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### EDITORIAL

EVIDENCE BASED NURSING: BARRIERS AND CHALLENGES FOR CONTEMPORARY NURSES

### RESEARCH ARTICLES

SELF-CARE MANAGEMENT, KNOWLEDGE, SELF-EFFICACY FOR MEDICATION AND QUALITY OF LIFE IN CHRONIC HEART FAILURE PATIENTS

A RETROSPECTIVE STUDY OF MEDICAL EMERGENCY MANAGEMENT IN A HEALTH CENTER IN GREECE

PREVALENCE OF FAMILIAL HYPERCHOLESTEROLEMIA IN ATTICA REGION, GREECE

COST EVALUATION IN ADULT ICU: A TWO-YEAR STUDY IN A GREEK STATE HOSPITAL

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### A retrospective study of medical emergency management in a Health Center in Greece

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## RESEARCH ARTICLE

## A RETROSPECTIVE STUDY OF MEDICAL EMERGENCY MANAGEMENT IN A HEALTH CENTER IN GREECE

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## Abstract

**Introduction:** Primary Health Centers face a plethora of emergencies of different nature and severity and it is necessary a decision - whether or not to refer patients to the nearest hospital for further treatment and investigation- to be made.

**Aim:** The aim of the present study was to investigate the management of emergencies in a HC of regional type near a large urban center.

**Material and Methods:** This was a retrospective study. The data of 400 randomly selected patients admitted to the health center with acute conditions during the years 2017-2018 were recorded.

**Results:** Out of all cases examined, 22% were rated as truly medical emergencies and 44% as not; 34% were classified as urgent; 25.9% of patients had arrived within the first hour of onset of symptoms, while 81.7% had already reached within the first 24 hours. Pain and respiratory diseases were the most common problems. In 15% of cases the patient was ambulance-transported to hospital. The proportion of ambulance referral to the nearest hospital was higher in patients with comorbidities (18.8%) than in those without (14.9%); 76% of cases were treated in accordance with evidence-based practice.

**Conclusions:** Despite the significant progress made in treating patients in the community, it is necessary to improve management of non-emergency cases, as well as to improve the procedures for emergencies management in the HCs.

**Keywords:** Health Center, emergency, management.

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## INTRODUCTION

The meaning of Primary Health Care (PHC) established in 1978 with the declaration of Alma Ata. PHC is considered as the system providing basic and integrated health care services in an individual or family level. It is the first contact point between a person and the country's health system, of which it constitutes an integral part. PHC relies on the concept that health is an ecumenical social right, regardless of the tribe, social and religious beliefs and economic situation. Its philosophy bases on the principle of social justice and equality while its strategy aims to satisfy individual and community needs by people's participation.<sup>1,2</sup>

With reference to the public sector, PHC is provided in the Health Centers, Regional Medical Centers and Outpatient Clinics of the National Healthcare System (NHS) hospitals which produce proximate 15% of total care. A significant part lies in Social Insurance Institute (40%). Moreover, PHC is available in National Emergency Center services (National Emergency Centre), Mental Health Units, rehabilitation centers, Open Care Center for the elderly and in "domestic help" programs. National Emergency Center, which consists of 12 stations in Greek cities, is, also, part of Hellenic Healthcare System. It plays a central role in Primary healthcare and it operates as a "link" for more specialized care. However, the majority (45%) of primary health care production and contribution belongs to the private sector. Nowadays in Greece operate 170 Health Centers and 1311 Regional Medical Centers.<sup>3</sup>

PHC in community is exerted mainly by Health Centers and Regional Medical Centers. Health Centers, according to the provision Law 1397/1983, aim for the Primary health care contribution (diagnosis, treatment, rehabilitation) with the necessary laboratory support and the attendance of specialized doctors. They, also, aim at the emergency department and hospitalization supply and the transportation to the hospital by ambulance or other vehicle. In addition, Health Centers provide prevention services (vaccination, health education, family programming etc), as well as people's social care (elderly disadvantaged people protection)(provided by expert health executives and social workers).<sup>4</sup>

A variety of emergency cases, which differ in terms of nature

and importance, enters in Regional Medical Centers and Health Centers and a decision has to be made when it comes to whether patients will be transferred to the nearest hospital for further treatment or not. A clinical event is characterized as urgent when it carries immediate hazard for a patient's life. The doctor must act promptly, but not rashly, in order to prevent severe, non-reversible damage to a patient by following certain rules and widely acceptable algorithms. Finally, the decision about patient's transportation to the hospital should be assessed in the light of the clinical picture, the patient's record, the suspicion of a further deterioration, the necessity for patient's hospitalization and the experts' treatment. In several cases, not only medical reason are significant, but also social, geographical and, occasionally, economical. An even more eminent role in the outcome of patient's health plays the doctor's decision to discharge patient from health center and return him to his home after a successful curative intervention with all the difficulties of a Regional Medical Center or a Health Center (lack of specific health material). The crucial factor for providing adequate emergency treatment is doctor's scientific background, good knowledge of the guidelines and potential experience.<sup>5-8</sup>

Thus, the aim of the present study was to explore the medical emergency management in a Health Center in the region of a big urban center of Greece.

## MATERIAL AND METHODS

### Sample and procedure

This was a retrospective study. Health Center data of 400 patients with reported emergency situation in 2017 and 2018 have been evaluated. The source of information was the medical records of the health center of Tirnavos, district of Larisa, Greece. Data recorded included patient's demographic characteristics, diagnostic and management procedure. The patients have been selected randomly from those who visited the Health Centers emergency station during the aforementioned period and in equal number per month. For every patient, their first visit in the Health Center during this period has been recorded. Patients who admitted to Health Center for tests such as electrocardiogram, as well as those who were waiting for a

medical prescription have been excluded from the study. The sample of the research was based on a 95% confidence intervals and 5% significance level. The estimation of the sample size has shown the amount of 377 individuals, a number that has been rounded up to the closest hundred, which means 400 individuals. This number was, also, the estimated average of emergencies, relating to an amount of 1500 visits to the emergency station of a Health Center per month, as a result of a sample evaluation of three random months.

### Ethics

All data were anonymous and have been used exclusively for the needs of the research. Permission for the research had been given by the 5<sup>th</sup> Regional Health Authority of Greece.

### Statistical analysis

Data analysis was performed by the statistical package SPSS 22.0. For the qualitative variables the  $\chi^2$  test (with the Yates' correction for 2x2 tables) was applied ( $\chi^2_c$ ). The statistical significance level was set to  $p=0.05$ .

### RESULTS

The patients' mean age was  $57.95 \pm 22.81$  years old. The demographic characteristics of the studied sample are presented in *Table 1*. Fifty six point three percent (56.3%) of the participants were male. The majority (73.8%) of the studied sample had medical insurance. Initial diagnosis and the related categories of pathological emergency diagnosis are presented in *Table 1*.

The pain of any or unknown origin was the most frequent among the symptoms leading someone to the HC emergencies (27.1%). Respiratory problems [Chronic Obstructive Pulmonary Disease (COPD), viral infection, asthma, upper and lower respiratory system infection], follow in the second position and gastroenteritis (16.5%), allergies (12.8%) in the next positions of the listed categories. The percentage of drug abuse, poisoning, hypertensive crisis and faint incidents was less than 10% respectively; 25.9% of the patients had been entered to the HC within the first hour of the symptoms, while the remaining 81.7% had been entered within the first 24 hours, (Graph 2).

Ninety percent (90%) of the patients arrived at the HC by their own means of transportation (car), 1% on foot and 9% by ambulance. The patient was escorted by someone familiar in 97%

of the incidents. In 15% of the cases, patient were transported to another hospital and 81% of the patient returned home according to doctors' instructions, (Table 2).

In *Table 3*, comorbidities, emergency categorization so as treatment provided according to evidence based medicine are presented. In 24% of the cases recorded, there were coexisting chronic diseases. Thirty four percent (34%) of the cases was characterized as "emergency cases" and 22% as "non emergency cases". Seventy six point three percent (76.3%) of the studied sample was treated according to evidence based medicine.

The percentage of transportations and deaths was higher in patients with comorbidities (17.7% and 5.2% respectively) compared with those who didn't have any other health problems (14.4% and 3.2% respectively), which means that the percentage of transportation seems to be higher almost around 30% in the team with comorbidities,  $\chi^2=143.179$ ,  $p<0.001$ . The percentage of the emergencies regarding patients with comorbidities was higher (42.7%) compared with the percentage of those who didn't have other health problems (31.2%),  $\chi^2=4.325$ ,  $p=0.115$ , (Graph 3).

### DISCUSSION

According to the results of the present study, only a third of the incidents that have been recorded in the HC could be characterized as "emergencies". The ache, no matter the cause, respiratory diseases and gastroenteritis were the main reason why someone was entered the emergencies, while the main comorbidities were diabetes and atrial fibrillation. The majority (90%) of the patients entered the emergency room within the first 24 hours from initial symptoms whereas 60% within the first 2 hours. This fact proves a rather easy patients' access to the HC. The rate of transportation to hospital was estimated to be 15%, which is significantly increased, almost around 30%, when comorbidities are present.

These results contributed to the essential progress that has been made about the health service of those living in the community, especially in semi-urban areas where the accessibility in HC is easy, while on the other hand there is a need for alternative immediate care services so as to reduce non urgent

demands. A strong primary care network should be the cornerstone of national healthcare system. This is a common issue especially in countries where the patient evaluates his own problem's severity and is self-reported to the primary health care.<sup>9-11</sup> In a research in Turkey, the percentage of arrivals to PHC within the first 24 hours was 73%.<sup>12</sup> In Lucas and Sanford research,<sup>13</sup> 72% of the patients characterized their problem as of modest severity or serious, while 59% stated immediate care was needed. In the Akpinar et al. research,<sup>14</sup> a significant percentage of the patients entered HC, because the HC was open apart from working hours (13,2%), with capability of a fast treatment (8,6%), near the house (3,1%) and an "opportunity for lab tests" (2,4%). In the same research, the main causes of patients were related to fever and fatigue (35%), sore throat (6%), indigestion (10%) and long term ache (14%). In fact, almost a third of the patients had arrived to the HC, not because of an emergency, but in order to encounter their chronic diseases easier, a fact that causes anxiety about both the effectiveness of the health system to cover the non-urgent requirements of the patients and the culture that has been formed in the local societies in respect to the role of the PHC and especially about the treatment of the emergencies. Since there is no mandatory referral system through a general doctor, the "self-reported" to the health system is in effect with whatever difficulties it might have in self-evaluation of the patients' symptoms and, consequently, in the system's congestion. Beland et al have shown that patients who live near HC tend to visit them more frequent while actual urgent incidents are coming from long distance places.<sup>15</sup> So, the high percentage of HC arrivals in the first 24 hours in the present research would probably be interpreted by the easy access to the HC, as it is about a plain semi-urban area, but also, by need of access in medical services, even if it is not an emergency. Some of these emergencies can be entirely confronted by the family doctor, whereas some others really need to be transferred to the hospital after their initial handling. The level of handling for every patient can be set out by the level of illness severity, the doctor's experience and the distance from the nearest hospital.

Comorbidities further deteriorate the clinical picture. Research shows that people regularly visiting PHC, also visit family doc-

tors very often, because of comorbidities. Additionally, regular visitors of the emergency department are at risk for chronic diseases and increased mortality.<sup>16,17</sup> The main comorbidities in the present study research referred to high blood pressure and diabetes mellitus. These two chronic diseases have been found to be responsible for the significant percentage of complications in cases of patients visiting HC.<sup>18</sup> On the other hand, with regard to the transfers and based on the percentage of the population covered by Tirnavos HC, it is estimated that 7-8 transfers account for every 1000 residents per 3 months. Data which are similar to those have been presented in Xatzikokolaki dissertation.<sup>18</sup> Comorbidities and financial crisis exert a lethal compination for elderly patients and affect poorly organized PHC.<sup>19-22</sup>

### Limitations

The research was conducted in only one Health Center, near to an urban center, while the incidences have been evaluated by only one researcher. In addition, it is about a retrospective investigation with randomly selected cases. Consequently, the case of a potential false categorizing of the incidences cannot be excluded.

### CONCLUSIONS

The present research has shown that the emergency services in PHC level need improvement in regard to procedures and effectiveness. PHC services need modification and imperfections must be taken into consideration alongside with the available resources in order to upgrade PHC. Regular surveillance and evaluation of the HCs is necessary.

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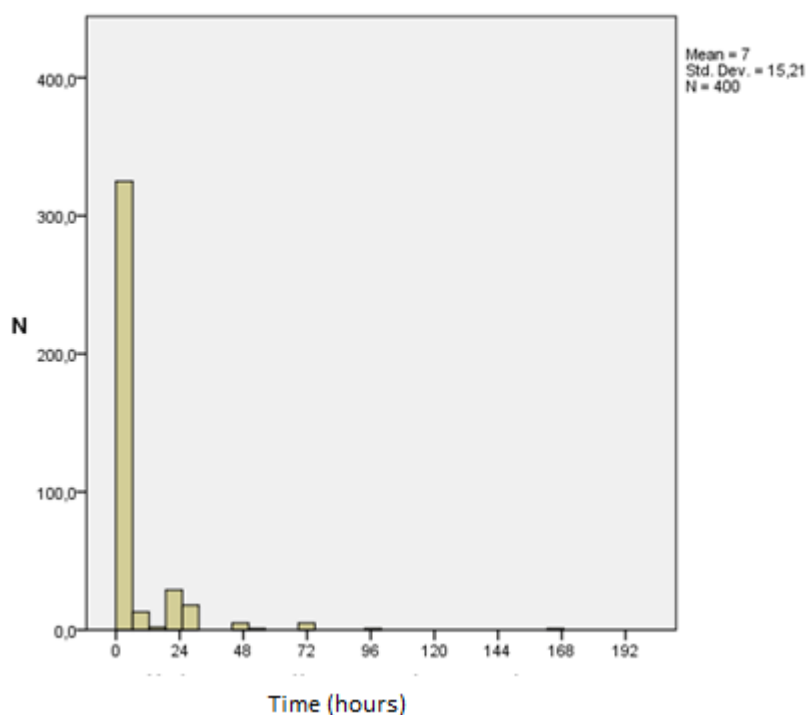
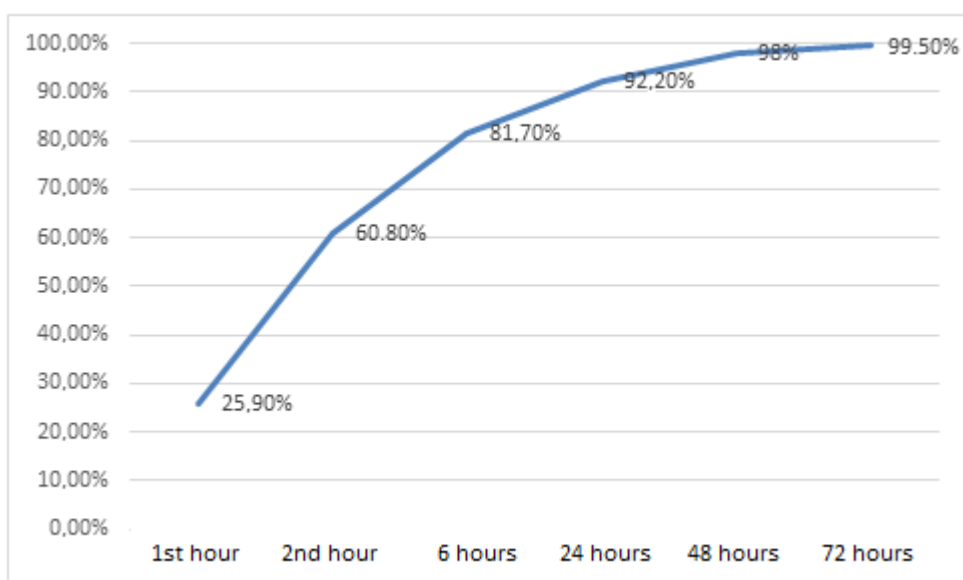
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## ANNEX

Table 1. Demographic characteristics of the sample

Demographic features	N	%	Mean $\pm$ SD
<b>Gender</b>			
Male	225	56.3	
Female	175	43.8	
<b>Insurance</b>			
Yes	313	78.3	
No	87	21.7	
Total	400	100.0	
<b>Kind of emergency</b>			
Surgical	82	20.5	
Psychiatric	8	2.0	
<b>Medical</b>	295	73.8	
-Cardiologic	42	14.2	
-Neurologic	35	11.9	
-Purely <b>Internal medicine case</b>	218	73.9	
Death	15	3.7	
Total	400	100.0	
<b>Categorization of pathological emergencies</b>			
Pain of any origin	59	27.1	
Respiratory System Emergencies	46	21.1	
Gastroenteritis	36	16.5	
Allergies	28	12.8	
Faint incident	20	9.2	
Hypertensive Crisis	12	5.5	
Poisoning	9	4.1	
Drug abuse	8	3.7	
Total	218	100.0	
<b>Age</b>			57.95 $\pm$ 22.81
SD: Standard deviation			

**Graph 1.** Time interval from the onset of the symptoms (hours) until patients arrival at HC**Graph. 2.** Patients arrivals percentage according to time interval from the onset of the symptoms (hours)



**Table 2.** Patients transportation

<b>Way of entrance</b>	<b>N</b>	<b>%</b>
Car	360	90.0
Ambulance	36	9.0
On foot	4	1.0
Total	400	100.0
<b>Escort</b>		
Yes	388	97.0
No	12	3.0
Total	400	100.0
<b>Outcome</b>		
Transportation by ambulance	60	15.0
Home	325	81.2
Death	15	3.8
Total	400	100.0

**Table 3.** Comorbidities, emergency evaluation and implementation of evidence-based practice.

Co existing chronic diseases	N	%
No	304	76.0
Yes	96	24.0
Total	400	100.0
<b>Evaluation</b>		
Urgent	136	34.0
Not urgent	88	22.0
Emergency but not urgent	176	44.0
Total	400	100.0
<b>Documented practice</b>		
Yes	305	76.3
No	95	23.7
Total	400	100.0

**Graph 3.** Relation between comorbidities and outcome (deaths are included)