

YOUNG ADULTS SEARCHING FOR HEALTH-RELATED INFORMATION ON THE INTERNET

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ABSTRACT

This study aimed to examine the use of internet as a source of health-related information (HRI), as well as the change in attitudes following the online search for HRI. The current study sample included 88 participants, randomly divided into two experimental groups. One was given the name of an unfamiliar disease and told to search for information about it using various search engines, and the second was given a text about the disease from a credible scientific source.

The study findings show a large percentage of participants used the internet as a source of HRI. Likewise, no differences were found in the extent to which the internet was used as a source of HRI when demographic were compared. Those who searched for the HRI on the internet had more negative opinions and believed symptoms of the disease were worse than the average opinion among those who obtained the information about the disease from a credible scientific source. Internet clearly influences the participants' beliefs, regardless of demographic differences.

KEYWORDS

healthcare, HRI, COVID-19, disinformation

INTRODUCTION

Since the time of Hippocrates, doctors have had a monopoly on health-related information (HRI), thereby ensuring their professional position and status. Currently, "the internet is now considered as one of the major sources of HRI" [1 p.364]. Most 'surfers' report using the internet to look for information, with the most common tools used by the public for finding information being search engines, particularly Google [2]. Eight of the ten patient health-related consultations were started through search engines such as Google, Yahoo or Bing [3] and, one out of 20 searches on Google is related to health [4].

Studies in the field show that searching for HRI using search engines potentially escalates the searcher's medical concerns, with such escalation directly linked to the

amount of knowledge to which the user is exposed, meaning the more information the user is exposed to, the greater their anxiety and concern [5].

In a seminal work, researchers [6] have examined the effect of the agent of influence's credibility on shaping and changing people's attitudes. They discovered that when the message is transmitted by an authorized source (in their study, a professor of physics), the public views the information as more credible than that originating from a non-expert source, making original attitudes more likely to change. In

other words, when information is provided by an expert and doesn't fit the information seeker's existing views, there is a greater chance the seeker's attitude will change.

Other researchers [7] have found several situations in which a patient began by seeking information on the internet. First, before seeing the physician, the patient will search for information to decide whether to turn to professional help. Secondly, after visiting the professional, they will do so again either because they wish to reduce the tension they feel, or because they remain dissatisfied with the information given by the professional.

Searching for HRI on the internet enables the patient to actively participate in health decisions, with such active participation often encroaching on the doctor's authority and the patient's trust in him or her [9]. Conversely, it should be noted that people diagnosed with a serious disease often refrain from exposing themselves to additional information due to fear or tension [8]. Therefore, the internet can transform patients from passive to active consumers. Patients who use media and feel satisfied after obtaining the information are then motivated to search for further HRI [9]. Moreover, internet health information seeking can improve the patient-physician relationship. As patients have better access to health information through the Internet and expect to be more engaged in health decision making, traditional models of the patient-provider relationship and communication strategies must be revisited to adapt to this changing demographic [10].

The choice of modern media, particularly the internet, to meet needs emanates from various internet characteristics. The internet's most obvious property is the quantity and variety of information it offers, which bridges the difficulty of acquiring information from traditional sources [11]. Likewise, technology enables information to be frequently updated. Information is produced and transferred to the public by various groups of people, including professionals, suppliers, pharmaceutical companies, medical service providers, interest groups, and consumers themselves. Additionally, information is available on the internet in various formats, such as text, video, and audio files, allowing different people to use them in the way that suits users best [12].

We can therefore ask whether searching for HRI on the internet is beneficial or detrimental for the patient. There is no definitive answer to this question in the literature. Sometimes a person cannot get medical treatment due, for example, to financial constraints. Such a situation can lead people to search for HRI and self-diagnosis from the internet instead of going to a doctor. In such a case, the internet provides a reasonable and logical default solution [13]. However, even people who can pay for medical

treatment face circumstances that delay medical treatment, such as long waits for appointments, or overloaded schedules. In such cases, HRI on the internet and virtual communication can be effective. It was also found that an internet portal improves doctor-patient relations and increases patient comfort level, by providing the opportunity to post messages with questions and worries about non-urgent issues, without visiting a clinic [14].

In contrast, although exposure to a very large amount of knowledge can sometimes improve the patient's physical and emotional health, and even the doctor-patient relationship, sometimes exposure to such information can harm that relationship. A patient arriving with information they have found for themselves, may make the doctor feel threatened, forcing doctors to provide the patient with explanations regarding the credibility and appropriateness of the information. Moreover, another disadvantage is that the patient may demand inappropriate clinical intervention, due to the harmful information found online. The doctor may sometimes agree to the patient's requests when there is no real clinical need, fearing refusal will harm doctor-patient relations. Refusal to provide inappropriate treatment can lead to the patient feeling the doctor is motivated by a need for control [15]. Likewise, extensive knowledge can influence and arouse a sense of control that increases confidence and enables the patient to question and criticize the doctor's diagnosis [2]. However, the patient is liable to obtain wrong information about the type and effects of the illness, raising unnecessary anxiety and fear [15].

Researchers [15] conducted a study on internet searches for HRI in the United States. They found that 75% of the participants who searched for HRI looked for information relevant to their own health or that of friends or relatives. The more a person is active and experienced in searching for HRI on the internet, the more they will succeed in finding relevant information. This gap exists even though the public is sometimes better informed of new developments. Medicine is full of changes and new studies, and the newest and most up-to-date information is available firstly to professionals, appearing only later on the internet. Moreover, obtaining HRI from the internet is sometimes uncertain and confusing; users often need a professional to clarify the HRI they found online [13]. The consumer can misinterpret the information, leading to needless worry [7]. As a result, increasing accessibility to HRI on the internet can actually increase frequency of visits to health professionals [13]. Unnecessary visits encroach on effective

and fast service for patients who genuinely require a doctor's attention [7].

An important issue related to searching for information is based on trust and information quality. A range of organizations have developed methods and tools for evaluating and ranking website information quality to help the consumer make informed choices. These tools aim to guide people to screen inaccurate content, to identify key websites, and raise consumer awareness. The consumers are usually familiar with how to identify internet information quality and use a range of tools to evaluate and judge the source. Nonetheless, due to the availability and accessibility of information, curiosity wins, and people feel a strong need to read all the symptoms and possibilities, whether or not the information seems to be of high quality [16].

The frequency of HRI internet searches is also dependent on demographic characteristics. Gender-based differences in the use of the internet as a source of HRI have been found in previous studies. Women were found to see the internet as a tool for social usage and to develop ties with friends and relatives. In contrast, men focus on obtaining information and arranging things, such as using search engines [17],[18]. A US study conducted 15 years ago [19] showed 19% of those using the internet to search for HRI did so at least once a week, whereas 35% did so at least once a month. People with a high income and higher education searched for HRI on the internet more than others.

Studies in Switzerland show only one-third of the participants searched for HRI on the internet. Age, language knowledge, level of English, and the chronic nature or severity of the disease are all connected to frequency of medical internet searches [20],[21]. In Italy, gender, age, education, and marital status, were connected with HRI internet searches. For men, the percentage using the internet use to search for HRI dropped with age, while the highest rate of searching for HRI was among women aged between 30-41 years [22]. A study from Saudi Arabia found that Income and education are almost always the most influential and important factors in everything connected with HRI searches [1]. An Israeli study [23] found that among internet users, 62.3% searched for HRI frequently or very frequently. Women searched for HRI more than men; 69.9% of female internet users searched for information frequently or very frequently, while only 52.4% of male users did so. Likewise, the study

discovered that Arabs use the internet as a HRI source more than native Israelis or immigrants from the former Soviet republics.

Regarding the level of religiosity and internet use, in a study conducted in Israel [24], did not find any differences in electronic media consumption patterns between the religious and secular communities. However, two-thirds of the religious interviewees claimed they don't obtain any information from the internet. Study has found that when people are worried about their health, they will search more frequently for information on the internet [7].

A literature review shows an increasing trend of using the internet as a source of HRI [25] [26]. It would be interesting to examine differences regarding internet use as a source of HRI among different population segments, as well as the influence of internet searches on individuals' attitudes towards a disease as opposed to the attitudes of those who acquired information from a credible source. This study will examine the correlation between various demographic variables and the use of the internet as a source of HRI, as well as the attitudes towards a disease following users' internet searches for HRI about it. Two hypotheses will be examined:

H1: Differences will be found in internet use as a source of HRI by different population sectors. We assume there will be differences between men and women, high-income and low-income populations, and secular and traditional populations, regarding internet use as a source of HRI. Support for this hypothesis can be found in the literature. For example, in the 2009 Annenberg National Health Communication Survey it was found that middle-aged women of high socioeconomic status constitute the highest percentage of those seeking HRI on the internet, and they are the people most influenced by this information [8]. Kim found that young, educated men with high incomes are least likely to be searching for HRI on the internet, and a study from Israel showed religious people claimed they don't obtain information from the internet [24].

H2: Differences will be found in people's attitudes towards the disease, depending on whether knowledge was obtained from internet sources or from a credible source. The attitudes of the former about the disease will be more negative (the disease seen as more serious) than among those of people that obtained their knowledge from a credible source. This finding would concur with earlier research indicating that, in most cases, a search for

apparently innocent symptoms can lead to the patient drawing conclusions that the illness is more serious than in reality; likewise, after an internet search for HRI, a patient is likely to be confused, frustrated, and panic-stricken [7, 5].

METHOD

PARTICIPANTS

This study's population included 88 participants (since we wished to examine how knowledge is learned, one participant was removed from the study since he was familiar with sarcoidosis, the subject of the study). For the purposes of this study, young adults are defined as youth between the ages of 18-40 years ($M=23.3$, $SD=1.22$). The participants were students at "The Max Stern Yezreel Valley College" in Israel (the academic institution ethics committee authorization number 77-19). The research assistants approached the students and asked them to voluntarily fill out a manual questionnaire. Half the participants ($n=40$) formed the experimental group, and half the control group ($n=40$).

TOOLS

This study is a quantitative study using a self-report questionnaire which included 30 closed questions. Most questions were formulated for this study and we conducted an internal reliability test in order to calculate these questions to an index variables. The rest of the questions were taken from a previous study [27] in which their reliability and validity were tested. At the beginning of the questionnaire the participants were informed that the participation in the study was voluntary, the questionnaire is anonymous and no data will be used except for research purposes. Participants signed an informed consent form before completing the questionnaire. The participants were asked to answer questions that examined the following variables:

Internet information search habits. This measure was originally composed especially for this study (e.g., "I regularly search for HRI on the internet"; "I search for HRI on the internet for my personal medical problems"). The scale was composed of five degrees of agreement with the item (1- do not agree at all and 5 agree to a large extent) and then the answers were classified into three levels of agreement: the two lowest levels - disagree, the two highest levels - agree and the middle level - neutral (In the

original questionnaire the chosen answer was 3, neither positive nor negative regarding the statement).

Perception of internet credibility. This measure was also originally composed for this study (e.g., "I believe HRI that I find on the internet").

Attitudes towards the disease. The attitudes questionnaire included 11 items in total based on Cohen et al questionnaire. Cohen et al questionnaire is a general attitude questionnaire that can be adapted to any subject through small verbal changes (original Cronbach's $\alpha = .75$). [27] We made few adjustments (two items were removed because they did not fit to the context of the study and the wording of the other items was adjusted to examine the topic relevant to this study) created a moderately reliable scale ($\alpha = .77$). This attitude questionnaire was divided into two parts:

- (a) Emotional items ($n=4$, e.g., "I sensed a sudden drop in my mood after reading about the disease")
- (b) Cognitive items ($n=7$, e.g., "The disease is serious") about the disease ($\alpha=0.71$). The attitude questionnaire was answered on a Likert scale (1 - strongly disagree, 7 - strongly agree). A high score for this variable testifies to a more negative attitude about the disease (that is, the disease is perceived as more serious) and a low score testifies to a less negative attitude towards the disease (that is, the disease is perceived as less serious). The questionnaire ended with demographic questions: gender, age, income, and familiarity with the disease.

PROCESS

The participants were randomly divided into two experimental groups (The questionnaires in the different conditions were mixed and distributed to the participants randomly). The researcher alternately distributed a questionnaire from each condition to participants who gave their consent to participate in the study. The first group ($n=41$) was given only the name of the disease and told to search for information about it using the various search engines, without any guidance regarding how to search or for how long. The second group ($n=47$) was given a text from a scientific source regarding the disease. After reading or searching for information, the participants were asked to answer an opinion questionnaire.

FINDINGS

DESCRIPTIVE STATISTICS

participants were assured confidentiality and anonymity. The study included 44 women (55% of participants) and 36 men (45%). There were 77 (96%) who were single, and three (4%) were married. Likewise, 52 participants (65%) were secular Jews and 28 (35%) traditional. According to distribution by monthly income, 52 participants (65%) earned far less than the average wage, 26 (32.5%) less than average, and two participants (2.5%) close to average. Regarding internet information searching habits, it can be clearly seen that most participants – 72 (90%) – reported past HRI searches, as opposed to eight participants (10%) who reported never having searched for HRI on the internet. Of the participants, 81.2% answered that they sometimes searched for HRI for their medical problems on the internet, and 15.3% answered that they didn't do such searches (3.5% neutral); 55.3% noted they do so regularly.

Of the participants who answered that they searched for HRI on the internet, 23.5% answered that they do so to save consulting a doctor, and 58.8% answered that they don't search for HRI to avoid such a consultation (17.6% neutral). Of the participants, 68.2% will not stop with the information they read on the internet and will also consult a doctor and 17.7% answered that they consider what they read on the internet sufficient (14.1% neutral).

Of the participants, 41.5% answered that they believe HRI they obtain from the internet; 16% said they didn't believe this information; and 42.5% were neutral regarding credibility of the information.

Of the participants, 49.4% believed, due to the information they found on the internet, that the disease was more serious than the real problem, but 16.5% did not think so (32.9% neutral).

TABLE 1. PERCENTAGE WHO AGREES OR DISAGREE WITH STATEMENTS CONNECTED TO SEARCHING FOR HEALTH-RELATED INFORMATION (HRI) ON THE INTERNET

Statement	Agree	Disagree	Neutral
"I sometimes search for HRI for my medical problems on the internet"	81.2%	15.3%	3.5%
"I search for HRI on the internet to save myself consulting with a doctor"	23.5%	58.8%	17.6%
"I won't limit myself to the HRI I read on the internet, and will also consult with a doctor"	68.2%	17.7%	14.1%
"I believe the HRI I read on the internet"	41.5%	16%	42.5%
"The HRI I find on the internet shows the problem to be more serious than in actuality"	49.4%	16.5%	32.9%

To learn about the relationship between the research variables we computed Spearman correlations. A positive and significant correlation was found between how much a person believed HRI found on the internet and his actual search ($r_s=.28, p<.01$). Thus, the more a person believes in the information, the more he will search for it, and vice versa.

Likewise, a positive correlation was found between searching for HRI on the internet and one's friends recommending use of the internet as a credible information source ($r_s=.30, p<.05$), meaning the more a person uses the internet, the more he will recommend doing so to his friends.

A negative and significant correlation was found between how much a person believes the HRI on the internet conveying that a disease is more serious than in actuality, and searches for the HRI ($r_s=.30, p<.01$). In short, the more a person believes that the thrust of internet information on a disease is more serious than reality, the less often she will search for HRI in this way.

Additionally, a negative correlation was found between how much a person believes HRI on the internet and regularly searches for it ($r_s=.28, p<.01$). In short, the more a person searches for HRI on the internet, the less negative his attitude toward the disease.

EXAMINING THE RESEARCH HYPOTHESES

To examine the first hypothesis (H1), that discussed demographic differences in use of the internet as a focus

of HRI, a t-test for independent samples was conducted. As seen in Table 2, no differences were found for any demographic variable: there were no differences between men and women $t(84) = 0.636, p > .05$, Participants over the age of 23 and participants under the age of 23 $t(86) = -2.080, p > .05$, secular and traditional $t(83) = 0.634, p > .05$, and people with low or high incomes $t(78) = 1.51, p > .05$.

To examine the second hypothesis (H2), that there would be a difference in attitudes toward the disease between those finding information by internet searches and those finding it by reading an authorized source, t-test for independent samples was conducted. The research

hypothesis was confirmed, and a significant difference was found between the groups $t(86) = 2.011, p < .05$. The average opinions among those who searched for HRI on the internet ($M = 3.11, SD = .77$) was higher (that is, more negative) than the average opinion about the disease among those who had gotten their information from a credible source ($M = 2.81, SD = .61$). As seen in Table 3, those independently searching for the information estimated the disease to be generally more serious, harder to diagnose, and rarer. They were also in lower spirits and felt more helpless than those that had gained their information from a credible source, but thought the disease was easier to heal and was less terrible to be diagnosed with.

TABLE 2. DEMOGRAPHIC DIFFERENCES IN USE OF THE INTERNET AS A FOCUS OF HRI: (ON A SCALE OF AGREEMENT 1 -5, WITH 5 - AGREEMENT AND 1 - DISAGREEMENT).

Statement	Group	N	Mean	SD	t(df)
Gender	Men	21	2.95	0.56	0.636 (84)
	Women	61	2.94	0.78	
Age	Under 23	56	2.99	0.77	-2.080 (86)
	Over 23	32	2.89	0.81	
Level of religiosity	Secular	61	2.98	0.78	0.634 (83)
	traditional	27	2.88	0.50	
Income	High	31	2.93	0.71	1.51 (78)
	Low	57	2.97	0.96	

TABLE 3. DIFFERENCES BETWEEN AVERAGES ACCORDING TO STATEMENTS THAT MEASURED ATTITUDES TOWARD THE DISEASE (ON A SCALE OF AGREEMENT 1-5, WITH 5 - AGREEMENT AND 1 - DISAGREEMENT).

Statement	Group	N	Mean	SD	t(df)
"The disease is serious"	Credible source	47	2.06	0.96	2.480 (85)*
	Independent search	40	2.68	1.33	
"The disease is difficult to diagnose"	Credible source	45	2.28	1.17	-1.948 (82)*
	Independent search	39	2.80	1.25	
"The disease is considered easy to cure"	Credible source	45	2.78	0.97	2.687 (81)**
	Independent search	38	3.37	1.02	
"The disease is common"	Credible source	47	3.87	1.17	-3.040 (84)**
	Independent search	39	3.10	1.16	
"It is important to treat an illness as soon as possible after detecting it"	Credible source	45	2.35	0.91	0.236 (82)
	Independent search	39	2.41	1.21	
"Someone can continue living normally even without treating the disease"	Credible source	43	3.12	0.96	0.856 (79)
	Independent search	38	3.31	1.14	
"I suddenly felt in lower spirits after reading about the disease"	Credible source	47	2.77	1.11	2.480 (85)*
	Independent search	38	3.89	1.98	
"I felt helpless after reading about the disease"	Credible source	47	2.91	1.19	3.317 (83)***
	Independent search	35	4.06	1.26	
"It wouldn't be so terrible if I was diagnosed with the disease"	Credible source	47	2.17	1.12	4.185 (80)***
	Independent search	37	2.59	1.04	
	Credible source	47	2.21	1.04	

"If I knew that I would have to be treated for this disease, I would be really depressed"	Independent search	37	2.59	1.19	
"I would prefer to have this disease rather than more severe ones"	Credible source	47	3.51	0.90	1.567 (82)
	Independent search	40	3.85	0.92	

DISCUSSION

The current study explored differences in internet use as a source of HRI among different population segments. Specifically, it examined the influence of internet searches vs. consulting with a credible source on individuals' attitudes towards a disease. Unlike previous studies, which showed relations between internet search habits and demographic characteristics such as gender and education level, no demographic differences were found in this study regarding HRI search habits on the internet.

This finding is supported by an Israeli study on the religious sector's attitudes toward traditional media [24], which found that the religious Jewish population's media usage is similar to that of the secular population. The present study did not include religious participants, but rather secular and traditional participants. The latter are moderately observant Jews who tend to share the norms of secular Israeli society. One of the distinctive characteristics of this group is its positive attitude toward leisure activities, and towards internet use in particular, which is understood as part of social integration [28]. Had religious or even ultra-Orthodox Jewish participants been included in this study, perhaps no difference would have been found in internet use as a source of HRI. Accordingly future studies should examine the attitudes of these groups to internet-enabled HRI searches.

Another key finding is that participants who researched HRI for a disease using the internet had more negative attitudes towards that disease. This supports previous studies that concluded that when users obtain HRI from the internet, they are likely to misinterpret the information, leading to needless worry and extreme feelings about a disease [7]. Additionally, HRI can lead to unfounded assumptions and speculations on the part of the patient [13].

According to the elaboration likelihood model of persuasion (ELM) [29], when information is obtained from a

credible source, it is processed through a central route: the person thoroughly and seriously examines the information, as opposed to processing it on a peripheral track. In a peripheral track, the person examines the information superficially and based on clues. Information from the internet is usually unreliable and therefore processed on the peripheral track. Accordingly, users are greatly influenced by photographs, personal stories, or threatening headlines, and thus the information is seen as more negative. The present study also shows the importance of the source of the message in shaping attitudes to and the interpretation of the message. This reinforces the findings of Hovland et al.'s study [6], according to which the success of information will depend on the credibility of the source that convey messages about the product. If the source is credible, then the person receiving the message will trust it and receive it well. However, if the information is considered incredible, the message will not affect the receiver [30,31].

LIMITATIONS

The current study has several limitations. First, it is based on a small and relatively homogenous sample. This sample comprised "young adults" (aged 18-40) of similar backgrounds, who comprise a homogenous population. Therefore, the study results cannot be generalized to the general population. Future research should include a larger sample and other population sectors (e.g., elderly, religious, ultra-Orthodox) to verify the rationale on which the current study is based.

There may be another limitation caused by the gaps in motivation between the two experimental groups. Since this was a voluntary study and the participants were not compensated for it, it may be that the participants' motivation to read about the disease in depth clearly influenced the results among the group who searched the internet. These participants had to actively look for information, exerting more effort than the group given information from a credible source. These latter participants were only asked to read one paragraph, a much more passive activity.

FUTURE RESEARCH

Future research can increase motivation among the group with internet information and promise some reward to participants who treat the search with seriousness. Another possibility for overcoming this limitation is to enlist participants who have some association with the disease and thus possibly a strong interest in participating more seriously in the study; their motivation levels would not impair the results.

As aforementioned, future research that will deal with the technical limitations of this study but perhaps provide clearer and more unequivocal results.

CONCLUSION AND IMPLICATIONS

This study's theoretical contribution lies in lending support to findings that indicate the importance of the source of the message. Its practical contribution lies in demonstrating that when the message comes from a trusted source the source should be strengthened and emphasized (and vice versa).

It is important that professionals engaged in information sharing and persuasion, as well as people in general, know that unreliable sources (such as search sites such as Google or social networks) may distort the message and this should be noted especially when it comes to health messages as set out in this study.

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