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Self-reported effects of online medical information on offline medical behaviour

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Abstract

This study shows an initial direction of research where online behaviour is linked to offline behaviour of health consumers. Although no significance was found between online medical resources, it is stipulated that people are influenced by online medical information about their (possible) diseases or symptoms. Medical care providers should be aware of consumers that are heavily using the Internet as a resource of information reflecting back to their own situation. They should not reject this information immediately, but emphasize this and guide these people to professional websites or online communities to prevent unhealthy situations. Discussing online information can only increase the knowledge of the patient, to the extent that he or she can act upon it.

Keywords: General practitioners, health behaviour, empowerment, online health communities

1 Introduction

There are several ways for consumers to acquire knowledge about health issues and symptoms. Most commonly, people visit the General Practitioner (GP) to acquire

information and primary care. However, over the last years the Internet has become a great new source for information retrieval by consumers. People can visit medical sites that are somewhat encyclopaedias. In the United States 66% starts with a search engine where 64% searches for a particular disease or medical problem [1]. These sites can either be commercial or non-commercial. Another information medium, which is emerging last decade within ehealth domain, are online communities [2]. These online communities supports people with common interests to virtually share experiences, ask questions, or provide emotional support and self help [3].

Research showed that the use of Internet enhances the empowerment of consumers, specifically, online health communities. People who participated in online communities were better informed; felt confident with their physician, their treatment, and their social environment; improved acceptance of the disease; increased optimism and control; and enhanced self-esteem and social well-being [4]. Meta-analyses confirmed that online communities mostly support and hardly harm the participants [5].

The empowering outcomes emphasize different intrinsic aspects of people who participate in online communities. It is relatively unknown however, what the behaviour of people is *after* they find online medical information or participate in online communities. In some studies it is assumed that online medical information has an impact on the doctor-patient relationship [6]. However, the effects of online medical information reach further than only this relation. This study investigates the actual behaviour of people when online medical information is searched, and what effect this information has on the so-called offline behaviour and the stages that follow in this health process.

In this study we depart from the notion that people can use different media to acquire information about their health status. Although it is stated that there is no clear line between mass media and interpersonal communication [7], these media have different characteristics. In line with the media richness theory [8] one would expect that online communities have a 'richer' character than regular websites for example. In similar vein, it can be expected that such interpersonal characteristics of a medium also influence the 'offline' behaviour of people. To investigate this we compare the effect of two online media channels, regular websites and online communities, on the offline health behaviour of users. Besides the use of these online media, we also take the user satisfaction with this medium into account. As a main research question, this paper explores (1) if the use of online media has a independent effects on the offline health behaviour of persons, (2) if these effects differ with respect to the perceived quality of the medium, and (3) if there is a difference between online communities and websites with regard to perceived quality, and with regard to their effect on offline health behaviour. The next section elaborates on the data and methods that will be used to answer these research questions.

2 Methods

2.1 Data collection

Data is gathered within the Netherlands through an online questionnaire in 2008. The main rationales for using an online survey was the complexity of the survey, and to minimize time efforts for the respondent; which increases the response rate [9]. To recruit respondents, 149 online health communities were asked to put a hyperlink on their forum and to request their members to fill in the survey. Eleven communities responded positively. The link was placed on a forum about rheumatism, the forum of the Dutch breast cancer association, Dutch HIV association, Obesities association, Dutch diabetes association, a forum about multiple sclerosis, and a number of smaller online health communities. The members of these communities were invited to fill in the questionnaire. This resulted in a response of 578 clicks on the survey. From this, 401 persons started with the questionnaire and finally 321 respondents completed the survey (56%). Due to the open invitation for the survey also a lot of “healthy” people filled in the questionnaire. As we aim to study the offline behaviour of the people who actually “suffered” from a disease the past year, only this response group was taken into account (78%). With a total of 250(?) individuals, this study can only partly be generalized for people who are having the type of health injuries that are included in our response group.

2.2 Measurements

2.2.1 Demographic and Health Characteristics

Respondents were first asked for demographic characteristics, i.e. their gender, education, age, household and income. In order to indicate their health status, respondents were asked if they were usually healthy, ill on a regular basis, or having a long-lasting illness. Next to this general question, six statements were presented to the respondent, which were extracted from the extended ‘Parallel Process Model’, a well-validated diagnostic scale [10]. Three statements concerned the severity of the disease three other statements concerned with the susceptibility of the disease. Both sets of statements show high validity in terms scalability (alphas .85 and 0.85) in our dataset, and were subsequently used as the main indication of the threat of the illness from which the respondents were suffering.

2.2.2 Use and satisfaction of online and offline health information sources

Respondents were then asked which medium they use to acquire information about their health situation. First, they were asked if they consulted other people for information and help about their illness or symptoms. Next, they were asked from what medium or source they sought information; either by consulting a GP (General Practitioner), their

family or friends, or by visiting websites with medical information or online communities.

The perceived quality (or: satisfaction) of the user with the medium was asked by seven statements, that were derived from the Media Richness Approach and resemble four so-called 'richness characteristics' [8]. Respondents were asked to rank each medium they used on a five-point Likert scale (from 'totally disagree' to 'totally agree') with regard to the following criteria:

- Perceived self-efficacy: whether the medium was easy to express their problems and to formulate information requests;
- Rapid: whether the medium gave a quick response to their questions and about the possible threats;
- Comprehensible / clarifying: whether the medium was clear and understandable;
- Comforting: whether the medium is calming for them;
- Reliable: whether the respondent perceives the medium as trustworthy;
- Accessible: whether the medium is easily available or reachable;
- User friendly: whether the medium is welcoming or sociable.

2.2.3 The effect on online information retrieved on offline health behaviour

Finally the web questionnaire addressed the potential effects of seeking and retrieving online health information on the offline behaviour of respondents. This was measured by three questions that accumulate and can be seen as steps in the process of consulting a GP. First, the respondents were asked if the online medical information influenced their decision to actually go to a GP. The next question was if they discussed the information found online with the GP. Last and third, they were asked if the online medical information actually influenced the treatment that was proposed by the GP.

These three measurements are the key elements for answering the research questions and testing the expectation as formulated above.

The complete dataset was analyzed with SPSS 17.0. Due to the fact that the variables that are concerned with the offline health behaviour are dichotomous; the statistical tests used were primarily chi-square and t-tests. The test is significant, and report as such, when the P-value is below .05 or .01.

3 Results

3.1 Demographic Characteristics and the perceived effects

The data reveal that more women filled out the questionnaire than men. Due to the collection methods as described earlier, respondents generally suffer from a severe disease. The mean age of the respondents is 45, their mean income and education is somewhat higher compared to the Dutch population average.

Earlier studies show significant differences between men and women with regard to online use of health information [12]. Table confirms significant differences in gender and education when it comes to the variable if the use of online health information has influenced the decision to go to the general practitioner. On the question whether the respondent also discussed the online information with the general practitioner, only the severity and susceptibility of their disease matters significantly. Moreover, a significant relation is found between income and whether online health information actually influenced the proposed treatment by the general practitioner. From Table 1, it can also be concluded that in many cases demographic and health characteristics do not have a significant relationship with the respondents offline health behaviour. This implies that these background variables are of limited importance to explore the effect of the use of online health information sources.

Table 1. Testing the relationship between the influence of online information on offline health behaviour, and the demographic and health characteristics of the respondents

	Influence on visiting decision			Influence on discussing			Influence on treatment		
	χ^2 (df)	T-test	<i>P</i>	χ^2 (df)	T-test	<i>P</i>	χ^2 (df)	T-test	<i>P</i>
Gender	4.724 (1)		.030	0.70 (1)		.791	2.621 (1)		.105
Age		-0.268	.789		-0.229	.819		0.090	.928
Education	8.375 (2)		.015	0.300 (2)		.861	5.154 (2)		.076
Income		-1.256	.212		-0.860	.392		-2.513	.013
Threat		1.936	.055		2.601	.009		0.235	.815

3.2 Use of online health information and the perceived effects

Does the influence of online health information on offline health behaviour differ between the use of websites and online communities? Table 2 displays the results to answer this question. as in the previous table, the three types of influences of online information retrieval are distinguished. The table indicate that there are indeed differences between the use of websites and the use of online communities. First, it can be seen that websites are used by more people than online communities.

Table 2. Descriptive statistics different media of online health information

Used medium		Influence on visiting decision		Influence on discussing		Influence on treatment	
		Yes	No	Yes	No	Yes	No
Website(s)	Yes	48 (34%)	92 (66%)	95 (64%)	53 (36%)	45 (33%)	91 (67%)
	No	6 (26%)	17 (74%)	11 (48%)	12 (52%)	7 (32%)	15 (68%)
Sig. test		n.s.		n.s.		n.s.	
Online Community	Yes	28 (30%)	67 (70%)	60 (62%)	37 (38%)	34 (38%)	55 (62%)
	No	26 (38%)	42 (62%)	46 (62%)	28 (38%)	18 (26%)	51 (74%)
Sig. test		n.s.		n.s.		n.s.	

Next, statistical tests, as a chi-square analysis shows that the relation between the use of websites and the influence of online information on the visiting the GP decision is not significant ($\chi^2=1.559$; $df=1$; $P=.439$). Similar results are found concerning whether online health information is discussed with the GP ($\chi^2=2.262$; $df=1$; $P=.133$), and the influence on the proposed treatment by the GP ($\chi^2=.014$; $df=1$; $P=.906$). The unexpected result is hence, that it does not matter for the influence of online information on the offline health behaviour of individuals whether they use websites to retrieve health information or not. Apparently, the use of websites is not a determining factor for persons to consult a GP in the first place, nor for their use online in this consultation.

Similar results are found for the use of online communities. This has no significant relationship with on the decision to go to the general practitioner because of online information ($\chi^2=1.373$; $df=1$; $P=.241$), or discussing online information with the GP ($\chi^2=.002$; $df=1$; $P=.967$). Both users and non-users of online communities are equal in their opinion that online information has influences the proposed treatment by the GP ($\chi^2=2.584$; $df=1$; $P=.108$).

o extend these results, a split analysis is executed; respondents that only used websites and the respondents that only used an online community are extracted from the dataset for further analysis. The results of this analysis showed no significant differences between the two groups with regard to the influence of online information on the visiting decision ($\chi^2=1.540$; $df=1$; $P=.215$), on whether the respondent has discussed the online information with the GP ($\chi^2=.024$; $df=1$; $P=.877$) or on the treatment as was supposed by the GP ($\chi^2=2.395$; $df=1$; $P=.122$). Hence, the results indicate no difference between the use of websites and online communities in the influence of online health information on offline health behaviour.

3.3 Perceived quality of health media characteristics and the perceived effects

As hypothesized in the introduction it can be assumed that the type of experience a person has with an online medium is of influence on the effects of online information on offline health behaviour. This experience is measured by the perception of the respondents regarding the quality of the medium. As described above, the quality of an online medium is measured by seven items, i.e. criteria that are derived from Media Richness theory. Table 3 shows the descriptive statistics of these items for websites and online communities. Cronbach's confirms the validity of these richness items as a common measurement for perceived quality of websites and online communities (alpha is 0.899 and 0.895).

Table 3. Perceived quality of websites and online communities

	Websites		Online community	
	Mean	SD	Mean	SD
Highly self-efficacy	4.22	0.77	4.37	0.71
Rapid	3.75	0.98	3.78	1.09
Comprehensible / clarifying	3.82	0.92	3.89	0.94
Comforting	3.12	1.12	3.72	1.14
Reliable	3.62	0.94	3.83	0.98
Accessible	4.25	0.72	4.37	0.77
User friendly	4.02	0.86	4.25	0.83
Cronbach's α	0.899		0.895	

Next the hypotheses is tested if the perceived quality is related to the influence of online information on the offline health behaviour of the respondents. Table 4 shows the first result, with regard to the influence of online information on the decision to consult a GP or not. As can be seen there is a significant relationship between the perceived quality of the online community and the influence of online information on GP consultation ($p < .000$). The group that only uses website and the group that only uses online communities, do not differ significantly in this respect, as the paired t-test shows..

Table 4. Perceived quality of websites or online communities and whether people are influenced in their GP consultation by online information

	Did the online medical information make you decide to go (earlier) to the general practitioner?		T-test	P
	Yes	No		
Perceived quality of:				
Websites – Mean (SD)	4.3 (.72)	4.0 (.59)	1.773	.081
Online Community – Mean (SD)	4.4 (.69)	4.0 (.60)	4.112	.000
T-test (paired)	-1.285	0.324		
<i>P</i>	.213	.748		

Table 5 shows the same analysis with regard to the next indicator of offline health behaviour, i.e. whether people discuss online information with their general practitioner. The t-tests display a significant relationship between the satisfaction respondents have with websites or online communities, and whether they discussed online information with their GP. Again, no significant differences occur when comparing the respondents that use websites and those who use online communities with regard to this type of offline health behaviour.

Table 5. Perceived quality of websites or online communities and if people discuss online information with their GP

	Did you discuss the online medical information with the general practitioner?		T-test	P
	Yes	No		
Perceived quality of:				
Websites – Mean (SD)	4.2 (.69)	3.8 (.49)	3.436	.001
Online Community – Mean (SD)	4.2 (.70)	3.9 (.58)	3.054	.003
T-test (paired)	-.236	-.661		
<i>P</i>	.815	.515		

Lastly, Table 6 presents the results for with regard to the statement that the suggested treatment of a GP was influenced by online information brought in by the respondent. The t-tests show significant relationships between the respondents' perceived quality of the medium and their experience that their GP actually took their online information into account. In line with previous results, there are no significant results between groups that use only websites and those who use only online communities when it comes to this influence of online information.

Table 6. Perceived quality of websites or online communities and whether people perceive influence of online information on the GP's treatment proposal

	Is the proposed treatment by the general practitioner influenced by the online medical information?			
	Yes	No	T-test	<i>P</i>
Perceived quality of:				
Websites – Mean (SD)	4.2 (.65)	4.0 (.61)	1.990	.049
Online Community – Mean (SD)	4.3 (.58)	4.0 (.68)	2.553	.012
T-test (paired)	-1.793	.485		
<i>P</i>	.085	.630		

4 Conclusion

4.1 Principal findings

In our perception this is one of the first research which explores the effects of online health information on the offline health behaviour of individuals. From our limited survey among a sample of Dutch internet users, it can be concluded that online medical information does have an impact on offline health behavior, and this is most prominently determined by the perceived quality of these online sources, i.e. websites and online communities. Background characteristics, such as gender, education and income, have limited and non-systematic relationships with the influence of online information on offline health behaviour. The use of either online communities or regular websites as such have no significant effect on whether individuals go the GP with driven by online information, discuss this with their GP, and whether this actually effected the GP's treatment proposal. As earlier studies already indicated, the actually experience is more of influence on the effects of an (in this case: on-line) medium [13]. The hypothesis that the perceived experience of an online health medium is of influence on the adoption of an offline health medium is supported in this study. Regarding the three impacts, as described in this study, the results show a significant outcome. However, as hypothesized in the beginning, no significant results can be noticed between the experience of online communities and regular health websites. This is remarkable, since there were online communities that could be stipulated as a 'richer' medium.

4.2 Limitations

Although research is carried out with care, several limitations and discussion points must be mentioned. An issue in this retrospect is the fact that the offline behaviour is

measured by a survey, and by which the respondents were directly approached. Subsequently, this led to a perceivable method for the indication of the effect of online medical information. Thus, the actual offline behaviour was not measured.

A more in depth research about different websites and online communities is highly advisable. In this study a difference is made between these two media, however one can imagine that websites are not the same as online communities. Websites vary in professionalization and information resources. This is even more likely for online communities, where individuals and volunteers often initiate these kinds of communities.

Lastly, it is likely that the empowerment outcomes [4] can be an intermediate variable between the online use and the offline behaviour. For example, a high satisfaction of an online website can lead to an enhancement of their self-esteem, which in turn can be of influence on the offline behaviour. Hence, it is recommended to investigate a multivariate model, which include predictors for behaviour to medical care providers, such as the general practitioner, with regard to the use of online medical information.

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