

Original Paper

Relationship Between the Use of Internet Information for Health Purposes and Medical Resources Consumption for an English-Speaking Sample

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Abstract

Background: The Internet is becoming an important source of information for patients and clinicians [1]. Indeed, some statistics reveal that more than 93 million American people looked for health information on the Internet in 2002 [2]. Patients find on the Internet some answers to their health-related questions. So, many researchers in the fields of Information systems and medical sciences are manifesting a special interest to the area of the Internet use for health-related concerns. **Background:** The Internet is becoming an important source of information for patients and clinicians [1]. Indeed, some statistics reveal that more than 93 million American people looked for health information on the Internet in 2002 [2]. Patients find on the Internet some answers to their health-related questions. So, many researchers in the fields of Information systems and medical sciences are manifesting a special interest to the area of the Internet use for health-related concerns.

Objectives: The purpose of this research is to study the relationship between the use of Internet information by English-speaking patients and their consumption of medical resources. Even though the literature dealing with Internet information related to health is abundant, only one study tested this relationship but focused on French-speaking patients [3]. **Objective:** The purpose of this research is to study the relationship between the use of Internet information by English-speaking patients and their consumption of medical resources. Even though the literature dealing with Internet information related to health is abundant, only one study tested this relationship but focused on French-speaking patients [3].

Methods: A quantitative study based on an eleven-item questionnaire was performed. Questions deal with two variables that are "Habit of Internet information use" (independent variable) and "Consumption of medical resources" (dependent variable). The sample is made of 120 patients that suffer from a long-term disease and that are accustomed to the use of the Internet for health-related concerns. **Methods:** A quantitative study based on an eleven-item questionnaire was performed. Questions deal with two variables that are "Habit of Internet information use" (independent variable) and "Consumption of medical resources" (dependent variable). The sample is made of 120 patients that suffer from a long-term disease and that are accustomed to the use of the Internet for health-related concerns.

Results: Construct validity and reliability were ensured. Most items have loadings greater than 0.5. The path coefficient between the two variables is significant and high (0.482). The predictor variable explains 23.3% of the dependant variable. The use of online health information by patients has a positive relationship with their consumption of medical resources. This result can be explained by some short-term effects or by the fact that patients may misunderstand, or be overwhelmed by the poor quality of the information obtained from the Internet. As concluded by authors in [3], this situation can lead patients to make the wrong decisions or to worsen their health state. **Results:** Construct validity and reliability were ensured. Most items have loadings greater than 0.5. The path coefficient between the two variables is significant and high (0.482). The predictor variable explains 23.3% of the dependant variable. The use of online health information by patients has a positive relationship with their consumption of medical resources. This result can be explained by some short-term effects or by the fact that patients may misunderstand, or be overwhelmed by the poor quality of the information obtained from the Internet. As concluded by authors in [3], this situation can lead patients to make the wrong decisions or to worsen their health state.

Conclusions: The results of this research may have theoretical and practical contributions to the fields of management information systems and medical sciences. Indeed, researchers will be concerned with the role that Internet information can play in the management of medical systems and with the design of health-related websites. **Conclusions:** The results of this research may have theoretical and practical contributions to the fields of management information systems and medical sciences. Indeed, researchers will be concerned with the role that Internet information can play in the management of medical systems and with the design of health-related websites.

KEYWORDS

Health websites; Internet information; chronic disease; PLS; SEM

Introduction

Background

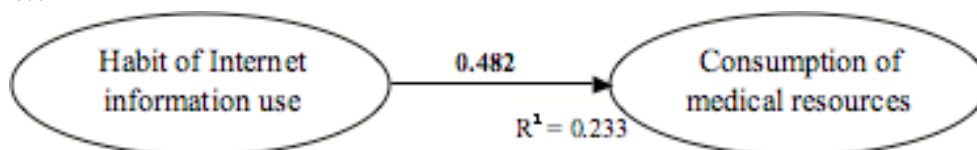
The Internet is becoming a major source of information for health concerns [4]. Statistics reveal that more than 93 million American people looked for health information on the Internet in 2002 [2,5]. Also, more than 15000 websites are nowadays offering information about health. This increase in the use of the Internet for health can be explained by many factors. First, the Internet is more advantageous compared to traditional information mediums like newspapers, television, and books because it is easier to accede. Second, the offer is growing rapidly because the information providers work hard to strive to meet patients' demands and to create new needs [6].

Many researchers in the fields of Information systems and medical sciences are manifesting a special interest to the area of the Internet use for health. For instance, some studies focused on the effects of the Internet on "Patient-clinician" relationship [7,8]. Researchers try also to understand the impact of the Internet on the quality of the health care services [1]. A survey of Pew Internet & American Life [9] concluded that Internet information helps patients improve their health state, prepare the meetings with physicians and decide if other medical consultations are necessary.

Objective

The aim of this research is to study the relationship between patients' use of Internet information and their consumption of medical resources for an English-speaking sample. Even though the literature dealing with online health information is abundant, only one study focusing on French-speaking patients answered this matter [3]. The research question that we propose is then: "Does the use of the information obtained from the Internet by English-speaking patients have a relationship with their consumption of medical resources?"

Figure . Research model



Methods

To answer this hypothesis, we performed a quantitative study based on an eleven-item questionnaire that was available online. Questions deal with the two variables of Figure 1. Some questions were designed from measurement instruments previously used and validated by other research [14,15]. On one hand, the variable "Habit of Internet information use" was measured by assessing the intensity of navigating on the Web to seek health-related information. The measurement instrument for this variable, made of five items, was obtained from the works of [14] and [15]. On the other hand, the variable "Consumption of medical resources" evaluates the use of health care resources by patients. These resources deal with complementary medical exams, "shopping" for other clinicians,

These days, the Internet allows patients to draw from the same knowledge base than physicians. Patients become then more educated and are considered as "informed consumers" [8,10]. They are more involved in health care decision making and disease prevention [1,8,11]. Patients can find on the Internet some answers to their health-related questions, which can help them decrease their frequency of consulting clinicians. Patients should also feel comforted about their health state and hence demand fewer complementary medical exams, do fewer "shopping" for other clinicians, or call medical staff for explanations less frequently [11]. Consequently, the use of these medical resources can be reduced when patients use Internet information.

However, many people think that the use of Internet information can increase health care resources consumption. In fact, people can find on the Web information that can make them confused and depressed [2]. This situation will lead them to call their clinicians more frequently, to take further appointments, or to spend more time with clinicians. In this context, Pew Internet & American Life [2] stipulates the existence of a positive correlation between the Internet information use and the number of appointments taken to meet a health care professional. Added to that, advice found in online discussion groups could be misunderstood by some patients and thus causes patients more harm than good [12]. The length of the medical consultation can be extended because patients may be worried about contradictory information or technical jargon in medicine retrieved from the Internet [2]. Finally, the abundance and lack of relevance and reliability of some Internet information can lead patients to make bad choices and wrongly manage their health state [13].

So, for the purpose of this research, we propose to test the following hypothesis H1: "There is a relationship between the use of the Internet information by English-speaking patients and their consumption of medical resources". Figure 1 represents the research model that we aim to test.

calling medical staff for explanations, asking for more appointments with clinicians, spending time with the doctor, and being hospitalized because of complications. Since we did not find any measurement instrument in the literature for this variable, we developed our own set of six items. Control variables like age, sex and educational level were not measured because some literature and empirical research proved that they don't have a significant effect on the two main variables.

Patients that suffer from a long-term disease (eg. Diabetes, epilepsy, arthritis, etc) and that are accustomed to the use of the Internet for health-related concerns is the target population selected for the sample. This choice is owing to two reasons. First, the aim of this research is to evaluate patients' actions when using the Internet. Hence, we need to get information from Internet users. Secondly, people that suffer from long-term

diseases are the most inclined to use the Internet frequently for health purposes [16,17].

The sampling is not probabilistic and the sample is made of 120 responses. To insure homogeneity, only Canadian Anglophone people answered the online survey. Indeed, the health system in Canada is public and does not discern between social classes. We asked some Webmasters of online discussion groups, personal websites, foundations of chronicle diseases websites and managers of online list serves to publish the link of the questionnaire.

Results

We used SPSS 11.5 software to check the reliability of the measurement instruments. The scales' reliability were tested

using Cronbach alpha measure. Good levels of internal consistency were observed. Indeed, Cronbach alphas are higher than 0.6 as it is suggested by the author in [18]. They are of about 0.829 for the independent variable and 0.811 for the dependent one.

Because of the latent nature of the variables, structural equation modeling (SEM) was the analysis method that we used to test the research hypothesis. PLS Graph is the software that allowed us to check the relationship between the two variables. As we can see in Table 1, all items have loadings greater than 0.5 with the variables to which they belong except two items (8 and 10) that were ulteriorly eliminated from the dependent variable. These items deal with consultation length and phone calls to medical staff.

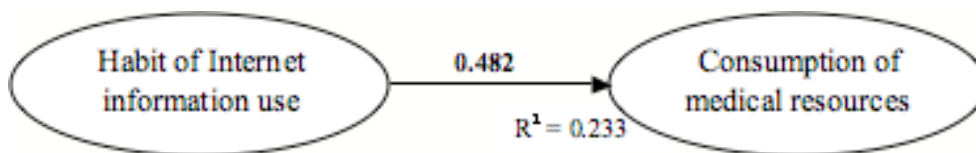
Table . Items' loadings

Items	Loading
Habit of Internet information use	
Item 1	0.616
Item 2	0.834
Item 3	0.865
Item 4	0.729
Item 5	0.717
Consumption of medical resources	
Item 6	0.790
Item 7	0.852
Item 8	0.497
Item 9	0.659
Item 10	0.080
Item 11	0.817

The construct validity of the measurement instruments was ensured. Indeed, the convergent validity was satisfying because the average variance extracted (AVE) is about 0.573 for the independent variable and 0.541 for the dependant one. Also, the discriminant coefficient validity, which value is 0.23, is lower than the AVE coefficients. This result leads to satisfactory discriminant validity. Confirmatory analysis proved again the reliability of the measurement instruments via the rho

coefficients, which are respectively of about 0.637 and 0.612 for the independent and dependent variables. Finally, the path coefficient between the two variables is significant and high. As we can see in Figure 2, it is about 0.482 ($P < .05$) and it means that there is a positive link between the use of health information by patients and their health care resources consumption. The predictor variable explains 23.3% (R^2) of the dependant variable.

Figure . Research model results



These results not only confirm our hypothesis, but they also give us an idea on the sign of the relationship. The “positive” link obtained can be explained by many arguments. For instance, we think that patients may misunderstand or be overwhelmed by the information they get from the Internet. This situation can lead them to make the wrong decisions or to worsen their health state. So, they can overuse health care resources by requesting

more help and explanations. For instance, they can ask to see their clinician more frequently, to change for another doctor, or to spend more time during a consultation. Another explication to these results may be related to the fact that, on short-term, Internet users may consume more medical resources because they obtain more information about the existence of alternative treatments or other specialized doctors from the Internet.

However, we guess that the results will be different on long-term.

Discussion

Causality concerns

Because we were not able to control some research conditions, we can't confirm that the significant link between variables is causal. In order to infer this link, we supported it by literature and by other in-depth analyses. A one-way analysis of variance (ANOVA) allowed us to evaluate the equality of variable means between the group of patients that frequently use the Internet information for their health and the group of patients that use it less often. The F-test confirms that the means of the use of medical resources differ significantly between the two groups. Indeed, the test of significance of about 0.03 is lower than 0.05. This result makes us confident about the existence of a possible causal link between the variables "Habit of Internet information use" and "Consumption of medical resources". Longitudinal studies can focus on this topic to confirm the causal relationship.

Contributions

This research may have theoretical and practical contributions. In fact, we did not find any empirical study that had already investigated our research question for English-speaking patients. Furthermore, the results of this research may have significant impacts on the fields of managing information systems and medical sciences. Indeed, researchers will be concerned with the role that the Internet information can play in the management of medical systems. We suggest to investigate more in-depth the reasons that explain a positive relationship between the two variables using a qualitative strategy. Longitudinal studies can focus on the effect, on long-term, of the use of Internet information by patients.

We think also that, in order to avoid such a positive relationship, health institutions and governments can work on providing more reliable information in their websites and on developing better portals for health information. Patients may also be interested in participating in newsgroups, online forums, or mailing lists that are mediated by health professionals. Educating patients on how to search and use medical information on the Web seems to be a priority.

Acknowledgments

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Conflicts of Interest

None declared.

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