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The burden on public emergency departments during the economic crisis years in Greece: a two-center comparative study



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ABSTRACT

Objectives: The effects of the Greek economic crisis on the emergency departments (EDs) of public hospitals have not been evaluated. The study aims to evaluate the burden of the financial crisis on public hospital's EDs.

Study design: The present study is a retrospective two-center comparative study.

Methods: ED visits, related admissions per year, and the admissions/visits ratio at two public Greek hospitals, the Sismanogleio of Athens (SHA) and the University Hospital of Crete (UHC), from 2008 to 2016 were retrospectively studied. A linear model was fitted for each variable, and the slope values of the linear equations were calculated and compared between the two institutions.

Results: ED visits of the UHC exhibited 8.9% increase during the study period, whereas related admissions and admissions/visits ratio increased by 23.4% and 12.5%, respectively. ED visits at the SHA exhibited 5.4% increase, whereas related admissions showed 6% decrease and the admissions/visits ratio was decreased by 8%. Significant differences between the rates of admissions ($P < 0.001$) and admissions/visits ratio ($P = 0.001$) among the two hospitals were observed.

Conclusions: Both institutions showed similarly increased ED visits. However, the UHC serving mainly rural, but also suburban and urban population, exhibited different changes regarding admissions and admissions/visits ratio compared with the SHA serving mainly an urban and suburban one, reflecting the way the crisis affected each social group. Depression has amplified the Greek National Health System structural problems and exposed the problematic urban primary health care. Improvement of primary urban health

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care, autonomy of EDs, and establishment of emergency medicine as independent specialty in Greece could serve better patients seeking care in public hospitals' EDs.

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Introduction

Since 2009, Greece is undergoing probably its most severe economic recession. However, austerity measures were not adopted until 2010, when a “memorandum” was signed by the Greek government and the European Commission, the European Central Bank, and the International Monetary Fund, including a series of reforms, as a requirement for receiving a 110 billion € loan or as it is called a “rescue package”. A series of austerity measures have been imposed on the Greek population since then, which have been approved by the Greek parliament each time.^{1,2}

The socio-economic effects of the debt crisis have been from the beginning apparent. Unemployment rate in 2010 reached 14.2%, whereas the gross domestic product (GDP) fell to –3.5%. Although the year 2009 is referred as the beginning of the economic recession, 2010 was the year that the crisis started becoming apparent, with the first reductions in salaries and increases in taxation.^{1,2} Hence, in 2017, unemployment had increased further to 21%, with further reductions in salaries and increases in taxation. However, the GDP had risen to 0.3%.^{3,4}

The potential effects on the Greek National Health System (GNHS) have already been extensively discussed.^{5,6} GNHS structural problems have been exaggerated by the lack of financing. Therefore, it has been considered that vital reforms need to take place in this public sector, especially because Greece spends for health care more than 10% of its GDP. Measures taken regarding GNHS include cuts in health-care workforce, their salaries, and pensions. Medical and pharmaceutical supplies have been reduced, and public insurance agencies have been merged.^{5,6}

Consequences of debt crisis on the population's health have been described, such as increased rate of suicides, mental problems associated with high unemployment rates, increased number of patients seeking treatment in public hospitals, and decrease of these hospitals' staff.^{6–10}

The present is a retrospective, two-center, nine-year study, aiming to evaluate changes in patient visits at the emergency departments (EDs) and related admissions in public hospitals through the crisis time. This first attempt was carried out by evaluating and comparing ED visits, related admissions and admissions/visits ratio of two public Greek hospitals: the University Hospital of Crete (UHC), covering mainly rural and to a lesser extend suburban and urban population, and the Sismanogleio General hospital of Athens (SHA), covering mainly an urban population.

Methods

The present study is a retrospective two-center comparative study.

Data regarding visits at the EDs and related admissions were retrospectively and anonymously collected from the prospectively functioning electronic system of the SHA and the UHC from January 2008 until December 2016.

ED visits, related admissions, and the admissions/visits ratio were recorded, while the ratio of admissions to visits was calculated and plotted along the total annual number of visits and admissions, for each year during the study period for both hospitals. For each variable, a linear model was fitted with GraphPad Prism 7 (GraphPad Software, Inc., CA, USA). The slope values of the linear equations were calculated along with their standard errors (SEs) and compared between the two institutions. Statistical significant differences were considered those with P -value <0.05 .

The UHC is a 700-bed, tertiary hospital on the island of Crete, Greece. It represents the reference hospital of the whole island, with a population of approximately 650,000, mainly rural and to a lesser extend suburban and urban.

The SHA is a secondary 500-bed hospital on the northern border of the city of Athens, the Greek capital. It covers the northern sector of Attica area (approximately 400,000). The population is mainly urban and to a lesser extend suburban.

The patients' population of both hospitals are representative of each region.

The study has been approved from the relevant committees of both hospitals.

Results

ED visits, related admissions, and admissions/visits ratio at the UHC in 2008 were 87577, 14227, and 0.16, respectively; in 2009 were 90318, 14597, and 0.16, respectively; in 2010 were 87001, 14597, and 0.17, respectively; in 2011 were 90766, 15825, and 0.17, respectively; in 2012 were 96555, 15791, and 0.16, respectively; in 2013 were 92004, 15544, and 0.17, respectively; in 2014 were 93924, 16398, and 0.18, respectively; in 2015 were 95787, 17318, and 0.18, respectively; and in 2016 were 95377, 17558, and 0.18, respectively; therefore, visits at the ED of the UHC exhibited an increase of 8.9% from 2008 to 2016, whereas related admissions and admissions/visits ratio showed an increase of 23.4% and 12.5%, respectively.

ED visits, related admissions, and admissions/visits ratio at the SHA in 2008 were 36912, 8928, and 0.24, respectively; in 2009 were 35329, 8992, and 0.26, respectively; in 2010 were 35436, 8410, and 0.24, respectively; in 2011 were 36908, 9219, and 0.25, respectively; in 2012 were 38264, 8651, and 0.23, respectively; in 2013 were 40660, 8755, and 0.22, respectively; in 2014 were 41949, 8769, and 0.21, respectively; in 2015 were 42219, 9263, and 0.22, respectively; in 2016 were 38896, 8396, and 0.22, respectively; therefore, visits at the ED of the SHA exhibited an increase of 5.4% from 2008 to 2016. Related

admissions showed a decrease of 6%, whereas the admissions/visits ratio was also decreased by 8% during the study period.

Regarding the number of visits, the slope of the linear model at the UHC was found to be 1045 (± 282 SE) and at the SHA, 756.4 (± 222.4 SE). No statistically significant difference was noted ($P = 0.4353$). The slope of admissions was 396.2 (± 43.3 SE) at the UHC and -17.68 at the SHA (± 42.6 SE). There is statistically significant difference between the two slopes ($P < 0.001$). The slope of the admissions/visits ratio was 0.00234 (± 0.0007 SE) at the UHC and -0.005008 at the SHA (± 0.001 SE). Statistically significant difference was also observed between these two slopes ($P = 0.001$).

Detailed data of the equations for each parameter are provided in Fig. 1.

Discussion

The structural problems of the GNHS have been intensified during the last few years by the economic distress.⁵ Primary health care in Greece has always been problematic and incomplete. The private sector had for years filled the void, by providing primary health-care services.^{6,11} During the austerity period, patients shifted from the private toward the public health-care system. During 2009–2010, a decrease of 30% in the number of patients was observed in private hospitals, whereas an increase of 25% was noted in public hospitals.^{6,9,10,12} The reason is obviously that patients could no longer afford private care. Hence, the arising problem is that public hospitals' EDs have become extremely overcrowded with cases requiring not only secondary but also primary health care. Another issue contributing to the problem is the lack of a good referral system between primary and secondary health-care systems.^{5,6,13}

The present study revealed statistically significant difference between the slopes of ED-related hospital admissions and admissions/visits ratio between the two hospitals. Slopes represent the change rate of each parameter (increase/decrease rate). Therefore, this means that the increase rate of ED-related admissions and admissions/visits ratio at the UHC is significantly higher than that of the SHA. On the other hand, no similar statistical significance was revealed between the increase rates of ED visits. It is of note that hospitals serving different types of population exhibited different changes regarding ED-related admissions and admissions/visits ratio. This reflects the way that the economic depression has affected each social group of the Greek society. It seems that the urban and suburban population of Athens has been affected in greater degree from the economic depression, leading them to seek primary health care at the free of charge EDs of public hospitals. Financial crises throughout history have a greater impact in urban populations.¹⁴ An additional factor could be that public primary health-care institutions, including peripheral medical offices and health centers, have not been developed in big cities but mainly in provincial areas.¹⁵ This could explain the reason why, although ED visits increase similarly in the two institutions, the same does not happen regarding ED-related admissions. The rural population of Crete seems to have still the ability to seek primary health care elsewhere. This could be attributed to the better structure of primary health care in the rural regions of Greece and to a lesser extend to the fact that the provincial population can still afford medical advice and assistance from physicians in private practice.

The ratio admissions/visits could also be considered an index of severity of cases presenting at EDs. This ratio exhibited a 12.5% increase in the UHC, whereas, an 8% decrease in the SHA. Therefore, the need for mainly secondary

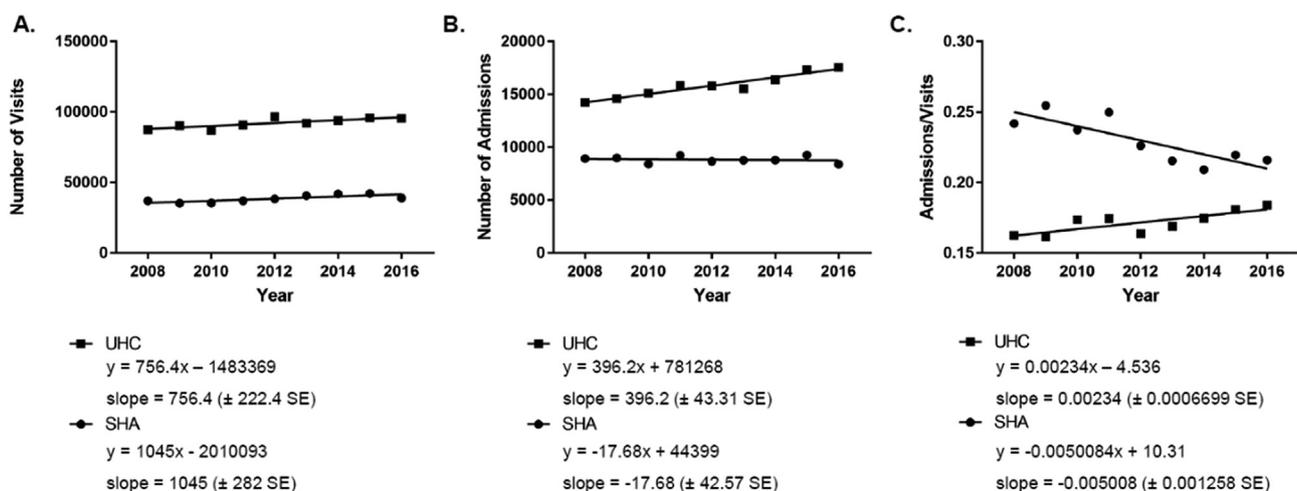


Fig. 1 – Representation of the linear regression model of each variable for the University Hospital of Crete (UHC) and the Sismanogleio Hospital of Athens (SHA). The slope of each graph represents the change rate (increase/decrease rate) of each variable. Slope is presented with the standard error (SE). (A) The annual number of emergency department (ED) visits and the linear equations and slope values for each hospital. The slopes are not significantly different between the UHC and SHA ($P = 0.4353$). (B) The annual number of ED related admissions, the slope values, and linear equations of the regression model. The slope values show a highly significant statistical difference ($P < 0.0001$). (C) The annual ratio of admissions/visits along with the linear equations and the slope values. The change rates are statistically significantly different ($P = 0.0001$).

and primary health care has been increased at the institution that serves rural and to a lesser extent suburban and urban populations, whereas the need for primary health care has been increased at the institution that serves urban and suburban populations.

A few studies have reported the effect of the economic depression on public health. They include an increase of mental health problems, such as major depression, aggressive behavior, suicides, and epidemics.^{6–8,16} Characteristic examples of epidemics were influenza A in 2009, the West Nile encephalitis in 2010 and 2011, and the increased number of AIDS cases among drug users, which was related to the disruption of preventive programs due to low budget.¹⁷ Increased rate of otorhinolaryngologic disorders, such as vertigo and tinnitus, has also been reported and associated with social anxiety.¹⁸ Poor outcomes of acute coronary syndromes in patients with severe financial problems have also been described.¹⁹ Severe effects on the GNHS have been reported as well.^{6,13} The system is understaffed, operating with 10–40% fewer than the required personnel. Several public institutions have been merged or closed, whereas the medical and nursing staff has suffered cuts in salaries and pensions by 40%.^{6,20} The retirement age has been increased.^{2,13}

The present study has revealed problems affecting health care and public health. The overcrowded EDs lead to many risks, such as postponed or delayed handling of urgent cases, with life-threatening consequences. In addition, organizational problems regarding the capacity of the institutions and the working conditions of doctors and nurses, leading to burnout and poorer quality of offered health care have become apparent.¹⁰

The present study has some limitations: it contains data from two centers, and there could not be categorization into medical and surgical patients from the existing data of these hospitals' EDs. However, it must be noted that the two institutions represent best examples of the Greek urban, suburban, and rural populations.

For some analysts and politicians, the economic depression should be seen as an opportunity for reformation and improvement of the public sectors, including the GNHS.¹² Problems in efficacy and efficiency in the GNHS had been reported for many years before the financial crisis. Gaps in organization, management, referral system, and inadequate quality control and assessment are important issues to be solved. Austerity served as a magnifying lens for all these weaknesses.^{5,6} Hence, reforms aiming for the improvement of the ED function are considered urgent and absolutely necessary. Reforms should include organization of primary health-care units, not only in rural but also in urban areas. EDs should become autonomous and not be covered by the personnel of other hospitals' departments. Emergency medicine should become an independent specialty in Greece, and each ED should have its own trained medical and nursing personnel.

The present study is the first study, revealing long-time existing problems of the Greek hospitals' EDs, magnified by the financial crisis. Major reforms and urgent measures are of utmost importance and should be taken to improve patients' health care and working conditions of the medical and nursing staff.

Author statements

Ethical approval

The study was approved by the scientific and bioethics committee of the University Hospital of Heraklion, Crete (Judgment number: 3545/14.03.2018) and the Sismanogleio General Hospital of Athens, Greece (Judgment number: 3392/13.02.2018).

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Competing interests

None declared.

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