Headache Profile Change in an Emergency Department during the Economic Crisis of Greece

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Abstract

Very few neurological researches are published regarding health effects of global economic crisis. Our aim was to assess the impact of economic recession on frequency and severity of headaches. We also tested if depression, anxiety and experiences associated with crisis, such as unemployment, were reflected in headaches. This is a retrospective observational study in the emergency setting of tertiary Aeginition Hospital’s Neurology Clinic from January 2008 until January 2009 and from January 2010 until January 2012 of Greek population. Demographic data were collected of 1094 consecutive adult patients with headache. Multinomial logistic regression performed to examine if HAD (hospital anxiety depression), HAD anxiety, experience of serious life events, year of survey had influence on type of headache. The number of headache cases increased significantly from 2008 to 2011 (188 cases for 2008, 233 cases for 2010 and 673 for 2011). The most common type of headache, overtime, was tension type headache, 42.6% for 2008, 39.5% for 2010, 43.7% for 2011, being followed by migraines for 2008 and 2011 (36.2%, 21.1%) and NOS (not otherwise specified) for 2010 (24.9%). The chi-square test showed significant relationship between type of headache and year, as well type of medication and year (p < 0.05). Common analgesics were the most common medication being increased five times during survey period (from 77% in 2008 to 87.6% in 2011). Multivariate analysis revealed stronger association for experience serious events with NOS headaches vs. tension type headache (Odds Ratio OR 0.13; 95% confidence interval CI 0.03, 0.7). This is the first study showing that the prolonged economic crisis affected headache frequency accompanied by a higher use of analgesics.

Keywords: Headache; Economic crisis; Emergency department

Abbreviations

HADS: Hospital Anxiety and Depression Scale; ICHD: International Headache Classification of Headache Disorder; NOS: Not otherwise specified.

Introduction

Since the beginning of the global economic crisis in 2009, not only has poverty been seen to deepen, but adverse health effects have also been noted. Accounting for 1-3% of total emergency departments (ED) visits, headaches pose a challenge in terms of both diagnosis and treatment due to significant psychological and socioeconomic consequences [1–3]. Although people are less likely to visit outpatient facilities in the era of economic crisis, a continuing rise in admissions to public hospitals was noted from 2009 to the first half of 2011[4–5].

No other European country has felt the shock of the global economic crisis greater than Greece. The government debt in Greece first manifested in late 2009, forcing Greece to sign two large EU/IMF loan packages. As a result, the Greek people were subjected to a series of tough austerity measures, the social effects of which were very severe. The income of the majority of Greek people was drastically reduced and unemployment rose dramatically. Austerity measures were intensified in 2011 in an attempt to accomplish the set goals (data from the Hellenic Statistical Authority; http://www.statistics.gr/portal/page/portal/ESYE), all of which had a devastating impact on health.

Data in the literature is scant regarding headache sufferers attending the Greek ED in Greece [6]. The aim of this study was to analyze the demographic and health data of adult patients (subjects over 18 years old) who attended the ED of tertiary Neurology Clinic in Athens complaining of headache and to assess the impact of the economic recession on the frequency and severity of headaches. We also tested the extent to which factors associated with the economic crisis, such as depression, anxiety and unemployment, were reflected in headaches. Our analysis included data for pre-crisis year 2008 and financial crisis years 2010-2011. To the best of our knowledge, this is the first retrospective study to report on such patients presenting to the ED during the ongoing economic crisis in Greece.

Materials and Methods

This is a retrospective study, based on the data of patients who experienced severe headaches that forced them to visit the ED of tertiary Aeginition Hospital’s Neurology Clinic from January 2008 until January 2009 and from January 2010 until January 2012.

We analyzed the data only of patients with primary headaches and especially tension type headache (TTH), migraine since they represented the majority of the cases (43.7% for 2011) and on the other hand its well known that they are the types of headache that are well documented to be related and impacted by any kind of stress [6]. Patients with headache not classified in any of ICHD category were included in other types of headache NOS (not otherwise specified, ICD-9: 784.0).

The ED of Aeginition Hospital provides medical services not only for the population of metropolitan Athens (up to 1.5 mil inhabitants), but also for the adjacent 58 municipalities of the Attica region (about 1.0 mil inhabitants) representing an urban and semi-urban population. To avoid missing data, a standardized questionnaire about demographic data (age, gender), diagnosis of the headache type, medication (with analgesics included only if they were used for the treatment of headache and not for any other cause) was used. The medical files of patients that visited the ED with headache as main complain were collected for further analysis.
excluding those who suffered a headache as an accompanied symptom of their main complain. The diagnosis of headache was based on patient’s medical history, clinical examination and if needed on laboratory tests including CT scan and MRI. Headache diagnosis was made by ED neurologist and was based on the International classification of headache disorders, 2nd edition [7].

Among these patients who had previously visited ED (total number of patients = 906 in years 2010-2011) only 144 patients accepted the ED neurologist’s invitation to follow up in Aeginition’s outpatient clinic. They were evaluated for serious life-events during the last three months (a major event that changes a person’s status or circumstances, such as losing job “Did you lose your job due to economic crisis in the last three months?”). They also completed the Hospital Anxiety and Depression Scale (HADS), a self-administered 14-item questionnaire (7 items on the Anxiety subscale and 7 on the Depression subscale) and were used to evaluate anxiety and depression [8]. The validated Greek version of HADS has showed high internal consistency and stability (Cronbach’s α = 0.88 for the whole scale, 0.83 for HADS anxiety and 0.84 for HADS depression) as well as high test-retest Intra class Correlation Coefficient 0.94 [9].

The study was approved by Aeginition Hospital Ethics committee and complied with the 2013 WMA- World Medical Association Declaration of Helsinki [10]. Written informed consent was obtained from each patient to allow the use of their medical records for research. All the archives were anonymized and de-identified prior to analysis.

Statistical Analysis

Apart from descriptive statistics, the independent samples tests were used to compare means of age between genders for all years of survey, and the Fisher’s exact tests were also used to examine if there were significant relationships between the rest demographics and considered year as well as between anxiety and depression levels and year of survey. Chi-square tests were performed for the relationship between gender of patients and year of attendance. Evaluation of anxiety and depression indices was performed via reliability analysis of Cronbach’s-alpha coefficient, and finally multinomial logistic regression performed to examine if HAD depression, HAD anxiety, experience of serious life events, year of survey, and some demographic characteristics (gender, age, employment status, marital status and education level) had influence on type of headache. The age distribution tends to be skewed to the right for all covered years according to the performed graphic tests in order to check normality.

Statistically significant p-values threshold was considered the common value of 0.05. All statistics were performed using SPSS software V.20.0 (IBM Corporation, Armonk, New York, USA).

Results

Among 5988 recorded attendances (2225 for 2010 and 3763 for 2011) in the hospital’s ED during the period January 1st 2010 - January 1st 2012, 906 patients presented with headache symptoms (15.1% of sample), most of whom lived in Athens. From 2010 to 2011, a large increase (69%) in attendances was noted, but also (15.1% of sample), most of whom lived in Athens. From 2010 to 2011, a large increase (69%) in attendances was noted, but also (15.1% of sample), most of whom lived in Athens. From 2010 to 2011, a large increase (69%) in attendances was noted, but also (15.1% of sample), most of whom lived in Athens. From 2010 to 2011, a large increase (69%) in attendances was noted, but also (15.1% of sample), most of whom lived in Athens. From 2010 to 2011, a large increase (69%) in attendances was noted.

Regarding demographics (Table 1), females were the majority
of patients for all years (64.8% vs. 35.2%, p < 0.001 for 2010, 63.4% vs. 36.6%, p < 0.001 for 2011, 63.8% vs. 36.2%, p < 0.001 for 2008). The ratio Females/Males ranged from 1.74 for 2011 to 1.84 for 2010.

Mean age of participants was slightly higher for 2010 and 2011 compared to this of 2008. For 2010 the relative results of age, mean (SD) for men was 40.38 (4.9) and for females 42.19 (16.4); for 2011, 43.14 (17.0) and 40.68 (16.2) correspondingly and for 2008, 41.40 (17.1) for men and 38.29 (15.6) for women. There was no significant difference in mean age for males and females, for all examined time periods (t Independent samples tests p = 0.407 for 2010, p = 0.063 for 2011 and p = 0.206 for 2008).

In our outpatient clinic, 144 patients with headache (46 in 2010 and 98 in 2011) completed the HAD Scale. The Cronbach's-alpha coefficient for the whole scale was found equal to 0.67; for HADS-A 0.52, and for HADS-D 0.49. Items correlations were ranging from 0.003-0.291. Although the results of reliability analysis were marginally satisfied, both indices of HADS-A and HADS-D were constructed according to literature proposal [7,8]. For better interpretation, depression and anxiety scores were classified as normal (0–7), mild (8–10), moderate (11–14), and severe (15–21) (Table 2).

Fisher's exact test showed statistically significant relationship between depression and year (p < 0.05), whereas the corresponding result for anxiety indicated no relationship with year (p = 0.44). Women reported significantly more depressive symptoms than men (p < 0.04) but not anxiety (p = 0.19).

Regarding the experience of serious life events associated with crisis (Table 3), Pearson chi-square test showed independence with year (p = 0.18).

TTH was the most common ranging around 40% (42.6% for 2008, 39.5% for 2010, 43.7% for 2011). The second most common headache in 2008 was migraine (36.2%) while for 2010 migraines were third (17.6%), since NOS were second (24.9%). In 2011 migraines were second (21.1%). Secondary headaches had an extreme increase from 2008 (9%) to 2010 (16.3%), gaining a slighter increase in 2011 (17.4%) (Table 4).

Regarding patients' gender, female predominated in all type of headaches, except MOH. For each year separately, the only non-statistically significant difference between female and male was found for 2008 (p = 0.175) while for 2010 and 2011 the corresponding test resulted in statistically significant difference (p < 0.05) (Table 4).

Regarding the distribution of medication across gender for all years (Table 5), the use of antimigraines (triptans) was greater among women for all years; Fisher's exact test showed that there was relationship between gender and type of medication only during 2008 (p = 0.04, p < 0.05 for 2010 and 2011). Analgesics (paracetamol and NSAIDs) were the most common medication for headache relief (62.2% in 2008, 79% in 2010 and 86.6% in 2011) with a statistically significant relationship between medication use and year of survey (p < 0.05). Regarding anti-migraine medication, no statistically significant change was noted during the recession years; this could be ascribed to the high cost of this type of medication. Worthy of mention, 13.1% of our sample did not use any medication in 2008, but this percentage dropped to 0.45% in 2011, leading to a statistically significant relationship between non-medication use during the years 2011 and 2008 (p < 0.05). This important finding could be an indirect index of headache severity meaning that the higher the economic recession (year 2011) the more headache severity leading to higher medication use.

Medication was reported as ineffective at 67% of patients of...
2010, while the majority of those in 2011 (55.7%) found them effective, as also did the majority of patients in 2008 (81.4%) (Table S1 in supplemental material).

Pearson chi-square test revealed that medication misuse and assessment of medication effectiveness were statistically significantly correlated to the year of survey ($p < 0.05$).

From multinomial logistic regression with reference category of headache’s type the one of tension type, there was significance relationship between the type of headache and the set of independent variables (Final $-2$Log Likelihood = 284.33, Chi-square = 98.00, $p < 0.05$). The Nagelkerke’s measure that used as an indicator of the strength of this relationship was equal to 0.53 so this relationship was neither weak nor very strong.

According to Table S2 (in supplemental material), the variables showing a statistically significant relationship in distinguishing migraine from TTH concerned 2010 whilst in distinguishing MOH from TTH, none of the variables seemed to be significant. Regarding the discrimination of secondary headache and tension type, age was seen to be a statistically significant contributor, whereas discrimination of NOS and TTH seemed to be influenced by the age of the patient and experience of serious life events. More precisely, patients in 2010 compared to those in 2011 were 23% (OR = 0.23, 95% C.I. (0.05, 1.01)) less likely to suffer from migraine than TTH whereas increases in age rendered patients about 8% (OR = 0.92, 95% C.I (0.84, 1.00)) less likely to suffer from secondary headache rather than TTH. Moreover, increases in age made a patient 6% (OR = 0.94, 95% C.I (0.90, 0.99)) less likely to suffer from NOS rather than TTH. Experience of serious life events decreased the likelihood of a patient suffering from NOS rather than TTH by approximately 87% (OR = 0.13, 95% C.I. (0.03, 0.70)).

**Discussion**

In this first study of headaches during the economic crisis in Greece, headache sufferers accounted for 15.1% of all patients who attended the ED of Aeginition Hospital from January 2010 to January 2012. This percentage is significantly higher than that reported in other studies [2,3]. This could be partially explained by the current economic conditions in Greece causing patients to seek less expensive health care. Worthy of mention, Greek Hospitals provide care to all patients attending the EDs at a very low cost; in many cases, it is completely free of charge. A significant increase in patients who visited the ED of our clinic for all health problems was noted in 2011 as compared against 2010, and significantly more complained of headaches. As the crisis deepened in 2011, a statistically significant relationship emerged between unemployment status and headaches.

However, this research is not without its limitations. The main limitation lies in its retrospective nature. Although all available data were carefully reviewed, bias in patient selection during follow-up could not be excluded. ED neurologists examined 906 patients who

### Table 5: Distribution of medication across gender for 2008, 2010 and 2011. (Data are presented as frequencies and (%). *p value significant < 0.05)

<table>
<thead>
<tr>
<th>Year</th>
<th>Gender</th>
<th>Type of medication</th>
<th>p value</th>
<th>p value (gender-medication)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Male</td>
<td>Female</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2008</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Common analgesics</td>
<td>Antimigrain</td>
<td>None</td>
<td>(gender-medication)</td>
</tr>
<tr>
<td>2010</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Male</td>
<td>Female</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2011</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Male</td>
<td>Female</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

#### Table 6: Medication misuse for headache management (Data are presented as frequencies and (%). *p value significant < 0.05)

<table>
<thead>
<tr>
<th>Medication misuse</th>
<th>Yes</th>
<th>No</th>
<th>*p value</th>
</tr>
</thead>
<tbody>
<tr>
<td>2008 (n=188)</td>
<td>21(11.2%)</td>
<td>167(88.8%)</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>2010(n=233)</td>
<td>89(38.2%)</td>
<td>143(61.8%)</td>
<td></td>
</tr>
<tr>
<td>2011(n=673)</td>
<td>570(84.69%)</td>
<td>103(15.3%)</td>
<td></td>
</tr>
</tbody>
</table>
presented with headache in the ED of Aginionion Hospital during the period 2010-2012. Unfortunately, only 146 (16%), out of the total 906 headache patients accepted the invitation to attend a follow-up visit in the outpatient clinic of Aginionion Hospital where they completed the HAD scale. However, it could be argued that the 144 patients who accepted the outpatient clinic felt the need to be followed up because their headache was important to them. The sample size obtained is modest because the recruitment period was only 12 months. There was also a potential bias in the interpretation of ICHD criteria by ED neurologists which could imply that any association between anxiety, depression and headaches diagnoses may have been underestimated in our study. Unfortunately, there were no data regarding predisposing factors for secondary headaches (i.e. increased BP, malignancy history etc.); in consequence, the increase in secondary headaches during the recession years 2010 and 2011 remains unexplained.

Contrary to the findings of other studies [6,11–18], TTH was the most common type of primary headache for which patients visited our ED followed by migraine, except for the year 2008. Migraine, a more serious and more disabling type of headache compared to TTH, was reported in previous studies to be the most common type of headache, varying from 15% to 63.5% [14–20]. In agreement with other reports [17,19], NOS is the second most common type followed by migraine (the opposite applies to the period 2008). The high frequency of NOS (not otherwise specified, ICD-9) can be explained on the basis that in this category, many cases of mixed headache (both characteristics of migraine and TTH) are included. The fact that TTH emerges as the most common type of primary headache could be explained by two factors: i) the severely affected income of Greek people did not allow visits to private physicians, and ii) the changes to the Greek national health system during the recession period promoted free hospital visits. Another possible explanation could be the inaccurate headache diagnosis of doctors in the ED. We suggest that this difference is due to the Greek Health system allowing patients to have direct access to the ED of a tertiary hospital, thereby bypassing the family’s private physician who requires payment. This could engender “emergency department abuse” by patients with chronic headaches receiving health care during the recession period and subsequent use of common analgesics prescribed by the attending physician. The efficacy of medication for headache relief emerges as poor, possibly due to the bad economic condition of patients that forces them to misuse medication or self-medicate to avoid or cancel medical consultation.

As concerns gender, all types of headache, except MOH, seem to show greater female prevalence. A significant relationship was shown for years 2010 and 2011 as opposed to 2008. In our study, women also received more analgesics than men, which concurs with other studies [6]. It becomes apparent that female patients presented TTH more frequently than men and were more affected by the recessionary period 2010-11 resulting in more treatment as compared against 2008 controls.

Whether or not medical care increases or decreases in the face of the economic crisis remains an empirical question since published data are lacking. This paper highlights the need for more research on this issue.

In the last decade, several studies have investigated the relationship between depressive symptoms and clinical factors associated with primary headaches such as migraine [21–23]. Depression and anxiety were more common among MOH patients than among people with episodic migraine, but in this association seems more dependent on headache frequency than headache diagnosis [19,24]. Similarly, our MOH patients didn’t report significantly more depressive symptoms than other types of headache.

Nowadays, the economic recession has been connected to increased risk for depression by 2.6 times in 2011 compared to 2008 [5,25]. Only one study in US has shown that the incidence of admissions due to headaches increased significantly during economic crisis [26]. In this study also the incidence of headaches increased significantly during peaks of unemployment, as a major factor of anxiety, which also confirmed by our study. Only patients with NOS headaches were less likely to report experience of serious event during the last three months than TTH sufferers. Considering the percentage of Greek population living in Athens and that the majority of headache sufferers end at our ED the generalizability is considered safe. Only one epidemiologic study of headaches exists in the Greek ED but in the prior to crisis period [6].

The prolonged financial crisis can be reflected in increased number of patients suffering from primary headaches, medication overuse and depression symptoms in women. Patients with NOS headaches were less likely to report experience of serious event during the last three months than TTH sufferers. Improved primary care services for headache patients, especially during the economic recession period are required in order to prevent further deterioration of headaches and to reduce the burden of primary headache disorders often seen in emergency departments. To our best knowledge this is the first study of headache sufferers who visited the ED during the recent economic crisis in Greece. Internationally there are no comparative results from other countries to confirm our results. As the crisis is deepening, larger prospective studies, however, will provide further information on stability and causal relationship of these results.

References


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