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Internet Uses for General, Health-Related, and Smoking Cessation Information Seeking from Gender and Uses and Gratifications Frameworks

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Informed by gender role framework and uses and gratifications theory, this study examines gender differences and factors associated with Internet use utilizing Health Information National Trends Survey data (N = 3,738). Women seek general health and smoking cessation information significantly more than men do; women also use the Internet significantly more to pursue gratifications of information seeking and sharing than men do. Gender deficits in health-information seeking exist. The Internet user profiles are tied to the types of information gratification sought. General nonhealth information seekers are young, highly educated, high-income, not retired/disabled, females with the intention to quit smoking and the belief of changeable smoking behavior; for *general health information seekers, the critical characteristic* is the belief that getting information is easy; and *for smoking cessation information seekers*, the prominent features are smoking little with the intention to quit, the belief of changeable smoking behavior, and no frustration felt during the information search. This study extends and advances nuanced differences between men and women in Internet information-seeking behaviors by testing theoretical boundaries for uses and gratifications theory.

Keywords: information seeking, Internet use, uses and gratification theory, gender difference, smoking

Millions of people have tapped into a wide range of health information on the Internet (Baumann, Czerwinski, & Reifegerste, 2017). Health-information seeking is the third most popular online activity, following the use of email and search engines (Magnezi et al., 2015). The Internet is the most preferred, easy, and convenient first stop when searching for health information (Xiao, Lee, Zeng, & Ni, 2020). Further, online health-information seeking strongly influences one's making sense of health-related issues, decisions, and behavioral intentions (Johnson & Case, 2012). Particularly, smokers are known to seek information

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about smoking cessation on the Internet, and when they do, they tend to participate in a smoking cessation program (Noh, Lee, & Choi, 2016). Thus, to address smokers' health motivations, it is critical to understand their online information-seeking behaviors.

There is an ongoing research interest in genderized use of the Internet for health and other information (Baumann et al., 2017). Males and females may have different attitudes, beliefs, and motives about using the Internet, resulting in the gender gap in health and other knowledge and outcomes (Ortiz-Dowling, Der Ananian, Larkey, & Hooker, 2019). Nonetheless, "the extent to which the correlates of [online] health information seeking among women and men differ, if at all, is currently unknown" (Nikoloudakis et al., 2018, p. 1359).

Although research has demonstrated differential gender motives for online information seeking and sharing, it lacks "theoretical exploration as to if and how these [gender] differences in motives and channel usage are also relevant for online health information seeking" (Baumann et al., 2017, p. 3). The theory of uses and gratifications is well-poised to help explore gender variations in use of the Internet (Ruggiero, 2000). Thus, the current study investigates gender divergences in motivations for online information seeking on smoking cessation, health-related, and other general information from uses and gratifications theory.

Uses and Gratifications and Internet Use

The theory of uses and gratifications posits that people are active and goal-oriented in their behaviors and that they have various reasons for actively seeking and using different types of media (Katz, Blumler, & Gurevitch, 1974). Instead of addressing what media do to people, the theory emphasizes what people do with the media (Swanson, 1979). It postulates media use as a means of fulfilling individual needs. In this regard, research on uses and gratifications is to explain why people use media and what psychological needs motivate them to use media (Chung & Kim, 2008). Katz and colleagues (1974) asserted that the process of psychological motivation works through the following steps:

> (1) the social and psychological origins of (2) needs, which generate (3) expectations of (4) the mass media or other sources, which lead to (5) differential patterns of media exposure (or engagement in other activities), resulting in (6) need gratifications and (7) other consequences, perhaps mostly unintended ones. (p. 20)

Palmgreen and Rayburn (1982) further explored the connections between media exposure and gratifications sought from the expectancy-value perspective (Vroom, 1964), which assumes that an individual's motivation for a certain behavior is determined by *expectancy* (the likelihood that an expected outcome will be achieved through the behavior) and *value* (the extent the individual values the desired outcome). In addition, Palmgreen (1984) classified six main areas of research, including gratifications and media use, gratifications and media effects, social and psychological causes of gratifications, gratifications sought and obtained, expectancies and values of uses and gratifications, and audience behaviors and activities. These previous studies have shaped research on uses and gratifications to focus on individuals' motives, antecedents of motives, and outcomes of media use (Chung & Kim, 2008).

Motives of Internet Use

Prior studies from the uses and gratifications perspective have identified information seeking, information surveillance, entertainment, and social utility as the major motivations for using the Internet (Ferguson & Perse, 2000). For example, Park and colleagues (2009) found that university students used social media to socialize with their friends and search for status. Others visit sports websites or interactive social networking sites for "escape, entertainment, excitement, passing time," or "social information" motivations (Ferguson & Perse, 2000, p. 165). In addition, some people visit news or information websites to satisfy information-oriented motivations such as information gains, issue guidance, surveillance (Lee & Oh, 2013). Yli-Uotila and associates (2013) reported similar motivations such as ease of communication, access to information, and emotional and informational support. Other people have opinion-oriented motivations for opinion formation, affirmation, and avoidance (Go, You, Jung, & Shim, 2016).

For the Internet use among smokers, seeking information about how to quit and about medications was found to be the motivation for current smokers; but how to cope with withdrawal was the motive for online information seeking among former smokers. Research participants, however, showed little interest in information about expert support, peer support, or telephone counseling (Cobb & Graham, 2006).

Antecedent Factors in General, Health-Related, and Smoking-Related Internet Use

There are a multitude of antecedents that affect use of the Internet for the general purpose. Bujnowska-Fedak (2015), for example, showed that "age, gender, education, employment status, place of residence, general health status, frequency of visiting doctors, long-term illnesses or disability, and mobile phone use" were significant predictors of the general use of the Internet (p. 5). Younger people, men, the employed, people who lived in big cities, and better-educated individuals were more likely than their counterparts to use the Internet.

Multivariate analysis of different factors that influence Internet use for health matters demonstrated that women, younger people, better-educated individuals, nonsmokers, people who had a chronic disease, or more years of Internet experience or access to broadband were more likely to seek *health* information through the Internet (Magnezi et al., 2015; Nikoloudakis et al., 2018). However, income and age were less consistently associated with online health-information seeking (Magnezi et al., 2015).

In the context of smoking, studies found socioeconomic status, education, and being employed were all correlated with online information seeking on smoking cessation among smokers (e.g., Mathur, Levy, & Royne, 2013; Nagler, Puleo, Sprunck-Harrild, Viswanath, & Emmons, 2014). However, there are mixed findings about the predictive ability of age on information seeking among smokers (Mathur et al., 2013; Van der Rijt & Westerik, 2004). Xiao and colleagues (2020) found that comprehension of information, trust in information sources, and confidence in obtaining information were predictors of online information seeking related to cigarette smoking.

Gender Differences in General, Health-Related, and Smoking-Related Internet Use

Studies have shown that gender differences exist in individuals' interactions with computers and all Internet-related activities, including information seeking, networking, solving professional tasks, and playing games (Pavlović & Zaharijevski, 2015). Research on gender differences in Internet use can be divided into two eras: before and after the year 2000 (Ono & Zavodny, 2007). Before 2000, gender disparities were primarily studied on Internet access and use frequency. A common finding was that, compared to women, men were more competent with using the Internet, more interested in the Internet, and more capable of understanding computers and the Internet. Therefore, consistent with gender role expectations, more men than women used the Internet (Newton, 2001). After 2000, research on gender variations has shifted from access and frequency of use to more specific problems and needs because men and women have been considered to have equal opportunity in terms of Internet accessibility and frequency of use (Ono & Zavodny, 2007). However, Pavlović and Zaharijevski (2015) argue that gender differences about accessibility and frequency of use of the Internet still exist, and gender differences vary when research goals are set on different topics such as content, competence, previous experience, and safety. Other recent studies (e.g., Bujnowska-Fedak, 2015; Magnezi et al., 2015) lend support to this argument that there are substantial gender differences in general Internet use (i.e., more men than women used the Internet) and Internet use for health matters (i.e., women are more likely to seek health information via the Internet). However, Nikoloudakis and colleagues (2018) found little gender difference in correlates of information seeking on the Internet; both men and women were likely to access online health information primarily for prevention purposes. Further, Rowley, Johnson, and Sbaffi (2017) found that, in online health-information seeking, both men and women focus on the factors that positively influence trustworthiness judgment, such as credibility, recommendation, ease of use, and brand. However, women gravitated toward the diverse information sources that are easy to understand, whereas men fixated on the comprehensiveness, accuracy, and familiarity of the sources of information with easy access and little complaints.

Although research on online information seeking in the context of smoking has found the correlations between information-seeking behaviors and the aforementioned factors, most studies have primarily focused on Internet use among general populations, and relatively little is known about the characteristics of Internet use among smokers. There is also a lack of understanding about how Internet use correlates with health and sociodemographic variables in the population of smokers. Thus, this study aims to examine: (1) the frequency of Internet use to seek information among smokers and nonsmokers; (2) the extent to which risky health behaviors such as smoking may interact with gender on such use; and (3) what gratification needs are associated with information seeking when using the Internet for general nonhealth information, general health-related matters, and smoking cessation, respectively. In particular, the current study identifies the profile of the Internet users based on five domains of interest grounded in uses and gratifications theory, including sociodemographic variables, smoking-related behaviors and beliefs, beliefs about cancer and information seeking, and trust in information sources.

Method

Data

Data were retrieved from the 2015 Health Information National Trends Survey (HINTS) conducted by the National Cancer Institute (NCI) and the Food and Drug Administration (FDA). HINTS-FDA collected data on tobacco-related online information seeking among former and current smokers (who might seek information for self) and nonsmokers (who might seek information for significant others). The survey was conducted by mail with a $2 prepaid monetary incentive between May 29 and September 8, 2015. Four mailings, including an initial mailing, a reminder postcard, and two follow-up mailings, were sent out. One adult was selected as a participant within each sampled household. Most households received one English survey per mailing, but those potential Spanish-speaking households received both English and Spanish surveys per mailing. A total of 3,738 households participated in the study.

Measures

To gauge smoking behavior, one question was employed, "Do you now smoke cigarettes?" Responses were coded as 1 = not at all, 2 = some days, and 3 = every day. Intention to quit smoking measured if participants would seriously consider quitting smoking cigarettes in the next six months (0 = no; 1 = yes).

Internet use for information on nonhealth general matters was assessed by asking participants if they ever went online to access the Internet for information or to send and receive email (0 = no; 1 =yes). Internet use for information on health matters examined whether participants had read health information on the Internet in the past 12 months (0 = no; 1 = yes). Internet use for information on quitting smoking assessed whether participants had used the Internet to look for information about quitting smoking (0 = no; 1 = yes). Venues for Internet access asked how often participants accessed the Internet through computers at home, at work, at school, in a public place, on a mobile device (e.g., cell phones/smartphones/tablets), or on a gaming device/Smart TV. Response options were 1 = daily, 2 = sometimes, 3 = never, and 4 = N/A. Health-related reasons or gratifications for Internet use were assessed by a 10-item list, which asked whether participants had used the Internet (0 = no; 1 = yes) for seeking or exchanging information. Example items include: "looked for health or medical information for yourself" and "shared health information on social media sites, such as Facebook or Twitter."

Trust in information sources was about how much participants would generally trust information about the health effects of cigarette smoking from a number of sources (e.g., doctor/pharmacist/healthcare provider, family/friends, government health agencies). The items were placed on a 4-point Likert scale ranging from 1 = a lot to 4 = not at all.

Beliefs about health-information seeking investigated responses to four statements (1 = strongly agree; 4 = strongly disagree), including "You felt frustrated during your search for the information," and "The information you found was hard to understand." For logistic regressions in this study, response categories of "1 = strongly agree" and "2 = agree" were recoded as "0," and "3 = disagree," and "4 =

strongly disagree" as "1." Beliefs about cancer were assessed by responses to four statements, including "Cancer is most often caused by a person's behavior or lifestyle" and "It seems like everything causes cancer." Response options ranged from 1 = strongly agree to 4 = strongly disagree. Beliefs about smoking behavior were based on respondents' answers (1 = strongly agree; 4 = strongly disagree) to the statement of "Smoking behavior is something basic about a person that they can't change very much." For logistic regressions, response categories of "1 = strongly agree" and "2 = agree" were recoded as "0," and "3 = disagree" and "4 = strongly disagree" as "1." Beliefs about the harm of smoking asked the following two questions, "How much do you think people harm themselves when they smoke a few cigarettes every day?" and "How much do you think people harm themselves when they smoke 10 or more cigarettes every day?" Responses ranged from 1 = no harm to 4 = a lot of harm.

Gender, age, yearly household income, employment, education, English proficiency, marital status, sexual orientation, and health insurance were surveyed. Because there are many variations in the responses, age was recoded (< 54.87 as 0, ≥ 54.87 as 1) based on the average age of the sample and education was also recoded by using the number of years that a person needs to finish high school as a criterion (≤ 12 school years as 0, > 12 school years as 1) in the logistic regression analyses.

Data Analysis

Statistical Package for the Social Sciences (SPSS 26) was employed for data analysis. First, descriptive statistics were reported on demographics, Internet use, venues for Internet access, trust in information sources, beliefs about health-information seeking, and beliefs about smoking. Chi-square tests were also employed to investigate the gender differences in Internet use for nonhealth general issues, general health matters, and quitting smoking, as well as in health-related reasons for Internet use. Second, bivariate logistic regressions were performed between Internet use (i.e., for nonhealth general issues, general health matters, and quitting smoking) and all the other variables. Third, significant variables from bivariate logistic regressions were entered into multivariate logistic regressions to identify significant factors of these usages of the Internet.

Results

Demographics and Socioeconomics

Among the participants (N = 3,738), 54% were females and 40% were males. Six percent did not indicate their genders. They were typically 54.87 years old (SD = 19.89). Approximately four of five were White (n = 3,129; 83.7%). The majority had health insurance (n = 3,444; 92.1%) and identified themselves as heterosexual (n = 3,405; 91.1%). Nearly two-thirds completed at least some college education (n = 3,230; 64.3%). Table 1 presents the detailed data on demographic and socioeconomic variables.

Table 1. Descriptive Statistics of Demographics (N = 3738).

	n	%		n	%
Age (M=54.87, SD=19.89)			**English proficiency**		
< 54.87	1,603	42.9	Very well	3,297	88.2
≥ 54.87	2,135	57.1	well	259	6.9
Gender			Not well	56	1.5
Male	1,497	40.0	Not at all	9	.2
Female	2,018	54.0	**Ethnicity**		
Occupational status			White	3,129	83.7
Employed	1,755	47.0	Black/African American	326	8.7
Unemployed	132	3.5	American Indian/Alaska Native	131	3.5
Homemaker	181	4.8	Asian	161	4.3
Student	50	1.3	other	21	.6
Retired	1,229	32.9	**Rent or own home**		
Disabled	235	6.3	Own	2,693	72.0
Other	20	.5	Rent	833	22.3
Marital status			Occupied without paying	103	2.8
Widowed	432	11.6	**Household income**		
Separated	82	2.2	$0 to $9,999	235	6.3
Single	538	14.4	$10,000 to $14,999	220	5.9
Education			$15,000 to $ 19,999	209	5.6
Less than 8 years	50	1.3	$20,000 to $34,999	506	13.5
8 through 11 years	187	5.0	$35,000 to $49,999	415	11.1
Completed high school	727	19.4	$50,000 to $74,999	605	16.2
Post high school training	306	8.2	$75,000 to $99,999	396	10.6
Some college	826	22.1	$100,000 to $199,999	542	14.5
College graduate	906	24.2	$200,000 or more	174	4.7
Postgraduate	672	18.0			

Uses and Access of the Internet and Gender

Among Internet users (see Table 2), 1,170 (42%) were males and 1,618 (58%) females. No significant difference in Internet use for nonhealth general information was detected for gender. However, using the Internet for health matters (χ^2 = 16.40; p < .001) and for smoking cessation information (χ^2 = 6.07; p < .05) were significantly tied to gender.

Per access to the Internet, home computers and mobile devices are the most common venues that participants used to access the Internet daily. About 53.8% (n = 806) of male participants and 51.1% (n = 1,032) of female participants used a home computer for daily Internet access; and 37.3% (n = 559) of men and 45% (n = 908) of women accessed the Internet daily on a mobile device. Significant differences between males and females were detected in their choices of Internet access venues. For Internet access, males

were less likely than females to use home computers, t (2,692) = −2.55; p < .05, but more likely to use mobile devices, t (2,667) = 3.76; p < .001.

Gratifications for Health-Related Internet Use and Gender

Two need gratifications for Internet use were measured in the current study: information seeking and information exchange. As shown in Table 2, significant differences existed between men and women in most of the gratifications sought in health-related Internet use. For example, for purposes of information seeking, most participants (n = 2,148) reported that they looked online for health or medical information for themselves, with women representing three-fifths (n = 1,289; 60%) of the individuals who searched such information for themselves, χ^2 = 11.55; p < .001. For information exchange, the most common activity online is to give and take supportive talk about health concerns with family or friends. Approximately a third (n = 1,281; 34.3%) of all participants reported engaging in such support exchange with family or friends, with 815 (63.6%) of them being females, χ^2 = 27.80; p < .001.

Table 2. Descriptive Statistics and Gender Differences of Internet use (0 = No, 1 = Yes) and Reasons for Internet Use.

	Yes		No		Chi-Square
	Male *n (%)*	Female *n (%)*	Male *n (%)*	Female *n (%)*	M vs. F
Internet use					
General Internet use	1170 (42)	1618 (58)	326 (45)	399 (55)	2.12
Internet use for general health matters in the past 12 months	630 (38.6)	1001 (61.4)	530 (46.3)	614 (53.7)	**16.40*** **
Internet use for quitting smoking	56 (32.7)	115 (67.3)	1081 (42.3)	1472 (57.7)	**6.07***
Reasons for Internet use					
Seeking information					
Looked for health or medical information for yourself	859 (40)	1289 (60)	281 (47.8)	307 (52.2)	**11.55*** **
Looked for health or medical information for someone else	659 (37)	1120 (63)	480 (50.3)	474 (49.7)	**45*** **
Kept track of personal health information	519 (39.4)	798 (60.6)	618 (43.6)	798 (56.4)	**5.04***
Used a website to help you with your diet, weight, or physical activity	442 (36.3)	774 (63.7)	697 (46)	817 (54)	**26.03*** **
Looked for a healthcare provider	390 (39.4)	600 (60.6)	740 (43)	980 (57)	3.40
Exchanging information					
Downloaded health information to a mobile device	145 (35)	269 (65)	995 (42.9)	1327 (57.1)	**8.86** *
Shared health information on social media sites	137 (32.6)	283 (67.4)	1002 (43.3)	1310 (56.7)	**16.80*** **
Exchanged support about health concerns with family/friends	466 (36.4)	815 (63.6)	672 (46.3)	778 (53.7)	**27.80*** **
Participated in an online forum or support group for people with similar health or medical issue	43 (28.9)	106 (71.1)	1095 (42.4)	1489 (57.6)	**10.59*** **
Watched a health-related video on You Tube	261 (41.7)	365 (58.3)	873 (41.6)	1224 (58.4)	.001

Note. Female: N = 2,018, Male: N = 1,497; ***p < .001, **p < .01, *p < .05.

Profiles of Internet Users

Table 3a and Table 3b display the results of bivariate associations between Internet uses and demographic factors. General Internet use was significantly correlated with age, ethnicity, place of

residence, education, English proficiency, occupation, sexual orientation, marital status, income level, and healthcare coverage. Internet use for health matters was significantly related to age, gender, place of residence, education, English proficiency, occupation, marital status, and income level. Internet use for quitting smoking was significantly associated with age, gender, place of residence, education, occupation, income level, and healthcare coverage.

Table 4 shows how smoking behavior, intention to quit smoking, beliefs about smoking behavior, and beliefs about harm of smoking were correlated with Internet use for nonhealth general issues, general health matters, and smoking cessation. For example, Internet use for general health matters was significantly related to disagreement with the statement that "smoking behavior is something basic about a person that he or she can't change very much" (*OR* = 1.04, 95% *CI*: 1.00–1.08), belief that smoking a few cigarettes a day is very harmful (*OR* = 1.08, 95% *CI*: 1.04–1.13), and belief that smoking at least 10 cigarettes a day is very harmful (*OR* = 1.10, 95% *CI*: 1.05–1.15). And Internet use for quitting smoking was significantly associated with more smoking behavior (*OR* = 4.61, 95% *CI*: 3.88–5.47) and less intention to quit smoking (*OR* = .14, 95% *CI*: .07–.29).

Table 5 shows the results of bivariate associations between the three types of Internet use and beliefs about cancer, beliefs about health-information seeking, and trust in information sources. Disagreement with the statement that one cannot do much to lower the chances of getting cancer (coded as 1= strongly agree and 4 = strongly disagree) had a significant negative relationship with general Internet use (*OR* = .73, 95% *CI*: .67–.80) and Internet use for general health matters (*OR* = .87, 95% *CI*: .80–.96), but a significant positive relationship with Internet use for quitting smoking (*OR* = 1.28, 95% *CI*: 1.08–1.52). Disagreement with the statement that it is hard to understand health information had significant positive correlations with general Internet use (*OR* = 2.08, 95% *CI*: 1.66–2.60) and Internet use for general health matters (*OR* = 1.28, 95% *CI*: 1.06–1.54), but a significant negative correlation with Internet use for quitting smoking (*OR* = .62, 95% *CI*: .44–.88).

Table 3a. Bivariate Logistic Regressions Between Demographic Factors and Internet Use (0 = No, 1 = Yes).

	OR (95% CI)		
	1	2	3
Age (μ=54.87, SD=19.89)			
<54.87 (coded as 0)	.30***	.65***	.52***
≥54.87 (coded as 1)	(.25–.36)	(.56–.75)	(.38–.71)
Gender			
Male (*n* =1,497, coded as 0)	1.13	1.37***	1.51*
Female (*n* =2,018, coded as 1)	(.96–1.33)	(1.12–1.60)	(1.09–2.10)
Ethnicity			
White	1.63***	.85	1.02
(1 = yes, 0 = No)	(1.31–2.03)	(.67–1.07)	(.63–1.65)
Black or African American	.58***	1.23	1.56
(1 = yes, 0 = No)	(.45–.75)	(.93–1.62)	(.96–2.54)
Rent/own home			
Rent (coded as 1)	.60*	1.18	2.70*
	(.39–.93)	(.73–1.89)	(1.26–5.79)
Occupied without paying monetary	.65***	1.34**	2.93***
rent (coded as 2)	(.54–.77)	(1.11–1.61)	(2.12–4.06)
Own (coded as 3)	reference	reference	reference
Education			
≤ 12 years/completed (= 0)	7.24***	1.65***	.63*
> 12 years of school (= 1)	(6.09–8.61)	(1.34–2.00)	(.44–.90)
English proficiency			
Well (coded as 1)	4.25***	.34*	.62
Not well (coded as 0)	(2.60–6.96)	(.14–.82)	(.19–2.06)

Note. 1 = General Use, 2 = Use for General Health Matters, 3 = Use for Quitting Smoking. ***$p < .001$, ** $p < .01$, *$p < .05$.

Table 3b. Bivariate Logistic Regressions Between Demographic Factors and Internet Use (0 = No, 1 = Yes).

	OR (95% CI)		
	1	2	3
Occupation status			
Unemployed	.19*** (.13–.28)	.74 (.48–1.14)	2.29** (1.23–4.26)
Homemaker	.30*** (.20–.44)	1.01 (.71–1.45)	.71 (.33–1.56)
Retired	.18*** (.15–.22)	.61*** (.52–.73)	.33*** (.20–.53)
Disabled	.12*** (.09–.16)	.75 (.52–1.07)	2.77*** (1.68–4.56)
Employed	reference	reference	reference
Sexual orientation			
Homosexual/gay/lesbian	4.09** (1.48–11.26)	1.23 (.73–2.06)	1.38 (.55–3.50)
Bisexual	2.21 (.78–6.24)	1.51 (.73–3.11)	2.14 (.74–6.15)
Heterosexual/straight	reference	reference	reference
Marital status			
Married/living as married	1.39* (1.08–1.79)	.90 (.72–1.11)	.76 (.50–1.15)
Divorced/widowed/separated	.38*** (.29–.49)	.73* (.57–.94)	1.06 (.67–1.70)
Single, never been married	reference	reference	reference
Annual household income ($)	.61*** (.58–.64)	.96* (.92–.99)	.80*** (.74–.86)
Healthcare coverage (1 = yes, 2 = No)	.72* (.52–.99)	.97 (.70–1.35)	2.58*** (1.57–4.25)

Note. 1 = General Use, 2 = Use for General Health Matters, 3 = Use for Quitting Smoking. ***$p < .001$, **$p < .01$, *$p < .05$.

Table 4. Bivariate Logistic Regressions Between Internet Use (0 = No, 1 = Yes) and Smoking Behavior, Intention to Quit Smoking, Beliefs About Smoking Behavior.

	OR (95% CI)		
	1	2	3
Smoking behavior	.68***	1.07	4.61***
	(.61–.77)	(.95–1.22)	(3.88–5.47)
Intention to quit smoking	.45***	.59*	.14***
	(.30–.66)	(.37–.95)	(.07–.29)
Belief about smoking behavior	1.16***	1.04*	.95
	(1.12–1.19)	(1.00–1.08)	(.87–1.05)
Belief about harm of smoking a few cigarettes every day	1.05**	1.08***	.98
	(1.01–1.09)	(1.04–1.13)	(.90–1.06)
Belief about harm of smoking 10 or more cigarettes every day	1.06***	1.10***	1.00
	(1.03–1.10)	(1.05–1.15)	(.91–1.09)

Note. 1 = General Use, 2 = Use for General Health Matters, 3 = Use for Quitting Smoking. ***$p < .001$, **$p < .01$, *$p < .05$.

Table 5. Bivariate Logistic Regressions Between Internet use (0 = No, 1 = Yes) and Beliefs About Cancer, Beliefs About Health-Information Seeking, and Trust in Information Sources.

	OR (95% CI)		
	1	2	3
Beliefs about cancer			
Behavior causes cancer	1.15***	1.01	.86
	(1.06–1.25)	(.93–1.09)	(.73–1.02)
Everything causes cancer	1.12**	1.04	1.32***
	(1.04–1.22)	(.96–1.12)	(1.13–1.55)
Can't do much to lower chances of getting cancer	.733***	.87**	1.28**
	(.67–.80)	(.80–.96)	(1.08–1.52)
Too many recommendations about preventing cancer	.93	1.06	1.13
	(.85–1.02)	(.97–1.15)	(.94–1.35)
Beliefs about health- information seeking			
Lots of efforts to get information	2.52***	1.51***	.76
	(2.04–3.12)	(1.27–1.79)	(.54–1.05)
Feel frustrated during information search	1.70***	1.09	.61**
	(1.36–2.11)	(.92–1.30)	(.44–.85)
Concerned about quality of information	1.04	.94	.59**
	(.84–1.28)	(.80–1.10)	(.43–.82)
Hard to understand information	2.08***	1.28*	.62**
	(1.66–2.60)	(1.06–1.54)	(.44–.88)
Trust in information sources			
A doctor	1.04	.98	1.03
	(.99–1.09)	(.93–1.04)	(.90–1.18)
Family or friends	1.13***	1.01	1.01
	(1.10–1.16)	(.97–1.05)	(.93–1.10)
Government health agencies	1.08***	.94**	1.02
	(1.05–1.12)	(.90–.98)	(.93–1.12)
Health organizations or groups	1.10***	.95*	1.03
	(1.06–1.13)	(.91–1.0)	(.93–1.14)
Charitable organizations	1.13***	1.00	1.04
	(1.10–1.16)	(.96–1.04)	(.94–1.14)
Religious organizations and leaders	1.16***	1.03	1.07
	(1.12–1.19)	(.99–1.07)	(.96–1.19)

Note. 1 = General Use, 2 = Use for General Health Matters, 3 = Use for Quitting Smoking
***$p < .001$, **$p < .01$, *$p < .05$.

Finally, multivariate logistic regressions were performed to create a multivariate model of Internet use by entering all the significant variables identified in the previous bivariate logistic regression analysis (Tables 3–5). The final model (Table 6) suggested that significant predictors of general Internet use included younger age (*OR* = .49, 95% *CI*: .25–.96), being White (*OR* = 2.12, 95% *CI*: 1.17–3.84), higher education attainment (*OR* = 4.04, 95% *CI*: 2.14–7.60), higher annual income (*OR* = 1.30, 95% *CI*: 1.10–1.54),

intention to quit smoking (*OR* = 2.17, 95% *CI*: 1.19–3.96), and disagreement with the statement that "smoking behavior is something basic about a person that they can't change very much" (*OR* = 1.46, 95% *CI*: 1.08–1.98). Those who were retired (*OR* = .23, 95% *CI*: .09–.55) or disabled (*OR* = .35, 95% *CI*: .15–.82) were less likely to use the Internet for general purposes than those who were employed.

Belief about health-information seeking was the only significant predictor of Internet use for health matters. Those participants who disagreed that it took lots of efforts to get health information were more likely to use the Internet for health matters (*OR* = 1.57, 95% *CI*: 1.10–2.22).

Significant predictors of Internet use for quitting smoking included place of residence (*OR* = 2.21, 95% *CI*: 1.16-4.20), less smoking behavior (*OR* = .40, 95% *CI*: .20–.82), intention to quit smoking (*OR* = 6.15, 95% *CI*: 2.91–12.99), and belief about smoking behavior (*OR*=.40, 95% *CI*: .20–.82). Those who did not feel frustrated during the search for health information were more likely to use the Internet for quitting smoking (*OR* = 1.15, 95% *CI*: 1.00–1.33).

Table 6. Significant Predictors of Multivariate Models of Internet Use (OR and 95% CI).

	Final Multivariate Model		
	1	2	3
Age (μ=54.87, SD=19.89)			
<54.87 (coded as 0)	.49* (.25–.96)		
≥54.87 (coded as 1)			
Gender			
Male (*n* = 1,497, coded as 0)	2.12* (1.17–3.84)		
Female (*n* = 2,018, coded as 1)			
Rent/own home			
Rent (coded as 1)			5.03 (.90–28.10)
Occupied without paying monetary rent (coded as 2)			2.21* (1.16–4.20)
Own (coded as 3)			reference
Education			
≤ 12 years (coded as 0)	4.04*** (2.14–7.60)		
> 12 years (coded as 1)			
Occupation status			
Retired	.23*** (.09–.55)		
Disabled	.35* (.15–.82)		
Employed	Reference		Reference
Yearly household income ($)	1.30** (1.10–1.54)		
Smoking behavior			.40* (.20–.82)
Intention to quit smoking	2.17* (1.19–3.96)		6.15*** (2.91–12.99)
Belief about smoking behavior	1.46* (1.08–1.98)		
Beliefs about health-information seeking			
Lot of effort to get information		1.57* (1.10–2.22)	
Feel frustrated during information search			1.15* (1.00–1.33)

Note. ***$p < .001$, **$p < .01$, *$p < .05$.

Discussion

The purpose of the study was twofold. One was to examine gender differences in three use types of the Internet: use for nonhealth general information, use for health information, and use for smoking cessation information. The other purpose was to identify the profile of the Internet users based on five domains of interest grounded in uses and gratifications theory: demographics, beliefs about smoking-related behaviors, beliefs about cancer, beliefs about information seeking, and trust in information sources.

For both smokers and nonsmokers, there is no significant gender difference in access to the Internet for general use. Women's Internet proficiency, skills, access, and usage are comparable to men's since 2000 (Ono & Zavodny, 2007). The gender digital gap or disparity has largely disappeared in the United States. Currently, both males and females appear to be equally comfortable with the Internet.

On the other hand, regardless of smoking status, there are significantly more women than men who accessed the Internet for general health-related matters. Further, females are significantly more likely to seek specific information relating to smoking cessation on the Internet. In addition, in comparison to males, females are more likely to look for online health or medical information for themselves and for others, keep track of health records through the Internet, and gain information on the Internet for healthier lifestyles (e.g., diet, weight, physical activity). Furthermore, females tend to exchange or share information with others than males by downloading health information to mobile devices, placing information on social media, supporting family and friends with health concerns, and participating in online forums or support groups. These results are consistent with previous findings that females are more frequent users of the Internet for health information (e.g., Manierre, 2015; Rowley et al., 2017).

While the finding that females seek online health information more than males is not surprising, the extent to which gender permeates the scenes of online health-information seeking draws fresh new attention to the *genderized* pattern of the Internet use. As presented in Table 2, in addition to the general health information and the specific smoking cessation information, females in the current study seek more information than males in four of five areas and exchange more information than males in four of five areas as well. In other words, females use the Internet significantly more to gratify information-seeking needs in 8 of 10 tested areas than males.

Thus, coupled with females' strong positive attitudes toward the Internet (e.g., convenience, access, cost, privacy/anonymity, expansive coverage) and information quality on the Internet (e.g., being helpful, understandable, current, clear, respectful, easy, unbiased, accurate, complete, detailed, not misleading; Powell, Inglis, Ronnie, & Large, 2011), females are likely to remain more active and more proactive than men in health-information seeking in the Internet and other venues (Rowley et al., 2017). This gendered information-seeking behavior inevitably raises an issue of the potential consequences.

Active and proactive health-information seeking is critical to health knowledge, which leads to greater participation in shared decision making between patients and care providers in areas of, for example, diagnosis, treatment choices, care, and maintenance (Galarce, Ramanadhan, & Viswanath, 2011). Active and proactive online health-information search further boosts patients' feelings of self-efficacy and empowerment that fulfill the desire for reassurance from a second opinion, greater understanding, and information access beyond traditional sources (Powell et al., 2011). Kim (2015) found that males are more likely to be inactive health-information seekers than females, not just from the Internet, but from many other health information sources (e.g., TV, newspapers, magazines, family and friends, care providers). Such an inactive information seeking represents the motivational deficit in uses and gratifications (Palmgreen, 1984). As a result, males may experience genderized health information deficit with respect to the quantity and quality (Powell et al., 2011). These findings lend strong support for genderized *online*

health-information seeking. In particular, differential gratifications in seeking *online* smoking cessation information are found to be pursued along the gender line.

The overall emergent profile of *general use* of the Internet is an individual who is relatively young (age), educated (education), rich (income), female (gender), but not retired or disabled (occupational status), has the intention to quit smoking with a belief that smoking behavior is changeable. The only significant predictor of Internet use for *general health matters* was the belief that it does not take a lot of time and effort to get health information; it was 1.5 times more likely to use the Internet for general health matters when the respondents found they spent less time and efforts to get health information they needed. The emergent profile for the Internet use of *specific health information of quitting smoking* was the individual who leases the place of residence (place of residence), smokes little (smoking behavior/status), has high intention to quit smoking (intention to quit), believes that smoking behavior is changeable (belief about smoking behavior), and feels less frustrated during the search for health information.

From the framework of uses and gratifications, Palmgreen (1984) and Palmgreen and Rayburn (1982) suggest that one's use of the media (e.g., information sources) is tied to one's attitudes toward the media or beliefs about what the media can do for the person. In this study, beliefs about the media with respect to information seeking were measured by efforts, frustration, quality concern, and information understandability. Use of the Internet for health matters and smoking cessation is, in part, linked to less frustration encountered and less time and efforts needed to seek information; as an individual feels more frustrated and believes it takes too much time and efforts to look for needed information from information sources other than the Internet (e.g., TV, radio, newspapers, family and friends, care providers), he or she is more likely to resort to the Internet to gain information on health issues in general and smoking cessation. In addition to beliefs about information seeking from the "other" media or sources of information, this study also found that beliefs about smoking behaviors themselves (smoking status, intention to quit smoking, belief that smoking behavior is changeable, beliefs about the harm of smoking) are likely to predict use of the Internet. From both bivariate and multivariate models (Tables 3–6), intention to quit smoking and view of changeable smoking behavior predicted the general use of the Internet; intention to quit smoking predicted the Internet use for general health matters; intention to quit smoking, smoking status, and view of changeable smoking behavior predict the Internet use for quitting smoking.

This pattern of the Internet use indicates that, based on their beliefs about the difficulty of navigating information sources (e.g., efforts, frustration) and beliefs about the target issue (i.e., smoking), people may gravitate to a particular medium such as the Internet for information seeking. Beliefs appear to be the key to motivational expectancies for use of a particular medium or information source. The expectancy-value model of uses and gratification theory (Palmgreen, 1984; Palmgreen & Rayburn, 1982) asserted that an individual's attitudes toward a particular medium or beliefs about what the particular medium can make available to him or her, he or she will decide to use the particular medium. In this study, we examined beliefs about or attitudes toward "other" media (i.e., all other available sources collectively) with respect to seeking information. Thus, it is apparent that not only beliefs about the particular medium but also beliefs about other media affect the use of the given medium. This finding offers additional insight into attitudes toward the media that lead to media exposure.

It is very interesting to find that trust in information sources (e.g., doctors, family members, friends) was not a significant predictor of Internet use for any type of information (general health and quitting smoking). This is not consistent with previous studies that have recognized trust in information sources as a key factor of information seeking (Williams, Ames, & Lawson, 2019) because trust in information sources foretells individuals' intentions, willingness, and motivation to seek information (Hartoonian, Ormseth, Hanson, & Bantum, 2014; Okello & Gilson, 2015).

Implications

Findings from the current study suggest that although there is little difference in using the Internet for nonhealth general information, females tend to use the Internet significantly more than males to seek both general *health* information and *personal health information*, such as smoking cessation. This strongly implies that females are much more active or even more proactive than males in health-information seeking on the Internet, which is likely to result in multiple deficits of health information, knowledge, and self-efficacy along the gender line, which in turn may impact illness diagnosis, treatment, care, and maintenance (Galarce et al., 2011). Thus, gender-tailored campaign messages may nudge males' orientation toward active and proactive online seeking of health information. Given that males are less enthusiastic than females about looking for personal health information such as smoking cessation, information about privacy and security should be made available, which would make males feel protected when seeking online health information. Additionally, gender-tailored *online* smoking cessation messages can serve as a supplementary component of clinical trials of tobacco dependence treatment for female smokers given that females are less likely to achieve abstinence in such clinical trials (e.g., Jarvis, 1984; Smith et al., 2015; Smith, Bessette, Weinberger, Sheffer, & McKee, 2016) but are more likely to seek information on the Internet for smoking cessation as suggested by the findings of the current study.

More than a few studies have demonstrated that gender is a major influencer in online health-information seeking (Rowley et al., 2017). One critique is that such studies are not generally theory-driven, making the reasons or mechanism underlying the gender difference in health-information seeking not so clear (Galarce et al., 2011). Several theoretical orientations have been proposed and tested, including gender role theory, self-concept approach, gendered reactivity hypothesis, and gendered perceived risk, gendered norms perspective (Goldner, Hale, Cotten, Stern, & Drentea, 2013; Manierre, 2015). The current finding that females sought health information online for themselves and significant others more than males suggests that the current participants may have acted according to their gender-prescribed roles; that is, females are traditionally responsible for taking care of sick children and spouses. Future research should address additional theoretical explanations of gender differences in online health-information seeking.

The current findings show that use of the Internet for health- and smoking cessation-related information seeking is strongly tied to frustration, easiness, time, and efforts. When people are less frustrated and need less time and effort to navigate the Internet easily, they are more likely to use the Internet for information seeking, particularly health-related and smoking cessation information. This reaffirms that online information seeking follows "the principle of least effort" that demands the smallest amount of effort and/or mental energy (Zipf, 1949, p. 544). At the same time, it is also indicative that online information seekers may not be that rational in their choices of websites or venues of information as

suggested in the theory of uses and gratifications. Instead of carefully assessing alternative information sources, Internet users may come across good-enough information sources and seek information from there perhaps because of the "bounded rationality" (Simon, 1957, p. 198) or habitual modes of Internet consumption (LaRose, Lin, & Eastin, 2004). People may not possess physical and mental abilities to search for all the available information and attach accurate values to available information they use to judge one information source, site, or medium against another (Simon, 1947). Further, as people get used to a certain information source or site, the choice of information source employed to search for information becomes habitual rather than active (LaRose & Eastin, 2004). Thus, people may engage in satisficing rather than optimal, rational choice of (online) information sources or venues (LaRose & Eastin, 2004). The theory of uses and gratifications should strive to account for such diminishing rationality in media choice when seeking information on the Internet. Additionally, public health community should make significant efforts to provide easy-to-access, easy-to-understand, and easy-to-use online information about smoking cessation for current smokers.

Further, uses and gratification theory asserted that attitudes toward the particular medium lead to use of the medium (Palmgreen, 1984; Palmgreen & Rayburn, 1982). The current study found that beliefs about other media (non-Internet) influence the use of the particular medium (Internet). This suggests that future research should explore additional boundaries of beliefs that could influence media exposure. Future research is also needed on why trust in information sources does not matter in some cases of online information seeking, especially related to health and smoking.

Finally, this study found people are motivated to seek *specific health information of quitting smoking* on the Internet when they have high intentions to quit smoking and when they believe smoking behavior is changeable and harmful. This indicates that online health communication messages targeting smoking cessation can first aim to develop such a self-efficacy belief that smoking behavior is changeable or quittable efficaciously (Bandura, 1997). Further, the theory of reasoned action (Fishbein & Ajzen, 1975) indicated that positive beliefs and attitudes toward quitting would lead to high intention to quit smoking, which then would increase the likelihood of the actual quitting.

Limitations

This study has limitations. First, several variables had a single-item self-reported measure, which limits the scope and depth of data available for examining research questions. Second, the current study only used the uses and gratifications theory as a conceptual and descriptive explanation for the Internet use among the sample studies since the theory has not provided much prediction or causal explanation of media use (McQuail, 1994). Third, HINTS surveys have employed stratified sampling methods, which might cause a misrepresented sample because some participants could fall into multiple strata and had a higher chance to be selected to participate.

Conclusions

The Internet makes available the trove of health-related information. Health-information seeking is critical to one's knowledge and self-efficacy in health care from diagnosis, treatment choices, to

maintenance in an increasingly shared decision-making healthcare environment. The study finds that women access the Internet to seek general as well as personal health information such as smoking cessation significantly more than men. Further, females are more likely to look for online health or medical information for themselves and for others, keep track of health records through the Internet, and gain information on the Internet for healthier lifestyles (e.g., diet, weight, physical activity) significantly more than males. Furthermore, females tend to exchange or share information with others more than males by downloading health information to mobile devices, placing information on social media, supporting family and friends with health concerns, and participating in online forums or support groups. The study also finds that *general* Internet use is typified by an individual who is relatively young, highly educated, rich female, but not retired or disabled (occupational status), has the intention to quit smoking with a belief that smoking behavior is changeable. Use of the Internet for *general health information* was best predicted by the belief that it takes too much time and effort to get health information from other media. Use of the Internet *for information on quitting smoking* was exemplified by the individual who leases the place of residence, smokes little, has high intention to quit smoking, believes that smoking behavior is changeable, and feels frustrated during the search for health information on other media. These findings contribute to testing of theoretical boundaries for gender differences and uses and gratifications theory. It extends uses and gratifications theory into the context of genderized Internet information seeking, especially related to smoking cessation. This study shows that gender-tailored online smoking cessation messages can be designed to help smokers, especially female smokers who participate in clinical trials of tobacco dependence treatment, develop positive beliefs and attitudes toward quitting smoking and actually quit smoking.

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