



Predictors of Health Information Overload within Internet Users

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ABSTRACT

The objective of this study is to investigate predictors (demographic, health information, and health care) associated with health information overload for online users in order to improve the policy makers and health professional for organizing and representing health information more effective. Data from the 2012 Health Information National Trends Survey (HINTS) with $n=1,270$ was analyzed. A Chi-squared test of independence was performed to compare the characteristics of health information overload and non-health information overload. In addition, a logistic regression analysis was used to examine the possible correlation of the factors and health information overload. Using demographic variables as baseline, we found frustrated searching information, concerned electronic information, get attention from health professional, and doctor's care were significant predictors of health information overload. An important finding of this analysis is the significant predictors of health information overload. In view of these factors, policy makers could provide an effective way to deliver health information when designing websites. Health professional should not only provide secure and actuated electronic information but also spend more time taking care of their patients.

Keywords: *Chi-squared test, health information overload, logistic regression, predictors*

I. INTRODUCTION

Health information seeking plays an important role in the societies. Due to the health concern, most Americans make a lot of efforts search for the trustworthy health information from a variety of media sources such as internet, magazines, or books (Tu and Hargraves, 2003) [1].

Health information on the internet is exaggeratedly increasing such as Web sites, chat rooms, and support groups and it has become the most convenient way to access health information (TR, 2001) [2]. Research has found that millions of Americans have used the internet to search for the health information (Susannah, 2000) [3]. Due to diverse health information flows into the internet, individuals might be frustrated on trusting and understanding the information. In the Health Information National Trends Survey 2012, about 80.3% of U.S. adults reported health information seeking. Within the individuals seeking health information, there were 90.1% of U.S. adults paid attention and trusted the information from the internet. Among them, about 22.8% of the U.S. adults reported that the health information were difficult to understand from the internet or health information overload.

Existed research has found that demographic variables, health status, and health communication were significantly associated with information overload (Kim et al., 2007) [4]. However, little is known about the health information and health care variables associated with health information overload within the online users. The purpose of this study is to identify what are the significant predictors (health information variables and health care variables) associated with health information overload using demographic variables as baseline given individuals paying attention and trusting the health information online. These findings would explain the reasons for the individuals who may suffer from health information overload from the internet, and help health professional to reduce information overload burdens when designing the website.

II. MATERIAL AND METHODS

The Health Information National Trends Survey 2012 (HINTS) is a telephone and survey conducted by the National Cancer Institute to study health information seeking behavior. 3,181 individuals reported that they looked for health information or medical topics from any sources. Out of that, there were 2,233 participants paying attention to the internet. Among the internet users, there were 2,011 individuals responded trusting the health information which is about 90.1%. After excluding the missing data, the final model was included 1,270 individuals in the analysis. The response variable we measured from the National Trends Survey: "Based on your most recent search for information about health and medical topics, how much do you agree or disagree: The information you found was hard to understand" The responses were classified as strongly agree (= 1), somewhat agree (= 2), somewhat disagree (= 3), and strongly disagree (= 4). This variable was collapsed into two groups: those who reported strongly agree and somewhat agree as health information overload (= 1) and those who did not (= 0) as non-information overload.

Socio-demographic characteristics

The following socio-demographic variables were included in the analysis: age (18-34, 35-49, 50-64, 65-74, 75+); gender; marital status (married or single); education levels (<high school, high school graduate, some college, college graduate); race/ethnicity (Hispanic, non-Hispanic white, non-Hispanic black); annual family income (<\$20,000, \$20000-\$34,999, \$35000-\$49,999, \$50,000-\$74,999, \geq \$75,000).

Media Sources

Internet is the most popular media source to access health information. According to the Pew Internet & American Life Project, eight in ten internet users have looked online for health information. It is important to consider "pay attention to the internet". The question includes "How much attention do you



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pay to information about health or medical topics from the internet?" Participants were asked to respond from a lot (= 1) to none (= 4). This variable is collapsed into two groups: those who reported a lot or some as "pay attention" (= 1) and those who reported a little or none as "don't pay attention" (= 2).

Trustworthiness Information

It is worth to understand how much they trust the health information when the individuals pay attention to the internet. The question includes "In general, how much do you trust information about health or medical topics from the internet?" Participants were asked to respond from a lot (= 1) to none (= 4). This variable is collapsed into two groups: those who reported a lot or some as "confident on information" (= 1) and those who reported a little or none as "no confident on information" (= 2).

Health Information

The examined health information questions including in the analysis are: "The most recent time you looked for information about health or medical topics, who was it for?" Participants were asked to respond "myself" (= 1), "someone else" (=2), and "both myself and someone else" (= 3).

"Based on your most recent search for information about health and medical topics, how much do you agree or disagree: You felt frustrated during your search for the information?" Participants were asked to respond from strongly agree (= 1), somewhat agree (= 2), somewhat disagree (= 3), and strongly disagree (= 4).

"If your medical information is sent electronically from one health care provider to another, how concerned are you that an unauthorized person would see it?" Participants were asked to respond "very concerned" (= 1), "somewhat concerned" (= 2), and "not concerned" (= 3).

Health Care

The health care questions are: "In the past 12 months, how often did your health professional: Give the attention you needed to your feelings and emotions?" Participants were asked to respond from always (= 1), usually (= 2), sometimes (= 3), and never (= 4).

"In the past 12 months, how often did your health professional: Explain things in a way you could understand?" Participants were asked to respond from always (= 1), usually (= 2), sometimes (= 3), and never (= 4).

"In the past 12 months, how often did you feel that you could rely on your doctors, nurses, or other health care professionals to take care of your health care needs?" Participants were asked to respond from always (= 1), usually (= 2), sometimes (= 3), and never (= 4).

"Overall, how would you rate the quality of health care you received in the past 12 months?" Participants were asked to

respond from excellent (= 1), very good (= 2), good (= 3), and poor (= 4).

The summary of the purpose of this paper is shown in Figure 1.

Statistical Methods

Data analysis was conducted by STATA 11 software (College Station, Texas, USA). A descriptive statistics was performed to evaluate the credibility of internet. A series of Chi-squared tests were performed to determine whether significant differences between the health information overload and the following variables: demographics, health information, and health care. We then proceeded logistic regression analysis to identify which of these variables could significantly predict the probability of health information overload.

III. RESULTS

Given that individuals pay attention and trust health information from the internet, most of the sample population is between 50-64 years of age (40%). The majority of responders reported non-Hispanic white (74%). About 51% of the respondents reported college graduate while 4% reported less than high school. Annual house income status shows that 37% have \$75,000 or more and 14% reported less than \$20,000. Almost 61% of the respondents reported they are married or living as married. The percentages and a series of chi-square analysis between a variety of factors and health information overload are shown in Table 1.

In view of the demographic variables, gender and income are shown to be significantly associated with health information overload with a p value of 0.012 and 0.001 respectively. Individuals who are male and who had higher income were more likely to suffer from information overload.

Under the health information variables, purpose of looking for information, frustrated searching information, and concern electronic information are significantly associated with overload with a p value of 0.001, < 0.0001, and < 0.0001 respectively. Individuals who looked for information for "both myself and someone else", who felt frustrated searching information, who concerned about electronic information, were more like to report health information overload.

With respect to health care variables, doctor's care, clear explanation from professional, and quality of health care are shown to be significantly associated with overload with a p value of 0.001, < 0.0001, and < 0.0001 respectively. Individuals who always had doctor care, who always had clear explanation from professional, and who had better quality of health care, were less likely to suffer from overload.

Using demographic variables as baseline, the results of logistic regression are shown in Table 2. Among the demographic variables, individuals who had higher income and being female were less likely to report information overload.



In health information factors, frustrated searching information and concern electronic information were shown to be significant predictors associated with information overload. Individuals who felt frustrated searching information and who concerned electronic information were more likely to suffer from overload.

Under health care factors, individuals who always get attention from professional and always received doctor's care were less likely to suffer from overload.

IV. DISCUSSION

Having a variety of media sources (e.g., internet, television, radio and print), individuals will become more difficult seeking trustworthy health information. Research has found that internet is the most credible sources compared to television, radio and print (Abdulla et al., 2002; Chan, 2012) [5, 6]. Our results revealed that 90.1% of individuals reported trust health information from the internet which is consistent to their findings. Therefore, our analysis will examine the characteristics of human behaviors associated with health information overload under the condition of paying attention and trusting the information from the internet.

Using demographic variables as a baseline, gender and income were significant predictors associated with health information overload. Individuals who were female, and who had higher income were less likely to suffer from overload. Research found that individuals with lower income were more likely to suffer from information overload (Kim et al., 1997) [4]. This is consistent to our findings. However, the relationship between gender and information overload still needs more exploration.

Health information plays a major role associated with health information overload. Our findings revealed that frustrated seeking information was a strong predictor of overload. The more individuals being frustrated, the more often they suffering from information overload. One explanation is that the adult groups might have low literacy so that they might easily get frustrated about the information. A research article reported that adults with low literacy may suffer informational obstacles on the internet when seeking health information (Birru et al., 2004) [7].

Furthermore, electronic information is a key to address in order to reduce the health information overload. One survey found that about 75% of Americans reported they would communicate electronically with their physicians while 60% of patients would look up test results online (Harris Interactive, 2006; Markle Foundation, 2003) [8, 9]. Due to mass electronic information, the greatest concern of patients is privacy and security of any types of electronic health care information. Existed research reported that "91% of people report they are "very concerned" about the privacy and security of their personal health information" (Kaelber et al., 2008) [10]. These results support to our findings that individuals were suffered

from overload if they were very concerned electronic information. Health care is also a key associated with health information overload. Our findings revealed that doctors' care and get attention from health professional were significant predictors of information overload. Individuals who always were paid attention and taken care by health professional were less likely to suffer from overload. One of the reasons might be due to the fact that doctors spent more time on internet searching health information. 82% of the doctors used the internet to search medical information so that they might develop information searching skills to help patients to reduce overload problems (Davies and Leicestershire, 2007) [11]. The other explanation is that hospital doctors could handle the large amount of medical information. Two out of three doctors could deal with the increasing flow of medical information so that they could advise patients overcome the informational obstacles on the internet (Nylenna, 2009) [12].

V. CONCLUSION

In this present study, we first reviewed the fact that internet was the most credible media sources compared with others (Abdulla et al., 2002; Chan, 2012) [5, 6]. Our results showed that 90.1% of individuals trusted health information from the internet. Therefore, we examined predictors of health information overload for internet users.

Using demographic variables as baseline, we further explored health information and health care associated with health information overload. Our findings revealed that frustrated seeking information and concerned electronic information were strong predictors of health information overload. The more individuals frustrated seeking information and concerned electronic information, the more frequent they were suffered from overload. These findings would suggest that health information websites should design as simple as possible to reduce the misleading information. The other important finding in this analysis is that health professional should provide secure and actuated information when communicating electronically.

Health care was also significantly associated with health information overload. Our results showed that individuals who always were paid attention and taken care by health professional were less likely suffered from overload. The significant of these findings is that health professional should spend more hours to take care of their patients and provide more presentations on demonstrating the concepts of medical information to the general public.

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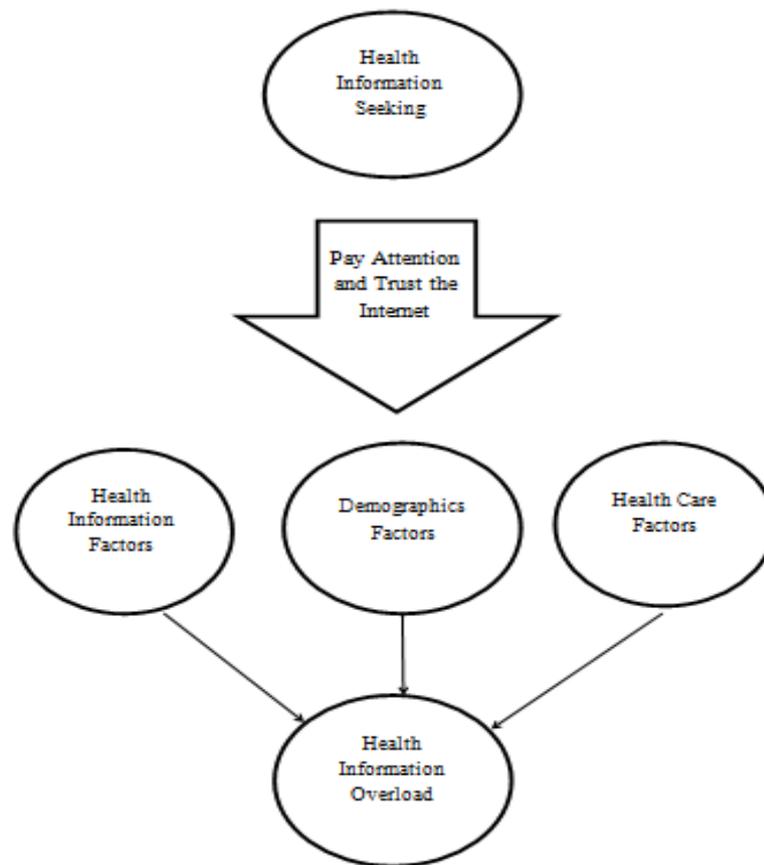


Figure 1: Conceptual Framework of Health Information Overload

**Table 1: Chi-Square Test between Predicted Factors and Health Information Overload**

| Variables | Internet (n=1,270) | | p-value |
|---|--------------------------|------------------------------|---------|
| | Information Overload (%) | Non-Information Overload (%) | |
| Age | | | 0.077 |
| 18-34 | 16.39 | 15.02 | |
| 35-49 | 19.75 | 28 | |
| 50-64 | 46.64 | 38.86 | |
| 65-74 | 12.61 | 12.6 | |
| 75+ | 4.62 | 5.52 | |
| Gender | | | 0.012 |
| Male | 42.02 | 33.43 | |
| Female | 57.98 | 66.57 | |
| Race | | | 0.331 |
| Hispanic | 10.92 | 9.59 | |
| White | 70.59 | 75.19 | |
| African American | 18.49 | 15.21 | |
| Education | | | 0.08 |
| < high school | 4.62 | 3.39 | |
| high school graduate | 12.61 | 12.02 | |
| some college | 38.66 | 31.59 | |
| college graduate | 44.12 | 53 | |
| Marital Status | | | 0.567 |
| Married | 62.18 | 60.17 | |
| Single | 37.82 | 39.83 | |
| Income | | | 0.001 |
| < \$20,000 | 20.59 | 12.6 | |
| \$20,000 to < \$35,000 | 17.23 | 13.95 | |
| \$35,000 to < \$50,000 | 15.55 | 13.76 | |
| \$50,000 to < \$75,000 | 19.75 | 19.96 | |
| \$75,000 or more | 26.89 | 39.73 | |
| Get Attention from Health Professional | | | 0.066 |
| always | 36.97 | 45.45 | |
| usually | 38.24 | 34.11 | |



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|--|-------|-------|----------|
| sometimes | 21.01 | 15.99 | |
| never | 3.78 | 4.46 | |
| Doctors Care | | | 0.001 |
| always | 45.8 | 53.2 | |
| usually | 36.97 | 37.4 | |
| sometimes | 14.71 | 8.82 | |
| never | 2.52 | 0.58 | |
| Clear Explanation from Professional | | | < 0.0001 |
| always | 51.68 | 65.6 | |
| usually | 35.29 | 29.07 | |
| sometimes | 11.76 | 4.65 | |
| never | 1.26 | 0.68 | |
| Purpose of looking for Health Information | | | 0.001 |
| myself | 57.14 | 58.82 | |
| someone else | 14.29 | 22.38 | |
| both myself and someone else | 28.57 | 18.8 | |
| Quality of Health care | | | < 0.0001 |
| excellent | 69.33 | 79.65 | |
| very good | 18.49 | 15.5 | |
| good | 12.18 | 4.84 | |
| poor | 0 | 0 | |
| Frustrated searching information | | | < 0.0001 |
| strongly agree | 20.59 | 2.23 | |
| somewhat agree | 41.6 | 14.73 | |
| somewhat disagree | 24.79 | 32.17 | |
| strongly disagree | 13.03 | 50.87 | |
| Concern Electronic information | | | < 0.0001 |
| very concerned | 27.31 | 14.24 | |
| somewhat concerned | 47.06 | 46.71 | |
| not concerned | 25.63 | 39.05 | |

Table 2: Logistic Regression Analysis of Significant Predictors of Health Information Overload

| | Odds Ratios (95% Confidence Interval) |
|---------------|---------------------------------------|
| Gender | |
| Male | 1 |
| Female | 0.64 (0.45, 0.92) * |



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| | |
|---|-----------------------|
| Income | |
| < \$20,000 | 1 |
| \$20,000 to < \$35,000 | 0.69 (0.39, 1.24) |
| \$35,000 to < \$50,000 | 0.76 (0.41, 1.38) |
| \$50,000 to < \$75,000 | 0.58 (0.32, 1.07) |
| \$75,000 or more | 0.44 (0.25, 0.80) ** |
| Get Attention from Health Professional | |
| always | 1 |
| usually | 1.28 (0.83, 1.97) |
| sometimes | 0.86 (0.48, 1.57) |
| never | 0.14 (0.04, 0.46) ** |
| Doctors Care | |
| always | 1 |
| usually | 0.54 (0.35, 0.84) ** |
| sometimes | 0.49 (0.22, 1.11) |
| never | 0.95 (0.16, 5.62) |
| Frustrated searching information | |
| strongly agree | 1 |
| somewhat agree | 0.31 (0.17, 0.58) *** |
| somewhat disagree | 0.08 (0.04, 0.14) *** |
| strongly disagree | 0.02 (0.01, 0.05) *** |
| Concerned Electronic information | |
| very concerned | 1 |
| somewhat concerned | 0.44 (0.28, 0.69) *** |
| not concerned | 0.31 (0.19, 0.51) *** |

Note: *p<0.05, **p<0.01. ***p<0.001