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Abstract

The widespread availability of healthcare websites has changed the traditional healthcare system by enabling patients to play an active role in health management. The emerging field of Health 2.0 has enabled both professionals and patients to engage in content generation; changing the traditionally accepted professional healthcare to a new dimension of patient-centric healthcare. With the easy access to health information online, patients are turning to the Internet to look up for symptoms, diagnose health problems, or determine treatment procedures. Anecdotal evidence suggests that individuals' health management practices can be highly influenced by online health information. Considering the psychological characteristics of adolescents and their high exposure to the Internet, this study investigates the mechanisms of how online health information can motivate adolescents' behavioral intention towards self-management of their health issues. Our results showed that empowerment, attitude towards the website and privacy concerns significantly predict adolescents' health self-management behavior. Our findings also revealed that perceived health threat is not directly influencing the intention to self-managed health but instead interacts with other factors to influence intention. The findings provide important implications for theory and practice, by providing a better understanding of an emerging field of health care.

Keywords: Adolescent health, Health self- management, Online health information, Health 2.0

1   INTRODUCTION

Widespread availability of online health information has enabled patients to play a more active role in health self-management. In particular, the increased popularity of healthcare based informational websites have changed the healthcare system from being institutional-centric to more patient-centric (Demiris 2006). Online healthcare websites including the virtual healthcare communities provide a diverse pool of information facilitating patients in self-diagnosing (Misra et al. 2008). With the easy access and convenience, people are turning to the Internet to look for symptoms, diagnose health problems or to get information on treatments. Considering the Internet's enormous potential benefits to facilitate patients in their health management, researchers are increasingly devoted to online health or e-Health technologies (Eysenbach 2008b).

Past research have shown that information seekers are likely to make significant health decisions based on their online findings, such as decisions on self-treatments or deciding on whether professional medical care is needed at all (Sarasohn-Kahn 2008; Schwartz 2008). In particular, virtual community based healthcare websites have provided a platform for health information seekers to meet their informational needs as well as social needs by enabling connect to a wider network of similar others. Anecdotal evidence suggests that health information seekers value the information they gained through social media (Kahn 2008) regardless of who has generated the content. Although the widespread availability of online health information may empower patients with information to make better decisions (van Uden-Kraan et al. 2009), self-diagnosis based on online search has also raised concerns such as leading to unnecessary health anxieties (White and Horvitz 2009) or leading to wrong health treatments. It raises the importance of understanding the circumstances in which health information seekers are more likely to engage in health self-management. Thus motivated this study empirically validates a framework to examine how online health information seeking could lead to self health-management behaviors, particularly in the adolescence age group.

Adolescence or young adulthood is a period where individuals face multiple health-related challenges and questions (Eysenbach 2008a). For example, concerns can arise around common medical conditions such as mental health disorders (e.g. depression), smoking and alcohol addiction (Williams et al. 2002), or eating disorders (e.g. obesity and anorexia) (Swallen et al. 2005).Given the adolescents susceptibility to social influence (Steinberg and Monahan 2007) and high exposure to the Internet (Gross 2004), they may be at high risks to engage in self-diagnosing and online health related behaviors. Thus, in this study, drawing upon the protection motivation theory, we are interested in exploring the mechanisms of how information of community based healthcare websites can influence adolescents' behavioral intentions.

RQ1: How does online health information motivate adolescents' behavioural intention towards self-management of health?

Although past research suggests that social support could empower patients to better manage health conditions (Gallant 2003), health behaviors could also depend on various other factors. Individual differences in demographic factors such as age, gender, marriage status or socioeconomic status have been studied as determinants of information seeking behavior (Czaja et al. 2003). Illness related factors such as disease type, stage of disease and time since diagnosis have also been found to be important factors in determining patient's information seeking needs and behavior (Luker et al. 2006; Rutten et al. 2005). In this study we propose that information seekers' behavioral change is dependent on their perceptions toward the illness. Theoretical and practical evidence suggest that individual perceptions play a vital role in behavioral intentions (Schwarzer 1999). Specifically, threat perception is widely studied as an important factor in predicting health behaviors (e.g. the relevant constructs in health belief model.) Thus, we also investigate the influence of the threat perception on adolescent's intentions towards health self-management.

RQ2: How does the individual's perception of threat to their health influence their behavioural intention towards self-managed health?

2   THEORETICAL BACKGROUND

Conceptualization of the model is based on the identification of how health information on the website can change beliefs of health consumers that will result in a change of their mindset related to the management of health conditions. Behavioral change theories have gained recognition for their effectiveness in explaining health related behaviors. As this research focuses on the change in behavioral intentions of online health information seekers, behavioral change theories can be appropriately adopted for this study. While using the Protection Motivation Theory (PMT) as the main theoretical lens, we synthesize literature from IS and healthcare to shed light on understanding other influential dimensions. PMT has been widely applied in explaining patients' behavioral changes when they are diagnosed with health related illnesses (Rogers 1975).

2.1   Protection Motivation Theory (PMT)

Protection Motivation Theory was originally (Rogers 1975) proposed to understand fear appeals and it has been mainly studied in contexts of education (Sprinkle et al. 2006), marketing and health awareness (Leventhal 1971). Initially developed within the framework of fear-arousing communication, it has become the predominant theoretical framework in fear appeal research (Ruiter et al. 2001). Throughout the past literature, researchers have focused on understanding how fear-arousing communications affect cognitions, attitudes, behavioral intentions and health behaviors directly or indirectly.

Later expansions to the theory included components of cognitive appraisal process to explain how individuals cope in stressful situations (Lazarus and Folkman 1984). This theory has been widely applied to discuss health related issues. PMT describes individuals' adaptive or maladaptive coping to a health threat can be resulted from two processes which are threat appraisal process and coping appraisal process. These two processes can be triggered by the information they receive. An individual's evaluation of the behavioral options to diminish the threat in these processes, and appraisal of the health threat and the coping responses, lead to the intention of taking adaptive responses (protection motivation), or maladaptive responses that place an individual at a health risk.

The coping appraisal process involves relevant components for the evaluation of the coping responses. These components include individual's belief that taking adaptive responses can effectively reduce the threat (i.e. response efficacy), and the belief in one's ability to perform the adaptive responses successfully (i.e. self-efficacy) (Rogers 1975). Online health information can empower patients by better informing them (van Uden-Kraan et al. 2009) and educating them on evaluating illness conditions. As a result patients will get an informal power and a control over the situation. Accordingly, the proximal outcome of the coping appraisal process is captured by the perception of empowerment in our model, which involves processing the knowledge, skills, and beliefs that allow people to exert control over their health.

According to PMT, in parallel with the coping appraisal process, the threat appraisal process evaluates the threat associated with the relevant health information. Online health information usually does not only inform seekers of how to cope with conditions but also highlight their particular threats to one's health. For example information on health vulnerabilities, symptoms and self diagnosis tools can increase information seekers' anxieties. Health messages highlighting threats to well-being with recommendations to take protective actions have been frequently used in public health campaigns (Ruiter et al. 2001). Specifically, threat is a negative psychological emotion that results from some harm that has not yet occurred, but is possible, probable, or inevitable (Lazarus and Folkman 1984). It can motivate people to take protective responses thus increasing the likelihood of engaging in protective health related behaviors (Janz and Becker 1984).

2.2   Attitude toward exploring the website

Individuals make behavioral decisions based on careful consideration of the available information (Pee et al. 2008). The theory of planned behavior (TPB) posits that human behavior is preceded by intention formation and intention is determined by perceived behavioral control, individuals' attitude

towards a behavior and subjective norm (Ajzen 1985). The framework has been successfully applied to many studies exploring the relations between beliefs, attitudes, and behavioral intentions in various research fields such as marketing, advertising, information systems and healthcare. In this study, we focus on investigating the relationship between one of the determinants, i.e. attitude toward exploring the heath-related website, and the behavioral intention to self-managed health care.

Attitude is generally accepted as "the categorization of a stimulus object along an evaluative dimension based upon, or generated from, three general classes of information: (1) cognitive information, (2) affective/emotional information, and/or (3) information concerning past behaviors or behavioral intentions" (Zanna and Rempel 1988, p.319). According to TPB, attitude refers to the degree to which a person has a favorable or unfavorable evaluation of the behavior in question. In studying health related behaviors, (Godin and Kok 1996) found that attitude toward the behavior can be one of the most significant variables responsible for the explained variation of the intention.

2.3 Privacy Concern

Privacy is always viewed as a key governing principle of the patient–physician relationship (Appari and Johnso 2010). In an early empirical study, (Goodwin 1992) found the reason for youth (most of the respondents in her study were college students) to seek privacy can be summarized into two themes: 1) control over intrusion, and 2) control over disclosure. Control over intrusion includes avoidance of behavioral response from others, avoidance of embarrassment, and avoidance of unspoken evaluations by others. Control over disclosure, includes protection of enjoyment, protection of information about the self, protection of the self-image, and protection of the undesired self. When it comes to patient–physician relationship, patients are required to share information with their physicians to facilitate correct diagnosis and treatment, and to avoid adverse drug interactions. In other words, seeing a doctor can invariably incur interference from the doctor, other medical personnel and also from parents (i.e. losing control over intrusion). Moreover, sharing the illness experience with others could take the form of losing the control over disclosure.

Specifically, patients with stigmatic health conditions often avoid seeking for healthcare and education (Berger et al. 2005). Efforts to hide stigmatic illnesses often lead to delays in seeking professional help (Link et al. 1992). Such patients may refuse to disclose information of their health problems as their disclosure may lead to social stigma and discrimination (Applebaum 2002). Therefore, when dealing with stigmatic illness conditions patients may experience greater concerns over disclosing their personal information. In light of the reluctance of such patients to seek for professional healthcare, the Internet has proven to be a useful health education tool for patient education. (Berger et al. 2005).

3 MODEL DEVELOPMENT

Figure 1 depicts the research model for this study. The dependent variable is health information seeker's intention towards self-managed healthcare (SMH). Intention is an indication of a person's readiness to perform a given behavior, and it is considered to be the immediate antecedent of behavior (Ajzen 1991). Intention towards SMH is defined as the patients' intention towards taking a significant decision on managing their health conditions. Further, our focus is mainly on patients' intention towards managing their health conditions on their own, that will minimize the need to seek for professional help. For instance, patients can decide to self-medicate based on their Internet research. Online health information seekers often use the Internet to learn about a disease, to get diagnosed or to learn what treatments exist (Preece 2001). The Internet opens the gate to a rich information base for patients to better understand their health conditions and take necessary actions, which gives a sense of control over the situation. Within this conceptualization we posit attitude towards the website, privacy concern, perceived empowerment, and health threat will influence health information seekers behavioral intention towards health self-management. Moreover, we also identify the moderating role of the perceived health threat plays in between the antecedents and adolescents' intention to self-care.
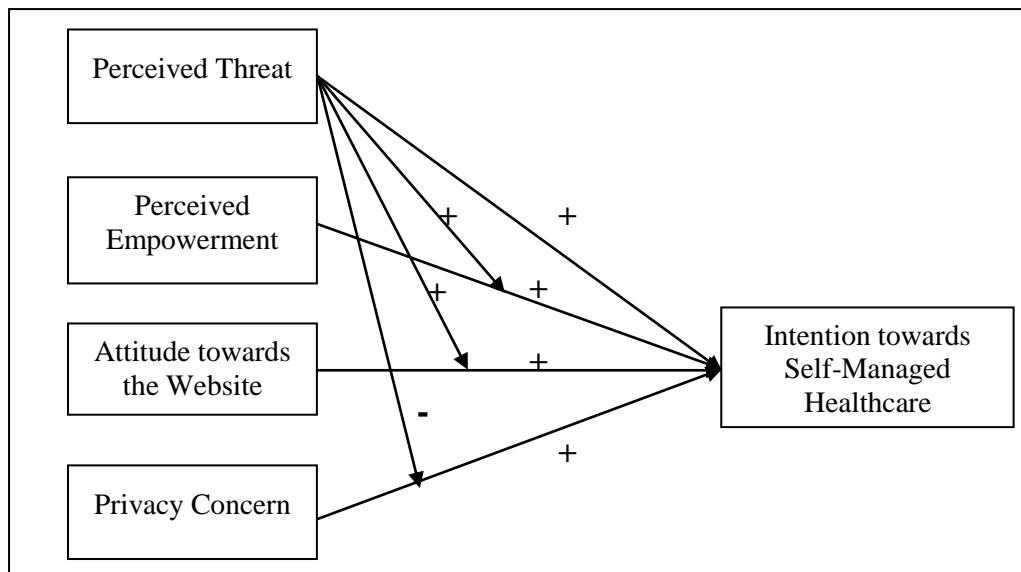
Figure 1.   Research model

3.1   Influence of attitudes on intention towards SMH

Attitude is the personal determinant of TPB that reflects favorable or unfavorable feelings about performing a behavior (Karahanna et al. 1999). Attitudes can be studied in a multi-component view, which assumes that attitudes are influenced by cognition as well as affect (Ajzen 2001). According to the theory of planned behavior (Ajzen 1991), people's attitudes directly influence their behavioral intentions. Information seeker's attitude towards the website indicates their "predispositions to respond favorably or unfavorably" to the site (Chen et al. 2002). Attitude is proven to be a key determinant of both consumer adoption and technology usage (Luo 2002). When health information seekers have a more favorable attitude over the website, they tend to use the website more as they believe and trust the information content and are likely to follow the health advices and guidelines present in the website. Thus, more favorable attitudes toward the health website may lead to higher acceptance of information content as well as the propensity to engage in self-managed healthcare. Hence, we hypothesize:

> *H1: Attitude towards using the healthcare website is positively related to intention towards self-managed healthcare.*

3.2   Influence of privacy concern on intention towards SMH

Social stigma can be defined as any aspect of an individuals' identity that is devalued in a social context (Goffman 1963). Stigma can lead to discrimination, ostracism, or persecution, and may cause feelings of embarrassment or humiliation in the stigmatized individual (Gilbert et al. 2001). In this study, the focus is on illness stigmatism or illness conditions associated with a social stigma (for example depression). Patients who perceive greater illness stigmatism would be more reluctant to share their information and would feel a greater risk of disclosing their identity. Hence, such individuals would have greater concerns over their privacy. That is their right and desire in disclosing their personal information (Rindfleisch 1997) as they desire to hide their conditions from the society.

Patients with higher privacy concerns experience a higher risk of revealing the information to the public. Due to the stigma associated with certain illnesses, people often conceal stigmatized health conditions, or avoid situations that may reveal their conditions (Berger et al. 2005). Efforts to hide stigmatized illnesses often lead to delays in seeking professional health care and information (Link et al. 1992). Online websites equip patients with relevant information to better understand and evaluate their health conditions. Thus patients with higher privacy concerns may turn to alternative sources of help online and engage in self-managed healthcare so as to minimize revealing their identity. Thus we hypothesize that:

H2: Privacy concern is positively related to intention towards self-managed healthcare.

3.3   Influence of perceived empowerment on intention towards SMH

People seek for online information to be in better control of their own health (Sillence et al. 2007). They could either be trying to diagnose a new health problem on their own or searching for advices and information of similar others (Fox and Rainie 2002). By exploring the healthcare websites that provide information related to one's own conditions, people gain greater control over decisions and actions affecting their own health. Information content accessible over the websites can enable people to have a sense of control over managing their disease by providing them with relevant information to understand and evaluate their own conditions. (Feste and Anderson 1995), argues that empowerment introduces 'self-awareness, personal responsibility, informed choices and quality of life.'

Online information enables users to challenge medical expertise (Hardey 1999) by equipping patients with information related to their conditions. Information empowerment helps patients to take informed decisions and it also gives them a greater control over their health situations. As a consequence, people may make significant health decisions, often in their best interest, or learn how to treat a health problem on their own (Gualtieri 2009). Greater levels of empowerment give greater control over health issues and higher confidence in managing health on their own. Thus we hypothesize that:

H3: Empowerment is positively related to intention towards self-managed healthcare.

3.4   Role of health threat in formation of intention towards SMH

Threat is a negative psychological emotion that results from some harm that has not yet occurred, but is possible, probable, or inevitable (Lazarus and Folkman 1984). Perceived threat can influence the likelihood of health related behavior (Janz and Becker 1984). According to PMT, health threat, through people's threat appraisal process, lays the basis for motivating people to take protective actions against adverse health conditions. Research examining individuals' healthcare motives has found it to be closely associated with health behaviors (Moorman and Matulich 1993). Therefore, we hypothesize:

H4: Health threat is positively related to intention towards self-managed healthcare.

In PMT, while an additive model holds within each appraisal process, it has been argued that by combining components (between the threat- and coping appraisal processes), interaction effects can occur (Prentice-Dunn and Rogers 1986). It is recognized that if response efficacy and/or self-efficacy (i.e. perceived empowerment) are high, increases in severity and/or vulnerability (i.e. health threat) will produce a much stronger effect on intentions. Hence we propose the moderating effect:

H5a: Perceived threat moderates the positive relationship between empowerment and intention towards self-managed healthcare such that the relationship is stronger with higher levels of perceived threat and weaker with lower levels of perceived threat.

When the health situation is more threatening and when people experience more negative effects, people seek for more information about how to control the threat and search for alternative means of coping (Leventhal et al. 1997). Higher threat level indicates that patients experience a higher risk for their lives (David et al. 2006), resulting in seeking for more information or alternative ways to cope. However, if the perception towards the website is more positive, people will adhere and utilize the information provided in the website more when there is a higher threat. Thus we propose the moderating effect:

H5b: Perceived threat moderates the positive relationship between attitudes toward using healthcare website and intention towards self-managed healthcare such that the relationship is stronger with higher levels of perceived threat and weaker with lower levels of perceived threat.

Concerns on stigma and privacy represents an increasingly significant factor affecting people's perceptions of their health and influencing acceptance of technologies (Gregory et al. 1996). Research has shown that patients who feel more threatened by an illness have a higher tendency to adhere and comply with the doctor's instructions (Caldwell et al. 1970). If the perceived threat is higher and when fear appeals control the perceptions, individuals may tend to make safer decisions undermining the privacy concern. Thus we propose that:

> *H5c: Perceived threat moderates the positive relationship between privacy concern and intention towards self-managed healthcare such that the relationship is stronger with lower levels of perceived threat and weaker with higher levels of perceived threat.*

4 RESEARCH METHODOLOGY

4.1 Research Design

To assess the proposed model, a scenario-based survey was conducted. A total of 120 college undergraduate students were recruited for the study. All the participants were aged between 17 and 20 representing the adolescent community. Given the high exposure to the Internet and the susceptibility to social influence (Gross 2004; Steinberg and Monahan 2007) college students can be ideal representatives of the adolescent online community.

In practice, an immense number of healthcare websites are available with different features and functionalities. People with health problems or questions can either enter search terms directly to search engine or directly use a specific health related website. A study among youth has shown that at least 16% of youth go directly to a specific site to search for health issues (Metzger and Flanagin 2007). New additions to Health 2.0 have enabled healthcare websites to incorporate social network features. As a result, not only technical savvy but also general public including patients, doctors and caregivers are generating content. Thus, for this study we are focusing on a community based website where both doctors and patients involve in content generation. The search attempts of users could be based on different health issues and conditions that vary among individuals. Hence, in-order to control for the search content we have followed a scenario-based survey approach. Further, to control for the website, a prototype version of a community website was developed and given to subjects to browse.

The prototype version of the health community based website was created to simulate an actual online health information-seeking scenario. Contents for the experimental website was extracted from two popular websites, WebMD and PatientsLikeMe to represent professional generated and patient generated content respectively. WebMD is a well established website maintaining up-to-date medical reference content databases and supportive communities, generated by full time healthcare professionals. On the other hand, Patientslikeme.com is a well-known platform of patient generated content, consisted of nearly 150,000 user profiles up to date. Thus, in designing the experiment, we incorporated features of both websites.

To provide variation in privacy concerns and perceived threat, the scenarios were manipulated along two dimensions – stigmatism and severity. In-order to manipulate different levels of stigmatism and severity, four illness scenarios were created based on two illness conditions. We used illness conditions from psychiatric disorders category due to two reasons. First, due to the stigma, patients susceptible to psychiatric disorders are more likely to turn to Internet for health information (Berger et al. 2005). Second, depression is an illness condition which is known to be a common psychiatric disorder among adolescents (Hallfors et al. 2004). Moreover, insomnia, which is closely related with depression (also known as a major symptom of depression), is also known to be a common health issue among adolescents (Buysse et al. 2008). Thus, descriptions of illness scenarios were created including the symptoms and health issues associated with depression and insomnia.

The scenarios were based on different levels of stigmatism and severity to provide variation to individual's perceptions of privacy concern and threat. Each dimension had two levels yielding four illness scenarios: 1) high stigma + high severity 2) high stigma + low severity 3) low stigma + high severity and 4) low stigma + low severity. To manipulate high and low levels of stigma, depression

and insomnia were selected respectively. Depression has been associated with high stigmatism while insomnia has been associated with a low stigmatism level (Corrigan and Penn 1997). Secondly, to manipulate two levels of severity, different seriousness levels and symptom severity levels of two health conditions were used.

Prior to the study, subjects were informed that they would receive US$8 as a reward for their participation in the study. They were randomly selected and given a scenario of the illness condition to read. Scenario includes symptoms, health issues and feelings that an affected individual would experience. Subjects were briefed and asked to read the scenario and assume themselves a 'sick role'. After the briefing session subjects proceeded with the searching. They were asked to browse through all the available information content on the website to understand and evaluate their illness. Finally, subjects completed a questionnaire. Each experiment session lasted for about 30 minutes.

4.2   Measurement Instrument

Constructs were mostly operationalized based on previously validated instruments from information systems and health literature. Questions were rephrased or modified wherever necessary. For example, to measure the empowerment, items from patient enablement instrument were adopted (Howie et al. 1998) and modified. All items were measured using a seven-point likert-scale with anchors from 'strongly disagree' to 'strongly agree'. The survey instrument is presented in the Table 1.

Construct	Items	Source
Empowerment (EM)	As a result of viewing the health information, do you feel: 1. You are able to understand your illness? 2. You are able to cope with your illness? 3. You are able to help yourself?	Adapted from (Howie et al. 1998): Patient Enablement Instrument
Attitude Towards Website (ATT)	1. I like surfing for health information on this website. 2. Obtaining health information on this website is a good idea. 3. Searching for health information on this website is appealing.	Adapted from (Grazioli and Jarvenpaa 2000)
Privacy Concerns (PC)	1. I'm worried about the confidentiality of my health condition. 2. I feel uncomfortable when other people know about my health condition. 3. I will feel uncomfortable when I come into contact with other patients at the doctor's.	Self developed based on (Sankar et al. 2003)
Perceived Threat (PT)	1. My illness is a serious condition. 2. My illness has major complications in my life. 3. My illness may cause difficulties for me and my family in my life.	Adapted from (Weinman et al. 1996): The Illness Perception Questionnaire
Intention to Self-managed healthcare (SMH)	1. I would prefer to self-care, and see if there are any possible remedies/treatments to help myself using the health information. 2. I will try to manage my own health using the health information as far as I can, and visit the doctor when necessary. 3. If I do see a doctor, it is likely I would discuss the information I found online with him.	Self developed based on the review of (Gallant 2003)

Table 1.   Questionnaire items

5   DATA ANALYSIS

First the survey instrument was tested for reliability and validity followed by assessment of the path model using structural equation modeling. Second, the structural model was analyzed using Partial Least Squares (PLS). PLS was chosen as it is a suitable tool for analyzing smaller sample sizes (Chin et al. 2003). Moreover, PLS is more prediction-oriented and maximizes the variance explained in constructs, thus making it "closer to data, more exploratory, and more data analytic" (Barclay et al. 1995).

5.1 Instrument Validation

To validate the measurement model, the reliability and validity of the constructs were assessed. Cronbach alpha and composite factor reliability (CFR) scores were used to assess the reliability of the constructs (Straub et al. 2004). All the constructs had adequate reliability of at least 0.70, in Cronbach alpha values and composite reliability scores (Nunnally 1978).

Factor analysis was conducted to examine the construct validity. Convergent validity was tested by assessing the item loadings to see whether items loads highly on their intended factor. Discriminant validity was assessed by examining the factor loadings to see that items loads highly on their intended factor than other factors (Cook et al. 1979). To check for discriminant validity, the correlations between constructs should be less than the square root of variance extracted (AVE) for a construct. Table 2 reports the factor correlations matrix. Discriminant validity was checked comparing diagonals (square roots of AVE) to non-diagonals.

	Attitude	Empowerment	Intention	Privacy	Threat	CFR	Alpha
Attitude	0.66					0.89	0.77
Empowerment	0.47	0.73				0.92	0.83
Intention	-0.09	0.01	0.51			0.87	0.77
Privacy	-0.08	-0.01	0.49	0.51		0.87	0.80
Threat	0.33	0.37	0.23	0.14	0.37	0.81	0.69

Table 2.   Factor correlation matrix

Convergent validity was assessed examining the item loadings. Two items (EM1 and ATT2) were removed since they were highly correlated with unintended items and loaded highly on unintended factors (value of above 0.5). Upon removing EM1 and ATT2 all the items fulfilled the requirement of convergent and discriminant validity (see Table 3).

	Empowerment	Attitude	Privacy Concern	Threat	Intention
EM2	0.93	0.45	-0.08	-0.04	0.35
EM3	0.85	0.39	-0.09	-0.12	0.23
ATT1	0.48	0.89	-0.06	-0.02	0.27
ATT3	0.39	0.95	0.05	0.01	0.38
PRIV1	-0.12	-0.02	0.81	0.41	0.19
PRIV2	-0.03	-0.01	0.89	0.40	0.21
PRIV3	-0.08	0.06	0.80	0.42	0.18
PT1	-0.04	0.03	0.41	0.70	0.05
PT2	-0.08	-0.02	0.45	0.96	0.17
PT3	-0.08	0.01	0.47	0.82	0.05
INTSC1	0.28	0.38	0.13	0.11	0.83
INTSC2	0.22	0.24	0.07	0.03	0.75
INTSC3	0.26	0.22	0.30	0.15	0.73

Table 3.   Factor loadings and cross loadings

5.2 Results of Hypothesis Testing

PLS was used to test the proposed structural model. Bootstrap re-sampling was performed on the structural model to examine the path significances. Path coefficients and explained variance for the model are shown in figure 2. All the hypotheses were tested at the 5% significance level.
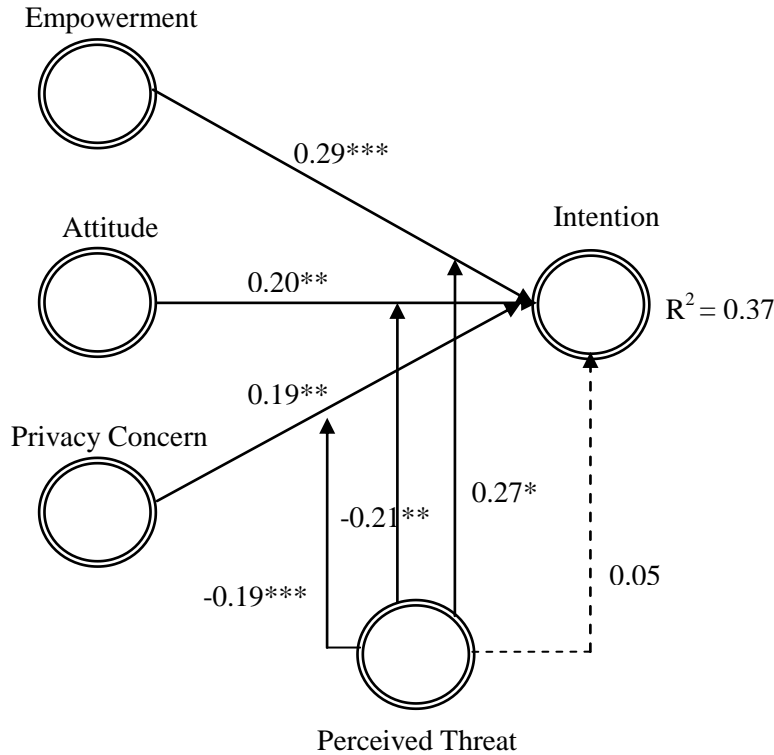

Figure 2.   PLS test of the path model

The overall model explains 37% of the total variance of dependent variable ($R^2 = 0.37$). Results indicated that empowerment significantly predicts the intention to self-managed healthcare ($t = 4.11$, $p < 0.001$). Attitude towards the website also significantly influences adolescents' intention to self-managed health ($t = 2.41$, $p < 0.01$). Perceived level of privacy concern is also seen to be a significant predictor of intention ($t = 2.95$, $p < 0.01$). However, perceived threat did not show a significant influence on intention.

Interaction between perceived threat and empowerment has a significant and positive effect ($t = 1.91$, $p < 0.05$), indicating that, although patients perceive a high level of threat, their intention to self-managed health will become stronger when they perceive a higher level of empowerment. Our results also showed a significant negative impact on intention from the interaction between privacy concern and perceived threat ($t = 3.18$, $p < 0.01$). Finally, contrary to our expectation, interaction of attitude towards the website and the perceived threat showed a significant negative effect ($t = 2.41$, $p < 0.01$). In other words, it indicates that when the perceived level of threat is higher, users' attitude towards the website becomes weaker. A summary of hypotheses testing is presented in table 5.

Hypothesis (path)	Path Coefficient	t-Value	Supported
H1: Attitude -> Intention	0.20	2.41	Yes
H2: Privacy concern -> Intention	0.19	2.95	Yes
H3: Empowerment -> Intention	0.29	4.11	Yes
H4: Perceived threat -> Intention	0.05	0.49	No

H5a: Empowerment * Perceived threat	0.27	1.91	Yes
H5b: Attitude * Perceived threat	-0.21	2.41	No (opposite direction)
H5c: Privacy concern * Perceived threat	-0.19	3.18	Yes

Table 4.   Results of hypotheses testing

6   DISCUSSION AND IMPLICATIONS

The goal of this research is to understand how and in what situations online health information seekers, especially adolescents, are motivated to take significant decisions on health. Specifically we focused on a situation where patients have not been officially diagnosed by a doctor. The Internet has provided a rich information source for health information seekers by connecting patients, doctors and other professionals regardless of geographical boundaries. The Internet has the potential to increase the anxieties of people by overwhelming them with information, especially when the web search is employed as a diagnostic procedure (White and Horvitz 2009). Given the high exposure to the Internet (Gross 2004) and susceptibility to social influence (Steinberg and Monahan 2007), we anticipate that adolescents' healthcare behaviors can be highly influenced by the Internet. Moreover, considering the stigmatic nature of psychological disorders, there is a natural tendency to turn to the Internet as the first information source.

Prior studies have showed that social support, emotional support and occasional advices facilitate the self-management process (e.g.DiIorio et al. 1996; Glasgow and Toobert 1988). With the widespread availability of online information, many people are turning to the Internet to look up symptoms, diagnose a problem or to learn about the treatments (Preece 2001). In particular, the proliferation of health-related Web 2.0 websites, which include user-generated content and collaborative features, have led to a field of Health 2.0 (Gualtieri 2009). Our research is an attempt to contribute to this emerging field of literature.

In general, results are encouraging and provide support for most of the hypotheses. As expected, intention towards self-managed healthcare was significantly predicted by empowerment, attitude towards the website and privacy concerns. Consistent with the protection motivation theory, results showed that empowerment has the strongest influence on patient's intention towards health self-management. Health empowerment is a concept that has emerged based on the principle that when the patients are entitled to access to health information they tend to determine their own health care choices (Demiris 2006). Through the health empowerment process patients will get a better understanding and control over their health issues.

Contrary to the protection motivation theory, our results showed that health threat is not directly influencing the intention to self-managed health. Instead, heath threat interacts with other factors to affect intention to self-health management. Our study reveals that interaction of empowerment and perceived threat has a significant positive effect on the intention towards self-managed health behavior. This finding gives an interesting implication to better understand patient empowerment. According to the health belief model, higher levels of perceived threat increase the likelihood of behavior change and it has been applied in studying compliance behaviors, disease prevention, adoption of healthy behaviors etc. (e.g. Forsyth and Goetsch 1997; Mullens et al. 2004). Our study reveals that, as a result of empowerment, patients are likely to take control over their health conditions more when there is a higher level of threat to their lives. This finding opens the path for further investigation, as the current literature has not properly explained health empowerment in risky health situations.

The significant direct effect of attitudes towards the website on intention was consistent with the predictions of widely used TPB. This result indicates that patient's favorable attitude towards the healthcare website is directly influencing the healthcare decisions by accepting the information content of the website. Interestingly, opposite to what we have hypothesized, interaction effect between attitude and perceived threat showed a negative and significant influence on intention to self-managed healthcare. Multi-component view of attitudes suggests that attitudes are influenced by

cognition as well as by affect (Ajzen 2001). Our findings suggest that perceived threat has influenced individual's cognitive evaluations. Although, information seekers possess a positive attitude towards the website, if the perceived level of threat is high they are less likely to depend on the website to perform self-managed healthcare.

Finally, privacy concern showed a significant positive direct effect and the interaction between privacy concern and perceived threat had a significant negative effect. These findings indicate that, although there is a higher concern of privacy, if the adolescents perceive a higher level of threat, their intention towards self-health management related behaviors becomes weaker. This is consistent with the notion that in presence of threat, people tend to take risk avoidance decisions (Rippetoe and Rogers 1987).,When it comes to health related behaviors, patients who are susceptible to illness conditions would make much safer decisions such as getting advice from doctors or solely depend on doctors for medication.

7   CONTRIBUTION TO RESEARCH AND PRACTICE

This study provides several theoretical and practical implications in the areas of health behavior change, threat and online health communities. Using the protection motivation theory as the main theoretical base, our research contributes to the literature by identifying mechanisms of how threat influences patients' intentions towards healthcare related decisions. Most patients engage in online activities without the adequate knowledge, experience, and objectivity of medical providers and without sufficient health literacy skills (Gualtieri 2009). Past literature gives evidence to the positive impact of online health information search (e.g. Beun 2003; Hu and Sundar 2010), but little attention has been given to study how patients change their intentions towards self-care based on their online findings.

Expanding the boundaries of literature, we have investigated the interaction effects between variables of protection motivation theory (interaction of threat with empowerment and attitude). Moreover, our study also reveals that threat appraisal process can influence the relationship between attitudes, privacy and intention. Threat (health belief model) and fear appeals (Rogers 1975) were shown to have significant influences on preventive health behaviors. Interestingly, base on empirical findings we can put forward that, in online contexts, threat is more likely to intervene with people's perceptions towards themselves as well as toward website than directly influencing the behavior.

Our findings provide important implications for website designers and healthcare professionals. First, for the healthcare professionals, our research explores how patient empowerment can influence health management and healthcare decisions of patients. Informational empowerment can influence patients in various ways. For example, patients can learn how to treat a health condition on their own or patients would make proactive decisions to visit a doctor and be involved in health decision making (Gualtieri 2009). On the other hand, there are major negative outcomes associates with empowering patients in health decision making. Most of the online help seekers may not have the required knowledge to evaluate the online medical content. Further, when threat interferes with perceptions of empowerment, subjects showed much stronger intention towards health self-management. It is important to empower patients in the 'correct way' and guide them towards rational decision making. One way to reduce the threat would be health professionals' active involvement in online health websites.

Second, our study illustrates that the relationship between the attitude towards the website and the intention to self-managed healthcare is influenced by perceived threat. When the threat level increases, information seekers have become less dependable on their beliefs towards the user generated content. These findings give useful implications for website designers by highlighting the importance of proper content verification techniques. Moreover, our findings further confirm the Internets' potential benefit for patients with high privacy concerns. This implies that, health-related websites should provide more content regarding stigmatic conditions in particular to meet the needs of such users. On the other hand, website designers should pay careful consideration on ensuring the privacy of users while collecting personal profiles to provide more advanced diagnostic tools.

Our research also offers some interesting contributions to adolescents' online health-related behaviors. Online health information can be an important source to inform adolescent health decisions on self diagnosis, because adolescents are often concerned with health problems that may be sensitive and hard to disclose. When they encounter stigmatic health conditions that are not perceived as causing severe threat to their life, young patients are more likely to conduct self-managed healthcare. This finding is coincident with the trend of youth gradually emancipating themselves from traditional authority figures and becoming increasingly self-reliant, which was observed by some previous studies (Eysenbach 2008b).

8   LIMITATIONS AND FUTURE RESEARCH

As with most studies, this study has its limitations. First, since the context of this study is limited to illness conditions manipulated through social stigma (depression and sleep disorders), caution should be taken in generalizing our findings to other illness conditions or illness types. For example, patients with chronic illnesses may have different concerns (other than privacy concerns studied here) from those with acute illness hence future research could explore other illness types and concerns. Moreover, subjects are college students who are much exposed to Internet than other age categories.

Second, findings of our study showed that in the presence of threat, relationship between attitudes and intention becomes weaker. Since, the context of the current study is limited to investigating the intention towards self-managed healthcare; it is interesting to investigate this phenomenon in other health related behaviors. Moreover, results also showed that perceived threat is undermined in the presence of patient empowerment. Future research may investigate the underlying mechanisms of how and why threat perceptions are not significant in the presence of empowerment.

9   CONCLUSION

With the widespread availability of online health information and with the advancement of Health 2.0, virtual health communities have become an important concern. Many people automatically turn to the Internet to look up for symptoms, diagnose health problems, or to learn about treatment procedures. Based on online search patients may take significant health decisions such as treating by themselves or decisions on seeking for professional medical care. The emerging field of Health 2.0 has enabled users to engage in content generation, changing the traditionally accepted professional healthcare to a new dimension of patient-centric healthcare. Considering the psychological characteristics of adolescents and their high exposure to the Internet, they are more likely to use online health information to engage in self-managed healthcare. Thus motivated, this study investigated the mechanisms of how online health information can motivate adolescents' behavioral intention towards self-management of their health issues. As a boundary condition we have chosen illnesses that manipulated through psychological conditions, because of the stigma such patients are highly engaging in online activities than patients with other conditions. Findings of this study can help web designers and healthcare professionals, by providing a better understanding of an emerging field of health care. Further, by increasing the awareness, this study could also benefit caregivers or parents of young adults.

The study is exploratory and reveals that empowerment, attitude towards the website and privacy concerns are significant antecedents that predict adolescents' health self-management behavior. Moreover, our results also revealed that under threatening situations, privacy concerns and favorable attitude towards the website becomes less important and individuals become are less likely to perform self-healthcare.

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