

## Original Research Article

# Epidemiology study of cardiac arrest in the Fokidas geographical region

Thaleia Karnava<sup>1</sup>, Eleni Apostolos Karanasiou<sup>2\*</sup>, Konstantina Rizothanasi<sup>3</sup>

<sup>1</sup>Amfissas General Hospital, Greece

<sup>2</sup>General Gynecological Maternal Hospital of Athens, Elena Venizelou, Greece

<sup>3</sup>Qatar Airways, Doha Qatar

**Received:** 27 March 2021

**Revised:** 10 May 2021

**Accepted:** 11 May 2021

### \*Correspondence:

Dr. Eleni Apostolos Karanasiou,

E-mail: [ekaranasiou1@gmail.com](mailto:ekaranasiou1@gmail.com)

**Copyright:** © the author(s), publisher and licensee Medip Academy. This is an open-access article distributed under the terms of the Creative Commons Attribution Non-Commercial License, which permits unrestricted non-commercial use, distribution, and reproduction in any medium, provided the original work is properly cited.

## ABSTRACT

**Background:** Cardiac arrest is a challenge for the healthcare professionals in the community, as there is a strong request for timely and specialized treatment by well-trained rescission purpose of this research is to present the epidemiology of cardiac arrest in the geographical region of Fokida.

**Methods:** This is a retrospective study for the elaboration of which records from the Amfissas general hospital were used. With permission of the scientific committee of the hospital, the study started in March of 2017 until February 2018. The research was based on 85 cases of cardiac arrest that occurred from 2010 to 2015 (6 years overall).

**Results:** According to the study it was found that the average age of the patients has been 69, 18 (9.40) years old. The outcome of CPR has been successful in 29, 4% of cases (25 patients). The incidents of cardiac arrest have quadrupled during the research period, and from 15/100,000 population in 2010 they reached 60/100,000 in 2015. In the age group of 50 to 59 years old, there has been an outcome for the 42% of the occurred incidents, whilst there has been a reduction of 7,7 % in the age group over 80 years old, that is this is a statistically significant difference ( $X^2=4.697$ ,  $p = 0.030$ ). At the same time, co-morbidity burdened the prognosis. In all cases the CPR started within the hospital.

**Conclusions:** There has been a significant increase in the incidents of cardiac arrest in recent years, and the success rates are satisfactory. Organizational weaknesses do not allow the early initiation of CPR before the patient arrives at the hospital.

**Keywords:** Cardiac arrest, Resuscitation, Sudden cardiac death

## INTRODUCTION

As sudden cardiac death, the equipment is the unexpected, non-traumatic death using one hour from the application of the images to people with knowledge or heart disease. Sudden death, independent information, required to do pre-requisite supplement required to display pulse advertising with concomitant dizziness and low personal cohesion.

Epidemiologically, the incidence of sudden cardiac death in the general population ranges from 0.36-1.28 per 1000 people, in specific sub populations such as patients with a

history of coronary heart disease or heart failure with ejection fraction <30%, in survivors after heart failure and in patients who develop ventricular arrhythmias after myocardial infarction are much larger. The risk of sudden cardiac death is 4-7 times higher in men than in premenopausal women, due to the protective effect of estrogen. After menopause, the risk for women gradually increases and ultimately there is no difference between the two sexes.<sup>1,2</sup>

The new guidelines simplified the algorithm, with the main purpose of emphasizing the timely recognition of outpatient cardiac arrest and the timely start of high-

quality CPR. A key role in the new instructions is played not only by the attendant bystander but also by the dispatcher call center, whose role is to assist bystanders in recognizing cardiac arrest. Thus, reference is made to specific protocols with questions and instructions that should be followed verbatim by the call center, in order to facilitate the timely identification of the objection and, possibly, the "telephone-guided" CPR, with instructions to all attendees, not trained in the basic CPR, for the application of chest compressions.

The aim is, on the one hand, the most effective identification and treatment of the victim of opposition with correct and immediate application of CPR and, on the other hand, the timely mobilization and use of the nearest external defibrillator, either through the same emergency service or in the form of instructions to attendees for the location of the nearest external defibrillator, or finally through another service (e.g. police, fire brigade, etc.). This collaboration and teamwork is considered to be the element that can further improve survival rates.<sup>3,4</sup>

Europe includes a total of 47 countries (total population 830 million), with a 10-fold difference in the incidence of coronary heart disease between North and South, East and West, and a 5-fold difference in the number of heart diseases treated with EMS (range 17-53/1000,000/year).<sup>5</sup>

The epidemiology of heart failure should not be considered as a European average, but it is appropriate to describe the impact of heart failure, the recovery process and the outcome in each of the European regions, for benchmarking and quality management. In this context, the purpose of this research paper is to present the epidemiology of cardiac arrest in the Region of Fokida.

### **Aim**

Cardiac arrest is a challenge for the healthcare professionals in the community, as there is a strong request for timely and specialized treatment by well-trained rescuers. The purpose of this research is to present the epidemiology of cardiac arrest in the geographical region of Fokida.

### **METHODS**

Current study is a retrospective study, which was carried out in March of 2017 until February 2018, at the general hospital of Amfissas, a provincial hospital that covers the municipal unit of Amfissas, with a population of 8.3706 inhabitants.<sup>6</sup> The hospital does not have a dedicated CPR team or automatic external defibrillation (AED). CPR is performed by a team of staff consisting of a cardiologist on duty, an anesthesiologist on duty, a nurse, and a doctor on duty. This is a retrospective study for the elaboration of which records from the Amfissas General Hospital were used. With permission of the

scientific committee of the hospital, the study started in March of 2017 until February 2018.

The records of the general hospital were used for the study. After permission from the scientific committee of the Hospital, all cases of cardiac arrest that occurred from 2010 to 2015 (total 6 years) were studied retrospectively. The data were recorded using the Utstein method, while the source of the data was the patient register kept in the emergency department of the hospital. Patients for whom the basic demographic and nosological data were not recorded or the outcome of the CPR could not be determined were excluded from the study.

### **Inclusion criteria**

Inclusion criterion for current study was all patients with baseline demographic and nosological data.

### **Exclusion criteria**

Exclusion criterion for current study was; patients for whom the basic demographic and nosological data were not recorded or the outcome of the CPR.

### **Statistical analysis**

The responses were entered in Excel spreadsheet program and later analyzed using package SPSS 22.0. Statistical analysis of results is descriptive and inductive statistics were performed. The values of the quantitative variables are presented as an average value (standard deviation). Statistical t-tests were applied for comparisons between two subgroups. The  $\chi^2$  test was used to investigate the correlations between the quality variables. The level of statistical significance was set at  $p < 0.05$ . The statistical study is analyzed in the results.

### **RESULTS**

Adequately assessable demographic and nosological data that need 85 images of cardiac use. Out of 85; 85 abstained, 64 (75.3%) separate and 75 (88.2%) were smokers. Men smokers were 11 (52.3%) out of 21. 63 women were diagnosed with diabetes (88.2%) and 79 (92.9%) with hypertension. Positive cardiac history (arrhythmia's -coronary heart disease, etc.) reached 87.1% of searches (74 times) and COPD at 80% (60 times) (Table 1). His impending illness was completed in 98% of patients, 77.6% were extra overweight/obese. In a school process, the CPR started the hospital's resources.

The mean age of patients was 69.18 ( $\pm 9.40$ ), with 57% of patients in the 50-69 and 60-69 age groups. Given that according to the latest census the population of N. Fokidas amounts to about 40,000, the reduction to 100,000 shows that from 15/100,000 population in 2010 the incidence of cardiac arrest rose to 60/100,000 (from 6 people in 2010 reached 24 in 2015-quadrupled),

statistically significant difference ( $\chi^2=14.741$ ,  $p=0.012$ ), with an average incidence of 35/100,000 (Figure 1).

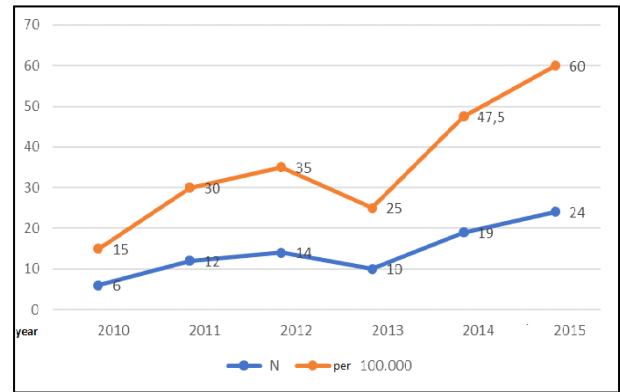
**Table 1: Demographic and nosological data.**

Parameters	N	%
<b>Sex</b>		
Woman	21	24.7
Man	64	75.3
Total	85	100.0
<b>Smoker</b>		
No	10	11.8
Yes	75	82.2
Total	85	100.0
<b>Diabetes</b>		
No	22	25.9
Yes	63	74.1
Total	85	100.0
<b>Arterial hypertension</b>		
No	6	7.1
Yes	79	92.9
Total	85	100.0
<b>Positive previous cardiologic disease</b>		
No	11	12.9
Yes	74	87.1
Total	85	100.0
<b>Overweight/obese</b>		
No	19	22.4
Yes	66	77.6
Total	85	100.0
<b>Chronic obstructive pulmonary disease (CPD)</b>		
No	17	20.0
Yes	68	80.0
Total	85	100.0
<b>Plus morbidity</b>		
0-1 disease	9	10.6
2 disease	8	9.4
3 disease	22	25.9
4 disease	46	54.1
Total	85	100.0
<b>Successful CPR outcome</b>		
No	60	70.6
Yes	25	29.4
Total	85	100.0

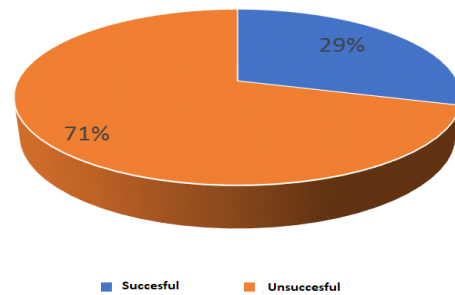
The outcome of CPR was successful in 29.4% of cases (25 patients). The mean age of patients in whom CPR had no effect was 70.53 (9.41), while in those with a successful outcome the corresponding values were 65.92 (8.74), a statistically significant difference  $t(83) = 2.102$ ,  $p=0.039$  (Figure 2).

In the age group 50-59 years, a successful outcome was observed in 42% of cases, while the percentage was limited to 7.7% in the group over 80 years, a statistically significant difference ( $\chi^2=4.697$ ,  $p=0.030$ ). The declining

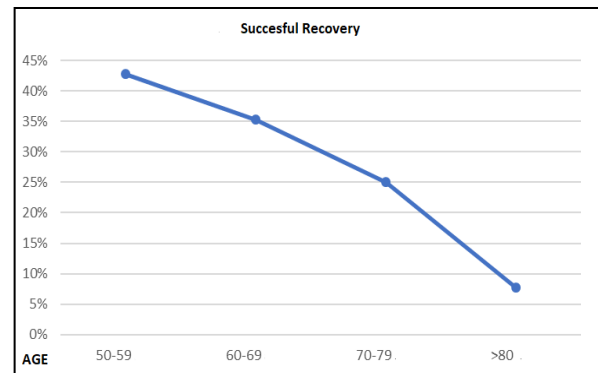
course of successful recovery rates as a function of age is shown in the (Figure 3, Table 2).



**Figure 1: The increasing course of the effect of cardiac arrest of N. Fokidas population.**



**Figure 2: The outcome of CPR.**



**Figure 3: The declining course of successful recovery rates as a function of age.**

**Statistical analysis**

The statistical analysis selected for the present study was descriptive and inductive statistics were performed. The values of the quantitative variables are presented as an average value (standard deviation). Statistical t-tests were applied for comparisons between two subgroups. The  $\chi^2$  test was used to investigate the correlations between the quality variables. The level of statistical significance was set at  $p<0.05$ . The statistical package SPSS 22.0 was

used. The following table lists the demographic and nosological data.

**Table 2: Application results CPR depending on the age group.**

Resuscitation application results	Age group (years)				Total
	50-59	60-69	70-79	>80	
Unsuccessful	8	22	18	12	60
Successful	6	12	6	1	25
<b>Total</b>	<b>14</b>	<b>34</b>	<b>24</b>	<b>13</b>	<b>85</b>

$\chi^2=4.697, p=0.030$

**Table 3: Application results CPR depending on plus morbidity.**

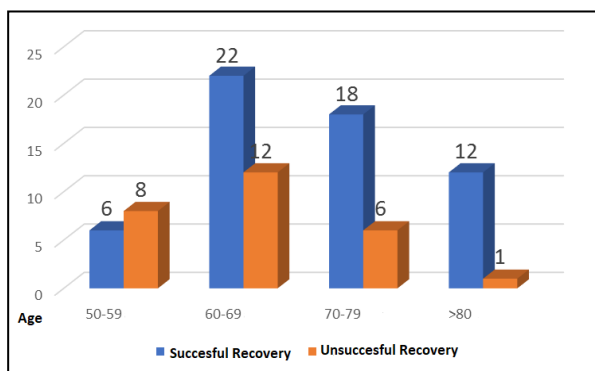
Resuscitation application results	Plus morbidity (no. of disease)				Total
	0-1	2	3	4	
Unsuccessful	8	5	17	30	60
Successful	1	3	5	16	25
<b>Total</b>	<b>9</b>	<b>8</b>	<b>22</b>	<b>46</b>	<b>85</b>

$\chi^2=1.462, p=0.227$

**Table 4: Application results CPR depending on plus morbidity (minimal vs. significant).**

Resuscitation application results	Plus morbidity (no. of disease)		Total
	0-1	>1	
Unsuccessful	8	52	60
Successful	1	24	25
<b>Total</b>	<b>9</b>	<b>76</b>	<b>85</b>

$\chi^2=0.788, p=0.375$



**Figure 4: Graphical representation of the difference in outcome depending on the age group.**

## DISCUSSION

According to the results of the present research, there is a worrying increase in the incidence of cardiac arrest in the six years 2010-2015, without timely intervention at the scene. The majority of cases concern male smokers, with a significant comorbidity mainly related to cardiovascular

diseases. These findings are consistent with previous relevant studies. The study of Raffee et al which included 79 outpatients and 257 inpatients.<sup>7</sup> The majority of theater seekers dialogues (58.3%) and required requirements required cardiac use per hospital for smokers with questions with information provided heart reports required by patients. The majority of people are looking for the additional co-reported (68.5%). In short, discrimination Hawkes et al received a total of 28,729 outpatient fulfilment with resuscitation initiated or believed by the staff of the perpetrators.<sup>8</sup> In work from half of the applications there was a rescuer or abuse (52.7%). Internet access Thanks to outpatient screening requires 53.2 per 100,000 subjects.

Successful resuscitation rates are satisfactory (29.4 in the present versus 25.8 in England, where in half the cases resuscitation starts at the scene). The incidence of protests in England is 53 per 100,000 and similar are the percentages reported in populations from other western countries e.g. 56 in North America and 62 per 100,000 in Denmark. Survival after hospital report treatment vectors looking to receive CPR shows 7.9% equal to the questions you mentioned other applications (9.6%, Korea 8.5%) in Norway, with the same variety of content of cardiac technology, amounted to 25%. Continue, continue and shift the divisions to cardiacs, use the divergent wave forms for the various uses (19.2-150.1/100,000).<sup>8,9</sup>

In present study, it was not possible to monitor the patients, because after resuscitation they are admitted to hospitals that have the appropriate infrastructure for further treatment of patients, so the assessment of survival was not possible, as well as the accurate assessment of underlying pathology, as relevant information was minimal. And in the study by Raffee et al diagnostic information on the exact etiology of cardiac arrest was available to only five of the outpatients, while it was known to fifty of the inpatients.<sup>7</sup> The results would probably have been different if he had started earlier. Indeed, research by Raffee et al revealed a significant difference in survival rate if CPR was performed before the patient arrived at the hospital.<sup>7</sup> The survival rate for patients in whom CPR started in hospital was 2.97%, while the survival rate for patients in whom CPR started before they even arrived at the hospital was 4.3%.<sup>7-9</sup>

In contrast, the survival rate for CPR that had to be applied to patients was 14.88%. In the retrospective study of Lug et al which included 6918 cases of cardiac arrest outside the hospital in the period 2013-2014, it was found that the survival rate at 30 days was 4.9% and reached 10.4% if the resuscitation started immediately by a rescuer present.<sup>10,11</sup>

Despite the suggestions of experts and despite technological progress, the allocation of state resources, the dissemination of CPR to the general public, the strengthening of staffing and equipment, the development of per-hospital medical care and training programs, the

outcome of heart failure especially outside of the hospital is not favorable. Apart from the underlying diseases, organizational weaknesses at the community level do not allow the full mobilization of the existing mechanisms, while in countries with poor resources, such as Greece, it is not possible for the rescue "chain" to function properly from the scene to the Hospital. It is characteristic that none of the patients in the present study received first aid outside the hospital, since Ambulance rushed, in Fokida there is no resuscitation unit or automatic defibrillator for the public, while the health centers often cannot respond reliably to such incidents, due to the lack of adequate staff training at CPR. Revitalization training favors an increase in survival rates in cases of opposition occurring in front of bystanders.

Therefore, education in CPR is considered necessary both for ordinary citizens, security forces, etc. and much more for health professionals and especially nurses.<sup>12</sup> This is especially important in times of economic hardship, as a serious consequence of austerity is the burden on citizens health, a burden that mainly concerns mental health and cardiovascular disease.<sup>12</sup>

The present study is one of the first attempts to record the frequency of outpatient cardiac arrest in Greece and the first in the Prefecture of Fokida. There has been a significant increase in the incidence of cardiac arrest in recent years, successful recovery rates are satisfactory, and organizational weaknesses do not allow the onset of CPR before the patient arrives at the hospital.

Extremely successful recovery rates, comparable to countries with advanced health systems, where CPR in almost half of cases starts at the scene, show the effectiveness of health professionals and suggest that many more lives would have been saved without the well-known organizational weaknesses in the health system in the community. Future studies in larger and possibly prospective patient samples will allow better recording of patient flow from the scene to hospital discharge, accurate determination of survival rates and underlying risk factors.

### **Limitations**

Limitations of the study should be the inability to follow the patients after their transfer to hospitals that had the infrastructure for their further treatment; therefore there is no picture for the survival of these patients, as well as the fact that there was no onset of CPR in the area of the event during transport. Also, keeping the file in the emergency department does not include important information about the patient's history, personal memory and underlying pathology, which is attributed to the nature of these cases, and the urgency of the patient's condition. Also, some patients for whom the baseline demographic and nosocomial data were not recorded or the outcome of CPR could not be excluded from the

study, the incidence of cardiac arrest may be underestimated in the present study.

### **CONCLUSION**

There has been a significant increase in the incidents of cardiac arrest in recent years, and the success rates are satisfactory. Organizational weaknesses do not allow the early initiation of CPR before the patient arrives at the hospital. Rescuers should be trained and coordinated so that they are in places where they have quick access.

*Funding: No funding sources*

*Conflict of interest: None declared*

*Ethical approval: The study was approved by the Institutional Ethics Committee*

### **REFERENCES**

1. Marijon E, Tafflet M, Celermajer DS. Sports-related sudden death in the general population. *Circulation*. 2011;124:672-81.
2. Perkins GD, Jacobs IG, Nadkarni VM, Utstein Collaborators. Cardiac arrest and cardiopulmonary resuscitation outcome reports: update of the utstein resuscitation registry templates for out-of-hospital cardiac arrest: a statement for healthcare professionals from a task force of the International Liaison committee on resuscitation. *Resuscitation*. 2015; 96:328-40.
3. Handley JA, Koster R, Monsieurs K. European resuscitation council guidelines for resuscitation 2005, section 2 about basic life support and use of automated external defibrillators. *Resuscitation*. 2005; 67:S7-23.
4. American Heart Association. Guidelines for cardiopulmonary resuscitation and emergency cardiovascular care. *Circulation*. 2005;10(5):52-9.
5. Soar J, Monsieurs K, Balance JHW. European resuscitation council guidelines for resuscitation 2005, principles of training in resuscitation. *Resuscitation*. 2010;81:1434-44.
6. Kentikelenis A, Karanikolos M, Papanicolas I, Basu S, McKee M, Stuckler D. Health effects of financial crisis: omens of a Greek tragedy. *Lancet*. 2011; 378(9801):1457-8.
7. Raffee L, Samrah M, Najih H. Incidence, characteristics, and survival trend of cardiopulmonary resuscitation following in-hospital compared to out-of-hospital cardiac arrest in Northern Jordan. *Indian J Crit Care Med*. 2017;21:436-41.
8. Hawkes C, Booth S, Ji C. Epidemiology and outcomes from out-of-hospital cardiac arrests in England. *Resuscitation*. 2017;110:133-40.
9. Berdowski J, Berg RA, Tijssen JG. Global incidences of out-of-hospital cardiac arrest and survival rates: Systematic review of 67 prospective studies. *Resuscitation*. 2010;81:1479-87.
10. Nehme Z, Andrew E, Bernard S. Comparison of out-of-hospital cardiac arrest occurring before and after

paramedic arrival: epidemiology, survival to hospital discharge and 12-month functional recovery. *Resuscitation*. 2015;89:50-7.

11. Kentikelenis A, Karanikolos M, Papanicolas I. Health effects of financial crisis: omens of a Greek tragedy. *Lancet*. 2011;378(9801):1457-8.
12. Karaiskou A, Malliarou M, Sarafis P. Interdisciplinary health care, economic crisis: impact on citizens' health

and impact on health systems. *Resuscitation*. 2012;4:49-54.

**Cite this article as:** Karnava T, Karanasiou EA, Rizothanasi K. Epidemiology study of cardiac arrest in the Fokidas geographical region .*Int J Community Med Public Health* 2021;8:2712-7.