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Implications of social media use on health information technology engagement: Data from HINTS 4 cycle 3

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ABSTRACT

Little is known about the association between Internet/social media use and health information technology (HIT) engagement. This study examines patterns of social media use and HIT engagement in the U.S.A. using data from the 2013 Health Information National Trends Survey ($N = 3,164$). Specifically, predictors of two HIT activities (i.e., communicating with a healthcare provider using the Internet or email and tracking personal health information electronically) are examined. Persons who were females, higher education, non-Hispanic others, having a regular healthcare provider, and ages 35–44 were more likely to participate in HIT activities. After controlling for sociodemographics and health correlates, social media use was significantly associated with HIT engagement. To our knowledge, this is one of the first studies to systematically examine the use and relationships across multiple types of health-related online media.

KEYWORDS

Internet access, Social media use, Health information technology engagement, Communication inequalities

IMPLICATIONS

Practice: The documented associations between social media and health IT use suggests that developers and clinicians must consider patients' technology and implementing HIT activities and platforms.

Policy: For any policies and mandates related to health information technology to have a real impact, considerations must be given to how people currently use existing technology platforms for health information.

Research: Further research should explore reasons behind the populations' differential use and preferences of technology platforms for health information

INTRODUCTION

Health information technology (HIT) has the potential to be a vital tool for individuals' management of health and healthcare needs. Commonly used HIT activities include accessing electronic health records (EHR), transferring health information between patients and their healthcare providers through a secure electronic messaging system, and using e-Health tools like wearable mobile health devices to monitor health status. Engagement of HIT activities (e.g., accessing and tracking personal health information electronically to monitor one's healthcare) has been relatively low in comparison to social media use for health information purposes. However, an increasing percentage of U.S. adults are using social media to obtain information and possibly building digital literacy skills that prime them to engage with HIT. Current social media use trends suggest increased levels of digital literacy and health information activities, which may imply an individuals' likelihood for HIT engagement. Understanding patterns of social media use (both general use and health specific use) in the U.S. population and the association between social media use and HIT usage patterns can provide insights that can increase HIT engagement.

The prevalence of social media continues to increase steadily in the U.S.A. In 2014, 74 % of U.S. adult Internet users reported using a social media platform, up from 67 % in 2012 [1, 2]. With increased popularity and easier accessibility through mobile technology [2] social media use is becoming a more attainable platform to obtain and generate various types of information. Generally, individuals use social media to communicate with family and/or friends, develop new relationships, share similar interests or hobbies with others, and read comments of public figures [3]. However in the domain of health information exchange, users are gradually expanding the functionality of social media by accessing this platform to consume and/or share health information [4, 5].

U.S. adult Internet users are also engaging with HIT functionalities such as accessing online medical records and communicating with healthcare providers electronically to manage their healthcare. In a 2013 study conducted by the Office of the National Coordinator (ONC) for Health Information Technology, almost half of the participants reported viewing their online health record at least once, 44 % shared their health record information with a family member, healthcare provider, or friend, and 39 % downloaded the information to a mobile app or a computer [6]. A 2012 study revealed that among U.S. adult Internet users: 19 % reported using the Internet to track personal health information and 19 % reported emailing or communicating with their online healthcare providers electronically [7]. HIT engagement is more common among certain demographic groups. High educational attainment [8–10], female gender [7, 9, 11], individuals with chronic health conditions such as cancer or caregivers for those with a chronic condition [12–14], and higher income [15] were predictors of HIT engagement. Older adults (65 years of age and older) are less likely to engage in HIT activities [15–18], including accessing personal health records electronically [16]. After controlling for participant characteristics, another study assessing registration and use of patient portals among older adults within federally qualified health centers found that African Americans were less likely to register for their patient portal account in comparison to White participants [19]. Prior research reports low HIT engagement, specifically among certain racial/ethnic, gender-specific, age-specific, and socioeconomic U.S. adult Internet users and subgroups, yet social media use has increased substantially over the past years for general and health-related information consumption among Internet users.

In 2009, the U.S. federal government enacted the Health Information Technology for Economic and Clinical Health (HITECH) Act [17]. A major component of the HITECH Act requires “meaningful use” of EHR among healthcare providers and patients [17]. Meaningful use is defined as “using certified EHR technology to:

- Improve quality, safety, efficiency, and reduce health disparities,
- Engage patients and family,
- Improve care coordination, and population and public health.” [20]

Since the HITECH Act in 2009 and the meaningful use payment incentives, the healthcare system has made significant strides in HIT adoption [21]. Over 90 % of non-federal hospitals and 78 % of office-based healthcare providers collect electronic patient data through EHRs [22] and 62 % of healthcare providers are electronically exchanging health information with external providers [23]. In phase 2 of the meaningful use incentive program and in the proposed regulation for phase 3 of the program, the concept of HIT meaningful use has been extended to increase active patient engagement in monitoring and generating personalized health information in collaboration with their healthcare provider. However, despite the healthcare system’s progression in creating an environment to increase meaningful use among patients, there are barriers to consumer/patient engagement. Reasons for consumer reticence have included security/privacy concerns, difficulty navigating the HIT platform [24, 25], and beliefs that HIT adoption will cause healthcare management to be more difficult [26]. Patients’ slow engagement of HIT stands in contrast to reports of continued, robust use of general search engines for health information seeking [27] and to the use of social media sites for seeking informal help on diagnosed conditions [28]. Expanding this area of research to examine barriers to HIT engagement during a period of marked increase in social media use may provide a clearer profile of an HIT engager. Understanding an individual’s social media use patterns may assist HIT developers with creating effective HIT platforms to promote behavior change among patients and potentially contribute to increasing patient engagement and reducing health disparities. To our knowledge, no known studies have examined the relationship between social media use and HIT engagement among adult Internet users.

In light of the parallel growth of social media and HIT, this study assesses the association of social media with HIT engagement in the general adult population. We understand that social media are sources of health-related information in addition to clinical types of HIT that are sources for managing one’s healthcare. Therefore, the *Channel Complementarity Theory* further motivated and directed this study’s aims to examine the relationship between the use of multiple digital platforms (e.g., social media and HIT) for health-related purposes. The *Channel Complementarity Theory* in the communication literature suggests that individuals are likely to use more than one channel (e.g., television, Internet, interpersonal networks, and providers) to obtain information for a specific content if the other channels serve a similar function [29–31]. We hypothesize that individuals who use social media may be likely to use HIT partly due to their increased comfort level with relationship-oriented communication technologies. We have the following study aims: (1) to identify sociodemographic and health-related factors (such as one’s cancer experience) related to Internet and social media use (general and health-related); (2) to ascertain the associations between social media use and specific HIT activities. The 2013 Health Information National Trends Survey (HINTS) is an ideal dataset to explore these aims because it allows us to examine a variety of social media platforms. HINTS also contain specific HIT items that reflect the current Federal HIT goals and practices of meaningful use in healthcare settings across the U.S.A.

METHODOLOGY

Data source

This study was a secondary data analysis that used data from the National Cancer Institute’s 2013 HINTS. HINTS is a nationally representative survey that routinely assesses the U.S. population’s use of health and cancer-related information. The dataset is available to the public online by accessing http://hints.cancer.gov. Data for this study were collected from September 2013 to December 2013 (HINTS 4 cycle 3) through a mailed questionnaire.

The sample was constructed using a two-stage stratified sampling design including mailing addresses selected from the United States Postal Service residential file and one respondent was selected per household using the last-birthday method. A more in depth description of the sampling design is available for review at http://hints.cancer.gov. For the initial analysis we included the entire HINTS data sample (N=3,164, see Table 1) to assess differences among Internet users and non-Internet users. Given the purpose of the study, we then conducted subsequent analyses restricting the sample to Internet users only (N=2,284) to assess social media use and HIT engagement.

Study variables

To assess prevalence of Internet access, social media use, and HIT engagement, this study analyzed data from eight HINTS questionnaire items. This study only included adult Internet users who responded to social media use questionnaire items. Therefore, Internet access was measured by response to the question: "Do you ever go online to access the Internet or World Wide Web, or to send and receive email?" (yes/no).

Social media use–Social media use items were categorized as "health-related social media use" and "general social media use." Any questionnaire items that assessed social media use for a health purpose was identified as "health-related social media use" and all remaining social media use items were identified as "general social media use." Each social media use questionnaire item within its respective categories was analyzed separately due to the unique and distinct properties that may have implications on health communications. The following sections highlight the specific social media use questionnaire items included in the analysis:

- *Health-related social media use items:* "In the last 12 months, 1) have you shared health information on social networking sites, such as Facebook or Twitter (yes/no); 2) have you participated in an online forum or support group for people with a similar health or medical issues (yes/no); 3) have you watched a health-related video on YouTube (yes/no)?"
- *General social media use* "In the last 12 months, 1) have you visited a social networking site such as Facebook or LinkedIn (yes/no); 2) have you written in an online diary or blog (i.e. Web log) (yes/no)?"

HIT engagement–Two questionnaire items assessed HIT engagement: "In the last 12 months, 1) have you kept track of personal health information such as care received, test results, or upcoming medical appointments (yes/no); and 2) have you used e-mail or the Internet to communicate with a doctor or doctor's office (yes/no)?"

Sociodemographics and health correlates–The following self-reported participant characteristics (sociodemographics and health correlates) were included in each statistical test as covariates: age, gender, education, race/ethnicity, general health status, having a regular healthcare provider, and cancer experience. Age was categorized into six groups: 18–24, 25–34, 35–44, 45–54, 55–64, and 65 years and older. Education was categorized as high school or less, some college, or college graduate or more. Respondents who reported vocational training were included in the "some college" category. Race/ethnicity was categorized into four categories: non-Hispanic White, non-Hispanic Black, Hispanic, and non-Hispanic Other.

Health correlates included self-reported general health status, having a regular healthcare provider, and cancer experience. General health status was measured by one questionnaire item: "In general would you say your health is...(Excellent, very good, good, fair, or poor)". The responses were categorized into two categories: (1) Excellent, very good, or good; and (2) Fair or poor. These categories were established based on prior HINTS analyses and publications with a similar sample size of Internet users to enhance ease of interpretation [10, 32]. Having a regular healthcare provider was measured by one questionnaire item: "Not including psychiatrist and other mental health professionals, is there a particular doctor, nurse, or other health professional that you see often? (yes/no)".

Cancer experience was measured by two questionnaire items: (1) "Have you ever been diagnosed as having cancer? (yes/no)" and (2) "Have any of your family members ever had cancer? (yes, no, or not sure)?" These items were collapsed into the following three categories: (1) no personal experience with cancer; (2) had family with cancer; (3) or had a personal cancer diagnosis. These categories were mutually exclusive: individuals reporting being diagnosed with cancer were categorized as having a personal cancer diagnosis regardless of having a family member diagnosed with cancer.

Statistical analysis

Descriptive statistics were calculated. Chi-square tests were used to examine bivariate relationships between participant characteristics and Internet access, social media use (general and health-related), and HIT engagement, and to examine bivariate relationships between social media use and HIT engagement. Multivariate logistic regression models were conducted to identify participant characteristics predictive of social media use (general and health-related). The main analysis applied separate multivariate logistic regression models to determine which participant characteristics and social media use (general and health-related) variables were predictors of HIT engagement. All logistic regression models were adjusted for participant characteristics, demographics and health correlates. All analyses were conducted in SAS 9.3 and sample weights were applied to account for the complex sample design and to make population inferences while also correcting for nonresponse and noncoverage bias using the Jackknife replicate weight technique [33]. Survey weights were applied so the results could be generalized to the national population. To create these weights, an adjustment to reflect the selection probabilities was made. To compensate for nonresponse and coverage error, the selection weights were calibrated using data from the American Community Survey. HINTS nonresponse is correlated with being male, young, a minority, having less education and being Hispanic. The calibration used age, gender, educational attainment, race, ethnicity, and Census region adjust for this pattern. An analysis conducted on earlier rounds of HINTS found that nonresponse is also negatively correlated with access to healthcare and to health status - in other words, those who have had fewer health problems and who have had less access to healthcare services were less likely to respond to the survey. To compensate for these patterns, insurance status and cancer status were used as additional calibration adjustments. The data to make this adjustment were taken from the National Health Interview Survey. Additional methodological information on HINTS is available by accessing http://hints.cancer.gov. A result of a p value of 0.05 or less was considered statistically significant.

RESULTS

Internet access

In 2013, an estimated 78.3 % of the U.S. adult population reported having Internet access (Table 1). Weighted bivariate analyses revealed a statistically significant difference among college graduates [X^2 (2, N=1058) = 136.69, $p<.0001$] and persons 25–34 years of age [X^2 (5, N=310) = 269.54, $p<.0001$] who reported having Internet access. Those who identified as non-Hispanic Black [X^2 (3, N=291) = 30.46, $p<.0001$] or Hispanic [X^2 (3, N=321) = 30.46, $p<.0001$] were less likely to have Internet access than other racial and ethnic groups. Respondents reporting having a family member with cancer [X^2 (2, N=1264) = 14.37, $p=.02$] or better health status [X^2 (1, N=1966) = 49.39, $p<.0001$] were more likely to have Internet access than other groups. Many of these identified factors such as education status, age, race/ethnicity, and chronic conditions such as cancer are associated with Internet access and are consistent with published literature [34, 35].

Social media use: general and health-related

Among those with Internet access, social media use is widely prevalent. Table 2 below reports on the associations between five types of social media use and

Table 1 | Weighted bivariate associations between characteristics and Internet use (N = 2,284)

Characteristics	Internet users (N = 2,284, 78.3 %)	Standard error (SE)
Age[a]	*$p < 0.0001$*	
18–24	88.3 %	5.17
25–34	92.5 %	2.11
35–44	86.6 %	1.93
45–54	78.5 %	1.93
55–64	80.8 %	2.03
65+	49.7 %	2.19
Gender	$p = 0.39$	
Male	79.6 %	1.37
Female	78.0 %	1.22
Education[a]	*$p < 0.0001$*	
High school or less	42.6 %	4.41
Some college	77.5 %	1.32
College graduate	91.8 %	1.31
Race/ethnicity[a]	*$p < 0.0001$*	
Non-Hispanic White	85.8 %	1.11
Non-Hispanic Black	72.7 %	3.44
Hispanic	69.1 %	3.77
Non-Hispanic Other[b]	81.7 %	4.76
General health[a]	*$p < 0.0001$*	
Excellent, very good, or good	81.9 %	1.07
Fair or poor	58.4 %	3.09
Psychological distress	$p = 0.59$	
Yes	80.6 %	1.02
No	73.5 %	13.63
Cancer experience[a]	*$p = 0.002$*	
No personal experience with cancer	76.0 %	2.63
Had family with cancer	82.3 %	1.12
Had a personal cancer diagnosis	72.8 %	2.42
Have regular health care provider	$p = 0.11$	
Yes	80.6 %	1.05
No	76.1 %	2.35

[a] Italic font indicates statistically significant associated with Internet use at p-value of 0.05 or less

[b] Other includes American Indian, Asian American, Pacific islander, Native Hawaiian, Alaskan Native, and multiple races mentioned

Table 2 | Weighted bivariate associations between types of social media (SM) use and demographic characteristics ($N = 2{,}284$ Internet users)

SM general info. users	Health-related social media users				
	Visited social networking site(s) ($N = 1{,}632$)	Blogged ($N = 140$)	Watched health-related YouTube ($N = 709$)	Shared health information on social networking site(s) ($N = 447$)	Participated in online support group ($N = 150$)
Characteristics	% (SE)	% (SE)	% (SE)	% (SE)	% (SE)
Percent of Internet users	76.0 % (1.32)	6.4 % (0.78)	35.4 % (1.40)	23.5 % (1.56)	7.0 % (0.80)
Age[a]	$p < 0.001$	$p = 0.04$	$p = 0.0001$	$p < 0.001$	$p = 0.01$
18–24	90.0 % (4.76)	7.7 % (2.82)	58.4 % (8.03)	33.1 %(11.38)	10.1 % (4.29)
25–34	88.6 % (2.97)	12.2 % (3.44)	45.2 % (3.89)	34.3 % (3.97)	9.2 % (1.75)
35–44	79.5 % (3.73)	4.8 % (1.55)	36.4 % (3.94)	29.8 % (4.17)	10.4 % (2.50)
45–54	73.3 % (2.55)	5.3 % (1.36)	27.3 % (3.54)	16.2 % (2.30)	4.1 % (0.91)
55–64	66.2 % (2.37)	4.0 % (0.94)	26.3 % (2.73)	15.3 % (2.08)	4.5 % (1.48)
65+	52.7 % (3.43)	2.4 % (1.05)	21.8 % (3.02)	8.2 % (1.71)	1.9 % (0.72)
Gender[a]	$p < 0.001$	$p = 0.44$	$p = 0.20$	$p < 0.001$	$p = 0.01$
Male	68.6 % (2.39)	5.7 % (1.36)	33.6 % (2.34)	15.3 % (21.9)	4.7 % (1.14)
Female	83.8 % (1.29)	7.0 % (0.94)	37.7 % (2.22)	31.4 % (2.39)	9.2 % (1.10)
Education[a]	$p = 0.47$	$p = 0.88$	$p = 0.62$	$p = 0.05$	$p = 0.07$
High school or less	77.3 % (5.02)	7.1 % (2.73)	43.7 % (8.53)	21.7 % (6.56)	2.8 % (1.66)
Some college	74.9 % (1.95)	6.6 % (1.32)	35.2 % (2.52)	26.9 % (2.56)	7.4 % (1.67)
College graduate	77.5 % (1.48)	6.0 % (0.97)	35.1 % (1.82)	19.4 % (1.66)	6.9 % (0.94)
Race/ethnicity[a]	$p = 0.46$	$p = 0.54$	$p = 0.001$	$p = 0.005$	$p = 0.83$
Non-Hispanic White	77.0 % (1.46)	6.1 % (1.11)	32.3 % (2.00)	25.7 % (2.06)	6.8 % (0.99)
Non-Hispanic Black	72.8 % (4.78)	4.7 % (1.77)	31.7 % (5.70)	13.2 % (3.00)	5.9 % (1.82)
Hispanic	81.6 % (3.45)	9.3 % (2.73)	53.6 % (4.77)	25.7 % (3.98)	8.5 % (2.73)
Non-Hispanic Other[b]	76.9 % (5.80)	7.3 % (2.02)	49.3 % (5.76)	21.0 % 4.94)	10.7 % (5.70)
General health	$p = 0.57$	$p = 0.44$	$p = 0.32$	$p = 0.32$	$p = 0.30$
Excellent, very good, or good	75.6 % (1.46)	5.9 % (0.69)	35.9 % (1.55)	22.9 % (1.60)	6.6 % (0.82)
Fair or poor	78.2 % (4.36)	9.3 % (4.48)	30.2 % (5.50)	29.7 % (6.51)	10.4 % (3.56)
Psychological distress	$p = 0.89$	$p = 0.72$	$p = 0.16$	$p = 0.98$	
Yes	76.2 % (1.42)	6.2 % (0.83)	35.2 % (1.49)	23.5 % (1.61)	7.13 (0.81)
No	77.5 % (10.9)	4.5 % (4.78)	19.1 % (11.49)	23.2 % (13.5)	No responses
Cancer experience[a]	$p = 0.001$	$p = 0.69$	$p = 0.01$	$p = 0.003$	$p = 0.31$
No personal experience with cancer	70.4 % (3.21)	5.3 % (1.28)	33.8 % (3.06)	15.6 % (2.16)	5.6 % (1.44)
Had family with cancer	80.3 % (1.63)	6.1 % (0.85)	38.5 % (2.11)	27.8 % (2.19)	8.0 % (0.99)
Had a personal cancer diagnosis	66.5 % (4.21)	4.6 % (1.38)	25.3 % (3.53)	22.6 % (3.89)	8.4 % (2.87)

Have regular health care provider[a]	$p = 0.34$	$p = 0.87$	$p = 0.11$	$p = 0.39$	*$p = 0.005$*
Yes	75.1 % (1.88)	6.3 % (0.87)	33.6 % (1.78)	24.6 % (1.98)	8.6 % (1.33)
No	78.0 % (2.11)	6.6 % (1.64)	39.3 % (2.76)	21.8 % (2.50)	4.2 % (0.99)

[a] Italics font indicates Statistically significant associated with one or more of the social media p value of 0.05 or less.

[b] Other includes American Indian, Asian American, Pacific islander, Native Hawaiian, Alaskan Native, and multiple races mentioned

demographics among those reporting Internet access. A total of 76 % (*N*= 1,632) reported visiting some type of social networking site in general. Watching health-related YouTube videos was the second most reported form of social media use across all types of media and the most frequently reported form of health-related social media use (*N*= 709, 35.4 %). Blog writing was the least reported type of social media use (*N*= 140, 6.4 %).

Across all types of social media (general and health-related), age was significantly associated with use. Study participants 65 years of age and older were less likely to visit a social media platform for any purpose[X^2 (5, N=211) = 92.21, p<.0001]. However, females were more likely to visit a social networking site for some general and health-related purposes. Specifically, 83.8 % (SE = 1.29) of females visited a social networking site, 31.4 % (SE = 2.39) shared health information on a social networking site, and 9.2 % (SE = 1.10) participated in an online support group for health/medical purposes.

Bivariate associations found that although Hispanics were less likely to report Internet access, they were more likely to watch health-related YouTube videos [X^2 (3, N=143) = 19.88, p=.001] in comparison to racial and ethnic groups. In contrast, Internet-using non-Hispanic Blacks have lower rates of social media use in comparison to other racial/ethnic groups. This suggests a potential "Double-Divide," in that non-Hispanic Blacks are already less likely to be online (see Table 1), and once online, they are less likely to use social media for a variety of purposes. Equally of note, only 13.2 % of non-Hispanic Blacks reported sharing health-related information on a social networking site in comparison to other racial/ethnic groups (13.2 %–25.7 %). Aside from sociodemographic factors, we found the health-related correlate of general health was not significantly associated with any types of social media use.

HIT engagement

Comparatively, reports of HIT engagement for healthcare is less common than general social media use. An estimated 28.0 % of Internet-accessing U.S. adults reported tracking their personal health information (PHI) electronically and 30 % reported communicating with a healthcare provider using Internet or email (Table 3).

In terms of user characteristics, weighted bivariate analyses revealed a statistically significant difference among females [X^2 (1, N=449) = 4.46, p=.04], persons having at least a college education [X^2 (2, N=365) = 14.82, p=.002], and individuals identifying as a non-Hispanic other [X^2 (3, N=64) =9.13, p=.04] who reported tracking PHI electronically. Those who were 35–44 years of age [X^2 (5, N=126) = 24.25, p=.002], college educated [X^2 (2, N=386) =23.33, p<.0001] and having a regular healthcare provider [X^2 (1, N=507) =7.33, p=.009] were more likely to communicate with a healthcare provider using Internet or email than other groups.

Table 3 | Weighted bivariate associations between types of reported health information technology activities (HIT) and characteristics (N = 2,284 Internet users)

Characteristics	Health Information Technology (HIT) Engagement activities	
	Tracked personal health info. (PHI) (N = 702, 28 %)	Communicated w/ HCP using Internet/email (N = 668, 30 %)
% (SE)		% (SE)
Age[a]	p = 0.06	*p = 0.002*
18–24	16.3 % (4.48)	16.5 % (5.23)
25–34	35.6 % (4.05)	32.8 % (3.91)
35–44	26.3 % (2.85)	32.9 % (3.07)
45–54	31.0 % (3.52)	31.6 % (2.70)
55–64	28.6 % (2.54)	31.0 % (2.99)
65+	23.6 % (2.59)	21.9 % (2.43)
Gender[a]	*p = 0.04*	p = 0.20
Male	25.3 % (2.43)	27.6 % (2.26)
Female	31.0 % (1.64)	31.9 % (2.09)
Education[a]	*p = 0.0002*	*p < 0.0001*
High school or less	20.3 % (7.44)	17.2 % (7.17)
Some college	23.6 % (1.94)	24.2 % (1.88)
College graduate	35.8 % (2.68)	39.4 % (2.19)
Race/ethnicity[a]	*p = 0.04*	p = 0.33
Non-Hispanic White	27.0 % (1.62)	29.6 % (1.74)
Non-Hispanic Black	31.1 % (5.46)	31.7 % (5.10)
Hispanic	28.7 % (3.82)	29.0 % (3.96)
Non-Hispanic other	46.4 % (6.23)	38.8 % (5.07)
General health	p = 0.36	p = 0.41
Excellent, very good, or good	28.5 % (1.64)	30.0 % (1.54)
Fair or poor	24.0 % (4.75)	25.2 % (5.70)
Psychological distress	p = 0.65	p = 0.12
Yes	28.1 % (1.54)	29.9 % (1.44)
No	34.7 % (15.28)	14.6 % (7.68)
Cancer experience	*p = 0.07*	*p = 0.17*
No personal experience with cancer	28.7 % (3.25)	31.4 % (2.98)
Had family with cancer	27.3 % (1.73)	28.6 % (2.16)
Had a personal cancer diagnosis	38.6 % (4.18)	38.9 % (4.56)
Have regular health care provider[a]	p = 0.07	*p = 0.009*
Yes	30.4 % (1.97)	33.0 % (1.72)
No	24.2 % (2.78)	24.2 % (2.74)

[a] Italics font indicates variables statistically significant associated with HIT-mediated communication adoption at p-value of 0.05 or less

Social media use implications on HIT

We hypothesized that those who used social media would be more likely to engage with HIT, and in preliminary bivariate analysis, we found that all social media use variables were associated with HIT engagement (communicating with a healthcare provider through Internet/Email and tracking PHI electronically) with a p value = <0.001. Table 4 displays multivariate logistic regression models on HIT activities, controlling for demographics, health correlates, and different types of social media use.

After controlling for sociodemographics and health correlates, social media use remained significantly associated with both types of HIT engagement activities. Social media users who (1) visited a social network (OR = 2.00, 95 % CI = 1.33–3.01), (2) watched a health-related YouTube video (OR = 2.25, 95 % CI = 1.51–3.34), or (3) shared health-related information on a social network (OR = 2.22, 95 % CI = 1.33–3.71) were more likely to communicate with a healthcare provider using the Internet or email. Persons who tracked their PHI electronically were more likely to engage in all types of social media use except for blogging: (1) to visit a social network (OR = 1.84, 95 % CI = 1.17–2.89), (2) to watch a health-related YouTube video (OR = 1.45, 95 % CI = 1.03–2.05), (3) to share health-related information on a social network (OR = 1.75, 95 % CI = 1.11–2.74), or (4) to participate in an online support group for health/medical info (OR = 3.16, 95 % CI = 1.56–6.41).

DISCUSSION

Our social media findings explored the Internet-accessing U.S. adult population's engagement with HIT to manage their personal healthcare needs. As stated previously, to our knowledge, this is the first study to examine the relationship between social

Table 4 | Odds ratio and 95 % confidence intervals for the Odds of HIT engagement by social media use among U.S. adult Internet users

	Health Information Technology (HIT) engagement			
	Tracked personal health info. (PHI)		Communicated w/ HCP using Internet/email	
	OR 95 % (CI)	*P*	OR 95 % (CI)	*P*
Visited a social network (ref no.)[a]		*0.008*		*0.001*
Yes	1.84		2.00	
	(1.17–2.89)		(1.33–3.01)	
Blogger (ref no.)	0.43		0.13	
Yes	1.31		1.73	
	(0.67–2.54)		(0.85–3.50)	
Watching health-related YouTube videos (ref no.)[a]		*0.04*		*<0.0001*
Yes	1.45		2.25	
	(1.03–2.05)		(1.51–3.34)	
Shared health info. on social network (ref no.)[a]		*0.02*		*0.002*
Yes	1.75		2.22	
	(1.11–2.74)		(1.33–3.71)	
Participating in an online support group for health/medical info. (ref no.)[a]		*0.001*		0.11
Yes	3.16		1.74	
	(1.56–6.41)		(.88–3.45)	

Controlled for self-reported demographics and health-related correlates (including general health status, cancer experience, and having a regular healthcare provider) in the weighted multivariate logistic regression analysis

[a] Italics font indicates social media variables statistically significant associated with HIT-mediated communication adoption at p-value of 0.05 or less

media use and engagement with HIT-related functionalities. The *Channel Complementarity Theory* supports our study's findings, which demonstrate that a portion of U.S. adult Internet users are more likely to use multiple digital platforms by accessing social media and HIT for health-related purposes.

In addition, this study's findings offer insight into the Internet-accessing U.S. adult population's digital profile of social media use and HIT engagement. The 2013 NCI's HINTS 4 cycle 3 dataset allowed us to identify communication trends as well as factors related to Internet access and various types of social media use, for general and health-related purposes. Our results revealed 76 % of individuals online reported having visited a social networking site in 2013 compared to 23 % in 2007. More U.S. adult Internet users reported sharing health information on social media (23.5 %) in comparison to 16.8 % of the population in 2012, nearly a 20 % growth. Although not as significant, participation in an online support group increased from 3.26 % in 2012 [7] to 7 %. On the contrary, personal blogging decreased slightly since 2007 from 7 to 6.4 %. This suggests that blogging may potentially have become an outdated social media behavior, or that "microblogging"-brief messages such as texting, tweeting, instant messaging, and emailing- through social networking sites are growing and replacing more traditional blogging. Further research is necessary to determine differences in prevalence and trend with respect to particular online content and/or populations.

For the first time, HINTS included an additional social media questionnaire item that examined a specific behavior on a particular digital platform: watching health-related YouTube videos. Watching health-related video content on social media is becoming increasingly popular, with over a third (35.4 %) of the Internet-accessing U.S. adult population reported participating in this social media activity and it was the second most reported form of social media use in our study. According to a 2013 study conducted by the Pew Research Institute, general online video watching has increased to 72 % and video sharing sites such as YouTube are becoming a significant contributor to online watching, posting, and downloading among adults [36]. Pew also reported in a 2010 study that 25 % of Internet users or 19 % of adults reported watching a health-related video online [36]. These 2010 data in combination with our findings from 2013 may suggest that the prevalence of health-related video watching is increasing. This significant percentage of YouTube watchers for health-related information may translate to understanding individual's preference levels for obtaining and exchanging health information through HIT activities.

Health-related YouTube video watching, and sharing health information on social media, were the only two social media variables where racial/ethnic differences were revealed. Specifically, Hispanics were more likely than any other racial/ethnic group to watch a health-related YouTube video. This is a key finding because our results revealed communication inequalities in Internet access among non-Hispanic Blacks and Hispanic racial/ethnic groups. However, it is important to note that this inequality may not be present among Hispanic adult social media users with Internet access. According to a 2014 Nielsen report, Hispanics watch more online videos than any other non-Hispanic group, spending more than 8 h a month viewing this online content [37]. According to the 2013 AHAA Hispanic Study, 37 % of Hispanics were more likely to watch videos online in comparison to 30 % of non-Hispanics and 21 % more likely than non-Hispanics to watch TV online using their mobile phones [38]. The increased viewership of online video content may be due in part to the accessibility of an online video possibly offering Spanish language content. A Google Consumer Survey revealed Hispanics Google searches included both English or English and Spanish word searches [39]. This suggests that Hispanics are taking advantage of the Internet to access online content (e.g., online videos) for various purposes that may be available in their preferred language to assist with varied levels of comprehension. Our study findings specifically reveal that Hispanics are also watching online health-related videos through a social media platform.

The second significant racial/ethnic difference is observed with respect to using social media to share health-related information. Non-Hispanic Blacks were less likely to report actively using social media to share health-related information in comparison to other racial/ethnic groups. Although a prior study reported non-Hispanic Blacks and Hispanics were more likely to use social media than their White counterparts [40], our study revealed the non-Hispanic Black population was less active in using social media for health-related purposes in comparison to other racial/ethnic groups. Prior research has found parallel findings in low HIT engagement among non-Hispanic Blacks, specifically in online patient portal use [19].

LIMITATIONS AND STRENGTHS

There are a few limitations that are important to note within this study. First, this was a cross-sectional study and we were unable to determine causality or directionality. Future research should consider additional barriers and supports for individual's HIT engagement such as hospital or clinics ability to exchange health information with patients through various HIT activities (e.g., healthcare providers provide patients with the ability to access their electronic medical records).

Second, our study was limited to assessing two types of HIT activities: (1) tracking health information electronically and (2) using email or the Internet to communicate with a healthcare provider. We are aware that there are additional types of HIT platforms and activities available to patients to manage their healthcare and acknowledge that additional research should explore the implications of social media on HIT engagement through activities that are more detailed in nature such as willingness to exchange and/or share health information, viewing digital medical images, medication reminders, and monitoring appointment reminders. An individuals' likelihood to engage in these specific HIT activities may vary despite active social media use.

Third, the HINTS instrument does not measure whether HIT is available by a patient's healthcare provider to allow engagement. The current HINTS items only inquire whether a patient is engaging in certain HIT activities. Future HINTS' instruments should consider including measurements for healthcare provider adoption of HIT as well.

Lastly, a qualitative analysis of social media users' reasons for using HIT in comparison to non-social media users would provide a deeper understanding of what motivates social media users to engage in HIT. Our study findings were only able to obtain information for the types of HIT activities social media users are engaging. The HINTS instrument did not include a measure for HIT motivation.

Although there are limitations in this study, a significant strength in this study is this being the first known study to assess the relationship between specific types of social media use and HIT engagement. Another strength is that this study involves a nationally representative sample. Most of the social media and HIT related studies previously noted in our background/literature include local community and/or statewide samples. Our study provides findings that suggest social media use and HIT engagement on a national level.

CONCLUSION

Social media use and HIT engagement are both increasing. While these two areas of technology use are traditionally studied in isolation, our study set out to determine the relationship between the use of specific types of social media and HIT engagement. We executed this study with the assumption that if an individual is comfortable navigating technological platforms such as social media sites , especially for those related to health, then these individuals may be more likely to engage with certain types of HIT functionalities. Our assumption is explicitly congruent with predictions from *Channel Complementary Theory,* it also suggests that experience with online social connectednesswhether with peers or with one's healthcare team–as a design requirement to consider when creating online technologies in support of health [41].

As social media use continues to grow, the likelihood of patients engaging in HIT activities is also likely to increase as our study revealed that indeed social media users are significantly more likely to engage in HIT. We examined various ways that Internet users engage health-related social media, including sharing health information on social media and watching health-related videos. Reported engagements with these activities may shed light on the respondents' online habits and preferences (e.g., active online 'sharer' versus a passive information seeker). In order to optimally meet end users' needs, HIT designers and healthcare providers should aim to ascertain the individuals' online habits and preferences when designing and implementing HIT platforms. For instance, determining whether a patient is an active and frequent "sharer" in online support groups may help inform the types of engagement to be integrated into a patient portal. As another example, the data revealed the high prevalence of watching health-related YouTube videos among Spanish speakers, which could suggest the utility for developing more Spanish language online video content in HIT services for Hispanic clientele. Such considerations could help boost engagement in accordance with the spirit of Meaningful Use incentives. In addition to HIT developers, healthcare providers, and health communication researchers and practitioners should also consider where, when, and how to implement these digital health platforms within the healthcare system according to the target population.

In addition, our study suggests a digital divide in that non-Hispanic Blacks are significantly less likely to be online and use social media for health-related purposes. This finding contrasts prior research that found no differences in social media use among racial/ethnic groups once Internet access is afforded [42]. However, Hispanics are found to report watching health-related YouTube videos more than other racial/ethnic groups [34]. These findings offer potential explanations for certain documented communication inequities and have implications for health communication practice nationally.

Continued monitoring of the population's technology access across platforms may provide insight into predictors of HIT engagement. While the digital divide has been well documented, in that there are gaps in technology access and those with less technology and HIT access (racial/ethnic minorities, older adults, individuals with a lower SES) also tend to have worse access to health services. Even though HIT holds promises in assisting individuals with managing and monitoring their healthcare, populations affected by the digital divide are often less likely to benefit from HIT due to various barriers, chief among them is limited, sporadic, or no access to Internet due to poverty or rural living. According to the FCC 2015 Broadband Progress Report, a digital divide remains with 55 million Americans lacking advanced broadband access [43]. Policy makers must consider this barrier when developing and mandating policies such as HITECH. At a fundamental level, government programs need to increase Broadband access to enable access to HIT platforms, which can in turn improve overall healthcare.

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COMPLIANCE WITH ETHICAL STANDARDS

Conflict of interest: Devlon N. Jackson has no conflict of interest to report. The findings reported within this manuscript have not been previously published and this manuscript is not being simultaneously submitted elsewhere. It was presented at the 2015 DC Health Communication Conference, April 2015.

The data used to conduct this research was a publicly accessible secondary data set and the authors of this manuscript agree to allow the journal to review the data if requested.

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The research study for this manuscript used a publicly accessible secondary data set of human subjects ages 18 years of age and older, did not involve any animals, formal consent was not required as well.

IRB approval was not required to conduct this secondary data analysis using this publicly accessible data set by the National Institutes of Health, National Cancer Institute.

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