

# Habits of Internet users and usefulness of websites in Spanish for health education

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## Abstract

**Objective:** To analyse whether websites in Spanish are an adequate medium to be self-informed considering the surfing styles of Internet users.

**Methods:** In a real context 225 subjects searched for information on the Net to answer a series of questions on two diseases and one therapeutic technique. Also, they informed their habits when using Internet.

**Results:** Slightly more than the half of the questions were correctly answered. To find information, they visited more than 70 different pages in all cases. A major number of websites visited was not related with a better knowledge of treatment or illness ( $p>0.05$ ).

**Conclusions:** When health professionals recommend a website to a patient (web prescription) they must consider both, the quality of the information, and the style for surfing on the Net.

Year after year, the number of web searches dealing with health topics increases every day<sup>1,2</sup>. These searches are particularly relevant when they are done by people who have severe pathologies, but not only in these cases<sup>3,4,5,6,7</sup>. Two thirds (66%) of American Internet users have looked up information on a specific disease, and over fifty percent looked up information about therapies (51%), or about diet and nutrition (51%)<sup>8</sup>. It is becoming more frequent for the patients to visit their doctor after visiting health-related websites in order to compare the information obtained online<sup>9</sup>.

The Internet has become a powerful tool for health education. In fact, the number of pages featuring specific contents aimed at patients (managed by scientific societies, health institutions, patient associations, etc.) continues to grow. Health programmes being implemented increasingly have to take into account the consequences of the information presented on the Net, particularly when the information is not so reliable<sup>10-13</sup>.

In the United States<sup>14</sup>, most e-patients (81%) use a general search engine in order to locate medical information. Once the search criteria have been entered and a list of results has been obtained, they visit the sites that appear on top of the list (45%), or they read the list and then choose those pages they consider more relevant (39%) or those that they know (12%). A typical search lasts approximately 30 minutes and entails visiting 2 to 5 websites.

In Europe, Eysenbach and Köhler<sup>15</sup> using qualitative techniques studied how German patients look for health-related information online and how they assess the quality of the pages they visit. The Internet users used 8 search engines in order to find pages from where they could learn answers to health-related questions posed to them. After choosing one of the first shown results, they started to redirect the search. They visited 646 different web pages, and on average spent 1 minute and 9 seconds on each page. The average time they took to find the answer to each question was 5 minutes and 42 seconds and, though the quality of the answers was not assessed, only 5 (%) of the questions remained unanswered. Adams, de Bont and Berg<sup>16</sup> conducted qualitative interviews and observed Dutch patients' search practices: they use a search engine or visit well-known portals and, once on a site, they explore it to find information. They select bits of information from several sites and combine them as an integrated answer to their health questions.

The question that arises is whether, by visiting websites, an Internet user can get enough information about one particular disease, or at least information related to its most relevant aspects, and if the way to surf the Internet reduces the risk of potential misinformation. This information is necessary in order to assess the usefulness of website recommendations and offers physicians clues as to how they may recommend these health-related web pages (the so-called web prescription).

The objective of this study is to consider whether online information in Spanish is effectively contributing to health education by assessing whether the Internet, such as is generally employed by internet users, is an adequate medium for users to obtain relevant information about health and diseases.

## Methods

Descriptive observational study carried out in order to assess the knowledge the users acquire by going online in a real context. In the study, Internet users were asked to surf the Internet freely in search of information in Spanish about: periventricular leucomalacia, rheumatoid arthritis, and haemodialysis. These were selected because it is possible to find information about them on the Internet and because they were not very well known (there are usually no health stereotypes or beliefs related to them among the population). Internet users were free to choose which websites they would read and to freely browse websites and search engines according to their own choices.

In order to establish if the subjects were able to surf without difficulties, a 17-question survey was designed to know the respondents' habits when it came to using the Internet in their daily life. In order to determine if the Internet users were able to obtain relevant information by means of health-related portals, five rheumatologists (for rheumatoid arthritis), one neonatologist (for periventricular leucomalacia) and three nephrologists (for haemodialysis), specialized in each of the pathologies and the therapeutic technique, drew up a list of topics they considered to be basic: those that the patients should know and that the physician must inform them of during the patient's visit. The Internet users answered 12-15 questions once they had visited the pages. Previously, it had been confirmed that these questions were understood and dealt with relevant topics. The specialists also delivered the corresponding evidence-based answers to all the questions, so that the Internet users' answers could be assessed later on. The specialists were chosen based on their professional background (more than 15 years of experience) and professional acknowledgement (Heads of Department, Heads of Clinics and/or Intern Physician's Tutors).

## Subjects

A cluster random sampling technique was used, determining the level of education and areas of the cluster that were invited to participate. A 6-euro payment in exchange for collaboration was offered, in order to foster participation in each conglomerate. A 225-subject sample size (112 males and 113 females) was defined, considering a 5 (%) precision for the estimation of the probability of occurrence of Internet use habits, a normal bilateral asymptotic 95% confidence interval and assuming an expected 70 (%) proportion. The mean age was 21.15 years (typical deviation 2.16). The sample comprised of young university students (from experimental, technical and social classes) because they were considered a population with enough ability to understand texts and use Internet regularly, thus avoiding potential comprehension limitations in the ability to answer questions about previously

read texts and the bias of not knowing how to surf the net. Students of health-related disciplines were excluded, as it was considered that their education and knowledge would significantly influence the results. Users who had a friend or relative on haemodialysis or suffering from either of the two conditions were excluded as well. The participants were randomly assigned to look for information about leucomalacia, arthritis or haemodialysis until at least 75 respondents were assigned to each of the three categories.

The statistical analysis of the quantitative and qualitative variables (including dichotomic variables) was carried out by means of descriptive statistics. Internet surfing frequency was taken as the criterion to classify the participants and analyze the health-related online search behavior or control its potential effect on health education by means of this method. In order to analyze gender differences in the marks, the t-Student model for independent samples was used. The proportions were compared by means of the chi-square test, and Yates' correction was used in case of 2x2 tables. In order to compare knowledge of leucomalacia, arthritis and haemodialysis and to determine whether those scores and the number of pages visited were related, a single-factor ANOVA was used. A p value <0.05 was considered significant and it has been calculated for 2 tails and for a 95% confidence interval.

## Results

Seventy-six point three percent of the respondents had Internet available at home, which was where it was most commonly used (61.3%), followed by universities (21.3%). Regarding how often the respondents searched the Internet, 43.6 % did it every day, whereas 27.1 % did it 4 or 5 times a week. Almost half of the respondents (48.9%) devoted 1 to 2 hours a day to surfing the Internet. It is worth mentioning that most respondents (93.8%) considered that the Internet was an easier way to obtain information compared to other written media. Therefore, the sample is capable of surfing on the Net easily.

Sixty-seven percent of the respondents resorted to the Internet to search for medical information. The main motivations were curiosity regarding health topics (61.5%), followed by diseases that affected the respondents and/or their friends or family (38.5%). Among those who had looked for medical information, 73.7% stated that finding said information had been easy, and that in 80.4% of the cases the information had been fairly helpful in terms of providing clarification; 12.0% acknowledged that the information had not been completely accurate and only in 7.6% of the cases the information was not useful.

Regarding the search engines used by the students to locate information, Google was by far the most used (64.1%), followed by Yahoo (10.9%), Terra (6.8%) and AltaVista (4.7%). These four search engines were used to carry out 86.5% of all the searches of this study.

By means of these search engines, the participants located a series of pages related to each pathology and therapeutic technique. Overall, 77 different leucomalacia pages, 71 arthritis pages and 80 haemodialysis pages were visited.

	Percentage of subjects	Total visit time (minutes)
<b>Pages about leucomalacia</b>		
mmhs.com/clinical/peds/spanish	22.7	909
encolombia.com/medicina/pediatrica/actualizacionesped12402-contenido.htm	6.7	136
healthsystem.virginia.edu/UVAHealth/peds_hrnewborn_sp/pvl.cfm	5.7	134
cedip.cl/	4.7	59
uninet.edu/	4.0	40
pasoapaso.com.ve/cyber/cyberpasos_expertos6.htm#2	3.7	70
ultrasonografia.cl/us61/lopez.html	3.3	76
siicsalud.com/	3.0	40
tupediatra.com/	2.7	44
paidos.rediris.es	2.7	45
<b>Pages about arthritis</b>		
ser.es/pacientes/art_reuma.html	16.8	733
tuotromedico.com/temas/artritis.htm#4	15.0	293
arrakis.es/~arvreuma/artri.htm	10.7	210
artritiscentral.com/html/spfaqrheu.htm	5.8	94
medspain.com/n5_jun99/artritis_tto.htm	5.8	93
drzurita.com/doctoralpuche/	2.6	44
aurasalud.com/	2.3	52
ondasalud.com/edicion/noticia/0,2458,25746,00.html	2.3	24
pcs.adam.com/	2.3	38
nlm.nih.gov/medlineplus/spanish/rheumatoidarthritis.html	2.3	61
<b>Pages about haemodialysis</b>		
donacion.organos.ua.es/info_sanitaria/p-renal/hemodialisis.htm	20.0	805
saludalia.com/starmedia/temas_de_salud/doc/nefrologia_urologia/doc/doc_hemodialisis.htm	7.4	142
nefrored.edu.bo/	5.8	98
kidney.org/atoz/pdf/hemodialysis_sp.pdf	5.5	139
medicoscel.8m.com/nefrologos.htm	4.3	73
nlm.nih.gov/medlineplus/spanish/ency/article/003421.htm#visualContent	3.7	86
juntadeandalucia.es/servicioandaluzdesalud/ hrs/enfermeria_2003/registros_enfermeria/hemodialisis.pdf	3.1	63
diariomedico.com	3.1	27
pcs.adam.com/	2.5	53
kidneydirections.com/mexico/patients/choices/hemo/index.htm	2.2	54

Table 1: The 10 pages most frequently visited by the Internet users and the approximate time devoted to each of them

Table 1 features the websites that attained more visits and the approximate time devoted to each of them by the Internet users.

The number of pages detected by each user by means of said search engines was very high. Thus, 48.6 % of those looking for information about haemodialysis visited more than 25 pages. The percentage that consulted more than 25 pages about the same topic was even higher in the case of leucomalacia (53.4%), and highest of all in the case of arthritis (68%). In all cases, the pages most visited by the Internet users, and those to which most time was devoted, were those pages with the highest ranking (top 10) in the search engine results pages.

In the case of haemodialysis (table 2), the mean scores obtained for each question ranges between 1.28 and 5 (top mark), for arthritis the range was 1.47 and 4.36, and for leucomalacia, 0.95 to 4.66. Mean scores were highest in the

case of haemodialysis (3.06, SD 0.66; 95% CI 2.91-3.21), followed by arthritis (2.78, SD 0.55; 95% CI 2.65-2.90) and leucomalacia (2.57, SD 0.48; 95% CI 2.45-2.68). When the values for the two pathologies were compared to those of the therapeutic technique, the presence of statistically significant differences ( $F=14.07$ ;  $p<0.0001$ ) was confirmed. Post-hoc comparisons confirmed these differences for leucomalacia vs. haemodialysis:  $p<0.0001$ ; leucomalacia vs. arthritis:  $p=0.04$ ; and arthritis vs. haemodialysis:  $p=0.001$ . Differences regarding knowledge about the disease in terms of gender were solely observed in some questions (prognosis, detection of abnormalities, aid for children presenting sequelae, probability that it might be repeated in a subsequent pregnancy) about leucomalacia ( $p<0.02$ ). Visiting a greater or lesser number of pages did not have a bearing on greater knowledge. The polled users' scores did not vary significantly among those who visited under 10

Questions	Scores		
	Mean	Std. Dev.	Var. Coeff.
<b>Leucomalacia</b>			
What is periventricular leucomalacia?	4.66	0.76	0.16
Why does my son/daughter have this condition?	2.76	1.27	0.46
How can they know if my son/daughter has this disease?	3.68	1.97	0.54
What are the symptoms of the disease?	3.80	0.89	0.23
Why can it be associated to intraventricular hemorrhage?	1.61	1.30	0.81
How is the disease treated?	4.11	0.90	0.22
Can the disease be prevented?	1.85	1.51	0.82
What kind of problems can a child with leucomalacia have?	2.74	1.51	0.55
How can I know if my son/daughter has any abnormalities due to this disease?	1.49	1.13	0.76
How can we help a child with sequelae?	2.19	1.33	0.61
What is the prognosis for affected children?	0.97	0.92	0.95
What are the chances of developing the disease again in another pregnancy?	0.95	1.40	1.48
<b>Arthritis</b>			
What is rheumatoid arthritis?	3.51	0.89	0.25
Why does this disease appear?	2.81	1.16	0.41
Why does hand grip strength decrease?	1.72	1.21	0.71
Is the disease contagious?	4.36	0.85	0.19
Can this disease be cured? Do patients have to be treated for life?	3.48	1.12	0.32
Does the disease progress despite treatment?	2.43	1.37	0.56
Are the therapies very aggressive?	1.91	1.50	0.79
Can this medication be taken together with other therapies?	2.01	1.75	0.87
Do medications cure or improve the disease or just alleviate it?	3.23	1.02	0.32
Can patients stop taking medications and utilize alternative therapies?	2.47	1.74	0.71
What else can I do (diet, habits) in order to feel better?	3.41	1.49	0.44
Can I get pregnant while undergoing this therapy?	3.23	1.31	0.41
Is it inherited?	3.51	1.78	0.51
Can I receive the flu shot?	1.47	1.50	1.02
Are weather changes related to joint pain?	2.12	1.26	0.60
<b>Haemodialysis</b>			
What is haemodialysis and what is it used for?	3.78	1.04	0.27
When does it have to be initiated?	3.92	0.98	0.25
How long do I need to undergo dialysis? Why?	3.74	0.99	0.27
How should I prepare for it?	2.84	1.66	0.58
Is it necessary to follow a special diet? If so, which?	3.78	1.14	0.30
Frequency of treatment	5.00	0.00	0.00
What are the alternatives to haemodialysis?	2.92	1.35	0.46
Which medications do I have to take?	3.55	1.81	0.51
Possible lifestyle plan	1.92	1.18	0.61
What in the basic care of an arteriovenous fistula?	2.89	2.17	0.75
How much liquid can I drink?	2.73	1.43	0.52
Can I continue to work, have sex, swim in the ocean...?	2.57	0.98	0.38
Do I have to undergo dialysis as long as I live?	3.61	1.38	0.38
Which persons are candidates for kidney transplant?	1.28	1.20	0.93
Can my family have the same disease that I have?	1.97	1.92	0.97

Table 2: Scores for each of the questions asked in each of the three pathologies

pages or more than 25 websites ( $p > 0.05$ ) (table 3).

## Discussion

In a recent American project<sup>8</sup>, the following results were obtained: 77 % of American Internet users aged 18 to 29 years have looked for health-related information in the Net. Our study highlights the fact that 67 (%) of Spanish younger aged 18 to 25 years resort to the Internet in search of health

related information.

In practice, and as others<sup>17,18</sup> and we have corroborated, these young adults look for information not only for themselves but also for their family and friends. This highlights the fact that the Internet is becoming, or has already become, an information source that every healthcare professional must take into account. This issue multiplies the chances for patients to access information located in

		Mean	SD	95% CI		F	p
<b>Leucomalacia</b>	Less than 10 pages	2.41	0.46	2.22	2.61	1.68	0.19
	11 to 25 pages	2.64	0.34	2.41	2.87		
	Over 25 pages	2.63	0.52	2.46	2.80		
	Total	2.57	0.49	2.45	2.68		
<b>Arthritis</b>	Less than 10 pages	2.93	0.58	2.58	3.28	1.01	0.37
	11 to 25 pages	2.61	0.39	2.35	2.87		
	Over 25 pages	2.77	0.56	2.61	2.93		
	Total	2.78	0.55	2.65	2.90		
<b>Haemodialysis</b>	Less than 10 pages	3.01	0.70	2.72	3.30	0.47	0.63
	11 to 25 pages	3.22	0.43	2.96	3.48		
	Over 25 pages	3.03	0.72	2.79	3.28		
	Total	3.06	0.67	2.90	3.21		

Table 3: Number of visited pages and Internet-acquired knowledge

websites, even when they do not have a computer at home.

It was also confirmed that Internet users resort to the same search engines to look for medical information and to look for information about other topics. Three of the four most used search engines (Google, Yahoo and AltaVista) are identical to the search engines most used by German Internet users<sup>15</sup>. In the United States, it is also common for Internet users (2/3) to resort to general search engines (Google, Yahoo, etc.) in order to find health-related web pages<sup>17</sup>. This information shows how important it may be during a clinical interview to know the websites appearing within the first few pages or in prominent spots on the right frame when using these search engines.

A large number of pages are accessed by means of these search engines. What is it that leads Internet users to visit some of them and not others? By entering the criteria (periventricular leucomalacia, rheumatoid arthritis and haemodialysis) in the main identified search engines, it was confirmed that the pages most visited by users coincided with those appearing first in the results' list provided by each search engine. This is in keeping with the strategy followed by almost half (45%) of the American internet users who visit these first pages directly<sup>14</sup>. Once this fact was extrapolated to websites dealing with other health-related topics, such as diets, anorexia, cancer, etc., we might find that the privileged positions in the ranking (the top ten results of a search) have an effect on the information viewed by the users. At the visit, the physician must be aware of this fact, in order to warn patients that these high-ranking websites are not always those featuring the best information. Websites recommendation –the so-called web prescription–, then, becomes a useful alternative whenever the physician confirms that the patient is already looking for information on websites. In this case, the physician should consider not only the recommended website contents but also the way the patient surfs the Net.

The results from our experience suggest that Internet users visit a large number of pages (56.7% surfed through more than 25), and devote more time to some of them than

to others (the ten most visited pages for each pathology accounted for approximately 60 % of the overall Internet surfing time). Thus, they jump from one page to another and read those pages they consider most interesting. Credibility (defined as the degree to which Internet users trust or believe that the information provided by the health-related portals or pages coincides with scientific knowledge and evidence<sup>19</sup>), might account for this fact. This aspect is also important in terms of physicians' website recommendations, as said recommendations should not be based on only one address in order to avoid the risk of patients visiting other websites featuring conflicting information.

The empirical results of our study confirm the conclusions derived from several qualitative researches on how information is sought in the Internet<sup>14,15</sup>, while adding a new aspect to research, which is the analysis of searches in web pages in Spanish language.

The Net has an enormous potential to provide information on any subject, including health.

Slightly more than the half of the questions were correctly answered. When physicians recommend quality sites to their patients ("web prescription"<sup>20</sup>) they should also take into account the Internet users' habits and considerer the high number of pages that they usually visit when they are surfing on the Net.

This work does not directly assess the quality of the visited pages but whether the subject is able or not to respond correctly to a number of health-related questions after surfing the net freely. This approach, better suited to the reality of many internauts, shows how important the physician's role still is in terms of informing the patients; yet it also reinforces the idea that said information can be improved and expanded with the aid of websites the physician judges reliable.

When it comes to interpreting these data, it should be considered that the fact that university students were selected to determine how information is sought on the Internet might entail a limitation. The sample does not

represent the overall population, but is a homogeneous group, familiar with the use of the Internet and, a priori, they are surely those who use it more often. On the other hand, the family structure in Spain is strong, and children and grandchildren seek information online for their families as they are the group more given to Internet searching. This makes them a very attractive group in which to study Internet navigation behavior, as they are regular Internet users.

An obvious limitation is that we have not controlled the differences in terms of academic performance, a variable that could have a bearing on the results and affect the level of knowledge about the diseases or technique. However, the fact that the study was carried out with college students implies that the population has passed elementary and high school, and the selectivity entailed in such schooling, and that therefore their level of understanding and ability in that sense is at least equal and maybe higher than that of the general population. A second limitation is that the call to participate in the study was more encouraging to those most familiar with the Internet. However, the fact that a reward was given for participation in the study and the variability observed among the Internet use frequencies suggest that this has not been the case. According to data about their Internet navigation habits, the users included in the study fit the "standard" patterns<sup>21</sup> of their reference group. Other potential limitations are: we cannot assume there is no previous knowledge of the diseases or techniques despite precautions taken; the subjects self-reported the search being carried out; the search engine used; etc. In this case,

a program recording all computer usage could not be employed (such program affords automated monitoring of searches performed by each user).

E-patients have online information available that can help them improve their health or learn about a disease, make decisions regarding one or more therapies, or choose a hospital<sup>22</sup>, but learning how they look for that information on the Web seems advisable. In this study, we tried to understand the search patterns for online health-related information and assess whether this medium is adequate for healthcare education. □

#### Acknowledgements

This study has been made possible by the work of the following specialists: Teresa Bosque Peralta, Concha Delgado Beltrán, Javier Manero Ruiz, Marta Medrano San Ildefonso, Ángela Pecondón Español, M<sup>a</sup> Remedios García Martínez, Katia López Revuelta, Enrique Gruss Vergara and Manuel Angoso de Guzman.

We would like to thank Olga Tomás for her cooperation in the statistical analysis of the data. Mercedes Guilabert, David Rodríguez and Esther Heredia were involved in the organization of the trial and the development of the work sessions with the volunteer Internet users.

This research was financed by the Fondo de Investigaciones Sanitarias (FIS) (reference 03/0369). A grant, the Ayuda a Grupos de Investigación, Dirección General de Investigación y Transferencia Tecnológica, Generalitat Valenciana (reference: 05/030) has been obtained for the carrying out of this trial.

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