maximum effectiveness?	1 min	80 (33.3)	240 (100.0)
	5 min	22 (9.2)	0.0
	10 min	29 (12.1)	0.0
	30 min	30 (12.5)	0.0
	Have no idea	79 (32.9)	0.0

CPR, Cardiopulmonary resuscitation;

**Table 5:** Causes to avoid to perform CPR, even if trained

Reasons	n	%
Fear of performing immature techniques or possible harm that can be caused as a result of improper CPR	117	48.8
Agreed to perform CPR	97	40.4
No difference between performing CPR immediately and waiting for the emergency personnel to arrive	33	13.8
Avoid legal problems	24	10.0
Fear of performing mouth-to-mouth resuscitation	12	5.0
Afraid of getting an infectious disease	10	4.1
Social/ religious issues	3	1.2

CPR, Cardiopulmonary resuscitation;

**Table 6:** Public perception and willingness to perform bystander CPR in Pakistan

Parameter	Have you ever participated in CPR training?	Are you willing to provide simple assistance such as checking consciousness, breathing and dialling 1122?	Should the public learn CPR to help their family members or someone else when necessary?	Do you think your family members/ friends would approve of you performing CPR for strangers?	Would you prefer to perform only chest compressions, without using mouth-to-mouth resuscitation, to a stranger who needs first aid or whose breathing or heartbeat has stopped accidentally?
Yes	58 (24.2)	223 (92.9)	131 (54.6)	169 (70.4)	137 (57.1)
Maybe	0 (0.0)	17 (7.1)	70 (29.2)	52 (21.7)	18 (7.5)
No/refused to answer	182 (75.8)	0 (0.0)	39 (16.3)	19 (7.9)	29 (12.1)
Gender	0.692	0.001	< 0.001	0.002	< 0.001
Age group	< 0.001	0.835	< 0.001	< 0.001	< 0.001
Education	< 0.001	0.401	< 0.001	< 0.001	< 0.001
Association with any organisation	< 0.001	0.110	< 0.001	< 0.001	< 0.001

CPR, Cardiopulmonary resuscitation;

**Table 7:** Stratification of advanced knowledge of CPR after training

Question	Answer	General population n = 47 (%)	Studying in Falah Foundation n = 66 (%)	Vocational trainee at Hunar Foundation n = 74 (%)	Volunteer working in Red Crescent n = 53 (%)	p-value
How much do you know about the CPR training courses?	Can smoothly perform CPR	0 (0.00)	0 (0.00)	4 (8.51)	53 (100.00)	< 0.001
	Do not know at all	7 (14.89)	27 (79.41)	15 (31.91)	0 (0.00)	
	Know only the name	40 (85.11)	7 (20.59)	28 (59.57)	0 (0.00)	
How much time do you think the delay of CPR can be permissible for its effectiveness?	1 min	1 (2.13)	0 (0.00)	5 (6.76)	49 (92.45)	< 0.001
	10 min	11 (23.40)	1 (2.94)	16 (21.62)	0 (0.00)	
	30 min	23 (48.94)	7 (10.61)	8 (10.80)	0 (0.00)	
	5 min	7 (14.89)	0 (0.00)	10 (13.51)	4 (7.55)	
	Have no idea	5 (10.64)	58 (87.88)	35 (47.30)	0 (0.00)	
How much do you think CPR provided by laypeople is effective?	Have no idea	5 (10.64)	62 (93.94)	27 (36.49)	0 (0.00)	< 0.001
	Little effective	32 (68.09)	0 (0.00)	30 (40.54)	2 (3.77)	
	Moderately effective	2 (4.26)	0 (0.00)	6 (8.11)	5 (9.43)	
	Not effective	8 (17.02)	4 (6.06)	5 (6.76)	0 (0.00)	
	Very effective	0 (0.00)	0 (0.00)	6 (8.11)	46 (86.79)	
How prevalent do you think CPR by lay people is in Pakistan?	Have no idea	1 (2.13)	60 (90.90)	27 (36.49)	1 (1.89)	< 0.001
	Little prevalent	43 (91.49)	0 (0.00)	30 (40.54)	29 (54.72)	
	Moderately prevalent	0 (0.00)	0 (0.00)	3 (4.05)	2 (3.77)	
	Not prevalent	3 (6.38)	6 (9.09)	14 (18.92)	21 (39.62)	
	Highly prevalent	0 (0.00)	0 (0.00)	0 (0.00)	0 (0.00)	
Where did you just attend the course?	Falah Foundation	0 (0.00)	66 (100.00)	0 (0.00)	0 (0.00)	< 0.001
	Hunar Foundation	0 (0.00)	0 (0.00)	36 (76.60)	0 (0.00)	
	Red Crescent	47 (100.00)	0 (0.00)	11 (23.40)	53 (100.00)	
If you witness the collapse of your families or friends hereafter, what actions will you take?	Attempt CPR	35 (74.47)	63 (97.06)	47 (100.00)	53 (100.00)	0.041
	Call for an ambulance	12 (25.53)	1 (2.94)	0 (0.00)	0 (0.00)	
If you witness the collapse of strangers hereafter, what actions will you take?	Attempt CPR	9 (19.15)	27 (79.41)	37 (78.72)	53 (100.00)	0.02
	Call for an ambulance	36 (76.60)	7 (20.59)	9 (19.15)	0 (0.00)	
	Call people or telephone	2 (4.26)	0 (0.00)	1 (2.13)	0 (0.00)	

CPR, Cardiopulmonary resuscitation;

Participants reported many hurdles while performing CPR. Among them, performing the immature technique or possible harm that can be caused while performing improper CPR (48.8%), afraid of being involved in legal issues (10.0%), getting any infectious disease (4.1%), afraid of performing mouth-to-mouth resuscitation (5.0%) and other social, cultural or religious issues (1.2%) were some of the reasons of the participants, showing their unwillingness to not perform CPR during medical emergencies, even if they were trained (Table 5). The summarised comparison of individual questions related to their perception and willingness to perform bystander CPR, along with p values is shown in the Table 6. On stratification, it was found that gender (male), education (higher education), age group (20-29 years) and association with any organisation or

society play a significant role in performing CPR except the willingness to assist in consciousness, breathing or dialling 1122 (Table 7).

On detailed analysis, it was concluded that participants' beliefs about the effectiveness of CPR provided by laypeople varied. Ninety-four respondents (39.17%) stated that they had no idea about the effectiveness of CPR performed by laypeople. Similarly, training played a significant role in changing the perception of professionals including medical staff, social workers, or basic life savers as they showed positive attitudes and willingness towards performing CPR after the masterclass as compared to the general population who was only interested in performing CPR on their family members or friends, even if trained.



## Discussion

Cardiovascular emergencies are quite common and life-threatening occurrences that must be identified and treated without delay to increase the survival rate of patients.<sup>15</sup> For this, bystander CPR is considered an essential and significant factor for OHCA survival. Despite widespread recognition as a life-saving ability, the rate of bystander CPR is less than 50 % on average,<sup>16,17</sup> with its restricted training and performance implementation in low and middle-income countries. Pakistan is not an exception.<sup>6</sup> This study was devised to highlight the low rate of bystander CPR performance and uncover the obstacles in improving the rate and ability to perform CPR by a layman.

In study, the main reason for not learning and taking part in CPR training was insufficient behaviour and knowledge of the importance of bystander CPR. They did not know that they could also play their part in saving victims with the help of proper training. Chen et al<sup>3</sup> also demonstrated in their research that bystander CPR provided by the common man is based on the behaviour of kindness and goodwill towards strangers. Thus, people are willing to perform CPR out of goodwill towards strangers. But several factors stop them from doing so. First and the foremost reason is their fright of the consequences when they cause harm unintentionally, followed by their involvement in legal actions. Cheskes et al<sup>18</sup> also identified the barriers and driving forces in performing bystander CPR and concluded that compassionate and humane beliefs urge participants to perform CPR. Similarly, Daud et al,<sup>19</sup> Johnston et al,<sup>20</sup> Mao et al<sup>21</sup> and Dobbie et al<sup>22</sup> pointed out common barriers including fear of transmission of disease, blood, perceived danger, legal actions and become a reason of injury unintentionally. Attitude towards culture or religion is another neglectful, yet important barrier in performing CPR. The study concluded that culture is an unrecognised barrier but doctors in Pakistan did not consider it as a barrier while performing CPR.<sup>23</sup>

On stratification of results for variables, it was found that gender, age, education and belonging to any society or foundation plays a significant role in willingness towards bystander CPR training and performance on strangers. In a retrospective study, it was observed that the majority of individuals who participated in training were

between the age of 20-29 and this age group was also less hesitant to perform CPR on strangers. Similarly, as compared to females, males showed their willingness. Those who were reluctant to perform CPR, even after training had primary or secondary education. A similar study was conducted by Huang et al<sup>5</sup> in which gender (more men as compared to women) were more inclined to perform bystander CPR. This was in contradiction with the observations made by Ahmed et al<sup>24</sup> where a high number of females performed bystander CPR.

Studies also revealed that many times, cardiac arrests occur at home or out of the hospital and demand instant treatment. Therefore, bystander CPR plays a significant role. But it must not be performed without proper training. In the present study, 63.3 % of participants were eager to participate in a CPR training course. From table 6, it can be clearly assumed that professionals are more inclined to perform CPR but the general population is reluctant to perform CPR, specifically on strangers. Iqbal et al<sup>23</sup> also stated that CPR is one of the most influential components in the cycle of survival and 82.3 % of doctors believed that without any training, bystanders should not perform CPR. According to Park et al<sup>26</sup> and Khan et al<sup>6</sup> the performance of bystander CPR is essential along with the pre-hospital emergency care system. They also reinforced that through bystander CPR, OHCA outcomes can be improved.

In summary, this study suggests that the government along with organisations need to make a strategic plan so that bystander CPR performance can be improved. Firstly, the public should be educated in this regard so that the situations can be controlled and improved for those who need CPR outside the hospital.<sup>27</sup> Secondly, legislation must be introduced to protect bystanders who came forward to rescue and put aside all their fears. Thirdly, the authoritative bodies need to create an encouraging atmosphere socially and culturally for those who give a helping hand to others in need. Finally, targeting a large number of the population irrespective of their race, language, gender, etc to get CPR training through many national programs and make it compulsory at the school and college level.<sup>26</sup>

## Limitations

This study has several limitations. Firstly, it involved a very limited number of individuals from the general population which cannot be considered the representation of Pakistan. Secondly, research was conducted through a questionnaire and participants' behavioural intentions were analysed hypothetically. As the behaviours in the real world vary from situation to situation, thus, the responses of positive behaviour do not mean to occur in real scenarios. It is recommended to investigate actual CPR performance for future studies.

## Conclusion

In conclusion, the number of people realising the importance of bystander CPR is increasing around the globe. But, in Pakistan, CPR training and bystander CPR are quite uncommon to date. The population has started to show interest and willingness towards CPR training and bystander CPR irrespective of gender, age and education. The obstacles that cause reluctance in performing this life-saving action are fear of disease transmission, involvement in legal procedure and low confidence in performing CPR ie fear they may adopt the wrong technique and eventually harm the injured person. However, it is highly suggested that governments, organisations and responsible personnel join hands together to create awareness among common citizens, provide effective and high-quality training and sound legislation, include CPR in the curriculum and encourage culture to offer assistance to those needed to increase the willingness to perform bystander CPR without any fears.

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## Conflict of interest

None.

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