Health care utilization and unmet needs in Spain: an analysis based on National Health Survey data

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Abstract

Using data from the Spanish National Health Survey, before the crisis (2006) and during the economic crisis (2011-2012), this study examines the determinants of health care utilization and unmet needs for health care in Spain. Special emphasis is put on the impact of labour force status characteristics. The analysis shows that health care utilization would be related to the economy, although, the estimation results vary between services. Age, gender and educational level are the most important factors to explain utilization, whereas being unemployed isn't as important as expected. Related to unmet care needs, the waiting list is the main reason in both periods.

Keywords: health care utilization; access to health care, unmet needs, Spanish National Health Survey, waiting list.

JEL Classifications: I10; I11; I18.

1. INTRODUCTION

Achieving health equity means that people can develop their full potential regardless of their health status or other circumstances determined by social factors. Health inequities therefore involve inequality with respect to health determinants, access to the resources needed to improve and maintain health or health outcomes; and they also entail a failure to avoid or overcome inequalities that infringe on fairness and human rights norms (World Health Organization). Thus, there are factors that could contravene this goal of public health policy.

So, how does the economy influence this equity and health care utilization? Definitely, does the demand for health care change during an economic collapse? Or what are the determinants of unmet needs for health care services? In this context, it is important to highlight the Spanish case which most significant characteristic is the increasing unemployment rate. According to Eurostat, this rate for Spain roses from 8.3% to 26.4% between 2007 and 2013, while for the UE-27 it was 7.2% and 10.9%, respectively. These data widely justify addressing the relationship between unemployment and health care utilization, while in addition, the analysis of unmet care needs.

Several studies have examined the relationship between different socioeconomic factors such as income, education or labour status, and the level of health (Cantarero and Pascual, 2005; Gili et al, 2013; López-Casasnovas and Ribera, 2002). These factors also influence the use of health services. In fact, the lower the level of the aforementioned factors, the higher the expected demand of health care services, that is, the rate of visits or consultations (with its corresponding remarks). The paper is related to some theoretical and empirical approximations, but we build on this literature.

Concretely, in this study, we sought to address two issues. The first one consist on analysing the degree of association between the demographic and socioeconomic characteristics for adults (with special attention to unemployment) and the use of health care services (expressed as the utilization of public family medicine, specialist, emergency services and hospitalization) and unmet health care needs. The second objective is to test the possible influence of changes in demographic and socioeconomic indicators on attendance, before the crisis (2006) and during the economic crisis (2011-2012). The abovementioned studies hardly distinguish between different economic

situations. For these aims, the latest available microdata from the National Health Survey (NHS) are used. Count data modelling and discrete choice models are applied.

This paper contains various innovative approaches. On the one hand, using the newest data it employs econometric methods for testing the relationship between socioeconomic factors and health care utilization when considering different economic situations. On the other, from a policy economic perspective, this paper facilitates the awareness of some specific behavioural changes that could emerge during economic downturns. Therefore, this contribution would be valuable to policymakers when planning the management of health care services trying to respond to the objectives of the public health system. Under these economic circumstances incorporating socioeconomic and demographic parameters become more important in order to enhance the equity and sustainability of national health care systems. That is, health policies should help to reduce health inequalities, promoting equal access to health services to those most disadvantaged and most at risk of social exclusion[1].

The structure of the paper is the following one. In Section 2 it is showed a review of previous literature. Section 3 described the methodological aspects and the data set. Section 4 is devoted to comment on the results. Finally, Section 5 summarizes the main conclusions and points out some policy implications.

2. PREVIOUS RESEARCH

Our research is closely related to a number of theoretical and empirical papers. As previously highlighted, several studies have examined the relationship between different socioeconomic factors —income, education or labour status— and the level of health. These factors also influence the use of health resources. In addition, a large body of empirical literature has been devoted to the analysis of unmet health care needs. Regarding to unmet health care needs, although health care systems in Europe provide a basic coverage for all (or almost all) residents, there is still, a non-negligible proportion of the population has to forgo or delay necessary or preventive care, mainly for financial reasons. Some social groups are more exposed than others, which may contribute to increase inequalities in health (Chaupain-Guillot and Guillot, 2014).

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[1] In this study, it is represented by unemployed. In other, equity issues related to the provision of health care, are related to elderly people Crespo-Cebada ansd Urbanos-Garrido (2012).

Thus, Kraut et al. (2000) studied for randomly selected residents of Manitoba (Canada) whether prior use of health services predicts a subsequent risk of unemployment and the acute effects of exposure to unemployment on the use of health care services. They found that hospitalization increased after a period of unemployment. Similar results are set up in Beale and Nethercott (1985) or Linn, Sandifer, and Stein (1985) both of which showed an increase in the use of health services (medical consultations or hospitalizations) by the unemployed. However, the results are far from conclusive (Åhs and Westerling, 2006). Proof of this, is the paper of Van der Heyden et al. (2003) which found that in Belgium lower educational groups make more often use of the general practitioner and are more often admitted to hospital than those with a higher education. But, after adjustment for health status and demographic characteristics people with a higher socio-economic status report more often visits with a specialist. Similarly, Morris, Sutton, and Gravelle (2005) showed from England how low-income individuals and ethnic minorities have lower use of secondary care despite having higher use of primary care.

Concentrating the analysis to the empirical evidence for the Spanish case, it is worth mentioning the following ones. Lostao et al. (2001) analyse the evolution of the use and accessibility of health services between 1987 and 1995/1997 for different socioeconomic groups. Their found that at the same level of necessity the groups of lower socioeconomic status have higher rates of medical consultation than the higher ones although the magnitude of this relationship decreased during the time span evaluated. Other authors, García-Pérez et al. (2007) explore the relationship between socioeconomic factors and family medicine consultations for one of the Spanish regions (Community of Madrid). Their results indicated, that factors usually associated with attendance, as the percentage of unemployment or higher educational level, do not influence when adjusting by income.

Besides González-Álvarez and Gamero-Burón (2013) assess the health care costs caused by the increase of health care services due to work stress between 2006 and 2011. They confirmed that in 2006 workers under stressful situation had a greater propensity to use health services. Instead, in 2011 the results concluded that these workers only make a greater use of emergency services. The authors justify such results due to the economic situation which may have caused changes in the perception and priorities of workers and the general population.

Furthermore, Abásolo, Negrín-Hernández and Pinilla (2014) study the probability of utilisation of health care services and the respective waiting times using data from the NHS (2006). As shown in this research, there is evidence of inequity in the access to specialist and hospital health care services which favours the highest socioeconomic groups, whereas for general practitioner services, although health care utilisation favours relatively more those with lower socioeconomic level, waiting times are detrimental to those with lower education level. Similar results, are also found in González-Álvarez and Barranquero (2008), using PHOGUE data for 1995-2001.

3. METHODS AND DATA VARIABLES

Two important issues in this Section are the methods and the data employed in this paper. Different empirical contributions provide a motivation for the model discussed below.

3.1 Theoretical framework and empirical strategy

Demand for health care is multi-faceted. It depends on different socioeconomic factors (such as biological, demographic or social) and the decision making process that underlies this demand is based on the individual's perception of medical symptoms and the incentive towards action Rivera (2004). Besides, the theoretical approaches susceptible of application to the analysis of demand and use of health care are two (Clavero-Barranquero and González-Álvarez, 2005): (i) the Grossman model (Grossman, 1972a, b) which following the traditional consumer theory emphasizes the role played by the patient's choice or (ii) principal-agent models, in which the physician, as agent of the patient, determines the amount of medical services used for the patient once the first visit has been done (Zweifel, 1981).

Nonetheless, typically, the indicator of health care utilization is the number of visits in a given period. Accordingly, the econometric model should take into account that the dependent variable, number of visits, takes only non-negative integer values. Thus, an appropriate framework is count data modelling (Cameron and Trivedi, 1986; Cameron et al., 1988; or Vera-Hernández, 1999). We use a Poisson and negative binomial models where the expected number of visits per period is given by

$$E(u_i|x_i) = \exp(x_i' \beta) \tag{1}$$

where u_i indicates the utilization and x_i contains the explanatory variables which include socioeconomic measures for each individual, such as labour status, age, gender, educational level, marital status, or nationality. Thus, for each type of health care utilization dependent variable analysed, the specification would be the following:

$$E(u_i|x_1 \ldots x_k) = \exp(\beta_0 + \beta_1 \text{Unemployed} + \beta_2 \text{Age} + \beta_3 \text{Gender} + \beta_4 \text{Educ} +$$
$$+\beta_5 \text{Married} + \beta_6 \text{Nationality}) \tag{2}$$

The Poisson distribution is the benchmark in count data applications. This assumes that the conditional mean of the dependent variable is equal to the conditional variance. In the presence of overdispersion, the Poisson model is no longer efficient and the use of negative binomial model is preferable.

The analyses includes measures of socio-demographic factors, as well as personal attitudes, to analyze if these factors tend to encumber or facilitate contacts with the health care system. As the measure of care needs is dichotomized, the analysis of the determinants of unmet needs for health care is performed using discrete choice models. The general model, takes the following form

$$y^*_i = X_i' \beta + \mathcal{E}_i \tag{3}$$

where $\mathcal{E}_i$ is the error term which follows a normal distribution (probit model). The dependent variable is coded 1 if the individual reported that, at least once in the last 12 months, he/she needed a medical examination or treatment but did not consult, whatever the reason was (and 0 otherwise). The following individual characteristics are included as explanatory variables: labour status, age, gender, self-perceived health, educational level, marital status, or nationality. Thus, the specification to be analyzed is

$$UHN = \beta_0 + \beta_1 \text{Unemployed} + \beta_2 \text{Age} + \beta_3 \text{Gender} + \beta_4 \text{Educ} +$$
$$+\beta_5 \text{Married} + \beta_6 \text{Nationality} + \beta_7 SAH + \mathcal{E}_i \tag{4}$$

3.2 Data

Taking advantage of the latest data reported by the Spanish Ministry of Health. We use microdata from the NHS for two periods, 2006 and 2011-2012. That is, before and during the economic crisis. The NHS is a research operation that the Spanish National Institute of Statistics (INE) carries out based on a partnership agreement with the

Ministry of Public Health, Social Services and Equality (MSSSI). The NHS is a representative survey of Spanish population. The sampling of the data follow a three-stage stratified design. Thus, it is directed at families and its main objective is to obtain data on the state of health and determinant factors from the citizens' viewpoint. The unit of the first stage are the census sections. The unit of the second stage are the main family households. Within each household, and adult (16 or older) is selected to fill all the questionnaires.

Both surveys, reported national and regional data for different aspects associated with health status, heath care and health care determinants. Thus, they are comparable to other European health databases. The survey sample consists of approximately 31300 and 24000 dwellings, distributed into 2236 and 2000 census sections, for 2006 and 2011-2012, respectively. We have restricted the selected sample to the working-age population (16-65 years). The sample of employed and all unemployed workers, once removed the missing observations of unemployment and health care utilization is 3.116 for 2006 and 172 for 2011-2012.

Description of the data:

To analyze health care utilization, in this paper there are quantified four medical services dependent variables: the number of visits to general practitioner in the last four weeks (*n_visits_gp*); the number of visits to the specialist in the same period (*n_visits_sp*); the number of emergency visits in the last year (*n_visits_urg*); and the number of times admitted to hospital in the last twelve months (*n_times_hosp*). Whereas for unmet health needs *UHN* dummy variable defined as 1 when the person says "yes" when he/she was asked if at least once in the last 12 months, he/she needed a medical examination or treatment but did not consult, whatever the reason was, 0 otherwise, is used.

Related to the explanatory variables we use: *Age* which is a continuous variable ranging from 16 to 65; *Gender,* a dichotomous variable 1 if male, 0 otherwise; some variables related to educational level categorized by five dummies: primary education or below (*Educ1*), compulsory secondary education (*Educ2*), non-compulsory and pre-university secondary education (*Educ3*), specific labour training requiring non-compulsory secondary education (*Educ4*) and university graduate (*Educ5*); *Married* is a dichotomous variable 1 if married, 0 otherwise to analyse familiar status; *Nationality* is a dichotomous variable 1 if Spanish, 0 otherwise. Related to self-assessed health, *SAH*

is coded as 1 when the person declared to have a very good or good health status. Finally, in relation with labour status, *Unemploye*d which is a dichotomous variable, 1 if the person declares to be unemployed, 0 otherwise. The definition of each variable used in this paper is given in Table 1.

Table 1: Definition of variables

Variables		Definition
Utilization	*n_visits_gp*	Number of visits to general practitioner in the last 4 weeks
	n_visits_sp	Number of visits to specialist in the last 4 weeks
	n_visits_urg	Number of visits to urgent care in the last 12 months
	n_times_hosp	Number of times admitted to hospital in the last 12 months
Unmet health needs	*UHN*	1 if the individual reported that, at least once in the last 12 months, he/she needed a medical examination or treatment but did not consult, whatever the reason was.
Age	*Age*	Age in years
Gender	*Male*	1 if male
Education	*Educ1*	Primary education or below
	Educ2	Compulsory secondary education
	Educ3	Non-compulsory and pre-university secondary education
	Educ4	Specific labour training
	Educ5	University graduate
Marital status	*Married*	1 if married
Nationality	*Nationality*	1 if Spanish
Self-assessed health	*SAH*	1 if person declares very good or good
Labour status	*Unemployed*	1 if the person declares to be unemployed

Access to health services is addressed through questions on (perceived) unmet needs for health care, without a distinction being made between medical care services. Questions are phrased as follows: "Was there any time during the last 12 months when, in your opinion, you needed a medical examination or treatment but you did not receive it?" Those who answer in the affirmative ("Yes, there was at least one occasion when [they] really needed examination or treatment but did not") are then asked to give the main reason why they did not see a doctor when they needed to. Table 2 indicated the main reasons for unmet health needs.

Table 2: Unmet health needs: main reasons

Reason	Pre-crisis (2006)	Crisis (2011-12)
Financial reasons	5.64	4.52
Waiting list	32.03	37.62
Lack of time	7.67	8.57
Distance, transportation difficulties	2.63	0.71
Fear	2.41	1.19
"Wait-and-see" attitude	-	18.81
Other reasons	49.62	28.57
TOTAL	100	*100*

Table 3 provides in descriptive terms the relationship between unemployment and demand for health services whereas Figure 1 shows the graph pie of utilization for the employed and unemployed. In any case, an increase of utilization is observed for both collectives between the time span considered (except for hospitalizations in the last period for the unemployed). It is also observed that the visits to general practitioner are greater than those for the specialist one. Although the mean values are higher in the case of emergency services, it should be considered that it measure the number of visits over a full year (the same to number of hospitalizations). As to the differences in use between collectives, it is showed that the unemployed would make greater utilization of general practitioner services while it is slighter for the specialist ones. It is also observed over time a change in the tendency between groups for emergency and hospitalizations visits.

Table 3: Average number of visits by unemployment status

	General Practitioner		Specialist		Emergency		Hospitalizations	
	2006	2011-12	2006	2011-12	2006	2011-12	2006	2011-12
Employed	1.259	2.191	0.732	1.816	1.948	2.581	1.390	1.676
Unemployed	1.264	2.222	0.635	1.417	2.140	2.194	1.447	1.083

Figure 1: Health care services utilization for *unemployed*: 2006 vs. 2011-2012
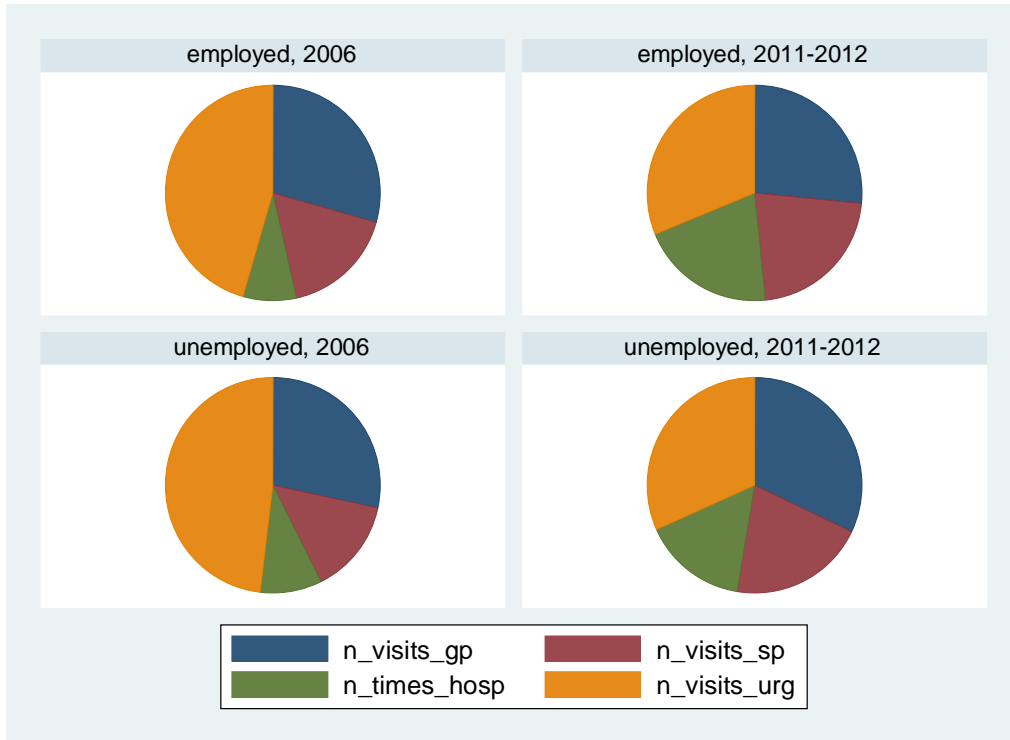
4. EMPIRICAL RESULTS

In this Section we present the results for the probability of experiencing unmet health needs and the socio-economic determinants of health care utilization, during the pre-crisis (2006) and the crisis (2011-12) considered periods.

Looking first at the impact of socio-economic characteristics on the probability of experiencing unmet health needs (Table 4), we see that for both periods, men are less likely than women to forgo medical care. In addition, the probability of reporting unmet needs, is lower among people which reported "good" health status, with lower educational level or for the national population. This may reflect the fact that less healthy individuals often have more care needs and hence are more often faced with the decision to delay (or forgo) treatment or not. Related to the educational variables, the effect is unexpected. One possible explanation is that higher educated people, have more time constraints. By contrast, whereas there are no significant labour status or familiar condition effects prior the crisis, there are during it. Then, unemployed people would have higher probability for unmet health care needs, whereas the reverse effect is

obtain for married individuals. Thus, the analysis shows that health care utilization would be related to the economy.

Finally, Table 5 contains the Poisson/Negative binomial model estimation for the utilization of public family medicine, specialist, emergency services and hospitalization. The use of one or the other estimator is determined by the Alpha *p*-value. Related the pre-crisis period, age and lower educational level, appear to be the main factors affecting utilization. Thus, in accordance with the literature review, whereas lower educational groups make more often use of the general practitioner or emergency services and are more often admitted to hospital than those with a higher education, the reverse is observed for the specialist ones. Related to age, it can be appreciated, the regular use the higher the age is. Then, there is a negative effect for emergency services. It is important to highlight the lack of significance over the crisis period, where only the fact the individual is unemployed is significant for the hospitalizations, indicating less use for this collective. On the other hand, unemployment status, does not have any more effects. Thus, at least at this stage of the analysis, being unemployed isn't as important as expected.

As indicated above, it should be highlighted the fact that there could be a problem of endogeneity. It may be mainly caused by the health status of the individual. That is, less healthy individuals often have more care needs and the probability of using health care services would be higher. In addition, we should never forgot the fact the demand is determined by the supply.

Table 4: Probit model estimation. Dependent variable *unmet needs for medical care*

Variable	Pre-crisis (2006)	Crisis (2011-12)
Unemployed	0.027	0.147 ***
	(0.520)	(2.790)
Age	-0.002	-0.003
	(1.480)	(1.620)
Male	-0.182 ***	-0.121 ***
	(5.840)	(2.790)
SAH	-0.473 ***	-0.466 ***
	(15.130)	(9.790)
Educ1	-0.033	-0.177 **
	(0.720)	(2.160)
Educ2	0.107 **	0.052
	(2.040)	(0.930)
Educ3	0.109 **	-0.043
	(2.330)	(0.640)
Educ4	0.206 ***	0.065
	(3.400)	(0.710)
Married	-0.005	-0.123 ***
	(0.170)	(-2.710)
Nationality	-0.114 **	-0.182 ***
	(2.330)	(-10.110)
constant	-1.151 ***	-1.191 ***
	(14.580)	(-2.590)
Number of obs	21952	15278
LR chi2(10)	314.45	141.15
Prob > chi2	0	0
Pseudo R2	0.0363	0.0367
Log likelihood	-4172.2699	-1853.0425

Notes: *z*-statistics in parentheses; ***, **, and * denote significant at 1%, 5%, and 10% respectively.

Table 5: Poisson/Negative binomial model estimation. Dependent variable *health care utilization*

Variables	General Practitioner		Specialist		Emergency		Hospitalizations	
	Pre-crisis (2006)	**Crisis (2011-12)**	**Pre-crisis (2006)**	**Crisis (2011-12)**	**Pre-crisis (2006)**	**Crisis (2011-12)**	**Pre-crisis (2006)**	**Crisis (2011-12)**
Unemployed	0.036 (0.62)	0.050 (0.35)	-0.084 (-0.92)	-0.193 (-1.14)	0.074 (1.41)	-0.196 (-1.10)	0.063 (0.66)	-0.412 *** (-2.28)
Age	0.007 *** (4.86)	0.002 (0.37)	0.011 *** (5.30)	0.005 (0.89)	-0.004 *** (-3.33)	-0.017 *** (-2.71)	0.002 (0.84)	-0.001 (-0.21)
Male	-0.016 (-0.45)	-0.032 (-0.28)	0.099 * (1.86)	-0.070 (-0.56)	-0.132 *** (-3.92)	-0.185 (-1.30)	0.078 (1.24)	-0.141 (-1.09)
Educ1	0.079 ** (2.08)	0.117 (0.85)	-0.186 *** (-3.23)	0.030 (0.20)	0.116 *** (3.32)	0.576 *** (3.49)	0.109 * (1.65)	0.141 (0.94)
Pseudo R^2	0.005	0.002	0.005	0.007	0.003	0.003	0.004	0.018
Alpha *p*-value	0.000	0.058	0.000	0.093	0.000	0.000	1.000	0.385
Observations	3116	172	3116	172	3116	172	780	172

Notes: *t*-statistics in parentheses; ***, **, and * denote significant at 1%, 5%, and 10% respectively.

5. CONCLUSIONS

Recent literature provides mixed answers regarding the factors related with health care utilization. Using data from the Spanish National Health Survey, before the crisis (2006) and during the economic crisis (2011-2012), we examine the determinants of health care use and unmet needs for health care in Spain. Our results show that health care utilization would be related to the socio-economic situation. Whereas there are no significant labour status for unmet health care needs before the crisis, there are during it. On the other hand, related to general practitioner, specialist, emergency or hospitalizations services visits, being unemployed isn't as important as expected.

From a policy economic perspective, this contribution would be valuable to policymakers when planning the management of health services trying to respond to the objectives of the public health care system. Health policies should help to reduce health inequalities, promoting equal access to health services to those most disadvantaged and most at risk of social exclusion.

Finally, it is important to highlight the research limitations and extensions of the paper. Despite the NHS allows incorporating individual-specific characteristics, a data drawback is the lack of objectivity in the responses by the individuals. Also, the missing values there are. Because health inequality is an area in which greater effort must be made to generate empirical information for policymakers, this paper could be extended. It would be valuable to test the results by using other methods and control variables or making a multi-country study. These and other extensions of the analysis of this study are left for further research, when there will be available new data on health indicators.

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