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Primary Health Services Utilization in Greece: Studying the Past for Planning the Future

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Χρήση Πρωτοβάθμιων Υπηρεσιών Υγείας στην Ελλάδα: Μελέτη του Παρελθόντος για το Σχεδιασμό του Μέλλοντος

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ABSTRACT

The objective of this paper is to study healthcare utilization in Greece. The data were derived from a national survey conducted in 2006, and analysed through Logistic and Linear Regression. The likelihood of primary healthcare utilization is determined by the gender, the existence of a chronic disease, the self-rated health and the age, while the logarithm of the visits to primary health services is determined by the gender, the existence of a chronic disease, the income, the geographical region and the perceived threat from the health condition. Thus, primary healthcare utilization is determined by beliefs, health need as well as socioeconomic factors.

KEY WORDS: Primary health services, healthcare utilization, change over time, Greece

ΠΕΡΙΛΗΨΗ

Σκοπός του συγκεκριμένου άρθρου είναι η μελέτη της χρήσης των πρωτοβάθμιων υπηρεσιών υγείας στην Ελλάδα. Για το σκοπό αυτό αναλύθηκαν, μέσω των μεθόδων Logistic και Linear Regression, δεδομένα από πανελλαδική έρευνα η οποία υλοποιήθηκε το έτος 2006. Η πιθανότητα χρήσης υπηρεσιών υγείας προσδιορίζεται από το φύλο, την ύπαρξη χρόνιας νόσου, το αυτό-αξιολογούμενο επίπεδο υγείας και την ηλικία, ενώ ο λογάριθμος του αριθμού των επισκέψεων προσδιορίζεται από το φύλο, την ύπαρξη χρόνιας νόσου, τη γεωγραφική περιφέρεια, το εισόδημα και την αντίληψη σχετικά με την απειλή από τα ιατρικά προβλήματα. Η χρήση πρωτοβάθμιων υπηρεσιών υγείας συσχετίζεται επομένως με τις αντιλήψεις των ατόμων αλλά και με παράγοντες οι οποίοι εκφράζουν τις ανάγκες υγείας ή το κοινωνικοοικονομικό επίπεδο.

ΛΕΞΕΙΣ-ΚΛΕΙΔΙΑ: Πρωτοβάθμιες υπηρεσίες υγείας, χρησιμοποίηση υπηρεσιών υγείας, μεταβολές στο χρόνο, Ελλάδα

1. Introduction

The utilization of health services is determined mainly by the health needs and by several geographical, demographic, socioeconomic and structural factors of the healthcare systems (Phelps and Newhouse, 1974; Newhouse and Marquis, 1978; Wagstaff, 1986; Kasper, 1986; Feldstein, 1988; McGuire et al., 1988; Marmot and Wilkinson, 1999). More specifically, perceived morbidity, self-rated health (SRH), degree of urbanization, geographical region, age, gender, marital status, education, income, occupation and insurance coverage, are considered as the most important determinants of health services use (Pappa and Niakas, 2006; Economou, 2006, Geitona et al., 2007, Alexopoulos and Geitona, 2009).

Since medical care is an input of the health production process (Grossman, 1972), the understanding of the mechanism through which the factors mentioned above affect health services utilization, is crucial in understanding differences presented in population health. However, the relative importance of health services utilization's predictors, as well as health status's predictors, may change over time (Lix et al., 2002; Bernstein et al., 2003), making imperative the need for examination of findings on changes over time relative to social and economic policies (Braveman, 2003). Since the negative impact of current economic crisis on SRH and health care needs' satisfaction in Greece (Kentikelenis et al., 2011; Zavras et al., 2012), is the outcome of the economic policies adopted during the last three years, particular attention should be given on past health services use (Parkhurst, 2008). In addition, since past healthcare utilization predicts, in many cases, future utilization (Doran, 2011), studying the past may contribute to a clearer understanding of the present and this may affect the future (Porter, 1995). Thus, research which examines past experience empowers policy analysis that should be focused on the future (Klarman, 1980).

In this context, the aim of this article is to identify factors affecting primary health services utilization in Greece during 2006, attempting to provide decision-makers with insights into how to prioritize healthcare resources and manage utilization by studying the past.

2. Material and Methods

This paper is based on the data of a cross-sectional survey conducted in Greece between May 2006 and July 2006. Sample selection was based on the 2001 Census of the Hellenic Statistical Authority, following random stratified sampling by age, gender, degree of urbanization and geographical region of place of residence (NUTS II). Due to lack of information related to the distribution of health services utilization with the stratification variables, the formula of simple random sampling was used:

$$n > \frac{p(1-p)z^2_{a/2}}{d^2}$$

where a=0.05, d=1.55%, and $p_{\text{users-non users}}$=50%.The sample size was calculated at n=4003 adult individuals (18+) and distributed in 364 strata ($\text{strata}_{\text{gender}}$=2, $\text{strata}_{\text{region}}$=13, $\text{strata}_{\text{degree of urbanization}}$=2,$\text{strata}_{\text{age}}$=7). For the data collection the method of personal face to face interviews

with a structured questionnaire was applied. The questionnaires were piloted before the main data collection phase (June 2006). The interviews were carried out by specially trained professional interviewers and standard quality assurance procedures were used for reconfirming 15% of the interviews.

The survey instrument was based on the methodology of the World Health Organization (WHO) (Üstün et al., 2001), but it was adapted to the characteristics of the Greek health care system (e.g. type of health services provided, health insurance fund). In order to identify ambiguities in the questionnaire and to control the degree of difficulty in completing it, 150 interviews were conducted in the area of Athens by experienced trained researchers. The audit showed that there were no questions creating problems to the respondents and therefore the 150 completed questionnaires of the pilot survey were included in the study.

Per capita visits which are the key variable of the present study correspond to a recall period of one (1) year according to Jones (2006) and O'Donnell & Van Doorslaer (2007). Given that the minimum of this variable is 0, the analysis of the primary health services utilization was performed in two stages: a) on the first, the annual number of visits to doctors was dichotomized (0: 0 visits to doctors per year, ie non-utilization of health services during the year and 1: 1-maximum number of visits to doctors per year, ie utilization of health services during the year) and b) in the second stage, the variable representing the number of annual visits and had a minimum value of 1 (Buntin and Zaslavsky, 2004) was used. In the first stage given that the dependent variable is binary the Logistic Regression (LR) method was applied. In the second stage the variable under consideration is discrete quantitative so the selection of the appropriate statistical method was based on the methodology of Manning and Mullahy (2001), who suggest that the analysis should begin with a Generalized Linear Model (GLM) and if the coefficient of kurtosis of the ln scale residuals is greater than 3, the Ordinary Least Squares (OLS) method should be applied with the logarithm of the variable under consideration as the dependent variable. With this methodology we used a GLM with Gamma Family and Log Link. However, since the ln scale residuals of this model had coefficient of kurtosis 5,038>3, the transformation of the variable under consideration as ln (utilization of primary health services) and the application of the OLS method was necessary. Both the LR Model and the OLS Model have been evaluated based on diagnostics tests as to their goodness of fit to the data and the violation of regression assumptions e.g. normality and homoscedasticity of residuals.

The independent variables used in the analysis are: a) gender (1: female, 2: male), b) age (1: 18-30, 2: 31-45, 3: 46-55, 4: 56 -65, 5: 66 +), c) self-rated health (1: very bad and bad, 2: moderate, 3: very good and good), d) the existence of chronic disease (0: no, 1: yes) e) education level (1: no education or primary education, 2: secondary education, 3: tertiary education), f) income (1: no income, 2: 1-500€, 3: 501-1000€, 4: 1001-1500€, 5: 1501-2000€, 6: 2001€ +), g) employment (1: employed, 2: unemployed, 3: retired, 4: housewife 5: school student, university student, soldier, 6: other), h) public health insurance (0: no, 1: yes), i) private health insurance (0: no, 1: yes), j) degree of urbanization (1: rural, 2: urban), k) geographical region (1: rest of Greece, 2: Athens, 3: South Attica, 4: West Attica, 5: North Attica, 6: Piraeus), l) perceived threat from the health condition (1: moderate or low at all times, 2: serious sometimes, 3: serious most of the times).

3. Results

Regarding the sample characteristics, the participants mean age was equal to 45.71 years (n = 3983, missing values =20, standard deviation =17.52), the percentages of men and women 49.29% (n = 1973) and 50.71% (n = 2030), respectively, and the percentages of urban and rural areas 63.53% (n = 2543) and 36.47% (n = 1460), respectively. Table 1 shows the percentage of geographical distribution of the sample.

According to the LR Model, the likelihood of utilization of the primary health services is determined by: a) age, b) self-rated health, c) gender and d) the existence of chronic disease. More specifically, as the OR of age is equal to 0.88 <1, the elderly, compared with younger people, have lower likelihood to use primary health services. Additionally, as the OR of the gender equals 0.66 <1, men compared to women, have lower likelihood to use primary health services. The same holds for people with higher levels of self-rated health, compared to people with lower levels of self-rated health, since the OR for this variable is equal to 0.62 <1. However, persons who suffer from a chronic disease, compared to healthy individuals, have a higher likelihood to use primary health services, since the OR is equal to 6.52> 1 (Table 2).

The results of the Link Test are satisfactory. The hat is statistically significant, while the hat^2 is not. Therefore this model does not suffer from specification error (Table 3).

The Pearson and Hosmer & Lemeshow goodness of fit criteria correspond to p equal 0.56> 0.05 and 0.61> 0.05 respectively, indicating that the model has a good fit to the data. In addition, the assumptions of normality of the deviance residuals and of homoscedasticity of standardized deviance residuals are not violated since $p_{\text{Jarque-Bera}} = 0.27 > 0.05$ and $p_{\text{Brown \& Forsythe}} = 0.37 > 0.05$.

Finally, as the area under the ROC curve is equal to 0.72, which is relatively high (Graph 1), this model has high ability of prediction.

With regard to the study of the frequency of primary health services utilization, according to the OLS model the logarithm of the number of visits to primary health services is determined by: a) the geographical region, b) the gender, c) the existence of a chronic disease, d) the perceived threat from the medical condition and e) the income. More specifically, the South East Attica and North Attica, presents a higher number of visits to primary health services compared to the city of Athens. However people who suffer from a chronic disease have higher rates of health services utilization than healthy people. The same holds for individuals who perceive the threat from a health condition as high. On the contrary, men compared to women and high income people compared to low income people have a lower utilization of health services (Table 4).

According to the results of the Link Test, this model does not suffer from a specification error as the hat is statistically significant while the hat^2 is not (Table 5).

Moreover, as the p of the Modified Hosmer & Lemeshow criterion equals 0.069> 0.05, this model has a good fit to the data.

Additionally, the p of the Ramsey Reset Test is equal to 0.34> 0.05, indicating that there are no omitted variables.

Finally, the standardized residuals follow the normal distribution ($p_{\text{Jarque-Bera}} = 0.068 > 0.05$) with equal variances ($p_{\text{Brown \& Forsythe}} = 0.063 > 0.05$), therefore the assumptions of the regression are not violated.

4. Discussion

According to the results of the analysis, the likelihood of primary health services utilization is determined by the gender, the age, the existence of a chronic disease and the self-rated health. In addition, the logarithm of the frequency of visits to primary health services is determined by the gender, the existence of a chronic disease, the income, the geographical region, and the perceived threat from the health condition.

The results of our analysis are consistent with international literature (Fylkesnes, 1993; Newbold et al., 1995; Murphy and Hepworth, 1996; Travassos et al., 2000; Van Der Heyden et al., 2003). More specifically, since women live longer than men, their health status is poorer (Bertakis et al., 2000). As a consequence, due to the increased morbidity that they experience, women have higher rates of utilization of health services than men (Redondo-Sendino et al., 2006). In our study, the differences of the primary health services utilization between men and women, may be, regardless of any differences in morbidity, a consequence of the difference in health behaviours that both genders adopt (women usually adopt healthier behaviours) (Zemp and Ackermann-Liebrich, 1988) or an effect of psychosocial factors (Green and Pope, 1999). Also, gender specific utilization differences can be considered as a consequence of women's tendency to use health services (Koopmans and Lamers, 2007). Verbrugge (1986) and Gijsbers van Wijk et al. (1991) suggested that women are more sensitive to symptoms and argued that women recall symptoms more readily than men and that they may be more willing to report their health problems. In addition, it is considered that women's greater experience of illness arises, at least in part, as a function of their social roles and position (Woods and Hulka, 1979). Psychosocial factors such as psychological distress, life stress, social support etc. predict health services utilization (Dorn et al., 2010). More specifically, persons undergoing stress tend to use more health services and the relationship between psychological distress and primary health care utilization is positive (Gortmaker and Eckenrode, 1982). In addition, the interaction of high life stress exposure and low social support is consistently linked to increased rates of health services utilization (Counte and Glandon, 1991).

Due to biological deterioration, age is associated with the utilization of health services, and it seems that this association is positive (Nie et al., 2008). However, as in our paper, some studies claim that the association between the age and the utilization of health services is negative (Economou et al., 2008). The negative association between the age and the likelihood of utilization of primary health services, regardless of the fact that health status may appear to be improved even in advanced age (Mitnitski et al., 2007), can be attributed to differences in access to health services across the various age groups (Whitehead, 1992), since psychological and physical barriers affect access to care among the elderly which is also influenced by poverty (Fitzpatrick et al., 2004).

The utilization of health services is also determined to a large extent by the self-reported morbidity (Foets et al., 1985). More specifically, self-reported morbidity is associated with higher probability of health services utilization. Thus, the health needs reflected through the self-rated health are negatively associated with the utilization of health services, as persons with lower self-rated health have a higher probability of using health services (Fernandez de la Hoz and Leon, 1996). The effect of the self-rated health in the specific study confirms the findings of similar studies which claim that a better health status relates to a lower number of doctor visits (Lima and Kopec, 2005). The effect of the existence of a chronic disease in the utilization of primary health services shows that the individuals' choices on health care seeking are a response to the

disease symptoms experienced. These symptoms include physical and emotional distress and impairments on various functions of the body and are not a mechanistic process (Lynch and Gardner, 2009). Since the association between the existence of health conditions and health care seeking behaviour is positive, and the association between the health status and the utilization of health care is negative (Shibusawa and Mui, 2008; Simmons et al., 2008), these findings are consistent with the international literature.

The income is also an important factor affecting the utilization of health services (Louvison et al., 2008), as it seems that people of low income have lower probability of utilization of health services (Geitona et al., 2007; Lemstra et al., 2009). The association between the income and the utilization of primary health services, which according to the analysis of this study is negative may reflects the fact that people with higher income adopt healthier behaviours (Leganger and Kraft, 2003). There is an association between common health practices like smoking, drinking, regularity of meals, physical activity and physical health status (Joung et al., 1995). Except for the positive association between income and high alcohol intake, measures of "unhealthy" behaviours are inversely associated with the socio-economic indices, suggesting that individuals in lower socio-economic groups are at an increased risk for health problems (Pomerleau et al., 1997). Consequently, health-related behaviors act as risk factors of poor health and lead to increased utilization of health services (Ruigomez et al., 1995). In addition, differences in health behaviours observed among different socioeconomic groups, are largely due to the fact that people of these groups perceive differently the random nature of health and the impact that the adoption of healthy lifestyles has in shaping the health status (Lantz et al., 1998; Kieffer et al., 2006; McGuire et al., 2006). It is not surprising, therefore, that the income as a determinant of health behaviour acts as a determinant of health services utilization (Strain, 1991). In addition, the negative association between the income and the utilization of health services is explained by the fact that people of higher socioeconomic status have better health (Adler and Ostrove, 1999; Molarius et al., 2007; Alexopoulos and Geitona, 2009; Zavras et al., 2011) and visit more frequently specialists (Dunlop et al. 2000). Additionally, the increased utilization of primary health services by people with lower income, based on a psychosocial interpretation, reflects the fact that people with lower income are more exposed to adverse psychosocial events compared to higher income people (Davey-Smith et al., 1998; House, 2001; Pikhart et al., 2003).

The differences in the utilization of primary health services across geographical regions may be partially explained by the impact of the physical environment on health, and specifically by the existence and the types of hazards (biological, physical, chemical, etc.), their source (natural, industrial, agricultural, etc.), 3) their origin (air, water, food, etc.) and their space of exposure (home, community, school, work) (Young, 2005). Additionally, the "sociobiological translation", is a phenomenon that explains the impact of society and the socio-economic environment on people's health as it considers that the way in which the social characteristics are perceived leads to biological signals which in turn are converted into disease (Tarlov, 1996). However, it can also be attributed to differences in access which is determined by the distance from health services or by spatial factors (Brooks, 1973; Meade and Earickson, 2005). These differences are explained by the distance from health services and the lack of access to the means of transport (Arcury et al., 2005a; Arcury et al., 2005b).

Finally, the results of our study are also consistent with the fact that the ways in which people perceive the threat from the disease plays a dominant role in decisions related to health care seeking (Rogers and Elliott, 1997; Rosenstock, 2005).

The findings of this study may contribute to effective planning of health services in Greece in times of economic crisis since they provide evidence from the past. The importance of this point lies in the fact that much of what we live within the present is a direct result of decisions made in the past (Tosh, 2000; Merriman, 2000; Ion and Beer, 2003). Understanding the past is a useful way of opening up the possibilities that may exist in the present and the future, especially when the economy slows down as in our days.

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Table 1: Geographical distribution

Geographical region	Frequency	Percentage (%)	Cumulative Percentage (%)
Rest of Greece	2561	63.98	63.98
Athens	301	7.52	71.50
Southeast Attica	463	11.57	83.06
West Attica	338	8.44	91.51
North Attica	140	3.50	95.00
Piraeus	200	5.00	100.00
Total	4003	100.00	

Table 2: LR Model on the Likelihood of Primary Health Services Utilization

Utilization of primary health Services	OR	Std. Err.	z	P>z	95% Confidence Interval
Age	0.8892932	.0304208	-3.43	0.001	0.8316243 -0.950961
Self-Rated Health	0.6230192	.0632894	-4.66	0.000	0.5105429-0.760275
Gender	0.6615056	.0523913	-5.22	0.000	0.566393-0.772589
Existence of Chronic Disease	6.520939	.8659601	14.12	0.000	5.026588-8.459545

Table 3: Link Test

Utilization of primary health services	Coefficient	Std. Err.	z	P>z	95% Confidence Interval
hat	1.050813	.2105878	4.99	0.000	0.6380683-1.463557
hat^2	-.0170314	.0682786	-0.25	0.803	-0.150855 -0.1167922
Constant	-.0210482	.1030794	-0.20	0.838	-0.2230801-0.1809836

Table 4: OLS Model on the Logarithm of the Number of Visits to Primary Health Services

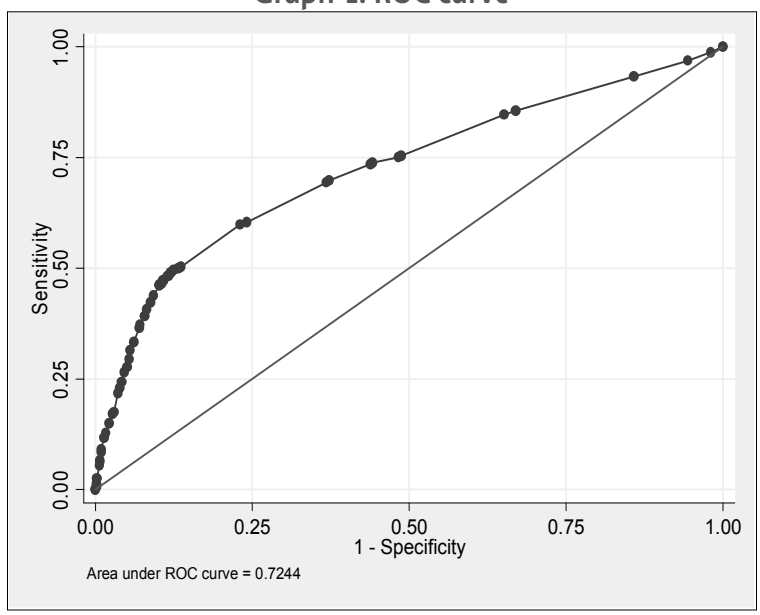
Logarithm of the Number of Visits to Primary Health Services	Coefficient	Std. Err.	t	P>t	95% Confidence Interval
Rest of Greece	.0376427	.0697444	0.54	0.589	-.099136- .1744213
Southeast Attica	.1859269	.0828103	2.25	0.025	.0235241- .3483298
West Attica	.0664586	.0916526	0.73	0.468	-.1132854- .2462025
North Attica	.2590377	.1200437	2.16	0.031	.0236148- .4944606
Piraeus	.0771966	.1012301	0.76	0.446	-.1213301- .2757234

Gender	-.158914	.0379153	-4.19	0.000	-.2332713- -.0845568
Existence of chronic disease	.8824502	.0416865	21.17	0.000	.800697- .9642034
Perceived threat of health condition	.1635113	.0246316	6.64	0.000	.1152053- .2118174
Income	-.0331781	.0158608	-2.09	0.037	-.0642834- -.0020728
Constant	.6400628	.1091232	5.87	0.000	.4260566- .854069

Table 5: Link Test

Logarithm of the number of visits to primary health services	Coefficient	Std. Err.	t	P>t	95% Confidence Interval
hat	.8100787	.2861558	2.83	0.005	.2488874 - 1.37127
hat^2	.0752244	.1124919	0.67	0.504	-.1453878 - .2958366
Constant	.098163	.1543703	0.64	0.525	-.2045787-.4009046

Graph 1: ROC curve



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