

# **Public Awareness of the Automated External Defibrillators**

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## **Abstract**

Quickly shocking the heart with an automated external defibrillator (AED) can return a person's heartbeat back to normal. This research explores attitudes and awareness about emergency medical services and AEDs among the public. The case study is Prachinburi Province, Thailand. The questionnaire explored information from emergency medical staffs and the public involved in the use of emergency medical services. According to the results, most of the most common problems with officers' duties include not being able to access residential areas because vehicles are inaccessible to individuals (28.75%), respondents know emergency medical services, but most respondents are unaware of AEDs (58.75%) and do not know the location of AEDs.

## **Keywords**

AEDs, EMS, public awareness, healthcare, survey.

## **1. Introduction**

In the minute of life, if there is only one AED in the place, and it is far from where the patient is unconscious. Help may not be timely, so in all locations, AED should be provided in an easy-to-spot spot. Automated External Defibrillator (AED) is an electrical device used to automatically diagnose life-threatening arrhythmias and can be treated with defibrillation using electricity. It causes the heart to regain its heart at the right moment. An important aspect of the resuscitation process is the timely within 4 minutes. If AEDs are installed in government and private companies, as well as public space, it increases the chances of survival for emergency patients. Especially, heart arrest, sudden cardiac arrest outside the hospital. The AED is useful to immediately assess the patient's situation and provide treatment in case of needing an electric current to stimulate the heart function, allowing blood to circulate to the brain and other parts of the body in time. Nowadays, Thailand has entered the aging society. The number of critical emergency cases in the country is likely to rise sharply. According to statistics (World Bank, 2022), as of 2016, 11% of the Thai population (about 7.5 million people) are 65 years or older, compared to 5% in 1995. And by 2040, it is projected that 17 million Thais will be 65 years or older – more than a quarter of the population. So, we now need to be prepared supported health system for the aging society. Especially for persons with severe diseases. According to

statistics (Bangkok Hospital, 2022) there are approximately 50,000 acute deaths from heart disease in Thailand per year, mostly due to acute coronary artery obstruction. This leads to myocardial infarction and subsequent cardiac arrest, that is, 40% of patients die immediately after a stroke. Therefore, unable to bring blood to the heart causing cardiac arrest or twitching and immediate death. In addition, acute cardiac arrest can occur in people of all ages, including those who are physically active. Basic training and education can help everyone to save lives in acute cardiac arrest quickly and in a timely manner. Each minute that passes after a cardiac arrest, results in a 7–10 percent reduction in the chance of survival. However, if a patient experiencing cardiac arrest is assisted by cardiopulmonary resuscitation (CPR) and using an AED in a proper internal way duration of not more than 4 minutes, the heart will return to work normally again. and gives the patient a chance to survive an acute cardiac arrest.

### 1.1 Objectives

This research aimed to survey public awareness of AEDs such as knowledge of usage, the location of AEDs that will affect the ability to assist emergency critical illnesses in a timely manner and the survival rate of patients.

## 2. Literature Review

In many developed countries, such as the Sweden (Schierbeck et al. 2021), the United States (Chan 2013), Taiwan (Huang and Wen 2014), South Korea (Lee et al. 2021), Taiwan (Wang et al. 2018), many countries have placed AEDs in places where many communities are easily accessible. AEDs are used less often in rural area due to knowledge of their use and insufficient the number of AEDs. Additionally, there are studied that have been done on emergency medical and AED awareness (Lee et al. 2021). For example, people are not aware of a central emergency medical services (EMS) system in India, (Vinod et al. 2016). The public is less interested in the use of medical emergency vehicles. If an emergency occurs, they prefer to use their vehicle instead of calling an ambulance. Moreover, the gender disparities for AED usage have been studied (Soham and Sriman, 2021), the authors found that female patients were less likely to be assisted by AED than male patients.

## 3. Methods

### 3.1 Case study area

Prachinburi Province is located in the Eastern of Thailand. The province is divided into 7 districts, which are Muang Prachinburi, Kabinburi, Na Di, Ban Sang, Prachantakham, Si Maha Phot, and Si Mahosot. These districts are further divided into 65 sub districts and 658 villages. Our population for this research is people living in Muang Prachinburi District, Prachinburi Province. (Table 1) In 2019, Muang Prachinburi District has a total of 106,320 people. The District are divided in to 13 sub districts, which reported in Table 1. The sample size in this study is selected from the total population in Muang Prachinburi District. We have 2 groups, which are from emergency medical service officers (included the trained volunteers that experienced with helping patients) and residents who experienced with using emergency medical service. To determine the sample size, we followed Taro Yamane's formulation, where  $N$ =population size=106,320,  $e$ =acceptable error level=0.1. By using the formulation of  $n=N/(1+Ne^2)$ , we yield the sample size of  $n=100$ . This sample size is for the residents who have experienced with emergency service. And for the emergency medical service officers, we fixed at the 50 persons. The total number of people who answers the survey completely is 80 for medical-related group, and 47 for non-medical-related group.

Table 1 Population in Muang Prachinburi District

Sub District	Population
Na Mueang	17,059
Ban Phra	16,090
Dong Phraram	14,829
Mai Khet	12,179
Dong Khilek	10,502
Noen Hom	7,762
Rop Mueang	6,414

<b>Sub District</b>	<b>Population</b>
Tha Ngam	6,185
Khok Mai Lai	4,087
Non-Hom	3,955
Bang Decha	3,191
Wat Bot	2,804
Bang Boribun	1,263

### **3.2 Emergency Crisis Disease Fragmentation Information**

Data obtained from incidents in Mueang Prachinburi district from the National Institute of Emergency Medical System (ITEMS) Information Technology for Emergency Medical System database, 2015- 2018.

The number of incoming calls from emergency medical institutions is as follows:

1. The number of patients with respiratory diseases is 1,344.
2. The number of patients with acute myocardial infarction is 299.
3. The number of stroke patients is 168.
4. The number of patients with acute cardiac arrest is 312.
5. The number of patients with severe injury is 3,763.

### **3.3 Collection of information from interviews**

The information from the interview is divided into 2 parts: information from emergency medical personnel and the public involved in the use of emergency medical services. Questionnaire of problems encountered when issuing emergency medical duties (for operators). General information of respondents, which is a data-driven survey using frequency and percentage methods. The questionnaire about the level of problems encountered when leaving for duty and preparing for work is a questionnaire by analyzing the mean standard deviation.

## **4. Results**

The questionnaire is divided into two parts of the survey: information on medical services and public service from 47 medical-related respondents as shown in Table 2 and 80 non-medical-related respondents as shown in Table 3.

Part I

Respondents: medical related respondents

Table 2 Outcomes from the medical related respondents

<b>Topic</b>	<b>Max. # of answers</b>	<b>Percentage</b>
Sex	Male	55.32%
Work Experience	More than 5 years	51.06%
Time to receive a report	Up to 5 mins	68.09%
Preparation period	1-3 mins	51.06%
The number of officers on duty each time.	3	46.81%
Obstacles encountered when leaving for duty	Travel access to the call	28.75%
The most common types of diseases to report.	Acute myocardial infarction	29.76%

Of 47 emergency medical practitioners is the second part of the questionnaire. Most of respondents have more than 5 years of working experience (51.06%; n = 24/47). Time to receive the incident is approximately 1-3 minutes and preparation time and medical equipment before leaving for duty about 1-3 minutes as well (51.06%; n = 24/47). The most common incidents that require AEDs are acute myocardial infarction (29.79%; n = 14/47). The most common obstacle encountered when leaving for duty is inaccessible to the patients' location (28.75%; n = 23/47).

The length of time when officers arrived at the location after reporting the incident was between 10–15 minutes (38.29%; n = 18/47).

Part II

Respondents: non-medical related respondents

Table 3 Outcomes from non-medical related respondents

<b>Topic</b>	<b>Max. # of answers</b>	<b>Percentage</b>
Sex	Female	55.00%
Age	Up to 35 years old	65.00%
Awareness of community rescue calls	Recognize	77.50%
Emergency medical service awareness channels	Television	65.00%
People who have accessed emergency medical services	Yes	48.75%
Training on how to use AEDs	Healthcare officers	20.00%
Type of informant	Bystander	56.41%
Type of location	Public places	51.28%
Distance from the house to the main road.	3-6 Km.	41.03%
EMS response time	10-15 min	46.15%
AED awareness	No	58.75%
Knowledge of how to operate AEDs	No	82.50%
AED Location Awareness	No	81.25%

Of 80 non-medical-related respondents, 39 (48.75%) originated from patients. Most non-medical-related respondents in this study were aware of community rescue calls (75%; n = 62/80), they had received EMS information from television with 65.00%. Experience in calling emergency medical services as bystanders 56.41%. Most places of emergency occur in public places, 51.28%. Most respondents were unaware of AEDs (58.75%; n = 47/80), and have no skilled how to use AEDs (82.5%; n = 66/80). In addition, respondents who were able to use the AEDs were trained by healthcare officers (20.00%; n = 16/80). Most respondents don't know where the nearest AED is (81.25%; n = 65/80). (Table 3)

**5. Conclusion**

In this study, respondents who were emergency medical staffs took within 5 minutes to receive an emergency notification; the highest number of diseases notified was acute myocardial infarction. The most common problem in getting out to help critically ill patients is accessing an emergency facility. For example, the place where the patient is located in an area where the vehicle is inaccessible. In part II, most of the non-medical respondents in the Prachinburi metropolitan area knew about emergency medical services through television, but most were unaware of AEDs, location, and how to use them. 20.00% of respondents knew how to use AEDs from healthcare officers. In general, emergency incidence was reported by bystanders, and EMS mostly arrived within 10- 15 minutes.

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