Promoting the use of health information and communication technologies in Spain: a new approach based on the ICT-H

La promoción del uso de la información de la salud y las tecnologías de la comunicación en España: un nuevo enfoque basado en la TIC-H

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Abstract

The rapid growth of the use of new technologies is having an important effect on individuals' health knowledge and behavior. The objective of this paper is to study the potential reduction in health care utilization associated with the expansion of new technologies. Using Spanish micro data from the Survey on the Equipment and Use of Information and Communication Technologies (ICT-H) in Households for 2014 we analyze information technologies equipment, availability of access and means of Internet connection per household. We model the probability of an individual being internet user in Spain as a function of a range of socio-economic characteristics, including individual's gender, age, education and employment situation. Also, we hypothesized that a greater use of this communication technologies is related to a lesser health care expenditure.

Key Words

Health - New technologie - eHealth - Utilization - Health expenditure - Probit models

Resumen

El rápido crecimiento de la utilización de las nuevas tecnologías está teniendo un efecto importante en el conocimiento sanitario y comportamiento de las personas. El objetivo de este trabajo es estudiar el potencial efecto reductor en la utilización de servicios sanitarios asociado a la expansión de estas nuevas tecnologías. Utilizando micro datos de la Encuesta sobre Equipamiento y Uso de Tecnologías de Información y Comunicación en los Hogares (TIC-H) para el año 2014 analizamos equipos de tecnologías de la información, la disponibilidad de acceso y los medios de conexión a Internet por hogar. Modelizamos para España la probabilidad de que un individuo sea usuario de Internet en función de una serie de características socio-económicas, incluyendo el género, la edad, el nivel educativo y la situación laboral. Se apoya la hipótesis de que un mayor uso de estas tecnologías de comunicación se relaciona con un menor gasto sanitario.

Palabras clave

Salud - Nuevas Tecnologías - eSalud - Utilización - Gasto sanitario - Modelos probit

1. Introducción

The fast growth of the use of new technologies is having an important effect on individuals' health knowledge and behaviour. The emergence of the Internet has made that health information, which previously was almost exclusively available to professionals, is more understandable to the general population. Access to health information on Internet is likely to affect individuals' health care related decisions and demand for health care services. Indeed, in recent years it has emerged substantial enthusiasm for telecommunication technologies for the delivery of health care and in support of wellness (Steinhubl, Muse & Topol, 2013). As more of the world's populations access Internet with greater flexibility, the majority are seeking to improve their health knowledge. However, only currently has the debate started on the implications of the expanding universe of "health on the Internet" (*or eHealth*) for health care and health promotion (Korp, 2006).

Thus, the starting point of this paper is the large and increasing proportion of the population that use Internet as a source of feasible health information. Since Arrow (1963) and Grossman (1972a, b), several papers have studied the relationship between socioeconomic factors (such as income, gender, education or labour status) and health care utilization (López-Casasnovas & Ribera, 2002; Cantarero & Pascual, 2005; Clavero-Barranquero & González-Álvarez, 2005; Gili Roca, Basu, McKee & Stuckler, 2013). The decision making process underlying the demand is based on the individual's perception of medical symptoms and the incentive towards action (Rivera, 2004). In general, they show the lower the socioeconomic level, the higher the expected health care demand (with its corresponding remarks). Here, the points of interest in this paper are mainly health information and communication technologies.

However, there is not a consensus in the literature on whether Internet health information is a substitute or complement to health care utilization. In fact, as pointed for example by Suziedelyte (2012), previous empirical research analysing the effect of Internet health information on the demand for health care obtained inconclusive and inconsistent conclusions.

On the one hand, by diffusing health information/ knowledge, the Internet may reduce people's dependence on health care services and it would derive in a lower utilization which will be associated with a lesser health expenditure. On the other hand, this greater availability of health information could cause doubts and so, patients/ seekers would go to the professional (general practitioner or specialist) in order to solve it. Consequently, the number of visits would increase with its corresponding effects on final health budgets.

Therefore, along the most recent studies on this field, whether consumers/ patients use health information, from non-physician information sources, as a substitute or complement for health services, we can indicate findings up to date suggest a dominating complementary relationship between them. What is more, as pointed by Renahy, Parizot & Chauvin (2008) it is not obvious that the Internet is a special information tool for primary prevention in people who are the furthest removed from health concerns. But, it appears to be a useful complement for secondary prevention, mainly for better understanding health problems or enhancing therapeutic compliance. In this regard they are the ones by Lee (2008) or Suziedelyte (2012). In the same line, Dwyer & Liu (2013) obtained that consumer's health information increases the likelihood of visiting a physician as well as the frequency of visits on average. However, low-trust consumers tend to substitute self-care through consumer health information for physician services. Furthermore, better-informed consumers make significantly fewer emergency services visits suggesting that greater information may improve efficiency in the market. That is, an appropriate substitution providing information at lower cost would reduce demand for health care and could solve some of the problems associated with the increasing health expenditure trends and the inadequate access to health care market.

In consequence, along the different empirical studies that found a relationship of substitution between consumer health information and the demand for physician we can quote the ones of Wagner, Hibbard, Greenlick & Kunkel (2001) or Schmid (2014). These authors found that information has an important impact on health care utilization, and so, increasing consumer health information has the potential to reduce health care expenditures.

In this line, Anderson, Rainey & Eysenbach (2003) try to resolve the following questions: What are the major factors that are leading to the increased use of the Internet by consumers to obtain health-related information? How do physicians view the use of the Internet by patients to obtain health-related information and services? How is the use of the Internet by consumers affecting physician–patient communications? Or what are the implications of the Internet for the future of physician-patient relationships? In this paper, the key point is how they determine the three features that makes the Internet the ideal via for health information and education:

- Everybody can be a publisher-including consumers,
- There are direct, immediate, and efficient feedback channels (which tell publishers of information what readers think, what they like and dislike, and giving them the possibility to adapt and refine their contents),
- Online publishers can respond to the needs and demands of consumers quickly, as changes are possible with little costs and virtually no delay.

Conversely, here we have the problem of quality of information. That is, objective and unbiased information must be available to the patient. Nevertheless, at the present, there is no agreed-upon mechanism for ensuring the accuracy or completeness of the information that is presented to patients. Misinformation can lead patients with life-threatening conditions to lose trust in their provider, and take actions that undermine the effectiveness of their treatment. Patients may use their limited time with their health care provider unproductively in ways that ultimately increase health care costs, and even abandon a provider delivering high quality care to pursue ineffective therapies. Besides, some vulnerable people may also be victimized by biased or incomplete information from those with a financial interest in the information they provide (Eysenbach & Diepgen, 2001). As concluded by Berland et al. (2001) accessing health information using search engines and simple search terms is not efficient. Coverage of key information on both English and Spanish language in the Internet is poor and inconsistent. However, they pointed

the accuracy of the health care available information provided is commonly good. Never the less, in order to understand this accessible information, a high level is required.

In addition, it is worth mentioning that most of the literature regarding *eHealth* utilization is mainly for the United States. Studies on the use of Internet and technologies for health information and purposes within Europe are still few. Thus, in order to motorize this field along European countries, that is, to investigate European health consumer's use of, their attitudes to and their desires with regards to Information and Communication Technologies for health purposes (*eHealth*), a survey in some countries (Denmark, Germany, Greece, Latvia, Norway, Poland and Portugal) was conducted through 2005-2008 as a project of the World Health Organization *eHealth* Consumer Trends Survey funded by the European Commission. The results for this project (results of the surveys conducted in 2005 and 2007) were published by Kummervold et al. (2008). One of the main findings given in this study is nowadays Internet health users reveals a tendency toward more "advanced" and more interactive use of the Internet for health purposes. They discussed that people rather than using the Internet to search for and/ or read health information, people are increasingly taking part in online communication with peers, unknown professionals, and their family doctors. What is more, the Internet is being used by more people for ordering medical health products.

Furthermore, we can also quote the study of Andreassen et al. (2007) which for the same seven European countries as Kummervold et al. (2008) - Norway, Denmark, Germany, Greece, Poland, Portugal and Latvia- analysed citizens' use of *eHealth* services. They pointed that the most common way to use the Internet in health matters is to read information, followed by deciding whether to visit a doctor and to prepare for and follow up on doctors' appointments. Indeed, the showed health-related use of the Internet does affect patients' use of other health services, but it would appear to supplement rather than to replace other health services. In sum, for Andreassen et al. (2007) *eHealth* appear again as complement rather than a substitute for demand of health care services.

Our objective is to study whether socioeconomics characteristics can help to explain the relationship between new technologies and health care utilization in Spain, and to what extent. In doing so, Spanish micro data from the Survey on the Equipment and Use of Information and Communication Technologies (ICT-H) in Households for the latest available year, which is for 2014, is applied. At this point it is worth mentioning to clarity this issue and justify the relevance how is the current health care services situation in Spain. Health protection is one of the main pillars of modern Welfare States and is mentioned in the Spanish Constitution of 1978 as one of the fundamental rights which have been consolidated in this country along with the change from a Social Security model to a National Health System (1986 Health Act) grounded on the principle of universalism (basic coverage for all residents). Nowadays, health care is decentralised to regions and its financing is covered through regional taxes, shared taxes and block-grants from the central government, and pharmaceutical co-payments. Related to health care powers, the process began in 1981 and ended in 2002, according to three models distinguished among the 17 regions (except Ceuta and Melilla). In Spain, as regards the organization of outpatient health care services, whereas the choice of general practitioner is possible, access to specialist care services is restricted. Patients are allowed to access specialist care only after the approval of their general practitioner. Because (mainly) of waiting lists, some individuals consult private specialists. In addition, people could complement their public health insurance with a private one.

Primary, the objective of this study is to model the probability to an individual for being an Internet user. From there, we would hypothesised its relationship with a lesser health care expenditure (in doing so, we use health care relative figures from the latest Spanish National Health Survey (SNHS)). Our results are related with those previous empirical contributions which indicate that the evolution of telecommunication technologies for the delivery of health care, and information in the Internet, should reduce demand for health care services, the corresponding "waiting lists" and the subsequent health care expenditure. Broadly speaking, in Spain, health information and communication technologies should play a moderating role in the use of health services, and thus a more efficient use of the scarce resources. Previous results for other European countries

(Kummervold et al., 2008) show that the Internet utilization for health purposes is growing in all age groups and for both men and women, with especially strong growth among young women.

Actually, it is important to highlight, that from a policy economic perspective, rising trends in health expenditure has concerned about the sustainability of national health care systems. Thus, it should be considered these issues when designing public policies and even more in nowadays current debates about the cost and benefits of some health care programs and their consequences in the final budgets. There is a communication revolution brewing in the delivery of health care and the promotion of health driven by the growth of new health information technologies (Kreps & Neuhauser, 2010). In this field, this paper is a new contribution regarding some key issues involved in the design of effective and humane *eHealth* applications to help guide strategic development and implementation of health information technologies.

As a result, future public health strategies should ensure that *eHealth* services are well implemented, in order not to create (new) inequalities in health care services. Here it is important to highlight, that reducing social inequalities in health is one of the priorities of the Spanish Ministry of Health, Social Services and Equality. 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. This is an additional justification which explains why it would be important to analyse the evolution of patients' use of Internet new tools.

In the field of health care inequalities there is a much extent evidence for the Spanish case. If we focus on the latest we can cite the ones of Abásolo, Negrín-Hernández & Pinilla (2014a, b) whom study the probability of utilisa-

tion of health care services and the respective waiting times using data from the Spanish national Health Survey (2006). As shown in their 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 & Barranquero (2008), using the European Community Household Panel (ECHP) data for 1995-2001.

The structure of the paper is the following one. Section 2 contains the methodological aspects and the dataset. The estimation results are presented in Section 3 and discussed in Section 4 which concludes.

2. Material and Methods

2.1. Empirical model and strategy

Our objective is to study the effect that socioeconomic characteristics of individuals on the probability of being an Internet user. Correspondingly, we hypothesized that a greater use of this communication technologies are related to health care expenditure due to variations of health care services.

Firstly, we analyse information technologies equipment, availability of access and means of Internet connection per household. For this, we model the probability of an individual being Internet user (yi^*) as a function of a range of several socio-economic characteristics. The econometric approach should take into account that this dependent variable (yi^*) is dichotomic. It reflects the fact that the individual has Internet access at his/ her household, and 0 otherwise. In this way, a set of socioeconomic factors, such as age, gender, education level, and labour status, gathered in a vector x explain this fact so that:

1. $Prob\ (Y=1)=F(x,\beta)$,

2. $Prob\ (Y=0)=1-F(x,\beta)$.

The set of parameters β reflects the impact of changes in x on the probability. In order to estimate these equations, a nonlinear specification of $F(.)$ can prevent logical inconsistency and the possibility of predicted probabilities outside the range [0,1]. The most common nonlinear parametric specifications are probit and logit models both of which have been analysed. So, we will use a latent variable interpretation (Jones, Rice, d'Uva & Balia, 2013). Let

3. $y=1\ if\ yi^*>0$

where $y=0\ if\ yi^*\leq 0$

4. $y^*=x'\beta+\varepsilon$,

xi is a vector of characteristics for individual i, and ε is the error term. If we assume that ε has a standard normal distribution, we obtain the probit model, while assuming a standard logistic distribution, we obtain the logit model. These models are usually estimated by maximum likelihood method.

Thus, we specified the empirical model for being and Internet user as follows

5. $Internetuser_i=\beta_0+\beta_1\ gender_i+\beta_2 age_i+\beta_3 educationlevel_i+\beta_4 labour\ status_i+\varepsilon_i$

Where *gender* is a dichotomous variable that is equal to 1 if male, 0 otherwise; *age* is a continuous variable ranging from 16 (additional dummies variables for different age intervals are considered); *education level* is categorized by means of four dummies: primary education or below (*educ1*, reference category), compulsory secondary education (*educ2*), non-compulsory secondary education and specific labour training and pre-university (*educ3*), and university graduate (*educ4*). Finally, *labour status* is also determined by three dummies: *employed* (1 if the individual is working, 0 otherwise), unemployed (1 if the individual is *unemployed*, 0 otherwise), *inactive* (1 if the individual is an student, retired person, he/ she works at home or is permanently disabled;

reference category, 0 otherwise). The definition of each variable used in the estimates and the descriptive statistics are given in Table 1. The number of observations is 15,551.

We assume that the error term has a standard normal distribution. So, we rely on the results obtained by the probit model. Also, in order to test the robustness of our findings, we also have obtained the corresponding coefficients from the logit model. However, there are not significant differences between them (Amemiya, 1981).

2.2. Data and descriptive statistics

Spanish micro data from the Survey on the Equipment and Use of Information and Communication Technologies (ICT-H) in Households for 2014 is used to analyse information technologies equipment, availability of access and means of Internet connection per household.

This Survey has been carried out by the Spanish National Statistics Institute (INE), in partnership with the Cataluña Statistics Institute (IDESCAT) and the Institute of Statistics and Cartography of Andalucía (IECA), within the scope of its Autonomous Community. Moreover, there is a partnership agreement with the Ministry of Industry, Energy and Tourism through the *Red.es* public business entity for the research of given information society indicators. The survey has a yearly frequency, and in this paper we use the latest information. Also, the theoretical size of the sample is 20,000 dwellings, one fourth of which is renewed every year. It follows the methodological recommendations of Eurostat and is (as indicated by the INE) the only source of its kind whose data is strictly comparable internationally.

Variable	Definition	Mean	Std. Dev.	Min.	Max.
y	1 if the household has Internet access, 0 otherwise	0.669	0.471	0.471	1
gender		0.450	0.497	0.497	1

Variable	Definition	Mean	Std. Dev.	Min.	Max.
age	1 if male, 0 otherwise Age (in years)	53.156	18.974	18.974	103
age1 16-25 (reference category)	1 if person is in this age intervals, 0 otherwise	0.078	0.268	0.268	1
age2 26-35		0.109	0.312	0.312	1
age3 36-45		0.193	0.395	0.395	1
age4 46-55		0.170	0.376	0.376	1
age5 56-65		0.165	0.371	0.371	1
age6 66-75		0.135	0.342	0.342	1
age7 76-85		0.113	0.316	0.316	1
age8 +86		0.036	0.187	0.187	1
educ1	1 if primary education or below, 0 otherwise (*reference category*)	0.273	0.445	0.445	1
educ2	1 if compulsory secondary education, 0 otherwise	0.060	0.238	0.238	1
educ3	1 if non-compulsory secondary education and specific labour training and pre-university, 0 otherwise	0.279	0.448	0.448	1
educ4	1 if university graduate, 0 otherwise	0.259	0.438	0.438	1
inactive	1 if the person reports to be inactive, 0 otherwise (*reference category*)	0.444	0.497	0.497	1
unemployed	1 if the person reports to be unemployed, 0 otherwise	0.141	0.348	0.348	1
employed	*1 if the person reports to be employed, 0 otherwise*	0.394	0.489	0.489	1

Table 1: *Definition of variables and descriptive statistics.*

Tables 2 and 3 show the different ways that each individual choses to use the Internet. The total number of observations is 24,906. However, this figures do not distinguish between those who use the Internet in a "healthy way" (using the Internet almost for sending e-mails and searching for information) and those who do not ("Internet-dependent") who have also frequently been found to be more attracted to interactive Internet applications such as chatting, games, and shopping (Yellowlees

& Marks, 2007). Thereby, we would hypothesise that the sample analysed is included in the former group. Besides, we only consider the fact the individual has Internet access at his/ her household. Thus, we do not consider if the individual surf the Internet to research "productive" information in other places, like his/ her workplace.

From then, it can be firstly appreciated the higher the proportion of females users there are. Secondly, it is noteworthy that the option more chosen is "other mobiles" followed by laptop. This circumstance may reflect the fact that traditional dispositives like personal computers (PC) are less used at the present and have been displaced by smartphones and/or tablets.

	PC	Laptop	TV	Console	Other mobiles
Male	2657	3404	741	1054	3826
Female	2887	4045	799	1007	4486
Total	5544	7449	1540	2061	8312

Table 2: *Way to use the Internet at home by gender. Number of observations*

	PC	Laptop	TV	Console	Other mobiles
Male	47.93	45.70	48.12	51.14	46.03
Female	52.07	54.30	51.88	48.86	53.97
Total	100.00	100.00	100.00	100.00	100.00

Table 3: *Way to use the Internet at home by gender. Percentage.*

3. Results

In this section, we present the results from the estimation of the probit model. They are included in Tables 4 and 5. The sign of the coefficients shows the qualitative effect of the explanatory variables. In addition, to determine the quantitative implications, we also report the marginal effects (for continuous variables) and the average effects (for binary variables). Thus, for example,

the sign of the coefficient *gender* is positive for Spain. This reflects that if the individual is a men he would have a less probability of being an Internet user than a female. Similarly, our results indicate the higher the individual the less probability he/ she is an Internet user. Note that this also applies regarding the educational level. As for labour status, whereas being unemployed is not significant for being an Internet user, people that are working are more likely to be an Internet user that those with not.

It is interesting that, our findings indicate there is a higher probability of being an Internet user if the individual is a female, the younger the person is or if the one is employed or if he/ she has a university educational level. Being unemployed is not statistically significant. Our results are along the ones on the literature. And they can be linked to the paper of Siliquini et al. (2011) which obtain people using the Internet more for health-related purposes were younger, female and affected by some illnesses (chronic diseases).

As previously indicated, probit models only have a qualitative interpretation. Thus, in order to interpreting the quantitative implications of our results, we have calculated marginal and average effects. Tables 4 and 5 contain the full estimations for the probit model considered.

Variable	Probit estimates		Average and marginal effects for probit model			
	Coef.	z	P>z	dF/dx	z	P>z
gender	-0.128	-4.99	0.000	-0.044	-4.98	0.000
age	-0.035	-38.09	0.000	-0.012	-38.30	0.000
educ2	-0.306	-5.08	0.000	-0.111	-4.83	0.000
educ3	-0.049	-1.13	0.260	-0.017	-1.12	0.263
educ4	0.140	3.74	0.000	0.047	3.82	0.000
unemployed	0.076	1.47	0.141	0.026	1.50	0.134
employed	0.770	20.82	0.000	0.246	22.64	0.000
constant	2.167	35.11	0.000			
Observations		15,551				

Table 4: *Results of the estimation (1). Dependent variable: Internet access at household.*

Variable	Probit estimates		Average and marginal effects for probit model			
	Coef.	z	P>z	dF/dx	z	P>z
gender	-0.127	-4.91	0.000	-0.043	-4.90	0.000
age2	-0.568	-7.96	0.000	-0.212	-7.62	0.000
age3	-0.505	-7.36	0.000	-0.184	-7.08	0.000
age4	-0.643	-9.47	0.000	-0.239	-9.14	0.000
age5	-1.175	-18.00	0.000	-0.438	-19.34	0.000
age6	-1.738	-24.85	0.000	-0.613	-33.39	0.000
age7	-2.249	-31.04	0.000	-0.715	-61.10	0.000
age8	-2.340	-26.30	0.000	-0.693	-71.61	0.000
educ2	-0.210	-3.49	0.000	-0.075	-3.36	0.001
educ3	0.002	0.03	0.974	0.001	0.03	0.974
educ4	0.177	4.59	0.000	0.059	4.71	0.000
unemployed	-0.072	-1.23	0.219	-0.025	-1.21	0.225
employed	0.621	14.74	0.000	0.203	15.76	0.000
constant	1.374	22.05	0.000			
Observations		15,551				

Table 5: *Results of the estimation (2). Dependent variable: Internet access at household.*

4. Discussion

To summarize, the main aim of this paper was to determine whether the different socioeconomics characteristics affect the probability of an individual being an Internet user. For Spain, with universal health care system, access to the Internet changes according socioeconomic status and health levels, and its use for health information seeking varies also with health behaviours and beliefs, but not to health care coverage. According to our analysis, we hypothesised that a greater use of these communication technologies is related to a lesser health care expenditure due to the reduction on demand for it.

What is the importance of the analysis of this relationship? In the last years, the number of Internet users around the world has tremendously increased. In fact, people in developed countries are using the Internet for various health-related purposes. However, as perfectly indicated by Atkinson, Saperstein and Pleis (2009) despite Inter-

net/ Online *eHealth* tools have the potential to help people manage their own health, their family health and health care utilization, there is little known about the use of these different kinds of *eHealth* tools across the population. It is important to study such use as it may have an impact on the individual's health and his/ her behaviour, patient-practitioner roles, and on general health care provision (Kummervold et al., 2008).

Reasons for this are the following ones. Women are more likely than men for being an Internet user. The same applies for young people, individuals which are employed and with university educational level. Regarding health care utilization, the empirical evidence and data shows that in Spain, the collectives of elder people would have a higher health care utilization. The same for lower educational level or lower socioeconomic groups (see Tables 6, 7, 8, 9, 10 and 11). However, there are great differences between health care services (for example, general practitioner or family doctor vs. specialist visits).

On the one hand, Tables 6 and 7 represent the percentages of consultations for both general practitioner and specialist by gender and age group. Thus, it is showed females generally use to visit the general practitioner and the specialist more than males. Regarding age group, for both gender, the elder the patient the more visits to general practitioner or specialist he/she made. Specifically, the highest percentage is concentrated for individuals between 75 and 84 years-old. In any case, percentages are higher for family doctor than for specialist.

BOTH							
15-24	25-34	35-44	45-54	55-64	65-74	75-84	85 and +
20.30	19.06	22.43	24.61	34.93	41.98	50.28	47.50
MALES							
15-24	25-34	35-44	45-54	55-64	65-74	75-84	85 and +
17.10	14.09	18.62	20.58	30.07	39.22	49.83	46.58
FEMALES							
15-24	25-34	35-44	45-54	55-64	65-74	75-84	85 and +
23.63	24.18	26.42	28.60	39.51	44.38	50.58	47.99

Table 6: *Consultation to family doctor in the last 4 weeks by sex and age group (percentages).*

BOTH							
15-24	25-34	35-44	45-54	55-64	65-74	75-84	85 and +
9.61	10.83	13.77	16.30	18.23	20.31	22.65	16.28
MALES							
15-24	25-34	35-44	45-54	55-64	65-74	75-84	85 and +
8.09	8.20	10.65	12.12	14.78	20.13	22.67	21.10
FEMALES							
15-24	25-34	35-44	45-54	55-64	65-74	75-84	85 and +
11.20	13.55	17.02	20.44	21.49	20.46	22.63	13.70

Table 7: *Consultation to specialist in the last 4 weeks by sex and age group (percentages)*

On the other hand, Tables 8 and 9 show the distribution of utilization by education level. Again, we distinguish between several health care services. Thus, regarding general practitioner, it can be seen the lower the education level the higher the visits the patient would do. However, if we focus on specialist visits education levels there is not no uniform behaviour, in fact, it is found higher utilization rates along individuals with the highest educational levels and along those with the lower ones.

Cannot read or write, or incomplete primary education	Complete primary education	Secondary education, 1st stage	Secondary education, 2nd stage	Advanced professional training or the equivalent	University education
45.85	36.67	27.04	25.15	21.22	19.95

Table 8: *Consultation to family doctor in the last 4 weeks by level of studies (percentages). Population aged 15 years old and over.*

Cannot read or write, or incomplete primary education	Complete primary education	Secondary education, 1st stage	Secondary education, 2nd stage	Advanced professional training or the equivalent	University education
19.16	15.73	13.62	14.98	11.56	17.08

Table 9: Consultation to specialist in the last 4 weeks by level of studies (percentages). Population aged 15 years old and over.

Finally, Tables 10 and 11 contain the relative figures to health care utilization between services by labour status. As expected, retired people would make a higher use of health care services (mainly for family doctor) and people who are unable to work would also have a higher rate (more importantly to specialist visits). Here two points need to be made. Firstly, the age this collectives have (as indicated on Tables 5 and 6). Secondly, restrictions and time limitations working people and students have. Among others, here it also come ups, unmet health care needs. For these, along them there are some of the following items: lack of time, financial reasons, waiting list, distance, transportation difficulties, etc.

Working	Unemployed	Retired person or early retirement person	Studying	Unable to work	Home-maker
21.13	24.29	44.18	19.48	46.45	38.40

Table 10: *Consultation to family doctor in the last 4 weeks by relation with the current economic activity (percentages). Population aged 15 years old and over.*

Working	Unemployed	Retired person or early retirement person	Studying	Unable to work	Home-maker
13.20	12.53	20.64	10.81	37.42	16.35

Table 11: *Consultation to specialist in the last 4 weeks by relation with the current economic activity (percentages). Population aged 15 years old and over.*

The results support those which indicate that the evolution of *eHealth* technologies for the delivery of health care and information should reduce demand for health care services, the corresponding "waiting lists" and the subsequent health expenditure. Reducing the need and demand for health care services is the key to reduce health care expenditure. Based on our results, we really think that health information and communication technologies plays a major role. That is, broadly

speaking, in Spain, health information and communication technologies should play a moderating role in the use of health services, and thus a more efficient use of the scarce resources. As indicated Anderson, Frogner, Johns & Reinhardt. (2006) for the Unites States, the adoption of health information technology has the potential of both lowering health expenditure and improving quality of health care sector. At this point, the importance of telemedicine may be also highlighted.

The idea that emerges from here, is the importance of education and information for general population in order to moderate demand for health care. Therefore, policymakers would do well to adopt some prevention strategies and in addition educational campaigns. In this regard, as pointed by Kreps & Neuhauser (2010) new *eHealth* applications (such as online health information websites, interactive electronic health care programs, mobile health applications, etc.) holds tremendous promise to increase consumer and provider access to relevant health information, enhance the quality of care, reduce health care errors, increase collaboration, and encourage healthy behaviours and lifestyles.

In any case, along this process health professionals (general practitioner, specialists, etc.) need to be aware of their patients' use of such new technologies and online health care information. In professionals are involve in this new channel of information and physician-patient relationship it might lead to much better informed users/ seekers/ patients. Additionally, patients' requests would be more efficient. Thus, health professionals must act in three main ways (Morahan-Martin, 2004): (i) they should recommend sites, (ii) they should promote more effective search and evaluation techniques, (iii) they should be involved in developing and promoting uniform standards for health sites.

As indicated by Eysenbach & Jadad (2001) the Internet has the requisites to be an ideal medium to promote health: (i) consumers who really want to learn something about their health, and (ii) the technical prerequisites (the reach of a mass-medium, combined with the possibility for interactivity to tailor information specific to the patients). This highlights the importance of linking the personal online-accessible health record with general health information from evidence-based resources.

This empirical analysis could be extended in different ways. Mainly, by exploring this relationship between Internet and health care utilization using micro data of number of visits to a general practitioner or specialist. The main limitation here, is the available information and how to combine data between several periods. These and other extensions of this paper are left for further research, when there will be available new data on health indicators that help us to disentangle this complex relationship.

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