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ORIGINAL RESEARCH

Determinants of the Public's Intention to Assist Out-of-Hospital Cardiac Arrest Victims: A Regional Survey

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Abstract

Background: Early cardiopulmonary resuscitation (CPR) substantially improves survival after out-of-hospital cardiac arrest (OHCA). However, the proportion of OHCA victims receiving CPR from the public remains low in Asia. Although several factors associated with the public's intention to assist OHCA victims have been identified, evidence from Indonesia remains limited, particularly among community-based populations.
Purpose: This study aimed to identify factors associated with the public's intention to assist OHCA victims in South Sumatra, Indonesia.
Methods: A cross-sectional survey guided by the Theory of Planned Behavior (TPB) was conducted among 433 residents from 17 regencies and municipalities in South Sumatra using a two-stage sampling approach. Trained enumerators collected data using a structured questionnaire based on TPB constructs with acceptable validity and internal consistency. Intention to assist OHCA victims was assessed as a binary (yes/no) outcome based on participants' self-reported responses. Multivariable logistic regression was used to identify factors associated with this intention.
Results: Among all participants, 64.9% expressed an intention to assist OHCA victims, whereas 15.2% reported previous CPR experience. Multivariable analysis showed that previous experience of encountering an OHCA victim (aOR = 2.89, 95% CI = 1.32–6.30, p = 0.008), positive attitudes (aOR = 3.37, 95% CI = 1.81–6.28, p = 0.001), high subjective norms (aOR = 2.09, 95% CI = 1.07–4.06, p = 0.030), willingness to attend CPR training (aOR = 3.62, 95% CI = 2.11–6.20, p = 0.001), and high perceived behavioral control (aOR = 3.94, 95% CI = 2.32–6.71, p = 0.001) were significantly associated with greater intention to assist OHCA victims.
Conclusion: High perceived behavioral control was the strongest predictive factor associated with the intention to assist OHCA victims. These findings support nursing-led, community-based CPR education strategies that strengthen confidence, promote positive attitudes and supportive social norms, and expand access to hands-on CPR training.

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1. Introduction

Out-of-hospital cardiac arrest (OHCA) is a major global public health challenge, with a pooled incidence of 4.1 cases treated by emergency medical systems (EMS) per 100,000 person-years worldwide (Gowens et al., 2022). Although early cardiopulmonary resuscitation (CPR) improves survival, global survival rates remain low, ranging from 8.8% to 20% at hospital discharge, and vary considerably across regions. Lower survival rates have been reported in Asia than in Europe and Oceania, with significant disparities also observed between rural and urban areas (Gowens et al., 2022; Smith et al., 2023; Xuan Dao et al., 2024). Patients who receive bystander CPR have substantially better outcomes than those who do not, emphasizing the need for multidisciplinary action and community involvement (Simmons et al., 2023; Važanić, 2022).

Bystander CPR plays a critical role in improving survival outcomes (Dainty et al., 2022), yet its implementation remains low worldwide (Liou et al., 2021; Shekhar & Narula, 2022). In the Asia-Pacific region, bystander CPR rates have ranged from 10% to 40% across sites participating in the Pan-Asia Resuscitation Outcomes Study (PAROS) (Ong et al., 2022; Liu et al., 2022). In Indonesia, the epidemiological profile of OHCA remains insufficiently characterized due to the absence of a national OHCA registry and limited population-based surveillance data. Available evidence suggests that public preparedness for emergency response remains suboptimal, with limited exposure to basic life support (BLS) education and training, and persistent barriers to performing bystander CPR, including inadequate knowledge, low confidence, and concerns about causing harm to victims (Artawan et al., 2021; Kusumawati et al., 2023).

Understanding the factors influencing the public's intention to assist OHCA victims is therefore essential, as these factors vary across regions (Ali et al., 2023; AlShehri et al., 2023; Andréll et al., 2021; Chowdhury & Anantharaman, 2021; Mao et al., 2021). Previous studies have identified several factors associated with the intention to assist OHCA victims in the community setting. Younger age, male sex, higher educational attainment, higher income, marital status, interest in attending CPR training, previous first aid experience, prior CPR training, confidence in performing CPR, and legal protection under emergency medical service regulations have been associated with a greater intention to perform bystander CPR (Daud et al., 2023). Another study conducted in Yogyakarta, Indonesia, identified several barriers to performing BLS, including lack of CPR knowledge, fear of harming the victim, low self-confidence, reluctance to assume responsibility, and concerns about infection transmission (Kusumawati et al., 2023).

However, no previous study has simultaneously examined behavioral determinants of the intention to assist OHCA victims together with sociodemographic characteristics and BLS-related training factors in a province-wide community sample representing all regencies and municipalities in Indonesia. Evidence regarding the determinants of bystander CPR intention in Indonesia, including South Sumatra, remains limited. In particular, little is known about how limited public exposure to basic life support information and training, diverse sociodemographic characteristics, and willingness to participate in BLS training influence the intention to assist OHCA victims. Behavioral intention, which represents the most immediate antecedent of behavior, has been widely explained and predicted using the Theory of Planned Behavior (TPB). According to the TPB, intention is influenced by attitudes, subjective norms, and perceived behavioral control. This framework is particularly suitable for understanding voluntary actions requiring immediate decisions, such as providing assistance to OHCA victims (Ajzen, 2012).

Addressing this gap is important because the relationships between these factors and the intention to assist OHCA victims may differ across populations and healthcare contexts, limiting the applicability of evidence generated from other countries to South Sumatra. South Sumatra, one of Indonesia's largest provinces with more than 8.8 million inhabitants (Statistics Indonesia, South Sumatera Province, 2024), comprises geographically and sociodemographically diverse urban and rural communities with varying access to healthcare services and opportunities for BLS education and training. These differences may influence public preparedness to respond to OHCA, making the province an appropriate setting to examine factors associated with bystander CPR intention. Because actual bystander CPR behavior is often difficult to observe in community settings, the intention to assist OHCA victims is commonly used as a proxy for future behavior. Guided by the TPB, this study aimed to examine factors associated with the public's intention to assist OHCA victims, including TPB constructs, sociodemographic characteristics, previous BLS exposure, and prior OHCA-related experience. The findings may inform nursing-led community education and health promotion strategies to improve public preparedness for OHCA and increase bystander CPR in South Sumatra, Indonesia.

2. Methods

2.1 Research design

A cross-sectional survey was conducted to estimate the prevalence of the intention to assist OHCA victims among the public and to identify factors associated with this intention. This design was chosen because it allows both to be assessed at a single point in time without follow-up or intervention (Wang & Cheng, 2020). Before analysis, all returned questionnaires were screened for completeness. Questionnaires with incomplete responses were excluded from the analysis.

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2.2 Setting and samples

Using population data from the South Sumatra local government, a proportionate stratified sampling strategy was employed to ensure representation from all 17 regencies and municipalities. The sample size was determined using Slovin's formula (Sugiyono & Puspandhani, 2024). Based on a population of 8,657,008 individuals and a 5% margin of error, the minimum sample size was 399.9, rounded up to 400 participants. The sample was proportionally allocated across all regencies and municipalities in South Sumatra according to population size. Allowing for a 10% rate of incomplete responses, the total target sample was increased to 440 participants. Within each stratum, eligible participants were selected using a systematic selection procedure based on the last digit of their national identification numbers, whereby those with an odd final digit (1, 3, 5, 7, or 9) were invited to participate. This procedure ensured an objective and consistent participant selection process across administrative areas.

Participants were recruited from 13 regencies (Banyuasin, Empat Lawang, Lahat, Muara Enim, Musi Banyuasin, Musi Rawas, Musi Rawas Utara, Ogan Ilir, Ogan Komering Ilir, Ogan Komering Ulu, Ogan Komering Ulu Selatan, Ogan Komering Ulu Timur, and Penukal Abab Lematang Ilir) and four municipalities (Palembang, Pagar Alam, Lubuklinggau, and Prabumulih) in South Sumatra. Eligible participants were residents aged 10-65 years who were willing to participate by providing informed consent. This age group was chosen based on international resuscitation recommendations, which advocate CPR education for school-aged children and adolescents. Therefore, individuals aged 10-17 years were included, as they represent a relevant population that may witness OHCA events in everyday settings (Donoghue et al., 2025; Schroeder et al., 2023).

Participants aged 18 years and older provided written informed consent. For participants aged under 18 years, written parental consent and the participants' assent were obtained before enrollment. Individuals who had relocated, worked in the medical field, had disabilities affecting limb function, or had limited physical activity due to illness were excluded. Selected participants were approached by trained enumerators in each administrative area, screened for eligibility, and provided with information about the study objectives and procedures before enrollment. Of the 440 individuals approached, one declined to participate, and 439 agreed to complete the questionnaire. All returned questionnaires were screened for completeness before analysis. Six questionnaires were excluded because of incomplete responses through a complete-case analysis approach, leaving 433 participants for the final analysis (Figure 1). Given the low proportion of incomplete questionnaires (1.4%), missing data were not imputed.

2.3 Measurement and data collection

A 36-item questionnaire was developed specifically for this study to assess the public's intention to assist OHCA victims. The questionnaire was designed for laypersons as the target population, including adolescents and adults who may encounter OHCA events in everyday settings. It comprised four domains: (1) sociodemographic characteristics; (2) personal characteristics, including attitudes, subjective norms, and perceived behavioral control based on the TPB (Ajzen, 2012); (3) informational factors, including knowledge of OHCA first aid, information exposure and sources, prior BLS education, and willingness to attend BLS training; and (4) intention to assist OHCA victims.

Knowledge of OHCA first aid was assessed using 10 items developed based on the American Heart Association (AHA) guidelines (Panchal et al., 2020). Each item was scored on a three-point scale: 0 for "don't know", 1 for an incorrect answer, and 2 for a correct answer. Attitudes, subjective norms, and perceived behavioral control were measured using the indirect TPB approach (Ajzen, 2012) with a five-point Likert scale. Intention to assist OHCA victims was measured as a direct dichotomous response (yes/no) based on participants' stated willingness to provide assistance. The remaining variables were assessed using direct questions with dichotomous (yes/no) or multiple-response options. The instrument was considered appropriate for participants aged 10-65 years because the assessed constructs represent general cognitive, attitudinal, and behavioral factors related to emergency response to OHCA that are applicable across the population.

The total knowledge score ranged from 0 to 20 and was categorized into three levels: poor (0-11), moderate (12-15), and good (16-20). Attitudes, subjective norms, and perceived behavioral control were measured using the indirect TPB approach (Ajzen et al., 2012). For each construct,

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paired items were scored by multiplying belief strength by outcome evaluation (attitude), normative beliefs by motivation to comply (subjective norms), and control beliefs by perceived power (perceived behavioral control). The product scores were summed to obtain a total score. Attitudes and subjective norms each consisted of four paired items (score range: 2-50), whereas perceived behavioral control consisted of two paired items (score range: 1-25).

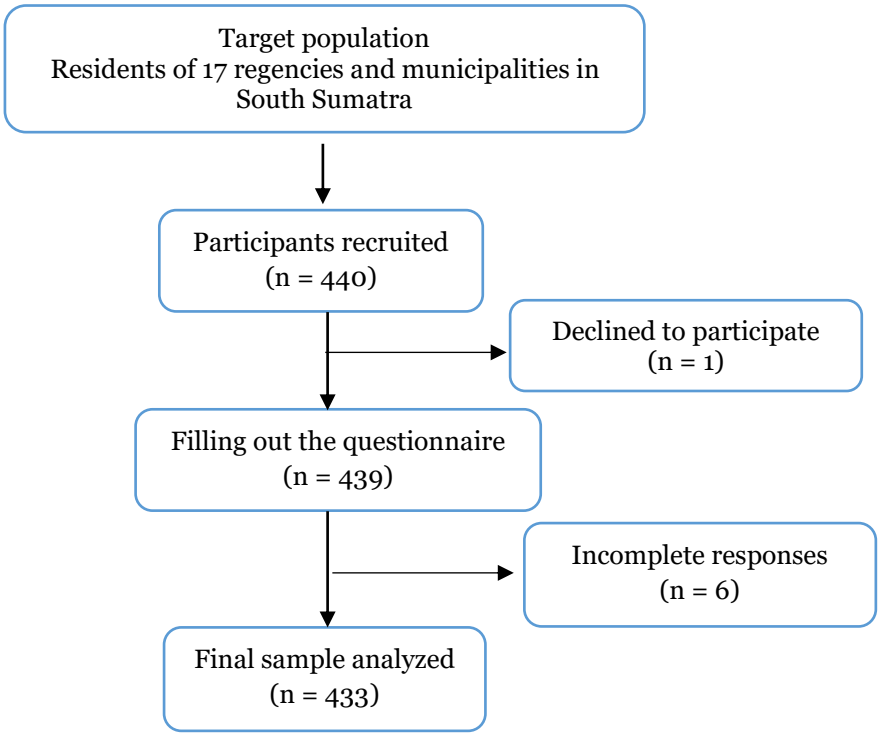


Figure 1. Flowchart of participant recruitment and selection

Based on the sample mean, participants in this study were categorized as having positive attitudes (≥ 23.02), high subjective norms (≥ 24.88), and high perceived behavioral control (≥ 15.65). Participants with scores below the sample mean were categorized as having negative attitudes, low subjective norms, and low perceived behavioral control, respectively. Intention to assist OHCA victims was measured as a dichotomous outcome (yes/no). These categorized variables were used for subsequent statistical analyses.

Prior to the main survey, the questionnaire was pilot-tested among 31 participants with characteristics similar to those of the target population. The validity of the questionnaire items was assessed using item-total correlation analysis (critical r value = 0.355). The correlation coefficients ranged from 0.406 to 0.743 for the knowledge of OHCA first aid items, from 0.683 to 0.916 for the attitude items, from 0.594 to 0.844 for the subjective norms items, and from 0.856 to 0.933 for the perceived behavioral control items. Internal consistency reliability was evaluated using Cronbach's alpha ($\alpha \geq 0.70$). The Cronbach's alpha coefficients were 0.785 for knowledge of OHCA first aid, 0.816 for attitudes, 0.761 for subjective norms, and 0.745 for perceived behavioral control.

This study was conducted over four months, including a preparation phase involving enumerator training and administrative coordination. After ethical approval was obtained, participant recruitment and data collection were carried out from August 24 to November 12, 2024. Seventeen trained enumerators recruited participants and collected data across 17 regencies and municipalities. Data were collected using a paper-based questionnaire administered through face-to-face surveys. Each participant received information about the study objectives and procedures, provided written informed consent, and completed the questionnaire within approximately 25–30 minutes. Participants received a small token of appreciation for their participation. For participants who required assistance, enumerators clarified the questionnaire instructions without influencing their responses. During data collection, one participant declined

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to participate, and six participants submitted incomplete questionnaires. All completed questionnaires were subsequently reviewed for completeness before data entry and analysis.

2.4 Data analysis

The primary outcome was the intention to assist OHCA victims, and the analysis examined factors associated with this intention. Variables analyzed included sociodemographic characteristics (age, gender, education, marital status, occupation, and income), TPB constructs (attitudes, subjective norms, and perceived behavioral control), prior experience, and informational factors (knowledge of OHCA first aid, information exposure and sources, prior BLS public education, and willingness to attend BLS training). Additional data were collected on the types of victims participants intended to assist, reasons for not performing CPR, and perceived factors facilitating the intention to assist. Data were analyzed using SPSS for Mac, version 27 (IBM Corp., Armonk, NY, USA). Descriptive statistics summarized the variables using frequencies and percentages. Because the study variables were analyzed as categorical variables, associations between independent variables and intention to assist OHCA victims were tested using the chi-square test. Multiple logistic regression was performed to identify independent predictors of intention, with results presented as adjusted odds ratios (aORs) and 95% confidence intervals (CIs). Variables with $p < 0.25$ in the bivariate analysis were included in the regression model, following Hosmer et al. (2013). Statistical significance was set at $p < 0.05$.

2.5 Ethical considerations

Ethical approval for this study was obtained from the Medical and Health Research Ethics Committee of the Faculty of Medicine, Universitas Sriwijaya (Protocol Number: 330-2024, approved on August 19, 2024). Ethical principles were upheld throughout the study. Participation was voluntary, and informed consent was obtained from all participants. Confidentiality and anonymity were maintained, and the data were used solely for research purposes. No interventions were performed, and the study therefore posed no direct physical risk to participants.

3. Results

3.1. Characteristics of the participants

Table 1 presents the characteristics of the 433 participants. Most participants were adults (91.7%), female (63.7%), and married (57.3%). Educational attainment varied across participants, with nearly half having completed high school (48.3%), followed by those with a college education (33.3%). The proportions of employed and unemployed participants were nearly equal (39.5% and 38.6%, respectively), and among employed and self-employed participants (n = 266), 62.4% reported earnings below the regional minimum wage.

Table 2 shows that the most commonly reported barriers to attending BLS training were lack of time (29.9%), perceived difficulty in learning CPR (19.2%), and the lack of awareness of available courses (18.6%). Among participants who intended to perform CPR, the preferred recipients were close family members (29.6%) and friends or neighbors (21.0%). Among participants who were unwilling to perform CPR, the most frequently reported reasons were lack of knowledge (36.3%) and fear of harming the victim (23.3%). Multiple responses were allowed in this section.

3.2. Public attitude, subjective norm, perceived behavioral control, and knowledge related to assisting OHCA victims

Table 3 presents the results for the TPB variables. More than half of the participants had negative attitudes (54.3%) and low subjective norms (56.1%) toward assisting OHCA victims. In contrast, the perceived behavioral control was relatively high, with 65.1% of participants reporting high perceived behavioral control. Regarding knowledge, participants generally demonstrated poor knowledge of OHCA assistance (67.2%). Statistically significant differences were observed for subjective norms, perceived behavioral control, and knowledge ($p < 0.05$), whereas attitudes did not reach statistical significance ($p = 0.084$). Furthermore, only 10.6% correctly identified the appropriate first-aid measures, and only 4.6% correctly identified the recommended chest compression rate and depth, indicating substantial gaps in both recognition and practical CPR knowledge.

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Table 1. Sociodemographic characteristics of the participants (n = 433)

Characteristics	Frequency (f)	Percentage (%)	*p*-value
Age group			
Adolescent (10-17 years)	21	4.8	< 0.001*
Adult (18-59 years)	397	91.7	
Elderly (60-65 years)	15	3.5	
Gender			
Male	157	36.3	< 0.001*
Female	276	63.7	
Highest educational attainment			
No formal education	8	1.8	< 0.001*
Elementary school	33	7.6	
Junior high school	39	9.0	
High school	209	48.3	
College	144	33.3	
Marital status			
Unmarried	164	37.9	< 0.001*
Married	248	57.3	
Divorced	21	4.8	
Occupation			
Unemployed	167	38.6	< 0.001*
Self-employed	95	21.9	
Employed	171	39.5	
Monthly earnings (RMW; n = 266)			
Below (< IDR 3,500,000)	166	62.4	< 0.0018
Within (IDR 3,500,000–5,000,000)	62	23.3	
Above (> IDR 5,000,000)	38	14.3	

Note. Unemployed: student, housewife, retired; Self-employed: entrepreneur, farmer, trader, breeder. Employed: private employee and government employee; RMW: Regional Minimum Wage,* Chi-square, statistically significant at p <0.05

Table 2. Participants' personal and informational factors and intention to assist OHCA victims (n = 433)

Variables	n	f	%
Personal Factors			
Encountered OHCA victim	433		
Yes		66	15.2
No		367	84.8
Performed CPR	66		
Yes		10	15.2
No		56	84.8
Informational Factors			
Heard about OHCA first aid	433		
Yes		248	57.3
No		185	42.7
Information sources (multiple responses)	260		
Printed media		30	11.5
Electronic media		172	66.2
Public health education		58	22.3
Attended BLS education	433		
Yes		29	6.7
No		404	93.3
Interested in CPR training	433		
Yes		201	46.4
No		232	53.6
Barriers to attendance (multiple responses)	338		
Difficulty in learning CPR		65	19.2
Unaware of available courses		63	18.6
Lack of time		101	29.9
OHCA is not life-threatening		7	2.1
CPR restricted to professionals		55	16.3
Lack of interest		47	13.9

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Table 2. Continued

Variables	n	f	%
Intention to Assist			
Intention to perform CPR	433		
Yes		281	64.9
No		152	35.1
Types of victims (multiple responses)	717		
Adult stranger		74	10.3
Stranger (traumatic injury)		65	9.1
Child stranger		72	10.0
Older adult		75	10.5
Friend/neighbor		151	21.0
Close family (parents, spouse, children, siblings)		212	29.6
Relatives		68	9.5
Barriers (multiple responses)	300		
Lack of CPR knowledge		109	36.3
Fear of harming the victim		70	23.3
Legal concerns		22	7.3
Lack of confidence		38	12.7
OHCA is not life-threatening		1	0.3
CPR restricted to professionals		36	12.0
Fear of victim's condition		24	8.0
Enablers of intention (multiple responses)	865		
Good knowledge		268	31.0
CPR causes no harm		125	14.5
Legal protection		77	8.9
Self-confidence		87	10.0
Victim may die if not assisted		118	13.6
Motivation from others		58	6.7
CPR training for laypeople		132	15.3

Note. n = number of participants; f = frequency. Percentages for multiple-response items were calculated based on total responses.

Table 3. Knowledge, attitudes, subjective norm, and perceived behavioral control related to assisting OHCA victims (n = 433)

Variables	f	%	*p*
Attitudes			
Positive	198	45.7	0.084*
Negative	235	54.3	
Subjective norms			
High	190	43.9	0.012*
Low	243	56.1	
Perceived behavioral control			
High	282	65.1	< 0.001*
Low	151	34.9	
Knowledge			
Good	25	5.8	< 0.001*
Moderate	117	27	
Poor	291	67.2	
Correct answer to knowledge questions			
Signs of cardiac arrest	85	19.6	
Appropriate first aid	46	10.6	
Steps for assessing an unconscious person	134	30.9	
The other name of chest compression	73	16.9	
Proper hand position for chest compressions	108	24.9	
Qualified person to perform CPR	126	29.1	
Benefits of performing CPR	222	51.3	
Recommended position of the victim	185	42.7	
Procedure of hands-only CPR	106	24.5	
Recommended rate and depth of chest compression	20	4.6	

Note. *Chi-square tests; statistical significance was set at $p < 0.05$

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3.3. Factors associated with the intention to assist OHCA victims

Table 4 summarizes the bivariate associations between participants' characteristics and the intention to assist OHCA victims. Adolescent participants had lower odds of intending to assist OHCA victims than adult participants (crude OR = 0.20, 95% CI = 0.08–0.53). Male participants did not differ significantly from female participants in the odds of intending to assist OHCA victims (crude OR = 1.00, 95% CI = 0.67–1.51). Compared with married participants, unmarried participants had lower odds of intending to assist OHCA victims; however, the association was not statistically significant (crude OR = 0.71, 95% CI = 0.47–1.07).

Table 4. Associations of sociodemographic, personal, and informational factors with the intention to assist OHCA victims

Variables	Intention		Crude OR (95% CI)	*p*-value*
	Yes f(%)	No f(%)		
Age group				
Adult	265 (66.8)	132 (33.2)	1	
Adolescent	6 (28.6)	15 (71.4)	0.20 (0.08–0.53)	0.001
Elderly	10 (66.7)	5 (33.3)	1.00 (0.33–2.97)	0.995
Gender				
Male	102 (65)	55 (35)	1.00 (0.67–1.51)	0.981
Female	179 (64.9)	97 (35.1)	1	
Highest educational attainment				
No formal education	4 (50)	4 (50)	0.28 (0.06–1.20)	0.088
Elementary school	20 (60.6)	13 (39.4)	0.44 (0.19–0.97)	0.044
Junior high school	12 (30.8)	27 (69.2)	0.12 (0.05–0.27)	0.000
High school	133 (63.6)	76 (36.4)	0.50 (0.30–0.81)	0.005
College	112 (77.8)	32 (22.2)	1	
Marital status				
Married	169 (68.1)	79 (31.9)	1	
Unmarried	99 (60.4)	65 (39.6)	0.71 (0.47–1.07)	0.106
Divorced	13 (61.9)	8 (38.1)	0.76 (0.30–1.90.90)	0.558
Occupation				
Unemployed	93 (55.7)	74 (44.3)	0.44 (0.28–0.70)	0.001
Self-employed	62 (65.3)	33 (34.7)	0.67 (0.39–1.15)	0.149
Employed	126 (73.7)	45 (26.3)	1	
Monthly earnings (RMW)				
Below	112 (67.5)	54 (32.5)	1	
Within	44 (71)	18 (29)	1.18 (0.62–2.23)	0.613
Above	31 (81.6)	7 (18.4)	2.14 (0.88–5.16)	0.092
Prior experience with OHCA				
Yes	53 (80.3)	13 (19.7)	1	
No	228 (62.1)	139 (37.9)	0.40 (0.21–0.76)	0.005
Attitude				
Positive	172 (86.9)	26 (13.1)	7.64 (4.70–12.42)	0.000
Negative	109 (46.4)	126 (53.6)	1	
Subjective norms				
High	168 (88.4)	22 (11.6)	8.78 (5.27–14.64)	0.000
Low	113 (46.5)	130 (53.5)	1	
Perceived behavioral control				
High	230 (81.6)	52 (18.4)	8.67 (5.51–13.62)	0.000
Low	51 (33.8)	100 (66.2)	1	
Exposure to OHCA first aid information				
Yes	170 (68.5)	78 (31.5)	1.45 (0.97–2.16)	0.066
No	111 (60)	74 (40)	1	
Knowledge of OHCA first-aid				
Good	23 (92)	2 (8)	8.18 (1.89–35.37)	0.005
Moderate	88 (75.2)	29 (24.8)	2.16 (1.33–3.49)	0.002
Poor	170 (58.4)	121 (41.6)	1	
Previous public BLS education				
Yes	22 (75.9)	7 (24.1)	1.76 (0.73–4.21)	0.205
No	259 (64.1)	145 (35.9)	1	
Willingness to attend CPR training				
High	171 (85.1)	30 (14.9)	6.32 (3.96–10.07)	0.000
Low	110 (47.4)	122 (52.6)	1	

Note. OR = Odds Ratio; CI = Confidence Interval; *Chi-square tests. Statistical significance was set at $p < 0.05$

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3.4. Independent factors related to intention to assist OHCA victims

Table 5 presents the results of the final multivariable logistic regression model. Prior experience of encountering an OHCA victim, positive attitudes, high subjective norms, high perceived behavioral control, and willingness to attend CPR training were independently associated with a greater intention to assist OHCA victims. Among these variables, high perceived behavioral control showed the strongest association with intention (aOR = 3.94; 95% CI = 2.32–6.71; p = 0.001).

Table 5. Factors associated with the intention to assist OHCA victims in the final multivariable logistic regression model (n = 433)

Factors	Reference Group	aOR (95% CI)	*p*-value
Personal factors			
Experience of encountering an OHCA victim (Yes)	No	2.89 (1.32–6.30)	0.008
Attitudes (Positive)	Negative	3.37 (1.81–6.28)	0.001
Subjective norms (High)	Low	2.09 (1.07–4.06)	0.030
Perceived behavioral control (High)	Low	3.94 (2.32–6.71)	0.001
Informational factors			
Willingness to attend CPR training (Yes)	No	3.62 (2.11–6.20)	0.001

Notes. aOR = Adjusted Odds Ratio; CI = Confidence Intervals

A sensitivity analysis was performed using only adult participants (n = 397), who represented the largest age group in the study. The analysis produced findings consistent with those of the primary analysis (which included all age groups), with the same predictors remaining statistically significant and exhibiting comparable adjusted odds ratios. These results suggest that age heterogeneity did not materially affect the observed associations (Table 6).

Table 6. Sensitivity analysis restricted to adult participants (n = 397)

Variables	Reference Group	aOR (95% CI)	*p*-value
Personal factors			
Experience of encountering an OHCA victim (Yes)	No	2.62 (1.17–5.84)	0.019
Attitude (Positive)	Negative	2.75 (1.46–5.17)	0.002
Subjective norms (High)	Low	2.12 (1.06–4.21)	0.035
Perceived behavioral control (High)	Low	3.99 (2.31–6.93)	0.000
Information factors			
Willingness to attend CPR training (Yes)	No	3.13 (1.80–5.42)	0.000

Notes. aOR = Adjusted Odds Ratio; CI = Confidence Intervals

4. Discussion

The study aimed to examine the factors associated with the public's intention to assist OHCA victims by performing CPR across diverse regions in South Sumatra, Indonesia. Most participants reported an intention to assist OHCA victims, with perceived behavioral control showing the strongest association with intention. Participants' intention was also associated with willingness to attend CPR training, attitudes, prior encounters with OHCA, and subjective norms. Unlike many previous studies that focused on specific subgroups such as students, workers, or trained individuals with prior CPR training (AlShehri et al., 2023; Chowdhury & Anantharaman, 2021; Fitri Y et al., 2023; Kusumawati et al., 2023; Mao et al., 2021; Salsabila et al., 2025; Ssewante et al., 2022;), this study included a broader community-based sample across different administrative areas, age groups, and sociodemographic backgrounds, providing more representative, region-specific evidence on factors associated with the intention to assist OHCA victims.

Early initiation of CPR can improve survival chances and increase the likelihood of favorable clinical outcomes in cases of OHCA (Dainty et al., 2022; Lo et al., 2023). In this study, most participants reported an intention to assist OHCA victims. This proportion was higher than that reported in China (34.1%) (Mao et al., 2021), but lower than that reported in Singapore (71.6%) (Chowdhury et al., 2021). The proportion reporting an intention to assist observed in this study

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was within the range reported in Asian countries, suggesting a moderate-to-high level of behavioral intention to assist OHCA victims in the community. However, differences in measurement approaches, population characteristics, and emergency response systems should be considered when interpreting cross-country comparisons.

According to the TPB, intention is the most proximal determinant of behavior (Ajzen, 2012; Fitri & Andhini, 2025; La Barbera & Ajzen, 2021). However, an intention-behavior gap may occur, particularly in OHCA situations where responses must be immediate and are influenced by unpredictable environmental and emotional factors. Previous studies have shown that high intention does not always translate into actual bystander CPR due to situational barriers and psychological constraints (Farquharson, 2023; Chen et al., 2024). This intention-behavior gap is commonly attributed to personal considerations, psychological closeness to the victim, diffusion of responsibility, or lack of perceived capability during emergency situations (Chen et al., 2024; Fitri Y. et al., 2023; Hasegawa & Hanaki, 2023; Mao et al., 2021).

In the final multivariable logistic regression model, prior experience of encountering an OHCA victim, positive attitudes toward CPR, high subjective norms, high perceived behavioral control, and willingness to attend CPR training were independently associated with a greater intention to assist OHCA victims by performing CPR. Among these factors, high perceived behavioral control showed the strongest independent association with intention, highlighting the importance of individuals' confidence in their ability to perform CPR. This finding is consistent with the TPB, which identifies perceived behavioral control as a key determinant of behavioral intention (Chen et al., 2024). According to the TPB, perceived behavioral control reflects individuals' perceptions of having the ability, resources, and opportunities to perform a behavior (Ajzen, 2012; Fitri, 2025; La Barbera & Ajzen, 2021).

The strong association between perceived behavioral control and intention observed in this study may reflect the current context of community emergency response in Indonesia, particularly in South Sumatra, where opportunities for the public to acquire CPR knowledge and practical skills remain limited. Individuals may rely primarily on their perceived capability when deciding whether to assist an OHCA victim. According to the TPB framework, individuals who perceive greater control over a behavior because they believe they have the ability and resources required to act are more likely to intend to engage in that behavior (La Barbera & Ajzen, 2021). Therefore, individuals' belief in their ability to recognize OHCA and provide appropriate assistance may therefore become an important determinant of intention, particularly in settings where structured community-based CPR education and training programs are not widely available. Recent evidence supports this interpretation, showing that perceived capability, feelings of being unprepared, and fear of causing harm are key psychological determinants of the public's intention to assist OHCA victims (Daud et al., 2023; Farquharson, 2023; Fitri Y. et al., 2023; Hasegawa & Hanaki, 2023). Similarly, Sun et al. (2024) reported that inadequate understanding of CPR, low awareness of OHCA first-aid, and low self-confidence and self-efficacy were major barriers to providing assistance to OHCA victims. These findings suggest that individuals who feel capable of recognizing cardiac arrest, performing chest compressions, and responding appropriately are more likely to intend to assist OHCA victims. Therefore, accessible, practical, skill-based CPR education may help strengthen perceived behavioral control and improve public preparedness to respond to OHCA (Fitri, 2025).

However, the role of each construct in the TPB may vary across research contexts. A recent study in China identified attitudes as the strongest direct predictor of the public's intention to perform CPR, while subjective norms influenced intention indirectly through attitudes and perceived behavioral control (Zheng et al., 2026). This difference may reflect variations in population characteristics, previous exposure to OHCA, and access to BLS training. In the present study, perceived behavioral control showed the strongest association with intention, while positive attitudes and high subjective norms were also independently associated with intention. Positive attitudes reflect the belief that providing CPR is beneficial, whereas subjective norms reflect the social support that encourages individuals to provide assistance. These findings are consistent with the TPB, which proposes that intention is influenced by these three constructs (Chen et al., 2024; Zheng et al., 2026).

This study revealed a low level of knowledge regarding assistance to OHCA victims, consistent with findings from other studies (Mao et al., 2021; Sayed et al., 2024). Notably, most participants demonstrated poor knowledge of OHCA first-aid, with a proportion that appears

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higher than those reported in several other countries (Andréll et al., 2021; Sayed et al., 2024; Sirikul et al., 2022). These disparities may reflect variations in the availability of CPR education, public awareness initiatives, and the development of emergency medical services (EMS) systems across countries. In Indonesia, public education remains limited, and the national EMS system is still evolving (Cahyono et al., 2022). Consequently, limited access to CPR training and low public awareness of emergency response may have contributed to the low level of knowledge observed in this study.

Only a small proportion of participants correctly identified the appropriate first-aid measures for OHCA, the hands-only CPR procedure, and the recommended chest compression rate and depth, indicating substantial gaps in essential CPR knowledge. These findings are consistent with previous studies showing that prior exposure to CPR information and training is associated with better CPR knowledge, whereas self-perceived knowledge does not necessarily translate into correct compression technique or hand placement (Gao et al., 2024; Østergaard et al., 2021; Sayed et al., 2024). The AHA recommends hands-only CPR for untrained bystanders witnessing an adult with sudden OHCA of presumed cardiac origin (Kleinman et al., 2025; Simmons et al., 2023). Therefore, expanding public access to CPR education and practical training, particularly in OHCA recognition and correct chest compression techniques, may help address these knowledge gaps and encourage bystander intervention in Indonesia.

In several Asian countries, community participation in bystander CPR has been integrated into the chain of survival, with laypersons encouraged to initiate CPR before the arrival of EMS (Ong et al., 2022; Liou et al., 2021). In contrast, emergency response in Indonesia has traditionally relied on healthcare providers and ambulance services (Brice et al., 2022; Cahyono et al., 2022). This context may partly explain the low proportion of participants who reported previous bystander CPR experience in the present study. Greater reliance on professional responders may also limit opportunities for laypersons to gain practical experience and confidence in responding to OHCA before EMS arrives. This interpretation is consistent with international resuscitation guidelines, which emphasize community preparedness and early bystander response as key components of the chain of survival (Greif et al., 2021; Kleinman et al., 2025; Schroeder et al., 2023; Simmons et al., 2023).

In this study, the proportion of participants who had never attended community BLS training was higher than the reported rates in several Asian countries, although it was comparable to findings from Pakistan (75.8%), where lack of awareness was identified as the primary barrier (Ali et al., 2023). Despite this limited training exposure, nearly half of the participants expressed a willingness to attend future CPR training, suggesting that limited access to training opportunities may contribute to low participation, alongside other barriers. Previous studies have shown that BLS training improves laypersons' readiness and confidence to assist OHCA victims (Alsabri et al., 2024; Ng et al., 2023; Tabata et al., 2024). These findings highlight the need to expand access to community-based CPR education programs in Indonesia to strengthen knowledge, skills, confidence, and intention to perform CPR. Successful initiatives implemented in countries such as China, Japan, Taiwan, and Singapore demonstrate that CPR education can be effectively delivered through schools, volunteer organizations, driver's license courses, fire station-based training, and collaborations with organizations such as the AHA and the Red Cross (Chowdhury et al., 2021; Ko et al., 2024; Liou et al., 2021; Ng et al., 2023; Tabata et al., 2024). Adapting similar community-based strategies may enhance public preparedness to respond to OHCA and increase bystander CPR rates.

Participants who were unwilling to attend CPR training cited several barriers, including perceived difficulty, lack of information about available training, time constraints, and the belief that CPR should only be performed by healthcare professionals, consistent with previous studies (Dong et al., 2023; Mao et al., 2021). The present study extends previous evidence by showing that these barriers persist in Indonesia, where structured layperson CPR training programs remain limited. Although willingness to attend CPR training was relatively high, previous training exposure was very low, suggesting that expanding access to structured CPR education may be a greater priority than increasing public willingness alone. Moreover, expanding CPR education through schools and community-based programs, broadening participation in OHCA registries, and reinforcing each link in the chain of survival are essential strategies for improving outcomes (Donoghue et al., 2025; Dezfulian et al., 2025). As Indonesia's EMS continues to evolve, these

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initiatives may strengthen the chain of survival, improve OHCA care, and facilitate timely and effective pre-hospital interventions.

In the bivariate analysis, a college education was associated with a significantly greater intention to assist OHCA victims. Consistent with a previous study (Ko et al., 2023), higher educational attainment was associated with greater interest in CPR training. The present study extends this evidence by demonstrating the association in a province-wide community-based population in Indonesia, where access to structured layperson CPR education remains limited. This may be associated with characteristics such as higher educational attainment and younger age, which are often linked to greater receptiveness to new knowledge, better access to information, and more favorable physical capacity (Qian et al., 2021).

The overall findings of this study suggest that interventions should extend beyond knowledge transfer alone. Given that perceived behavioral control showed the strongest association with intention, interventions should prioritize strategies that enhance individuals' confidence and perceived ability to perform CPR while strengthening social support and improving access to CPR education. Community education programs should extend beyond improving CPR knowledge and skills by incorporating hands-on training (Greif et al., 2021; Donoghue et al., 2025), psychological preparedness (Alsabri et al., 2024; Gao et al., 2024), motivational components, and public awareness campaigns delivered through mass media and social media platforms (Mao et al., 2021). Expanding access to CPR training through schools, universities, workplaces, and community settings may enhance public preparedness for OHCA and support nurse-led community CPR initiatives. Evidence suggests that nurse-led CPR training can significantly improve knowledge, self-efficacy, and CPR skills among nurses, school and university students, and community members (Baizulda et al., 2025; Madrigal de la Parte et al., 2026; Rafique et al., 2025). Building on this evidence, nurses can play a key role in designing, implementing, and evaluating community-based CPR education and health promotion programs to strengthen the public's readiness to assist OHCA victims (Dezfulian et al., 2025).

5. Implications and limitations

This study's findings have important implications for nursing practice and may inform nurse-led community CPR initiatives and related public health policy. Emergency and community nurses are well positioned to deliver short, nurse-led hands-only CPR and BLS education programs that extend beyond improving knowledge and technical skills. Guided by the TPB and the factors identified in this study, nurse-led interventions should strengthen self-confidence through hands-on training and psychological preparedness, promote positive attitudes and supportive social norms through community engagement and mass media campaigns, and also address common misconceptions and fears about performing CPR. Collaboration among emergency care providers and professional associations, nursing higher education institutions, primary healthcare services, schools, workplaces, and community organizations may further expand access to culturally appropriate CPR education and improve public preparedness for OHCA.

Several limitations should be considered when interpreting the findings. First, although a proportionate stratified sampling strategy was used to improve representation across all regencies and municipalities in South Sumatra, the exclusion of healthcare professionals and individuals with disabilities may limit the generalizability of the findings to these groups. To address this, future research should include more diverse participant groups to better capture varied experiences. Second, adults were overrepresented in the sample, which may limit the generalizability of the findings to adolescents and older adults. Future studies should aim for more balanced age representation. Third, data were collected using self-administered questionnaires based on hypothetical scenarios, which may not fully reflect actual behavior during real OHCA events. Furthermore, because this study employed a cross-sectional design, the observed associations should not be interpreted as causal relationships. Longitudinal and intervention studies are needed to confirm these findings and evaluate the effectiveness of nurse-led community interventions in increasing bystander CPR.

6. Conclusion

This provincial survey assessed the public's intention to assist OHCA victims. Prior experience of encountering an OHCA victim, more positive attitudes, stronger subjective norms,

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higher perceived behavioral control, and willingness to attend BLS training were independently associated with greater intention to provide assistance. Perceived behavioral control showed the strongest association with intention, suggesting that interventions targeting individuals' confidence and perceived ability to perform CPR may help strengthen intention to provide bystander CPR. Accordingly, emergency and community nurses should prioritize CPR education programs that improve CPR knowledge, strengthen confidence, promote positive attitudes and supportive social norms, and expand community outreach to improve bystander CPR preparedness. Given that nearly half of the participants expressed willingness to attend CPR training, integrating CPR education into school and university curricula, promoting public awareness campaigns, and strengthening multisectoral collaboration may support sustainable community CPR training initiatives. As this study used a cross-sectional design, the identified factors should be interpreted as associations rather than causal determinants of bystander CPR intention. Future research should evaluate the long-term effectiveness of nurse-led hands-only CPR education and community-based CPR training initiatives, identify strategies to overcome psychological and legal barriers, and develop scalable CPR education models.

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Author contribution

EYF: conceptualization, supervision, data curation, methodology, funding acquisition, resources, formal analysis, validation, writing (original draft, review and editing). DA: investigation, methodology, formal analysis, software, writing (review and editing). HH: investigation, project administration, writing (review and editing). UNR: resources, validation, writing (review and editing). All authors reviewed and approved the final version of the manuscript.

Conflict of interest

The authors declare that there is no conflict of interest.

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Declaration of Generative Artificial Intelligence (AI)

The authors used Grammarly, an AI-assisted writing tool, exclusively for grammar checking, language refinement, and maintaining consistency throughout the manuscript. The tool was not used to generate research ideas, analyze data, or develop the scientific content of the study.

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