

# Factors related to use of the Internet as a source of health information by urological cancer patients

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## Abstract

**Aims** The aims of this study were to describe the profile of urological cancer patients who look for health information on the Internet and to analyse the factors related to use of the Internet as a source of health information.

**Methodology** A cross-sectional descriptive study using individual, semi-structured, questionnaire-based interviews was carried out in oncology clinics in a hospital in Granada (Spain) in a sample group of 169 patients with prostate, bladder and kidney cancer. The dependent variable was use of the Internet as a source of health information. The independent variables were sociodemographic variables, health status, relationship with healthcare services, patient's role in decision-making process, satisfaction with healthcare, Internet use, Internet skills and attitude. Data analyses include descriptive, bivariate and multivariate analyses.

**Results** Of the patients in the sample group, 72.2 % had prostate cancer, 19.4 % had bladder cancer and 8.3 % had kidney cancer. Only 11.2 % of patients in the group used the Internet as a source of health information. These patients were typically men of an average age of 62 years, who live in urban

areas, who have completed secondary or university education, with a high income and who usually share the role of decision maker with their doctor. Patients who use the Internet as a source of health information usually look for support from psychological support groups, have family members who also look for information on the Internet and prefer sources of information other than those provided by the health services. **Conclusions** The study outlines the profile of urological cancer patients who use the Internet as a source of health information. Internet use is related to a patient's attitude towards decision making, level of education and whether or not they look for information from sources other than the health system itself.

**Keywords** Cancer · Patients · Internet · Information needs

## Introduction

The Internet is an important source of health information and advice. It has been estimated that 52.5 % of Spanish adult Internet users often look for information about health (compared with 66 % of Europeans and 80 % of North Americans) [1, 2]. Around one third of these people say that the Internet has had a real impact on the decisions that they make about their own health and/or their relationship with the healthcare system [3].

Despite the Internet's enormous potential as a source of health information and the fact that most people in developed countries have access to it, some patients with illnesses like cancer do not make the best possible use of it. A systematic review of the needs of cancer patients and the sources of information that they use found that just 5 % consider the Internet to be a source of first-hand, reliable

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information, preferring instead to obtain additional information (further to that provided by their doctor) from printed materials, their friends or family, patient groups or other public services [4]. The majority of articles included in this review considered samples with a variety of cancer diagnoses (52 %) and samples focusing exclusively on breast cancer patients (25 %). Our study exclusively focuses on urinary patients.

Some studies have been carried out on the information needs of breast, prostate, colorectal and gynaecological cancer patients in Europe. However, the majority of these studies were carried out in northern European countries [5, 6], and there is limited information available on Internet use by patients in southern Europe. Moreover, the vast majority of articles analysed in this review focus on patients' information needs during diagnosis and treatment, and there have been no studies on their information needs over the course of the cancer. According to the literature, most cancer patients who use the Internet as a source of health information do so to look for information about treatment and confirm the information received from their doctor [7].

In the English-speaking world, healthcare professionals are the source of information most highly valued by cancer patients, followed by printed materials, family members and friends, amongst others [4]. Studies concerning different cancer diagnoses have shown that most people start looking for information on a general information site or using a search engine [8]. They usually browse poor-quality websites before finding good, reliable information [9], and information needs depend on the role adopted by the patient with healthcare staff [10].

In this regard, geographical context is important to the Internet use for health information. A recent study [11] found that south European countries, like Spain, were at the bottom of use of Internet health services, and this difference may not solely be associated with the degree of general Internet access. Other factors are important such as cultural differences concerning preoccupation with health and illness, the number of accessible websites in local languages and the quality and accessibility of general health services.

With regard to the effects of information, some studies have found that it has positive effects in terms of improving knowledge, managing symptoms, managing the illness, satisfaction, clarity in terms of preferences, improvements to healthcare and affective states [12]. Benefits of information about cancer described in the literature include increased patient participation in the decision-making process [4], greater satisfaction with treatment options, improved capacity to face up to the diagnosis and stages of treatment, reduced anxiety, improved emotional state and better communication with family members [13].

By gaining a better understanding of how the Internet is used as a source of health information by cancer patients and

the factors linked to this use, healthcare professionals will be able to communicate with patients more effectively. The aims of this paper are therefore to describe the profile of urological cancer patients who look for health information on the Internet and to analyse the factors related to use of the Internet as a source of health information (sociodemographic factors, health status, relationship with healthcare services, role in decision-making process, satisfaction with healthcare and healthcare professionals and sources of health information).

## Methods

*Design* A cross-sectional descriptive study using individual, semi-structured, questionnaire-based interviews was carried out over a period of 7 months (May to November 2010). The interviews were held in the oncology department at the Virgen de las Nieves Hospital in Granada (Spain). The sample group recruited was made up of patients with prostate cancer, bladder cancer and kidney cancer who had completed at least one stage of treatment and who were attending follow-up appointments. These cancers were chosen because of their high incidence and prevalence and because of the effects that the different treatments can have on quality of life [14].

The required sample number was calculated on the basis of an estimated 20 % rate of Internet usage to within 6 % accuracy, a confidence interval of 95 % and with statistical power set at 80 % and for which it was therefore necessary to recruit 169 patients. Doctors invited all patients who meet the inclusion criteria to take part in the study. Those not in a condition to perform the interview due to their physical and/or mental circumstances were excluded ( $n=4$ ).

The variables gathered through the questionnaire and then analysed were:

Dependent: use of the Internet as a source of health information about their illness (yes/no).

Independent: sociodemographic variables (age, gender, marital status, level of education, area of residence, income, country of origin), health status (time since diagnosis, surgical intervention, type of treatment received, current health status), relationship with healthcare services, role in decision-making process (prefers to make decisions after considering the doctor's opinion, shares responsibility for decision making with the doctor, prefers the doctor to make decisions), satisfaction with healthcare and healthcare professionals (unsatisfied, moderate satisfied, quite satisfied), frequency of Internet use and self-rated knowledge level about the Internet (low, medium, high).

The questionnaire was developed using various sources, adapting the questions to the requirements of this study. The

item relating to patient roles was obtained from E Beaver et al. [15]. Questions relating to patient health and satisfaction with information received from the healthcare services were extracted from the Spanish National Health Survey [16]. Items relating to patient use and knowledge of the Internet were obtained from the technology acceptance model [17]. Items relating to sources of healthcare information and patients' information needs were obtained from the systematic revision of Finney et al. [4].

First, a descriptive analysis of the independent variables collected was carried out. Central tendency and dispersion measurements were calculated for the interval variables, and absolute and relative frequencies were calculated for the nominal variables. The data (age) normality of distribution was verified using the Shapiro–Wilks test, so that parametric and non-parametric tests could be applied accordingly. A bivariate analysis was carried out to analyse the variables related to use of the Internet as a source of health information. The Student's *t* test was used to assess the interval variables, and the Pearson's chi-square or Fisher's exact test was used to assess the nominal variables. In order to use the Fisher's test, some of the variables had to be grouped into categories. A multivariate logistic regression model was constructed with "use of the Internet as a source of health information" as the dependent variable. The principle independent variable of interest is the patients' role, as highlighted in the literature [10, 18]. This has been introduced into the model as a fixed factor, with the remaining variables associated with using the Internet as an information source being introduced using the stepwise method, leaving in the model those factors which moderate the effect of role more than 10 % on the OR [19]. For all the analyses, the level of significance used was  $p < 0.05$ .

## Results

Of the 169 patients studied, 122 (72.2 %) had prostate cancer, 33 (19.4 %) had bladder cancer and 14 (8.3 %) had kidney cancer. As more than half of the sample group had prostate cancer, quite a high percentage of the group were men, representing 95.3 % compared with just 4.7 % women. The average age of patients in the sample group was 72.2. Of the patients in the sample, 11.2 % used the Internet as a source of health information.

With regard to sociodemographic variables, a statistically significant association was found between use of the Internet and living in an urban area (19.3 % vs. 6.5 %;  $p = 0.05$ ), having a higher level of education (35.0 % vs. 3.9 %;  $p < 0.001$ ), having a higher income (more than 1,500 €) (26.7 % vs. 5.6 %;  $p < 0.001$ ) and being in employment (40.0 % vs. 9.4 %;  $p = 0.02$ ). The average age of cancer patients who used the Internet as a source of health information was 61.7, while

the average age of patients who did not use the Internet as a source of health information was 73.6 (this difference was statistically significant,  $p < 0.001$ ). No statistically significant differences were found between use of the Internet as a source of health information and gender, country of origin or marital status (Table 1).

With regard to the variables reflecting the health status of the patient, statistically significant differences were found between use of the Internet and having undergone surgical intervention (16.8 % vs. 4.1 %;  $p = 0.02$ ). This association was not found with the other variables (time since diagnosis, current stage of the illness, type of treatment received and current health status) (Table 2).

With regard to use of the Internet as a source of health information and the patient's role in the decision-making process, we found a relation between use of the Internet as a source of health information and the patient taking an active role in this process (patients who prefer to make their own decision after considering the doctor's opinion) ( $p = 0.01$ ). A statistically significant association was also found between Internet use and looking for support from psychological support groups (66.7 % vs. 10.2 %;  $p = 0.03$ ) and looking for spiritual support (50.0 % vs. 9.8 %;  $p = 0.02$ ). However, no differences were found between using the Internet as a source of health information and looking for support amongst family members, friends and other cancer patients and "not needing support" (Table 3).

A statistically significant association was found between Internet use and preferring sources other than healthcare professionals as primary sources of information (36.0 % vs. 7.0 %;  $p < 0.001$ ). Furthermore, an association was found between using the Internet to search for information about cancer and having family members who also use the Internet as a source of health information (26.3 % vs. 5.8 %;  $p = 0.01$ ). No link was found between the level of satisfaction with the information received from healthcare personnel and use of the Internet as a source of health information. Additionally, no differences were found between use of the Internet to look for information about cancer and frequency of Internet use, nor between that use and Internet skills (Table 4).

Given the low number of participants who stated that they use the Internet (which accounted for only 11 % of the sample), it was not possible to carry out a multivariate analysis of all statistically significant findings. Consequently, only the three variables which the investigators consider of greatest relevance to the study were subjected to this analysis. Although this could be considered to be a limiting factor on the model, it does not represent the main aim of this study and is solely intended to provide some indication of the profile of patients who use the Internet.

Three variables were included in the multivariate analysis: role in the decision-making process, level of education and looking for information in magazines and newspapers. The

**Table 1** Relationship between use of the Internet as a source of health information and sociodemographic variables

Sociodemographic variables		Use of the Internet as a source of health information			<i>p</i> value
		No	Yes	Total	
		<i>N</i> (%)	<i>N</i> (%)	<i>N</i> (%)	
Sex	Female	6 (75.0)	2 (25.0)	8 (100.0)	0.22
	Male	144 (89.4)	17 (10.6)	161 (100.0)	
	Total	150 (88.8)	19 (11.2)	169 (100.0)	
Country of origin	Spain	148 (89.2)	18 (10.8)	166 (100.0)	1.00
	Other	2 (100.0)	0 (0.0)	2 (100.0)	
	Total	150 (89.3)	18 (10.7)	168 (100.0)	
Area of residence	Rural	87 (93.5)	6 (6.5)	93 (100.0)	0.048
	Urban	46 (80.7)	11 (19.3)	57 (100.0)	
	Total	133 (88.7)	17 (11.3)	150 (100.0)	
Marital status	Partner (married or living together)	122 (87.1)	18 (12.9)	140 (100.0)	0.20
	No partner (single, divorced, widowed)	28 (96.6)	1 (3.4)	29 (100.0)	
	Total	150 (88.8)	19 (11.2)	169 (100.0)	
Level of education	Primary	124 (96.1)	5 (3.9)	129 (100.0)	0.00
	Secondary/university	26 (65.0)	14 (35.0)	40 (100.0)	
	Total	150 (88.8)	19 (11.2)	169 (100.0)	
Income	Up to 1,499 €	117 (94.4)	7 (5.6)	124 (100.0)	0.00
	More than 1,500 €	33 (73.3)	12 (26.7)	45 (100.0)	
	Total	150 (88.8)	19 (11.2)	169 (100.0)	
Employment status	Employed	6 (60.0)	4 (40.0)	10 (100.0)	0.02
	Unemployed/retired	144 (90.6)	15 (9.4)	159 (100.0)	
	Total	150 (88.8)	19 (11.2)	169 (100.0)	
Age		Average (SD)	Average (SD)	Average (SD)	0.00
		73.6 (8.4)	61.7 (10.2)	72.2 (9.4)	

Internet was used as a source of health information more often in patients with a high level of education (odds ratio (OR) 11.5 (3.5–37.8)), patients who look for information in magazines

and newspapers (OR 6.0 (1.7–21.0)) and patients who make their own decisions after taking their doctor's opinion into account (OR 8.3 (1.5–46.8)) (Table 5).

**Table 2** Relationship between use of the Internet as a source of health information and patient health status variables

Patient health status		Use of the Internet as a source of health information			<i>p</i> value
		No	Yes	Total	
		<i>N</i> (%)	<i>N</i> (%)	<i>N</i> (%)	
Time since diagnosis	Less than 3 years	7 (87.5)	10 (12.5)	80 (100.0)	0.83
	More than 3 years	79 (89.8)	9 (10.2)	88 (100.0)	
	Total	149 (88.7)	19 (11.3)	168 (100.0)	
Surgical intervention	No	71 (95.9)	3 (4.1)	74 (100.0)	0.02
	Yes	79 (83.2)	16 (16.8)	95 (100.0)	
	Total	150 (88.8)	19 (11.2)	169 (100.0)	
Current stage of illness	Undergoing treatment (diagnosis, start, restart, metastasis)	11 (78.6)	3 (21.4)	14 (100.0)	0.20
	Review	139 (89.7)	16 (10.3)	155 (100.0)	
	Total	150 (88.8)	19 (11.2)	169 (100.0)	
Type of treatment received	Chemotherapy/radiotherapy	27 (87.1)	4 (12.9)	31 (100.0)	0.76
	Other	123 (89.1)	15 (10.9)	138 (100.0)	
	Total	150 (88.8)	19 (11.2)	169 (100.0)	
Current health status	OK–poor	26 (83.9)	5 (16.1)	31 (100.0)	0.35
	Very good	124 (89.9)	14 (10.1)	138 (100.0)	
	Total	150 (88.8)	19 (11.2)	169 (100.0)	

**Table 3** Relationship between use of the Internet as a source of health information and patient's role in decision-making

Role of the patient		Use of the Internet as a source of health information			<i>p</i> value
		No <i>N</i> (%)	Yes <i>N</i> (%)	Total <i>N</i> (%)	
Role in decision-making process	Prefers to make decisions after considering the doctor's opinion	12 (70.6)	5 (29.4)	17 (100.0)	0.01
	Shares responsibility for decision making with the doctor	60 (85.7)	10 (14.3)	70 (100.0)	
	Prefers the doctor to make decisions	78 (95.1)	4 (4.9)	82 (100.0)	
	Total	150 (88.8)	19 (11.2)	169 (100.0)	
Looks for support from family members	No	44 (86.3)	7 (13.7)	51 (100.0)	0.68
	Yes	106 (89.8)	12 (10.2)	118 (100.0)	
	Total	150 (88.8)	19 (11.2)	169 (100.0)	
Looks for support from friends	No	93 (87.7)	13 (12.3)	106 (100.0)	0.77
	Yes	57 (90.5)	6 (9.5)	63 (100.0)	
	Total	150 (88.8)	19 (11.2)	169 (100.0)	
Looks for support from other cancer patients	No	89 (86.4)	14 (13.6)	103 (100.0)	0.34
	Yes	61 (92.4)	5 (7.6)	66 (100.0)	
	Total	150 (88.8)	19 (11.2)	169 (100.0)	
Looks for support from psychological support groups	No	149 (89.8)	17 (10.2)	166 (100.0)	0.03
	Yes	1 (33.3)	2 (66.7)	3 (100.0)	
	Total	150 (88.8)	19 (11.2)	169 (100.0)	
Looks for spiritual support	No	147 (90.2)	16 (9.8)	163 (100.0)	0.02
	Yes	3 (50.0)	3 (50.0)	6 (100.0)	
	Total	150 (88.8)	19 (11.2)	169 (100.0)	
Does not need support	No	119 (90.2)	13 (9.8)	132 (100.0)	0.25
	Yes	30 (83.3)	6 (16.7)	36 (100.0)	
	Total	149 (88.7)	19 (11.3)	168 (100.0)	

## Discussion

The results show that the profile of patients who use the Internet as a source of health information have a mean age of 62 years, reside in urban areas, have completed secondary school or university, have a high income and prefer to make their own decisions after having consulted with the doctor. Those who use the Internet as an information source often seek psychological support from support groups, have family members who do the same and prefer sources of information other than the healthcare system. It has been demonstrated that the patient's health does not influence their use of the Internet as a source of health information.

The Internet has changed the manner in which health information is sought by patients [20]. This poses a challenge to healthcare professionals, as they need to satisfy patients' new information needs. This study provides information of relevance for healthcare professionals specialising in oncology, as having an awareness of the factors related to use of the Internet as a source of health information will allow them to encourage that use effectively (e.g. by providing details of the best websites and explaining how to

evaluate information). Doctors could also make available healthcare information of proven quality, taking advantage of the potential benefits that it can offer patients and avoiding the potential adverse effects of incorrect use of the Internet.

This study indicates that the rate of Internet use by patients with urological cancer in Spain is low (11.2 %). This fact is attributable to the patient profile, as other studies have also found that older patients are less likely to use the Internet to research information about their illness [21].

Our sample group had a high average age (72 years) so the percentage of patients who used the Internet as a source of health information was relatively low, and a large percentage of the patients did not make use of computer resources. These results are similar to Spanish older Internet users (65–75 years) with 7.5 % rate of Internet use [2]. These results can be considered to be representative of average age of urological cancer patients, as found in other studies [6, 22]. Younger patients may have different patterns of use of the Internet as a source of health information.

In southern Europe, the "early adopters" of Internet are a younger group [21] who are possibly less concerned with own

**Table 4** Relationship between use of the Internet as a source of health information and satisfaction with the healthcare system, sources of information and Internet use

Satisfaction with the healthcare system—information received, information needs, looking for information and Internet use		Use of the Internet as a source of health information			<i>p</i> value
		No <i>N</i> (%)	Yes <i>N</i> (%)	Total <i>N</i> (%)	
Preferred source, most useful and easy to understand	Specialist books. TV–radio.	16 (64.0)	9 (36.0)	25 (100.0)	0.00
	Family–friends.				
	Support groups. Internet				
	Specialist doctors.	133 (93.0)	10 (7.0)	143 (100.0)	
	Private doctors.				
	Total	149 (88.7)	19 (11.3)	168 (100.0)	
Satisfaction with information received from healthcare staff	Unsatisfied	12 (85.7)	2 (14.3)	14 (100.0)	0.84
	Quite satisfied	138 (89.0)	17 (11.0)	155 (100.0)	
	Total	150 (88.8)	19 (11.2)	169 (100.0)	
Frequency of Internet use	Every day	8 (42.1)	11 (57.9)	19 (100.0)	0.50
	Once a week or month	10 (58.8)	7 (41.2)	17 (100.0)	
	Total	18 (50.0)	18 (50.0)	36 (100.0)	
Internet skills	Poor	7 (50.0)	7 (50.0)	14 (100.0)	1.00
	Good–very good	11 (50.0)	11 (50.0)	22 (100.0)	
	Total	18 (50.0)	18 (50.0)	36 (100.0)	
Use of the Internet as a source of health information by family members	No	97 (94.2)	6 (5.8)	103 (100.0)	0.01
	Yes	14 (73.7)	5 (26.3)	19 (100.0)	
	Total	111 (91.0)	11 (9.0)	122 (100.0)	

health issues than other sections of the population. Moreover, it is important to note that the results of this study show that, when it comes to information, family members can be an important link between healthcare personnel and the patient. As has been found in other studies, very few patients check the information found online with healthcare professionals [5]; however, there is an improved communication with family members or informal carers. A link has been found between patients looking for health information and their family members doing the same. As such, health education programmes or interventions relating to using the Internet as a source of health information should be aimed at family members as well as at the patients themselves.

Other studies have found that older patients are less likely to use the Internet as a source of health information [23]. This problem could be alleviated if healthcare professionals were to encourage patients to complete the computing and

Internet courses that are often offered by the local authorities. In this way, they could familiarise themselves with the Internet and look for information about their illness. However, it is important to note that our results also show that use of the Internet as a source of health information amongst these patients is not necessarily influenced by the frequency of Internet use nor the patient's Internet skills. This means that patients not only need to acquire those skills but that they also require specific interventions to be motivated to use the Internet.

The literature shows that women tend to use the Internet as a source of health information more than men [24]. The present study was not able to assess this information given that over 93 % of the sample was male. However, as in other studies, it was found that patients who had studied to university level are the ones who often use the Internet as a source of health information [25].

**Table 5** Logistic regression model for the use of the Internet as a source of health information (dependent variable)

	Raw OR	CI 95 %	Sig.	Adjusted OR	CI 95 %	Sig.
Decision making						
Doctor decides			0.02			0.04
Doctor and patient decide together	3.25	0.97 10.87	0.06	4.75	1.13 19.90	0.03
Patient decides	8.12	1.91 34.58	0.00	8.31	1.48 46.78	0.02
Level of education	13.35	4.42 40.33	0.00	11.47	3.48 37.78	0.00
Looks for information in magazines, newspapers	5.85	2.12 16.16	0.00	6.04	1.73 21.00	0.00

The percentage of patients living in urban areas who use the Internet as a source of health information is higher than that of patients in rural areas, which may be due to differences in the accessibility to Internet in different geographical regions. Spanish autonomous regional governments are developing accessibility policies in order to reduce these inequalities, promoting Internet access and training the public in the use of ICT [26].

The role that patients adopt in the decision-making process will influence their search for sources of information other than those provided by the healthcare system itself [10]. In this study, we have found that patients who use the Internet often state that they share responsibility for making decisions about their illness with their doctor. Consistently with these findings, other studies [18] conclude that patients with a monitoring coping style prefer a high information input. If doctors were to provide those “pro-active patients” about how to use the Internet as a source of health information (recommended websites, how to look for and evaluate information), it would be easier for them to share the responsibility for decision making.

It would not be unreasonable to think that patients look for health information on the Internet because they are not satisfied with the information provided by healthcare staff. However, the results of this study show that Internet use is not associated to a lack of satisfaction with the information received. This suggests that patients who look for information do not do so because they are dissatisfied with the information given to them by healthcare staff but that they have other motivations or worries which make them want to learn more and so feel more knowledgeable about their illness. Other studies have also found that consulting the Internet was associated with considering more treatment options [27].

This study also found that patients who use the Internet as a source of health information often look for psychological support from support groups or spiritual groups. This paves the way for another important means of supporting these patients: online support groups where patients can share information about their illness. The expansion of the Internet has allowed people with shared interests, similar health conditions or similar healthcare needs to form this sort of community. Virtual health communities therefore facilitate emotional support and the sharing of information, experiences and self-help tips and even health advice when a healthcare professional acts as a moderator [28, 29].

Future research could study the effectiveness of interventions that aim to educate patients about effective use of the Internet as a source of health information. These studies should be designed taking into account the factors related to Internet use found in this study, as this would make it possible to consider the peculiarities of each patient and their own specific needs.

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