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**Original Article**

**Correlation between personal characteristics and intention to perform bystander  
Cardiopulmonary Resuscitation**

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**Running title:** Correlation between personal characteristics and intention

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**Significance for Public Health:** Out-of-hospital cardiac arrest (OHCA) constitutes a significant public health concern characterized by poor survival rates. Research indicates that bystander CPR and AED use can potentially double survival rates. This study delves into the crucial relationship between community attributes and the willingness to deliver essential life support. Inadequacies in community response may stem from various factors, including bystanders' reluctance to administer critical life support, which can be influenced by individual disposition.

## **Abstract**

Out-of-hospital cardiac arrest is a major problem globally characterized by poor survival rates, particularly in residential settings. A delay in administering Cardiopulmonary Resuscitation (CPR) can reduce the survival rate, which is currently at 1 in 10. The chance of survival is influenced by several factors, including patient, population, and health system, particularly the actions of bystanders due to the need for immediate administration of CPR. Although the role of bystanders is very important in increasing the survival rate of cardiac arrest, not all individuals present at the scene are willing to carry out CPR due to personal characteristics. Therefore, this research aimed to explore the potential correlation between personal characteristics and the intention (willingness) to provide basic life support. The investigation was carried out in Malang City using descriptive correlation design and data were collected with questionnaires distributed through Google Forms. The sample consisted of residents of Malang City, with inclusion criteria comprising individuals aged between 17-65 years, not health workers or health students, and the ability to fill in data using Google Forms. After collection, the data obtained were processed descriptively using the SPSS 23 version.

The results showed that among 283 respondents, 80.6% were in the early adult age range, 64% were female, 57.6% had the last education level SMA/SMK, and 65.4% were students. Furthermore, the analysis showed that the intentions of the majority of respondents were in the moderate range, accounting for 64.7%. Correlation analysis showed a significant association between personal characteristics and intention, where age, gender, level of education, occupation status, and experience had correlation scores of -0.089, 0.054, 0.107, 0.104, and -0.261.

In conclusion, this research showed correlation strength for all characteristics ranging from very low to low, emphasizing the need to enhance the intention to perform bystander CPR across all levels. This is due to the very low correlation between community characteristics and intention. To overcome this

challenge, a strategy that has been proven effective in increasing intention is educating the public regarding cardiac arrest assistance.

## **Introduction**

Out-of-hospital cardiac arrest (OHCA) is a major problem globally, accounting for approximately 540,000 deaths in China.<sup>1-3</sup> To overcome this problem, a strategy that has been proven effective is through the establishment of a chain of survival for cardiac arrest patients outside the hospital. Although this strategy has been introduced since 1960, the survival rate for patients is still between 7-26%.<sup>4-5</sup> Early recognition and initiation of cardiopulmonary resuscitation (CPR) by bystander has been correlated with the chain, accounting for a 2 to 4-fold increase in survival and favorable outcomes.<sup>6</sup> Community participation is also very significant in improving assistance to cardiac arrest patients outside the hospital.<sup>6,7</sup> CPR action of bystander as a chain of survival is a significant factor in determining the survival rate.<sup>8</sup>

Based on previous research, the survival rate for cardiac arrest patients was found to be 14.7%, 16%, 10%, and 12% in the U.S., the U.K., Europe, and Turkey, respectively. The variation in survival rate is attributed to several influencing factors according to characteristics of each country which is predominantly determined by the time when bystander started performing CPR.<sup>4-5,9</sup> Moreover, the performance of CPR immediately after the victim experiences cardiac arrest is a very important factor in increasing the survival rate. This is because delay in performing CPR can reduce the survival rate by 10% every minute, showing the significant role of bystander in early recognition, CPR, defibrillation, and response from emergency medical services.<sup>1,5,10</sup> Previous results also showed that cardiac arrest patients who received CPR from bystander had a survival rate 2.6 times higher compared to those who did not receive.<sup>1,5</sup> However, when the collapse of OHCA patients is witnessed, the probability of starting CPR is significantly lower.<sup>11</sup>

Several factors influencing the possibility of bystander CPR implementation include fear, legal implications outside the hospital, knowledge, training, and socioeconomic status.<sup>8</sup> Moreover, community-level socioeconomic status has shown a significant association with bystander CPR rates

and the survival of OHCA patients. This showed that lower bystander CPR and survival rates were found in communities with lower socioeconomic status levels.<sup>12</sup> To overcome this challenge, a community-based healthcare resource has been proven effective in improving the survival of OHCA and access to emergency care in remote areas.<sup>13,14</sup>

Based on the Theory of Planned Behavior, action is affected by attitude, which is significantly influenced by will. This theory states that the implementation of an action is determined by motivation (intention) and ability (behavioral control). The relationship with the implementation of CPR by bystander is significantly determined by willingness,<sup>9</sup> which is influenced by personal characteristics, experience, and knowledge. Therefore, this research aimed to investigate personal characteristics and willingness to perform bystander CPR among Malang City residents.<sup>1,4</sup> The willingness of individuals to respond to cardiac arrest incidents, including early recognition, assistance, initiation of CPR, and use of AED, plays a significant role in improving survival rate.<sup>15</sup>

## **Materials and Methods**

This research used descriptive correlation design to determine correlation between personal characteristics and the willingness to perform bystander CPR by Malang City residents. This design was selected because the research was only observational regarding personal characteristics that could not be manipulated and to describe existing conditions related to the community's willingness to perform bystander CPR. The consecutive sampling method was used to select 283 respondents, which comprised Malang City residents, ranging from teenagers to the elderly, excluding health workers and those unable to fill in survey data online. Research data collection was carried out for 3 months, namely January-March 2023.

The questionnaire comprised four main questions regarding willingness to carry out bystander CPR steps, which were presented in the form of a 1-4 Likert scale, where 1 signified "very weak", 2 "weak", 3 "strong", and 4 "very strong". The questions were prepared in a Google form and distributed online through social media. Additionally, data collection was carried out directly in public places, where Malang City residents gathered, such as squares, sports venues, shopping areas, and campuses. Direct data collection started with a request for the respondent's willingness to fill out the questionnaire. Statistical data analysis was carried out using Excel to analyze descriptive data in the form of personal characteristics and willingness to perform bystander CPR. Subsequently, the Spearman correlation was used to analyze correlation of each personal characteristics to perform bystander CPR. This research received ethical approval from the Faculty of Health Sciences, Brawijaya University, Malang with number 6148/UN10.F17.10/TU/2022.

## **Results and Discussion**

The research showed that the majority of respondents were in the late teenage age range (17-15 years) at 80.6%, 36% were female, 57.6% had high school education level, 65.4% were student, and 58.8% had an experience witnessing cardiac arrest. The results showed that the majority of respondents (64.7%) had moderate intention to assist with cardiac arrest in Malang City, indicating the need for improvement to support the safety of OHCA patients. The role of bystander in handling OHCA patients in the first 10 minutes could increase the potential for Return of Spontaneous Circulation (ROSC), significantly influencing the ability to survive within 30 days after cardiac arrest. This shows the need to increase the number and quality of CPR provided by bystander,<sup>16</sup> representing the important components of the chain of survival. Therefore, any strategy to improve the outcomes of OHCA patients must focus on increasing the rate of bystander CPR and defibrillation.<sup>17</sup>



Previous research regarding the willingness to perform cardiopulmonary resuscitation among upper-secondary students showed<sup>7</sup> that the majority of respondents had a good willingness to carry out CPR due to various motivations. Although the majority aimed at performing CPR for friends or relatives, there was fear apprehension due to legal consequences. Despite the low participation, all students had a positive response to engage in CPR as bystander.<sup>16,18</sup>

The analysis showed that four among five personal characteristics had no relationship with the willingness to perform bystander CPR ( $<0.05$ ), indicating a very low level of correlation ( $<0.199$ ). Specifically, age (0.134), gender (0.362), level of education (0.071), and occupational status (0.081), showed no significant correlation. Personal experience had a significant relationship and low correlation with the willingness to perform bystander CPR ( $>0.200$ ) but negatively correlated with age.

Personal characteristics had a very low correlation with the willingness to perform bystander CPR, suggesting the influence of other factors. According to previous research, factors that influenced the willingness to perform bystander CPR were knowledge, attitude, and self-efficacy.<sup>5,18</sup> Personal characteristics in the form of experience had a significant relationship due to their significance in increasing self-efficacy.<sup>19,20</sup> Other influencing characteristics were found to be emotional barrier factors, particularly fear.<sup>15</sup> Furthermore, the majority of respondents identified potential accusations of sexual assault, particularly regarding women, as a contributing factor to less bystander CPR compared to men.<sup>21</sup>

Knowledge is a strong factor influencing a person's willingness to perform bystander CPR.<sup>2,22</sup> Additionally, the basic life support training that has been attended plays a significant role in willingness, which is correlated with self-efficacy for carrying out bystander CPR.<sup>5,19</sup> In previous research on public perception, participants at training events have many concern and fear regarding bystander CPR, causing additional harm as the leading concern across all patient domains. The lack of sufficient experience or confidence in skills was also identified as a contributing factor.<sup>23</sup>

## **Conclusions**

In conclusion, this research showed that there was no significant correlation between intention and personal characteristics, such as age, gender, education level, and employment status. However, only experience of witnessing a cardiac arrest event showed a significant relationship with willingness to perform bystander CPR.

## References

1. Mao J, Chen F, Xing D, Zhou H, Jia L, Zhang Y. Knowledge, training and willingness to perform bystander cardiopulmonary resuscitation among university students in Chongqing, China: A cross-sectional study. *BMJ Open*. 2021;11(6).
2. Jaskiewicz F, Kowalewski D, Kaniecka E, Kozłowski R, Marczak M, Timler D. Factors Influencing Self-Confidence and Willingness to Perform Cardiopulmonary Resuscitation among Working Adults—A Quasi-Experimental Study in a Training Environment. *Int J Environ Res Public Health*. 2022;19(14).
3. Simmons KM, McIsaac SM, Ohle R. Impact of community-based interventions on out-of-hospital cardiac arrest outcomes: a systematic review and meta-analysis. *Sci Rep*. 2023 Jun 23;13(1):10231.
4. Suharsono T, Sunarmi S, Ida N, Khirria BN, Asrin N, Ulya I. The implementation of code blue by nurses as first responders in outpatient and inpatient rooms at Malang Indonesia Hospital. *Healthcare in Low-resource Settings*. 2023 Feb 9;11(s1).
5. Regard S, Rosa D, Suppan M, Giangaspero C, Larribau R, Niquille M, et al. Evolution of Bystander Intention to Perform Resuscitation Since Last Training: Web-Based Survey. *JMIR Form Res*. 2020 Nov 30;4(11):e24798.
6. Yu Y, Meng Q, Munot S, Nguyen TN, Redfern J, Chow CK. Assessment of Community Interventions for Bystander Cardiopulmonary Resuscitation in Out-of-Hospital Cardiac Arrest: A Systematic Review and Meta-analysis. *JAMA Netw Open*. 2020 Jul 1;3(7):e209256.
7. Munot S, Redfern J, Bray JE, Angell B, Bauman A, Coggins A, et al. Improving community-based first response to out of hospital cardiac arrest (FirstCPR): protocol for a cluster randomised controlled trial. *BMJ Open*. 2022 Jun;12(6):e057175.

8. Carragher R, Johnson J, Harder M. Factors That Influence Bystander Cpr: A Narrative Review. *International Journal of Current Research*. 2027;9(06);52100-52103.
9. Park JY, Kim HJ, Song KJ. Factors Influencing for Intention to Perform Cardiopulmonary Resuscitation in Nursing Students. *Journal of muscle and joint health*. 2019 Aug 31;26(2):131–40.
10. Fitri Y EY, Andhini D, Effendi Z, Handayani S. Willingness to Act in Cardiopulmonary Resuscitation in High School Students. *JKS*. 2023 May 28;6(2):1581–91.
11. Brinkrolf P, Metelmann B, Scharte C, Zarbock A, Hahnenkamp K, Bohn A. Bystander-witnessed cardiac arrest is associated with reported agonal breathing and leads to less frequent bystander CPR. *Resuscitation*. 2018 Jun;127:114–8.
12. Lee S, Ahn KO, Cha MI. Community-level socioeconomic status and outcomes of patients with out-of-hospital cardiac arrest: A systematic review and meta analysis. *Medicine (Baltimore)*. 2021 Jan 22;100(3):e24170.
13. Pattanarattanamolee R, Sanglun RY, Nakahara S. Community-Based First Responder Network in Rural Thailand: A Case Study of Out-of-Hospital Cardiac Arrest. *Prehosp Disaster med*. 2021 Apr;36(2):234–6.
14. Ezem N, Lewinski AA, Miller J, King HA, Oakes M, Monk L, et al. Factors influencing support for the implementation of community-based out-of-hospital cardiac arrest interventions in high- and low-performing counties. *Resuscitation Plus*. 2024 Mar;17:100550.
15. Matsuyama T, Scapigliati A, Pellis T, Greif R, Iwami T. Willingness to perform bystander cardiopulmonary resuscitation: A scoping review. *Resuscitation Plus*. 2020 Dec;4:100043.
16. Fatmawati A, Mawaddah N, Sari IP, Mujiadi M. Improving Knowledge Of Basic Life Support In Cardiac Arrest Conditions Outside The Hospital And Cardiopulmonary Resuscitation For High School Students. *JMM (Jurnal Masyarakat Mandiri)*. 2020 Dec 14;4(6):1176–84.

17. Doan TN, Schultz BV, Rashford S, Bosley E. Surviving out-of-hospital cardiac arrest: The important role of bystander interventions. *Australasian Emergency Care*. 2020 Mar;23(1):47–54.
18. Song KS, Park KY. Factors Influencing for Intention to Perform Cardiopulmonary Resuscitation in Elementary and Secondary School Teachers. *Journal of Korean Academy of Community Health Nursing*. 2020;31(3):384-394.
19. Ahsan A. Analysis Of Factors Related To Adolescent Self-Efficacy In Performing Cardiopulmonary Resuscitation At State Vocational High School 2 Singosari. *Jurnal Ilmiah Kesehatan Media Husada*. 2019;8(2):8-24.
20. Estri AK. The Role Of Bystanders In Cardiac Arrest Management In The Community: A Literature Study. *Prosiding Seminar Nasional Multidisiplin Ilmu [Internet]*. 2019 Apr 6 [cited 2023 Aug 15];1(1). Available from: <https://prosiding.respati.ac.id/index.php/PSN/article/view/32>.
21. Perman SM, Shelton SK, Knoepke C, Rappaport K, Matlock DD, Adelgais K, et al. Public Perceptions on Why Women Receive Less Bystander Cardiopulmonary Resuscitation Than Men in Out-of-Hospital Cardiac Arrest. *Circulation*. 2019 Feb 19;139(8):1060–8.
22. Pivač S, Gradišek P, Skela-Savič B. The impact of cardiopulmonary resuscitation (CPR) training on schoolchildren and their CPR knowledge, attitudes toward CPR, and willingness to help others and to perform CPR: mixed methods research design. *BMC Public Health*. 2020 Dec;20(1):915.
23. Becker TK, Gul SS, Cohen SA, Maciel CB, Baron-Lee J, Murphy TW, et al. Public perception towards bystander cardiopulmonary resuscitation. *Emerg Med J*. 2019 Nov;36(11):660–5.

**Table 1. Characteristic of respondents**

<b>Characteristics</b>		<b>Frequency</b>	<b>Percentage (%)</b>
Age	Late teens (17-25 yo)	228	80.6
	Early adolescence (26-35 yo)	20	7.1
	Early adolescence (36-45 yo)	11	3.9
	Early elderly (46-55 yo)	12	4.2
	Late elderly(56-65 yo)	12	4.2
Gender	Male	102	36.0
	Female	181	64.0
Level of Education	Not complete elementary school	2	0.7
	Elementary school	9	3.2
	Junior high school	10	3.5
	High school	163	57.6
	Diploma	30	10.6
	Undergraduate/Postgraduate	69	24.4
Occupation	Doesn't work	28	9.9
	Government employees	10	3.5
	Private sector employee	28	9.9
	Self-employed	26	9.2
	Workers/Farmers/Fisherman	6	2.1
	Student	185	65.4
Experience witnessing cardiac arrest victims	Yes	158	55.8
	No	125	44.2

**Table 2. Level of intention**

<b>Level of intention</b>	<b>Frequency</b>	<b>Percentage (%)</b>
Low	19	6.7
Middle	183	64.7
Strong	81	28.6

**Table 3. Descriptive correlational analysis**

<b>Categories</b>	<b>Sig. 2-tailed</b>	<b>Correlation coeff</b>
Age	0.134	-0.089
Gender	0.362	0.054
Level of education	0.071	0.107
Occupation	0.081	0.104
Experience	0.000	-0.261