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Original Paper

# Using the Internet to Support Exercise and Diet: A Stratified Norwegian Survey

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## Abstract

**Background:** Internet is used for a variety of health related purposes. Use differs and has differential effects on health according to socioeconomic status.

**Objective:** We investigated to what extent the Norwegian population use the Internet to support exercise and diet, what kind of services they use, and whether there are social disparities in use. We expected to find differences according to educational attainment.

**Methods:** In November 2013 we surveyed a stratified sample of 2196 persons drawn from a Web panel of about 50,000 Norwegians over 15 years of age. The questionnaire included questions about using the Internet, including social network sites (SNS), or mobile apps in relation to exercise or diet, as well as background information about education, body image, and health. The survey email was opened by 1187 respondents (54%). Of these, 89 did not click on the survey hyperlink (declined to participate), while another 70 did not complete the survey. The final sample size is thus 1028 (87% response rate). Compared to the Norwegian census the sample had a slight under-representation of respondents under the age of 30 and with low education. The data was weighted accordingly before analyses.

**Results:** Sixty-nine percent of women and 53% of men had read about exercise or diet on the Internet ( $\chi^2=25.6$ ,  $P<.001$ ). More people with higher education (71%,  $\chi^2=19.1$ ,  $P<.001$ ), reported this. The same gender difference was found for using Internet-based interventions with 20% of women compared to 14% of men reporting having used these interventions ( $\chi^2=7.9$ ,  $P=.005$ ), for having posted a status about exercise or diet on Facebook or other SNS (23% vs 12%,  $\chi^2=18.8$ ,  $P<.001$ ), and for having kept an online exercise or diet journal (21% vs 15%,  $\chi^2=7.0$ ,  $P=.008$ ). Evaluations of own physical appearance accounted for some of the gender differences in using online exercise or diet journals. Seven percent of the total sample reported having used electronic communication to ask professionals about exercise or diet, while a few more had discussed online with peers (10%). Asking professionals online was more common amongst those with only primary education (13%,  $\chi^2<10.5$ ,  $P=.005$ ).

**Conclusions:** Gender and education are related to how the Internet is used to support health behaviors. We should be aware of the potential role of the Internet in accelerating social disparities in health, and continue to monitor population use. For Internet- and mobile-based interventions to support health behaviors, this study provides information relevant to tailoring of delivery media and components to user.

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**KEYWORDS**

Internet; Health Behaviors; Social Disparities; Health Literacy

**Introduction**

Currently, 85% of the Norwegian population use the Internet on an average day (1). Closing the access gap, however, makes socioeconomic differences in the use of Internet even more visible.

The concept “digital divide” is most often used to describe the gap between those who have access to computers and/or the Internet and those who have not (2). An important contribution of this concept is that it brought awareness of social inequalities into the reigning optimism with regards to the empowering potential of the Internet. There are, however, also some problems with this concept (2). One is that it makes the issue of access seem more dichotomous than it is. It obscures for instance, that quite a few people without access, especially older people, have others look up health information for them, or that health personnel and journalists use the Internet to a greater extent, also potentially influencing public health. Another issue obscured by this concept is that despite having access to the Internet, people engage in health related activities in it to a different extent, in different ways, and with different outcomes. Other concepts have been proposed that allows for more ambiguity while still pointing to the social inequalities, such as DiMaggio and colleagues’ (3) concept “digital inequalities”.

Pre-Internet concepts such as “health literacy” (4) may still be adequate for digital health purposes. “Health Literacy” is the skills needed by the individual to gain access to, understand, and use information in ways that promote and maintain good health (4). Nutbeam (4) has divided health literacy into three types: (1) functional literacy, which denotes sufficient basic skills in reading and writing to be able to function effectively in everyday situations; (2) interactive literacy, which denotes more advanced cognitive skills which, together with social skills, can be used to actively participate in, extract information from, and derive meaning from different forms of communication, and to apply new information to changing circumstances; and (3) critical literacy, which denotes cognitive and social skill to critically analyze information, and to use this information to exert greater control over life events and situations, such as engaging in shared decision making.

Some research groups have made even finer distinctions than this, but sufficient to say that the skills needed for successfully filling the roles of the active or empowered patient are diverse. Of course, doing all of this mediated via a computer and the Internet poses additional literacy demands on the user, both in terms of confidence and skills. This is covered by the concept “eHealth literacy”, first used by Norman and Skinner (5).

The social gradient in health is a well-established finding (6). Differences in education accounts for a substantial part of social disparities in health (7). One reason is that people with higher education are better able to attain and utilize health information to be proactive in relation to their own health (8,9). This can also be seen with regards to using the Internet for health

purposes. People with higher education use the Internet more for finding health information (10,11).

Many have been optimistic about the potentials for the Internet to enhance both the efficiency and reach of health communication (12,13). The Internet has been used to deliver interventions for health behavior change, such as smoking cessation (14), diet (15,16) and physical activity (17). Internet-based interventions are in general slightly less effective than the face-to-face individual counseling alternatives, but has been found to be efficacious, as long as they are based on sound theory and existing knowledge about effective components in behavioral change interventions (18,19). Even a small effect size can make a substantial public health impact given large enough reach (20).

For more than a decade the Norwegian population has been surveyed on their general use of the Internet for health purposes. In 2007, 40% of the 67% having used the Internet for health purposes, reported that they had been inspired to change lifestyle as a result of Internet use, and 44% reported having searched for information about health behavior such as diet and smoking cessation (11). In the 2011/12 US “Health Information National Trends Survey” (HINTS), 43% of US adults reported having “used a website to help with diet, weight, or physical activity” during the last 12 months (21,22). Health behavior related use was reported by a significant lower proportion of respondents with a lower educational attainment, but by equal proportions of men and women (21,22).

These two and other eHealth surveys have established that there are educational differences in the use of Internet to support health behavior change. We ask in the current study if there are further differences in how the Internet is used for health promoting purposes according to educational attainment. From a vantage point of conceptualizing education-related differences in health information seeking as a continuum from non-seeking and avoidance, via passive and unsystematic information intake, to active, systematic and critical review of health information (23), we expected to find differences in Internet use according to educational attainment.

**Methods****Design**

A survey on use of the Internet for health-related purposes was conducted amongst a representative sample of Norwegian Internet-users in October and November 2013.

**Sample**

A stratified sample of 2196 persons was drawn from TNS Gallup’s ISO 26362 certified Web panel of about 50,000 Norwegians over 15 years of age. The survey email was opened by 1187 respondents (54%). Of these, 89 did not click on the survey hyperlink (declined to participate), while another 70 did not return a completed survey. The final sample size for the current study is thus N=1028 (87% response rate of those

contacted). The final sample had a slight underrepresentation of respondents under the age of 30 and a slightly higher educational attainment than the general Norwegian population according to census.

### Questionnaire

Collected sociodemographic information included gender, age, and educational attainment. Highest completed educational attainment was categorized as completed primary, secondary, or tertiary education. Lower secondary education (Norwegian “ungdomsskole”) was grouped with primary education and higher secondary education (Norwegian “videregående”) is referred to as secondary education. A completed Bachelors degree or its equivalent at college- or university-level, or higher is classified as tertiary education. In Norway, primary and lower secondary education is compulsory (normally completed during 6-16 years of age), while everyone has the right to three years of public higher secondary education (including vocational studies). Entrance to higher (tertiary) education is based on competition, but the public and tuition-free offer is extensive.

Subjective health was measured with the item: “How is your health in general? Would you say it is: 5 = “very good”, 4 = “good”, 3 = “fair”, 2 = “bad”, or 1 = “very bad”? To assess satisfaction with looks of own body, we used three items from the “Appearance Evaluation Scale” (AES), which is a subscale of “The Multidimensional Body-Self Relations Questionnaire” (MBSRQ). We used a Norwegian translation validated by Loland (24): (1) “I like my look the way it is”, (2) “Most people think I look good”, (3) “I like my looks without clothes”, all ranged on a five-point scale from 1 = “completely disagree” to 5 = “completely agree”. This is a widely used instrument, and the subscale we used has been shown to function similarly across gender and age groups (25).

Various Internet use for supporting health behavior was assessed with yes/no-questions such as: “do you have any experience of using the Internet or your mobile phone for any of the following:” (1) “reading about diet or physical activity”, (2) “posting a status update about diet or exercise on Facebook or other social network sites”, (3) “asking professionals a question about diet or exercise”, (4) “used an Internet- or mobile-based self-help program, that is, a service that provides help and guidance in changing a health behavior (such as diet, exercise or smoking). For some of the questions, like the last one (4) and “have you ever used a health app”, there is probably some overlap (for a complete list of questions, see [Multimedia Appendix 1](#)).

### Statistical Analyses

The data was weighted according to age and educational attainment to be representative of the general Norwegian

population according to census. “I don’t know”-responses were counted as missing data and excluded from analyses in a pairwise fashion. None of the variables had more than 5% missing data. Dichotomous variables were made for education and subjective health for some of the analyses. A sum score ranging from 0-15 was computed for the appearance evaluation scale. Chi-square and ANOVA were used to test for differences between groups and logistic regression to analyze relationships between variables. Analyses were performed with IBM SPSS 19-22.

## Results

In the final weighted sample (N=1028), there were 50% men and 50% women. 27% of the men and 29% of the women had completed higher education ( $\chi^2=4.1$ ,  $P=.044$ ). Among those with a higher educational attainment 81% (241/299) report “good” or “very good” health compared with 69% (494/721) among those with secondary schooling or less ( $\chi^2=15.3$ ,  $P<.001$ ). The mean appearance evaluation score for men was 10.8 and 10.0 for women ( $F_{1,1021}=18.1$ ,  $P<.001$ ), and those with a higher education (mean 10.9) was more satisfied with their looks than those with a lower education (mean 10.2,  $F_{2,1021}=13.9$ ,  $P<.001$ ). There was no significant interaction between gender and education regarding appearance evaluation ( $F_{2,1021}=1.2$ ,  $P=.279$ ).

Overall, 78% of the respondents reported some kind of health-related use of the Internet. The most commonly reported activity, by 61% of the respondents, was reading about exercise or diet on the Internet. Use of Internet- or mobile-based programs to support exercise or diet was reported by 17%. See [Table 1](#) and [2](#) for the percentages of type of Internet-use related to diet or exercise stratified by gender and educational attainment.

If we look closer at gender differences first ([Table 1](#)), we find that more women than men reported having read about exercise or diet online (69% vs 53%), having used an Internet- or mobile-based program to support exercise or diet (20% vs 14%), having posted a status update about exercise or diet (23% vs 12%), or having kept an online exercise or diet journal (21% vs 15%). On the other hand, more men (9%) than women (7%) reported having shared online exercise or diet data with others ( $\chi^2=13.4$ ,  $P<.001$ ). There were no gender differences in the frequency of having asked professionals questions about exercise or diet (7%), or having discussed exercise or diet with peers (10%).

**Table 1.** Respondents' online health behavior by gender.

	Total	Women	Men	Test statistics	
	n (%)	n (%)	n (%)	$\chi^2$	P value
Read about exercise or diet	614/1003 (61.22)	347/503 (68.99)	267/500 (53.40)	25.6	<.001
Asked questions about exercise or diet to professionals	68/1012 (6.72)	34/505 (6.73)	34/507 (6.71)	0.001	.987
Discussed exercise or diet with peers	97/1003 (9.67)	49/503 (9.74)	48/500 (9.60)	0.006	.940
Used Internet- or mobile-based programs to support health behavior	170/1006 (16.90)	102/505 (20.20)	68/501 (13.57)	7.9	.005
Posted a status about exercise or diet on Facebook or other SNS <sup>a</sup>	175/1003 (17.45)	114/504 (22.62)	61/499 (12.22)	18.8	<.001
Kept an online exercise or diet journal	180/1007 (17.87)	106/503 (21.07)	74/504 (14.68)	7.0	.008
Shared online exercise or diet data with others	76/1007 (7.55)	33/503 (6.56)	43/504 (8.53)	13.4	<.001

<sup>a</sup>SNS: social network site

As for differences in use of the Internet for supporting health exercise or diet with according to educational attainment (Table 2), more people with higher educational attainment had read about exercise or diet (71% vs 62% and 56%), posted a status about exercise or diet (23% vs 14% and 16%), or kept an online

exercise or diet journal (25% vs 16% and 15%). On the other hand, those with only primary education had to a greater extent used the Internet to ask professionals questions about exercise or diet (13% vs 2% and 6%).

**Table 2.** Respondents' online health behavior by educational attainment.

	Primary	Secondary	Tertiary	Test statistics	
	n (%)	n (%)	n (%)	$\chi^2$	P value
Read about exercise or diet	90/146 (61.6)	310/556 (55.8)	213/300 (71.0)	19.1	<.001
Asked questions about exercise or diet to professionals	19/150 (12.7)	13/561 (2.3)	18/300 (6.0)	10.5	.005
Discussed exercise or diet with peers	20/148 (13.5)	50/507 (9.9)	27/271 (10.0)	2.94	.230
Used Internet- or mobile-based programs to support health behavior	29/147 (19.7)	88/561 (15.7)	53/299 (17.7)	1.57	.456
Posted a status about exercise or diet on Facebook or other SNS <sup>a</sup>	21/149 (14.1)	87/558 (15.6)	68/297 (22.9)	8.58	<.014
Kept an online exercise or diet journal	23/148 (15.5)	82/558 (14.7)	75/300 (25.0)	14.8	.001
Shared online exercise or diet data with others	9/148 (6.1)	36/558 (6.5)	30/300 (10.0)	0.26	.876

<sup>a</sup>SNS = Social Network Site

A two-block logistic regression was performed with having kept an online exercise or diet journal as the dependent variable and education, gender, subjective health as the independent variables in step one and additionally appearance evaluation in step 2. The final model can be seen in Table 3 and accounted for 3-4% of the explained variance in having kept an online exercise or diet journal. In the first step, when controlling for

each other, being female, having a higher education and a good or very good subjective health were all positively related to having kept an online exercise or diet journal. In block two, when we added appearance evaluation, we see that it reduced gender to non-significance, suggesting that some of the relation between gender and having kept an online exercise or diet journal can be explained by appearance evaluation.

**Table 3.** Logistic regression with having kept an online exercise or diet diary as dependent outcome (N=1002).

Block	Independent variable	Odds ratio (95% CI)	P
1	Good or very good subjective health	1.71 (1.15-2.59)	.009
	Higher education	1.76 (1.26-2.47)	.001
	Female	1.57 (1.13-2.18)	.008
2	Good or very good subjective health	1.92 (1.23-3.00)	.004
	Higher education	1.69 (1.18-2.44)	.005
	Female	1.40 (0.98-1.99)	.067
	More satisfied with appearance	0.96 (0.90-1.03)	.262

## Discussion

### Principal Findings

Most Norwegians have access to the Internet, and close to 80% of the population use it for some kind of health related purpose, most commonly reading about exercise or diet, reported by 61%. Of special interest to those of us who develop such interventions, 17% of Norwegians in this survey had used an Internet- or mobile-based program to support exercise or diet. This finding justifies the often-stated reach potential of Internet- and mobile-based interventions.

While several other kinds of health behavior related use of the Internet were unequally distributed in the population, the use of self-help programs did not differ according to educational attainment. However, women, use these interventions more frequently than men do.

A more specific question in our survey concerned the keeping of an online exercise or diet journal. There were 25% of those with higher education who reported keeping such journals, compared to 15-16% among those with a lower educational attainment. This is an important finding because self-monitoring is one of the most effective behavior change techniques we know of (26). Thus, it seems that those with a higher educational attainment use the Internet to support health behavior change in more effective ways.

As in previous research, we found that those with higher education had read about exercise or diet online to a greater extent than those with lower education. Zillien and Hargittai (27) found that of those with the highest socioeconomic status (SES), 45% reported searching for health information, compared to 29% in the lowest SES group, and 40% across all seven status groups. The status effect on health related Internet use did, however, become insignificant when controlling for age, gender and interest in topic, all which were significant predictors of health related Internet use (27). The finding that interest in health is a moderator between SES and health related Internet use is not surprising from a functionalistic account of media use, as people with higher SES are expected to utilize the Internet to meet their needs, whether the topic is politics, stocks or health.

In addition to a greater health information orientation (9), people with high educational attainment also have higher Internet information processing skills (28). Birru and colleagues (29)

showed some of the problems encountered by low-literacy adults when trying to find health information online. The participants had problems specifying effective search terms, tended to prefer sponsored links (which lead to alternative cancer treatments), and often ended up in websites with a high readability level. Many of the participants could identify and read back the relevant information on these sites, but were unable to paraphrase the information in their own words, suggesting limited comprehension of the material. In light of this, it is understandable that those with only a primary education in our survey to a greater extent had used the Internet to ask professionals about exercise or diet, a strategy which is likely to prove more effective than embarking on their own search.

We previously suggested that one of the ways that Internet might contribute to accelerating socioeconomic differences in health is through enabling those with a higher socioeconomic status to gain more health resources, including social support (30). In the current study, we found no significant differences between education groups with regards to discussing exercise or diet with peers online. Posting status updates about exercise or diet on Facebook or other social network sites was, however, more common among those with a higher educational attainment. This suggests that we need to refine our hypothesis and differentiate between different kinds of social support with regards to SES and health. Perhaps those with a lower educational attainment can utilize the Internet to gain instrumental support, while those with the highest educational attainment to a greater extent utilize the Internet to maintain a large social network. Furthermore, it is likely that posting statuses about exercise and diet could serve as a social class marker (31).

We, as other researchers, found that women are generally more active eHealth users (22,32). This finding has been explained in various ways, with women being the family's health liaisons, poorer subjective health status, and reproductive issues as popular explanations. However, many of these suggestions have been more or less refuted in research on consultation rates with general practitioners (33). Although this study focused on the use of the Internet or mobile phones for monitoring the individual's own health behavior, we still found that women were the more active eHealth users. This indicates that we need additional explanations for gender variance. With regards to women and health behaviors it has been suggested that it might have as much to do with appearance as with health (34). We found that as for monitoring one's own exercise or diet in the

form of keeping an online diary, controlling for appearance evaluation did reduce the effect of gender to non-significance, supporting that this may indeed be some of the explanation for women being more motivated to use eHealth tools to support their health behavior.

A weakness of our study is that we did not ask about watching videos online. Health literacy increase with the use of pictures, especially for those with a lower educational attainment (35). Previous studies of media preference (eg, 36) also found that TV were preferred over text by those with a lower educational attainment. Furthermore, some of the items we did ask about are probably overlapping, and not very precisely defined in terms of probably catching some eHealth use that is not directly related to health behaviors. We decided on this strategy of using and reporting several potentially overlapping items to make sure that we did not underestimate frequency of use based on the participant not being familiar with what we chose to name the activity, for example, "Internet-based intervention" would probably not ring any bells with most participants.

Another weakness of our study is that we lack detailed information about the participant's health behavior and whether there were any changes after Internet use. Future research could employ longitudinal designs that incorporate observational measures of health behaviors and critical health literacy to elucidate more of the causal relationship between education level and health outcomes as mediated via using the Internet.

Empowerment and health literacy are necessary first steps in health promotion. This means that in order to utilize the Internet in health promoting ways, a person would need to: (1) be able to read, write and technically use the Internet, (2) have an

internal locus of control (37) with regards to own health, and sufficient self-efficacy (38) for health behaviors that there seems a point to seek out health information or sign up for interventions, and (3) abilities to critically analyze and apply health information in a way that promotes own health. Offering eHealth services in lieu of measures to improve health literacy and sense of control in relation to personal health, will thus only benefit those who have gained these prerequisites themselves, and hence further empower those on the "winning end" of the social gradient.

There are at least two approaches we can take to accommodate the knowledge about social disparities in health behaviors into Internet-based interventions. We suggest that we first start with a screening of (e)health literacy (39-41) and then for those scoring under a certain threshold offer (1) a pre-intervention to increase (e)health literacy (eg, 42, 43) and/or (2) offer an intervention that rely more on interaction with professionals and/or peers and using more multi-media-based edutainment (23,35).

## Conclusions

Gender and education are related to how the Internet is used to support health behaviors. Women and people with higher education are more likely to use the Internet to support their health behaviors. However, men are more interested in uploading and sharing diet or exercise data, and people with lower education use the Internet more for communicating with others about diet or exercise. It becomes more and more evident that just providing universal access to eHealth in itself will only perpetuate and probably accelerate current social disparities in health.

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## Conflicts of Interest

None declared.

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## Multimedia Appendix 1

Survey questions concerning different kinds of exercise and diet related use of the Internet.

[[PDF File \(Adobe PDF File\), 29KB - med20\\_v4i2e3\\_app1.pdf](#)]

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**Short Paper**

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# mHealth: Don't Forget All the Stakeholders in the Business Case

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## Abstract

Mobile health (mHealth) facilitates linking patient-generated data with electronic health records with clinical decision support systems. mHealth can transform health care, but to realize this potential it is important to identify the relevant stakeholders and how they might be affected. Such stakeholders include primary stakeholders, such as patients, families and caregivers, clinicians, health care facilities, researchers, payors and purchasers, employers, and miscellaneous secondary stakeholders, such as vendors, suppliers, distributors, and consultants, policy makers and legislators. The breadth and depth of the mHealth market make it possible for mHealth to have a considerable effect on people's health. However, many concerns exist, including privacy, data security, funding, and the lack of case studies demonstrating efficacy and cost-effectiveness. Many American and European initiatives to address these concerns are afoot.

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**KEYWORDS**

Internet; mobile; mobile health; app; social media; health care market

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## Introduction

The evolution of the mobile health (mHealth) market reflects citizens' interest in using mobile tools to manage their health, and a growing emphasis on patient engagement makes mHealth attractive to health care systems. In addition to encouraging patients to engage in low-threshold personal self-management activities, mHealth affords the ability to link patient-generated data with electronic health records that incorporate various forms of clinical decision support systems. In addition to patients, care providers, and researchers, there are other stakeholders (including health plans, government payors, pharmaceutical and device manufacturers, platform/app providers and regulators) that have an interest in – and potentially significant influence over – the development of mHealth.

Most studies on mHealth have focused on the development and uptake of mobile applications [1]. These often relate to the effects of patients' mHealth use for condition management or examine the potential influence on care delivery and related costs. Other aspects of these applications have received less attention. We therefore give a quick overview of the primary mHealth stakeholders and then identify key issues that currently inhibit more widespread use of applications and platforms in health care or for health-related purposes. We then look at how governments are trying to change this through regulatory processes and point to a number of points that need to be addressed in future mHealth research.

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## Stakeholders in mHealth

Much has been written about mHealth's potential to transform health care, regulations governing mHealth, particularly the regulation of mobile medical applications, and regulatory effects

on technology development. We conducted a quick scan stakeholder analysis based on the framework of the health policy context of developed nations used in comparative health policy analysis [2]. Affected stakeholders include:

1. **Patients:** Patients are key stakeholders, using mobile devices to access health records and lab tests, and make appointments. They can participate in their care in the emerging patient-centered health care models, potentially experiencing improved care and fewer medical errors.
2. **Families and caregivers:** Families and others responsible for patients' care seek improvements in care delivery and care coordination, reduced medical errors, and more efficient management of their loved one's care.
3. **Clinicians:** Many clinicians appreciate the flexibility of mHealth devices and seek to improve care by accessing patients' records, utilizing computerized physician order entry, and prescribing medications electronically. They must balance costs, security and ease of use.
4. **Health care facilities:** Hospital and health systems, ambulatory surgery centers, long-term care facilities, home health agencies, other ancillary providers, and community group homes seek improvements in operational efficiency, reductions in the cost of patient care delivery, the ability to facilitate quality measurement, and expanded reporting capabilities.
5. **Researchers:** Researchers may use mHealth to generate more and potentially better data for use in clinical trials, comparative effectiveness research, and other areas.
6. **Policy actors:** Policy makers and legislators may gain better data from which to make decisions and facilitate the development of aligned incentives for the stakeholders through use of mHealth.
7. **Payors and purchasers (including health insurers):** Payors and purchasers, including self-insured employer groups, look to mHealth to improve health outcomes, provide more readily available data, achieve greater efficiencies, and reduce medical errors.
8. **Employers:** Employers would like mHealth technologies to contribute to greater quality of care in a more cost-effective manner for their employees, for example through wellness programs, as well as improve patient care delivery and reduce absenteeism.
9. **Additional stakeholders:** Vendors, suppliers, distributors, small-to-medium enterprise app developers and consultants could potentially develop business via mHealth technologies, and major platform providers also benefit from these developments. The diversity of business models coming from the various players also influences the mHealth market and thus user expectations, regulatory processes, etc.

## ***Mobile Health Market***

The scope of the mHealth market, projected to grow through the rest of the decade, foreshadows the possibilities. The connected devices market has been estimated at US\$16.4 billion by 2018 [3], nearly 100 million wearable remote monitoring

devices are expected to ship through 2019 [4], and the mHealth market is predicted to reach US\$49 billion by 2020 [5]. mHealth will grow, too, in terms of users, with 3 million patients to be monitored remotely by 2016 [6] and 50% of an estimated 3.4 billion smartphone users to have downloaded an app by 2018 [7].

Mobile health is already a reality. Twenty-seven percent of US broadband users use at least one connected health device [8], and 25% of US citizens track personal health measures using a wearable fitness device (e.g., a smart watch) or an mHealth app [9]. Wireless baby monitoring devices that measure an infant's respiration, position, and other characteristics are available [10]. Patients have even begun developing apps for medical needs not addressed by the commercial market (e.g., remote blood glucose monitoring of children) [11].

## ***mHealth User Expectations***

Both patient and care providers believe mHealth has the potential to improve health. In an August 2014 survey [12] of 1,102 patients and 1,406 health care professionals, including 827 doctors, respondents shared several expectations:

1. Patients (84%) and physicians (64%) think technologies such as smartphones are appropriate for diagnosis
2. Patients (64%) and physicians (63%) would use smartphones in blood tests if possible
3. Patients (42%) and physicians (40%) hesitate to use digital technology due to privacy concerns

Providers see value in the use of patient-generated data for agenda-setting, self-case assessment, and identification of barriers that patients face in managing their health [13]. Providers also demonstrate confidence in mobile devices through their own use of devices; 65% of nurses report using a mobile device for professional purposes at work for 30 minutes daily, and 20% report using a device for 2+ hours daily [14].

Despite the interest in mHealth, health care professionals report several concerns, including privacy, data security, funding, a lack of cases studies demonstrating efficacy and cost-effectiveness, and the need for more research [15]. Providers also worry about the workload resulting from widespread uploading of patient-generated data into electronic medical records and safety issues related to data use [16].

Privacy concerns, in particular, remain a barrier to large-scale adoption of mHealth. Only 30% of apps have privacy policies, and two-thirds of these policies are unrelated to the app itself, addressing rather the vendor or third parties [17]. A 2013 Privacy Rights Clearinghouse study of health and fitness apps noted that user information frequently is shared with third parties without users' knowledge, often without encryption [18]. Among 43 fitness apps reviewed, 72% had a medium or high risk of privacy loss, with free apps the riskiest. Just 43% of the fitness apps had a privacy policy, of which half were accurate.

## *Initiatives to Regulate mHealth*

The potential benefits of widespread mHealth use have motivated governments to seek protection for both patients and health care professionals.

### **United States Initiatives**

Members of Congress have expressed interest in modifying the Health Information Portability and Accountability Act (HIPAA) to support market development while protecting US consumers. Key objectives include:

1. Clarify what vendors must do to comply with HIPAA
2. Publish routine regulatory guidance updates to address technology advances
3. Identify implementation standards
4. Clarify how HIPAA affects encrypted data cloud storage when providers cannot access it
5. Provide assistance for HIPAA compliance

Several US regulatory agencies also seek to facilitate development of a mHealth environment. In September 2013 the Food and Drug Administration (FDA) released guidance on medical mobile apps and their application to wearable devices, and in October 2014 issued guidance on the content of premarket submissions for managing medical device cybersecurity. Previous FDA guidances and draft guidances cover social media and Internet information sharing. The Federal Trade Commission addresses development and use of mHealth and mobile devices through data security regulations. Individual states protect consumers through narrower statutes, such as a California mHealth app initiative [19].

### **European Union Initiatives**

In early 2014, the European Commission released the mHealth “Green Paper,” a pre-policy document for consulting with Member State stakeholders on 11 issues related to the development and use of mobile applications for health care [20]. It was accompanied by a staff working document on the legal framework regulating the development and use of apps in Europe and its adequacy to address the issues raised by apps considered “lifestyle and wellness” devices [21].

Reports composed by the Advisory Groups for the Horizon 2020 Work programs 2016-17 were released later in the year [22]. Several reports referred to information and communication technologies (ICT) as an important area for investment. While these reports span topics broader than health and health care, ICT’s potential to make a difference in the health and well-being of individuals was a cross-cutting theme in most reports.

These documents provide insight into the European Union’s (EU) strategic (research) priorities for the coming funding period. As a group these documents are optimistic, sharing a “promising ethos” of ICT more generally and mHealth in particular. That is, policy makers at the EU level anticipate the potential of these apps to increase access to primary care and prevention programs, improve quality of life, enable more efficient and sustainable health care, cut costs, and empower patients. The reports recognize that sustainable solutions require that intended users take an early, active role in development processes. The reports also point to the need for a greater role for small and medium enterprises in research and innovation and more insights from the social sciences and humanities in uptake and use evaluation.

## *Issues on the Horizon*

As the mHealth environment evolves, several additional considerations will need to be addressed to support further development of mHealth, including:

1. Regulation of new products and services such as software as a service
2. Regulation of consumer- and patient-developed devices and apps
3. More research on how other processes that formal regulation (e.g. market mechanisms or industry self-regulation) govern developments in mHealth – especially quality assurance
4. Evolution of privacy and data management regulations for the regulation of commerce
5. Privacy-promoting technologies that allow users to interact with providers and exchange data with confidence.

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## **Conflicts of Interest**

None declared.

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## Abbreviations

**EU:** European Union

**FDA:** Food and Drug Administration

**HIPAA:** Health Information Portability and Accountability Act  
**ICT:** Information and communication technologies  
**US:** United States

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Original Paper

# Harnessing the Web: How E-Health and E-Health Literacy Impact Young Adults' Perceptions of Online Health Information

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## Abstract

**Background:** The rise of technology has changed how people take control of their health, enabling individuals to choose to live healthier lives and make better treatment decisions. With this said, the Internet has emerged as the channel used by individuals for actively seeking or passively receiving health information.

**Objective:** To explore how young adults assess the quality of health information, and how they construct meaning of online health information in general. Through 50 in-depth interviews, this study aims to examine how and why young adults turn to the Web for health information, and what strategies they employ to ensure that they are getting credible information.

**Methods:** A total of 50 in-depth interviews were conducted with young adults to explore how they make meaning of online health information. Depending on the geographic area of the participant, the interview took place face-to-face at a location convenient for them, over Skype, or over the telephone and lasted on average 40 minutes. The interviews were transcribed verbatim, fully retaining the speech style of the moderator and the participants. Data were analyzed using techniques from the grounded theory approach, using a constant comparative method to allow for themes to emerge from the transcripts.

**Results:** The participants shared several benefits to this mode of health information seeking, claiming that it made for more productive visits with doctors and made health information more readily accessible through a variety of different formats. Additionally, the participants demonstrated their e-health literacy levels by discussing how they assessed online health information, engaging in a series of strategies that encompassed different aspects of e-health literacy. Social media channels were brought up by the participants as relatively new tools that can be used to assist in the seeking, understanding, and sharing of health information. However, participants also cautioned about the use of social media in regards to its informal nature, warning users to evaluate sources accordingly and to use these channels as supplementary outlets of information for more traditional channels.

**Conclusions:** The use of the Internet and technology for health purposes is a growing area for both scholarship and practice that has strong implications for health consumers, medical professionals, and communicators alike. The findings that emerged from this research demonstrated that the online space is an acceptable channel through which young adults can find and share information. However, in spite of the rising usage of social media by this particular group, the findings showed that they were hesitant and wary of the channel, not seeing it as a resource for health information but more of a channel for networking and entertainment. In spite of this, this study shows that the online health information seeking behaviors is an area that warrants further exploration.

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**KEYWORDS**

e-health literacy; young adults; online information seeking; online health information

## Introduction

### Background

The rise of technology has changed how people take control of their health, enabling individuals to choose to live healthier lives and make better treatment decisions [1]. According to the Pew Internet and American Life Project, 80 percent of adult Internet users have looked online for health information regarding a specific disease or treatment [2]. Kreps and Neuhauser [3] argue that a “communication revolution” is brewing in terms of delivering health care promotion and service through the use of new health information technologies.

With this said, the Internet has emerged as the channel used by individuals for actively seeking or passively receiving health information. The fluidity of the Internet has defined it as both an impersonal or personal channel [4]. If a person is searching for information on diabetes, for example, the Internet is impersonal and does not require person-to-person interaction with others. If that same person were participating in an eating disorders online support group, then the Internet becomes a personal channel for seeking health information. Some of the biggest advantages of using the Internet for disseminating health messages are its constant availability, its ability to provide useful information, and the fact that it offers anonymity to users [5].

One particular public that warrants attention among researchers is the young adult population. As the generation that grew up with the Internet, young adults realize its value for health information. A 2009 Pew survey found that 93 percent of young adults aged 18-29 are on the Internet, with 72 percent searching for specific health topics [6]. Therefore, the purpose of this study is to explore how young adults assess the quality of health information, and how they construct knowledge/make meaning [7] of online health information in general. Through a series of in-depth interviews, this study aims to examine *how* and *why* young adults turn to the Web for health information, and what strategies they employ to ensure that they are getting the most credible information possible.

### Literature Review

#### *Defining eHealth*

According to Eng [8], eHealth is defined as “the use of emerging information and communication technology, especially the Internet, to improve or enable health and health care” (p. 1). Though this is the most frequently cited definition in the field of communication, other definitions of eHealth have emerged in the extant literature. A systematic review of definitions by Oh et al [9] resulted in 51 unique definitions of eHealth proposed within the literature (For a select list of definitions, see [Table 1](#)).



**Table 1.** Definitions of eHealth (as cited in Oh et al [9]).

Source	Definition
Mitchell (1999)	A new term needed to describe the combined use of electronic communication and information technology in the health sector. The use in the health sector of digital data – transmitted, stored and retrieved electronically – for clinical, educational and administrative purposes, both at the local site and at a distance.
McLendon (2000)	eHealth refers to all forms of electronic healthcare delivered over the Internet, ranging from informational, educational and commercial “products” to direct services offered by professionals, non-professionals, businesses or consumers themselves. eHealth includes a wide variety of the clinical activities that have traditionally characterized telehealth, but delivered through the Internet. Simply stated, eHealth is making healthcare more efficient, while allowing patients and professionals to do the previously impossible.
Medical Business News (2000)	eHealth is a convergence between the Internet and the health care industry to provide consumers with a wide variety of information relating to the health care field
Oracle Corporation (2000)	Healthcare transactions, encounters, messaging, or care provision occurring electronically.
Deluca, Enmark (2000)	eHealth is the embryonic convergence of wide-reaching technologies like the Internet, computer telephony/interactive voice response, wireless communications, and direct access to healthcare providers, care management, education, and wellness.
Prelow (2000)	eHealth is the process of providing health care via electronic means, in particular over the Internet. It can include teaching, monitoring (eg, physiologic data), and interaction with health care providers, as well as interaction with other patients afflicted with the same conditions.
Baur, Deering & Hsu (2001)	The most broad term is eHealth, with refers to the use of electronic technologies in health, health care and public health. (...) The various functions of eHealth [are]: (...) reference (electronic publishing, catalogues, databases); self-help/self-care (online health information, support groups, health risk assessment, personal health records), Plan/provider convenience services (online scheduling, test and lab results, benefit summaries), Consultation and referral (doctor-patient or doctor-doctor consultation via telemedicine systems, remote readings of digital image and pathology samples), eHealth commerce (sales of health related product and services) [and] Public health services (automated data collection, data warehouses, online access to population survey data and registries, advance detection and warning systems for public health threats). (...) This chapter uses the term eHealth to refer to the broadest possible range of interactive technologies applied to health and health care.
Orlikoff & Totten (2001)	The use of the Internet and related information systems and technology in all aspects of health care.
Eysenbach (2001)	eHealth is an emerging field in the intersection of medical informatics, public health and business, referring to health services and information delivered or enhanced through the Internet and related technologies. In a broader sense, the term characterizes not only a technical development, but also a state-of-mind, a way of thinking, an attitude, and a commitment for networked, global thinking, to improve health care locally, regionally, and worldwide by using information and communication technology
Blake (2001)	The combined use of electronic communication and information technology in the health sector. It is important to note that eHealth is much more than business transactions. It encompasses everything from digital data transmission to purchase orders, lab reports, patient histories and insurance claims.
Robert J Wood Foundation (2001)	eHealth is the use of emerging information and communication technology, especially the Internet, to improve or enable health and health care.
Wysocki (2001)	eHealth refers to all forms of electronic healthcare delivered over the Internet, ranging from informational, educational and commercial “products” to direct services offered by professionals, non-professionals, businesses or consumers themselves

Source	Definition
Health e-Technologies Initiative (2002)	The use of emerging interactive technologies (i.e., Internet, interactive TV, interactive voice response systems, kiosks, personal digital assistants, CD-ROMs, DVD-ROMs) to enable health improvement and health care services.
Kirshbaum (2002)	There are many different definitions of eHealth: <ul style="list-style-type: none"> <li>• Electronic connectivity vehicle for improving the efficiency and effectiveness of healthcare delivery</li> <li>• Enabling consumers/patients to be better informed about their healthcare</li> <li>• Enabling providers to deliver better care in more efficient ways</li> </ul>
Wyatt and Liu (2002)	The use of internet technology by the public, health workers, and others to access health and lifestyle information, services and support; it encompasses <i>telemedicine, telecare</i> , etc.
Staudenmeir (2003)	Any use of the Internet or related technology to improve: the health and wellness of the population; the quality of healthcare services and outcomes; efficiencies in healthcare services or administration
COACH (2003)	The leveraging of the information and communication technology (ICT) to connect provider and patients and governments; to educate and inform health care professionals, managers and consumers; to stimulate innovation in care delivery and health system management; and, to improve our health care system.
RX2000 (2003)	eHealth signifies a concerted effort undertaken by some leaders in healthcare and hi-tech industries to harness the benefits available through convergence of the Internet and healthcare. Access, cost, quality and portability have been concerns in the health care arena. It's evident from many recent surveys that both health consumers and healthcare professionals are frustrated with the maze of health care delivery. Some, therefore, are turning to the Internet for answers and cost effective solutions.
WHO (2003)	eHealth is a new term used to describe the combined use of electronic communication and information technology in the health sector OR is the use, in the health sector, of digital data-transmitted, stored and retrieved electronically-for clinical, educational and administrative purposes, both at the local site and at a distance
Southwest Medical Group	eHealth is an emerging field focused on medical information and health care services delivered or enhanced through advanced Internet or related technologies. In a broader sense, the term extends the scope of health care beyond its conventional boundaries. Conceptually, eHealth enables patients to easily obtain medical related services online from health care providers
eHealth Technologies (2003)	The use of emerging information and communication technology, especially the Internet, to improve or enable health and healthcare thereby enabling stronger and more effective connections among patients, doctors, hospitals, payors, laboratories, pharmacies, and suppliers

***eHealth Literacy***

With more and more people taking control of their health to learn about a variety of conditions, diseases, and topics through the patient empowerment movement (du Pré, 2011; Schulz & Nakamoto, 2012) the fields of medicine and public health are starting to shift into a more consumer-focused practice. Individuals are seeking health information from a variety of different sources, including interpersonal interactions, television, print media and the Internet [4]. However, with 53 percent of adults having intermediate levels of health literacy [10], it has become evident that health literacy is an issue that warrants further attention, as national literacy levels in regard to health have been found to be low (Hay, 2010; Koh & Rudd, 2015; Torpy et al, 2011).

With this said, navigating the online sphere adds another dimension to health literacy, especially for young adults. Even though the majority of this population is competent in computer use and Internet searching, Hansen et al [11] found that their success in finding specific health information varied, due to frustration over the sheer volume of information available, as well as determining the credibility and accuracy of the information. Thus, with 80 percent of adult Internet users looking for health information online [2], it became imperative that a conceptualization of eHealth literacy was needed in order to determine exactly how to operationalize this measure. as a way to determine how individuals come to understand online health information.

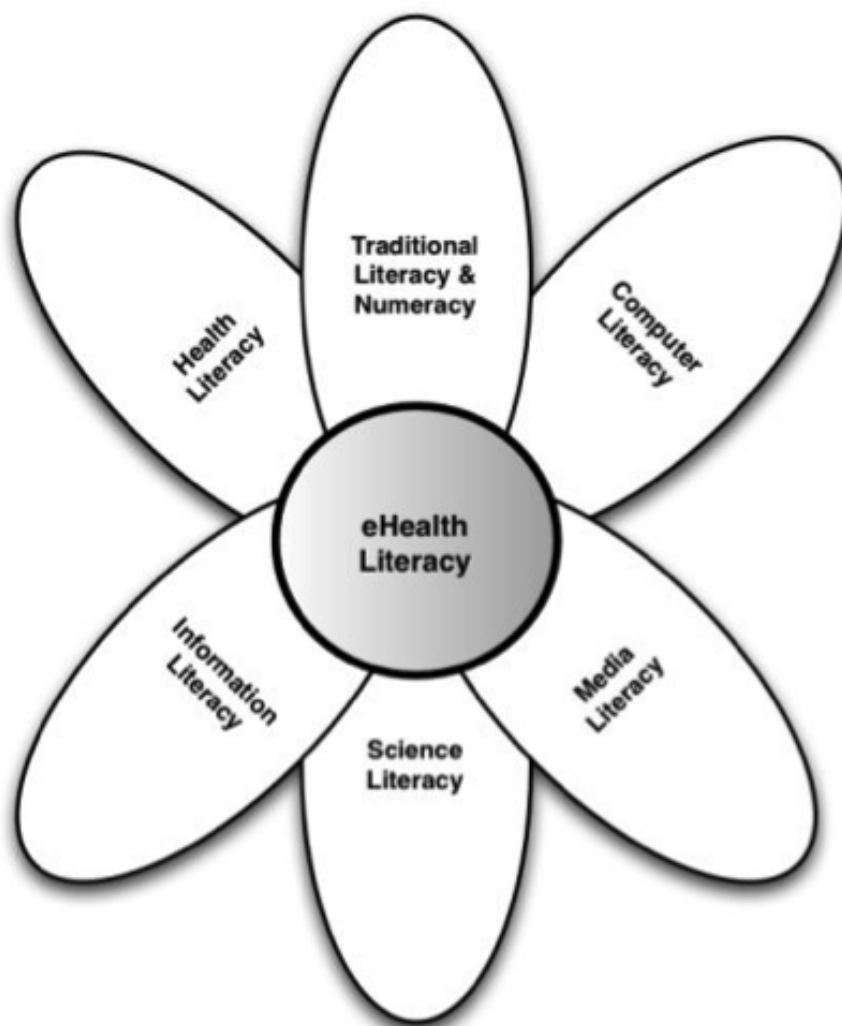
There is currently one definition of eHealth literacy that is predominantly cited all throughout the literature, proposed by

Norman and Skinner [12]: “The ability to seek, find, understand, and appraise health information from electronic sources and apply the knowledge gained to addressing or solving a health problem” (p. e9). Using the metaphor of the lily to model the idea of eHealth literacy, Norman and Skinner [12] claim that the “petals” of the lily consist of six core literacies that can be applied to the eHealth setting, with the “pistil” of eHealth literacy tying them all together (p. e9, see Figure 1). Norman and Skinner [13] have since designed the eHealth Literacy Scale (eHEALS) in order to assess health consumers’ perceived skills to better aid health educators and promoters in developing more personally relevant programs that more closely align with individuals’ levels of eHealth literacy. Additional research studies have further explored Norman and Skinner’s [12]

conceptualization of eHealth literacy by way of testing eHEALS in various settings (e.g., Norman [14]; Xie [15]), with several scholars finding the scales to be easy-to-use and reliable (Brown & Dickson, 2010; [16,17]).

The six literacies are further broken down into two central types: analytic and context-specific. The analytic types of literacy include traditional literacy, media literacy, and information literacy. The analytic component encompasses skills that are applicable to a broad range of topics or contexts. The context-specific types of literacy include computer literacy, scientific literacy, and health literacy. As compared to its analytic counterpart, the context-specific component can only be contextualized and applied to a specific problem, circumstance, or situation.

Figure 1. E-health literacy lily model.



**Traditional Literacy**

Based on the National Literacy Act of 1991, traditional literacy consists of “an individual’s ability to read, write and speak in English, and compute and solve problems at a level of proficiency necessary to function on the job and in society, to achieve one’s goals, and develop one’s knowledge and potential” [18]. Norman and Skinner [12] argue that in spite of the use of multimedia features such as still images, video and audio on

the Web, they still contain a large text-based component that users need to understand in order to obtain eHealth resources.

**Media Literacy**

Norman and Skinner [12] describe media literacy as “a skill that enables people to place information in a social and political context and to consider issues such as the marketplace, audience relations, and how media forms in themselves shape the message that gets conveyed” (p. e9). In order to find online health information, users need to develop the cognitive and critical

thinking skills necessary to truly assess and evaluate information online, especially with the sheer amount of information that is readily available online on a daily basis.

### Information Literacy

The American Library Association [19] defines information literacy as “how knowledge is organized, how to find information, and how to use information in such a way that others can learn from them.” The information literate person would be able to locate the appropriate online resources to find information on a specific health topic, utilize the correct search strategies, and can filter through large amounts of information to find exactly what they need [12].

### Computer Literacy

Logan’s [20] very simple and broad definition of computer literacy describes it as “the ability to use computers to solve problems.” Users need to consider the variety of options that are available in terms of computer technology, such as hardware and software, and be able to confidently utilize different computer systems in order to find health information. According to Norman and Skinner [12], a person could never become fully computer literate without quality access to computers and current information technology.

### Scientific Literacy

A broad conceptualization of scientific literacy is an understanding of the nature, aims, methods, application, limitations, and politics of creating knowledge in a systematic manner [21]. Science literacy is a component of eHealth literacy because all health information is driven by science; users need to understand the process of how health information is scientifically discovered, and the various opportunities and limitations that come along with that scientific discovery [12].

### Health Literacy

As previously discussed, health literacy consists of “the cognitive and social skills that determine the motivation and ability of individuals to gain access to, understand, and use information in ways that promote and maintain good health” [22]. Without the basic skills to successfully function in daily life and navigate the health system [23], users would never be able to translate that knowledge to the online space.

### The Role of Social Media in eHealth

The growth and expansion of social media tools have provided yet another opportunity for eHealth campaign developers and educators. Social media can be seen as the “various electronic tools, technologies, and applications that facilitate interactive communication and content exchange” [24]. Platforms such as Facebook and Twitter are increasingly being used to facilitate a dialogue within the public health community, and to support a variety of different health issues such as suicide prevention and heart health [25]. What makes social media such a valuable tool is not necessarily its technological components, but the ability

to create communities, spark health discussions, and provide interaction and engagement via the online space in real time [26].

A vital point for eHealth campaign developers to consider is the fact that social media should in no way replace traditional forms of communication, but rather should expand and enhance campaigns by way of creativity and broader reach [25]. In addition, like more traditional health communication campaigns, the same principles for effective campaign design still apply to a program utilizing social media channels, with similar principles as presented by Olgivy’s report “Using Social Media Platforms to Amplify Public Health Messages” [26]: (1) establish goals, objectives and strategies specifically for digital media; (2) identify audiences according to online information seeking, preferred social media networks, and social media usage; (3) optimize content by listening and engaging in bidirectional conversation on the specific health issue; and (4) evaluate digitally.

### Research Questions

RQ1: How do young adults assess the quality of online health information?

RQ2: How do young adults make meaning of online health information seeking in general?

### Methods

Qualitative methods were used to collect and analyze data. More specifically, 50 in-depth interviews were conducted with young adults to explore how they make meaning of online health information.

### Data Collection

To recruit participants, various university professors were contacted who provided access to students at different universities across the nation. Through these sampling methods a total of 50 participants were interviewed (for a listing of demographic information, see Table 2). Depending on the geographic area of the participant, the interview took place face-to-face at a location convenient for them, over Skype, or over the telephone and lasted on average 40 minutes. Participants were asked to sign a consent form prior to the start of the interview, and were asked to be audio recorded so that details could be gathered after the interview was conducted. . The interview protocol was reviewed and approved by the University’s Institutional Review Board (IRB). It followed a semi-structured format, which allowed the moderator the flexibility to change the order of the questions or clarify questions if needed [27]. Sample questions include the following: “Do you think the Internet is helpful in making decisions about your health?”; “How do you assess the quality and accuracy of online information?”; and “Do you use social media to get health information?”.

**Table 2.** Demographics of study participants.

Characteristic	Number of participants
<b>Sex</b>	
Male	25
Female	25
<b>Race</b>	
White	30
Black	3
Hispanic	4
Asian	13
<b>Age</b>	
18-19	18
20-21	12
22-23	7
24-25	13
<b>Sexual orientation</b>	
Heterosexual	47
Homosexual	3
<b>Relationship status</b>	
Single	23
In a relationship	27

## Data Analysis

The interviews were transcribed verbatim, fully retaining the speech style of the moderator and the participants. Memos and observer comments (OCs) were included throughout the transcripts to make note of interpretations of the interviewees and different questions or themes that may emerge from the data [28]. Data was analyzed using techniques from the grounded theory approach [29], using a constant comparative method to allow for themes to emerge from the transcripts [29-32]. First, open-coding procedures were used to examine the transcripts line-by-line to locate emerging themes and potential categories. Axial coding was then used to find how data can fit into the categorical themes that were identified in the first step, along with finding data that explicates the concepts presented in the proposed theoretical framework. According to Lindlof and Taylor [33], axial coding is a part of the integration process of the grounded theory approach that narrows down the number of categories by finding similarities across data in order to make the data clearer and more understandable. However, though single statements will be combined to create various concepts, stand-alone statements that were unique or exceptional were also coded, in an effort to avoid too much coherency in the data [34]. In addition, Corbin and Strauss [29] recommend using in-vivo codes in order to privilege the words of the participants, which refers to when a participant made a poignant point, these words were used verbatim as a code within the data analysis process. However, pseudonyms were used in the reporting of the results to protect the identity of the participants.

## Results

### RQ1: How Do Young Adults Assess the Quality of Online Health Information?

#### *Assessing the Credibility of Online Sources*

Several of the participants mentioned ways that they determined whether or not an online source is a credible, reliable piece of information. Amber claimed that sometimes some background research on the organization offering the information is needed:

*I guess if you find out who posted the information on the website, and then if its a company that posted it, you can find out background research on that company. Its a lot of work, which is probably why I don't do it, but I guess you just have to do the right research to figure out what the background of each person posting that information is.*

For Diego, he felt that pages that are pushing to sell products are less likely to be trusted:

*It's more of an eye test. If it has motives, like trying to sell stuff with ads and has ulterior motives then no. And also there are a lot of sites that are backed by the government or societies or even some colleges, and I think that anything that is backed by a strong academic place is going to be more reliable.*

Other participants, including Virginia, Erica, and Matt, want to see websites from reputable organizations, and were more likely to steer away from personal blogs. According to Erica,

*Maybe because I sort of have a working knowledge in health and human services, but I feel like I trust sort of those bigger agencies like NIH and CDC. I don't really trust something like if people have commented on something or a blog... I'm pretty skeptical on those things. I would trust something that had a more official feel to it.*

Virginia also agreed, and said, "I think if they're affiliated with a legitimate or I consider to be legitimate organizations like Red Cross or Greater Than AIDs for instance, I would take those to be more legitimate or more accurate than some random person's blog site." And Matt claimed he wanted "to see industry accreditation. If I see that its being sponsored by large recognizable associations of health I'm going to trust it more. I don't want to see a random medical blog where some "doctor" wrote [a post] from Kansas."

### **Cross-Referencing/Cross-Checking Websites**

Another way that participants assessed online health information was by going to a number of different websites and cross-referencing and cross-checking their information to see if they all match up. As Peter advised:

*Don't rely on one specific source for everything and that doesn't even mean a form of media. If you're going to get your health information through the Internet go around to a couple different websites. If you were going to a doctor and heard something you didn't want to hear, you would want a second opinion. If you were looking up something online that doesn't agree with you, it shouldn't be a one-stop deal, it should be more of like what does this website say or what has this doctor researched about this topic.*

Domenic claimed, "You have to be careful about what you see on there. I generally don't rely on one source. If one person says something, I'll check it on a different site. Anyone can post on the Internet. You need to correlate your results with other sources." Matt had similar advice, and said, "There's a lot of good information out there but you can get easily sidetracked by mediocre, bad websites. It's a matter of making sure the info you find you pair with other credible websites in order to get a good, solid, general opinion on something. To make sure everything meshes."

For Kyle, confirming information through other websites helps him assess to see if the original information is actually credible and correct:

*So if something sounds right, then I think I'd assume it is, then I'd take the confirmation of other sites. So through looking at multiple unrelated sites that's how I assess the credibility. If something sounds wrong, I'm going to assume that it's probably wrong but also try to confirm that. Basically if something looks credible I'll assume it's correct if it's online. If it doesn't sound credible then I will also double check to see where this crazy information is coming from.*

### **Addressing Website Characteristics**

A final criteria in terms of assessing online sources had to deal with different website characteristics, namely, the layout of the site and whether or not the site has been properly updated. In terms of website layout, Angela discussed how she checks to see if a site has a professional look and feel, and based on that criteria, is able to better judge to see if the information is legitimate and credible, as stated here: "For me, first off the way it looks...like whoever put the website together probably knows what they're talking about. It's not just some HTML page that doesn't have graphics or anything, like it looks good."

For Kyle and Diego, an important consideration is when the website has last been updated with the most recent information. Diego claimed, "You really have to make sure the information is up to date and that it's a legitimate source. I'm sure there are multiple ways to deal with that...make sure that whatever you do has been confirmed to work." According to Kyle, an updated site is very important, as the medical field is constantly changing and evolving:

*The problem is knowing which sources are trustworthy, and out of those sources, which has the most credible information. Because the site may have not been updated since 20 years ago, and we have so many advances in medicine. Knowing what's trustworthy, and then out of those, which are the most updated and comprehensive information.*

## **RQ2: How Do Young Adults Make Meaning of Online Health Information Seeking in General?**

### **Accessibility**

Participants were favorable toward the online space for health information because of it's ease, convenience, and accessibility of information, as Jack said, "You can try to look up almost anything on the Internet and find almost anything on the Internet." Max agreed, stating, "It's always there. It's information you don't have to make an appointment with somebody or call somebody. It's always at your hands, it's on your phone, there's live talks you can access when you need health information, and you can go to WebMD." Matt was a huge fan of using the Internet to find just about any kind of health information he needs or wants:

*It's an incredible plethora of knowledge right at your fingertips. Decades and decades and hundreds and hundreds of research and information at your fingertips. You can find anything. If I'm suffering from a serious illness it's not a replacement for going to the hospital or making regular appointments, but it's such a vital tool to help improve your general knowledge of health. Helpful practices, helpful tips, helpful things to do to better yourself mentally and physically.*

### **Time Saver**

The participants felt that going online for health information is a huge time saver that allows you to get information quickly, without needing to make an appointment with their doctor, or

to gauge symptoms while waiting to see a doctor. As Mandy mentioned:

*The availability, and you can access it quick. You don't have to call and wait for your doctor to answer an email or wait a couple of days. If you want to go to a reliable website, go to WebMD or something. If you have your information right there, you can search it and learn more about it. It's just so quick and readily available, it's so important.*

Angela had similar thoughts, and said, "I think it's really important because a lot of time you don't have the ability to just [be] like, 'oh let me call my doctor.' You can't just do that just with ease without having to get an appointment or having to talk to a nurse practitioner or somebody that's not really your doctor."

### **Verifies Visits to the Doctor**

Participants claimed that using the Internet for health information is helpful because it arms them with information that they can take to their doctor, which in turn they can use as a second opinion or to cross-reference what they are told by their doctor. As Angela stated, "I've had concerns about sicknesses or whatever and then I'll get information from my doctor and then I'll go to the Internet and a lot of the same things she says will come up." Elizabeth talked about this notion as a pro of being able to search online for health information, and said:

*Well, searching online...a pro would be just getting a general idea of what you're dealing with and what you think you have so that you can take that information to the doctor because ultimately if you do have something you should go to the doctor. I think that's the benefit of searching...just having a general idea and better being able to explain it to your physician.*

### **Recommendations to Incorporate Social Media**

The participants offered some suggestions in terms of how social media can be used in terms of health campaigns and messaging. Some participants gave specific examples by channel, such as Facebook or Twitter, while others had more general ideas of how social media can be used. For example, Kyle had some suggestions in terms of using Facebook:

*I think Facebook...if there was a group for a certain condition, a Facebook campaign would be extremely helpful. Just using Facebook as word of mouth among friends. If it's important. If you go to someone with friends, targeting certain conditions, that would be helpful. I would think Facebook would be a valuable tool.*

Diego warned about people's perceptions of Facebook, claiming that some may not view its content to be valid and true. However, he also explained that it could be a useful tool if it were backed by credible health organizations:

*I think if health organizations would become more integrated with it and would actually become more supportive, like if they contacted the social media*

*providers directly and create their own source of information and actually tried to use it to their advantage...not haphazardly put it together then they can make sure the health information being spread is accurate and not complete falsehoods.*

For Matt, he sees the following of credible health sources similar to following other well-known personalities for any type of information, and that social media can be used as a way to share knowledge already being disseminated via other traditional forms of media:

*...there are several effective ways it can be there. Functions where you're able to follow accredited associations, industry personnel, celebrities in the industry... I'm sure someone like Dr. Oz or other respected medical professionals, where they are regionally or nationally known are able to provide various information on their respected pages. If they want to link to published studies, or different health risks that have spread recently. I would think if social media were to be the most effective as possible it would need to be piggybacked by people of that level, people who have an influence, people with media experience, not just social media but media generally. So they can use their following and spring board it to social media to broaden their reach.*

Similar to a Google Med site, Nancy offered a suggestion in terms of what features this type of channel could provide:

*I would say maybe like have some type of question answer... a place where someone could go in and type a specific symptom or a question or anything that they have about any type of sexually transmitted disease or anything and have some type of way they can get real answers directed towards their question, not just general information.*

### **Wariness About Using Social Media for Health**

However, in spite of the potential opportunities social media can offer to the participants in terms of their health, there were those who were a bit more cautious and wary about using the channel for health purposes. As Tina put it:

*I don't think it can be used in a credible way. A lot of social media...people don't post the right information. People mostly use it for their personal life, I don't think it's informational, it's more recreational, so I wouldn't go on there to get health information.*

Rose agreed, and said, "In a way there's that barrier of what's personal and what's not. I don't think a lot of people are gonna talk about their body and what they're going through online. I don't think it would be very helpful."

Elizabeth felt similarly to Tina and Rose, and felt that social media is too casual a channel to be sharing personal health information:

*Yeah, I don't think it's the best avenue to take right now like I said unless you really know the doctor personally...maybe he has a large enough portfolio that he would have a decent amount of followers to*

*check out what he's putting out there. Otherwise I think it'd be hard for people to trust that, it just seems a bit too casual I think, which is why I think you would need to know them.*

## Discussion

### Preliminary Findings

This study explored how young adults made meaning of online health information seeking in general, and what strategies they employed to assess the quality of online sources. The participants shared several benefits to this mode of health information seeking, claiming that it made for more productive visits with doctors and made health information more readily accessible through a variety of different formats. Additionally the participants demonstrated their eHealth literacy competencies by discussing how they assessed online health information, engaging in a series of strategies that encompassed different aspects of eHealth literacy.

### Benefits and Opportunities

Since the majority of young adults are comfortable with using computers and surfing the Internet, participants seemed fairly confident in their competency to find the health information they needed whenever it was needed [35]. Many of the participants embraced the immediacy of online information, which allows them to gather health information at their convenience in a more self-guided manner [36]. Furthermore, participants are given so many options in terms of how to gather content, choosing from many different channels including laptops, desktops, mobile phones, or tablet devices [36]. The challenge for health communicators and campaign developers, as was mentioned by one participant, is determining where people are most frequently turning to and disseminating messages that will attract their attention amongst the online clutter.

Once that information is found and processed, however, participants discussed the benefit of bringing that information to their visits with a doctor. Wald et al [37] argued that this helps create more efficient use of clinical time, and participants claimed that it helped them to better understand their doctor's prognosis. This also increases the potential for more shared decision-making between doctors and patients, shifting doctor-patient interactions toward a more collaborative communication model, where patients are seen as peers who openly discuss health options and make mutually satisfying decisions [38,39]. This involves teamwork, effective communication, and critical listening on both sides of the interaction, where both doctors and patients can ask clarifying questions and work together to develop and meet shared goals [40].

Social media channels were brought up by the participants as relatively new tools that can be used to assist in the seeking, understanding, and sharing of health information. According to Chou et al [41], social media for health can be beneficial for several reasons: (1) social media can increase perceived social support and interconnectivity among individuals; (2) information sharing is more democratic and patient controlled; and (3) public

health programs have recently demonstrated success utilizing social media for health promotion efforts such as smoking cessation and dietary interventions. Furthermore, because social media content is so easy to repost and share with others, there is an inherent viral nature to using these tools, relying on word of mouth and the social context the message is embedded in to ultimately persuade individuals to change their attitudes or behavior surrounding a particular health topic or condition [42,43]. Thus, social media provide a unique opportunity for health communicators and health consumers to develop online communities, spark health discussion, and engage in real-time interactions [26], as was seen as a great benefit to participants. However, participants also cautioned about the use of social media in regards to its informal nature, warning users to evaluate sources accordingly and to use these channels as supplementary outlets of information for more traditional channels [25].

### Assessment and eHealth Literacy

The participants discussed how they assessed the quality of online health information sources, which demonstrated how they utilized different components of eHealth literacy as defined by Norman and Skinner [12]. Participants utilized their cognitive and critical thinking skills to use appropriate searching strategies (media literacy), locate relevant information (information literacy), read and shift through information (traditional literacy), filter the most useful nuggets (information literacy) and overall evaluate the usefulness of online health information (media literacy) by way of tapping into their levels of the analytic types of literacy as mentioned by Norman and Skinner [12]. Furthermore, obtaining access to computers and current information technology (computer literacy), understanding the science behind health information via cross-checking sites (scientific literacy), and being able to harness information that toward making sound health decisions (health literacy) were additional ways participants utilized the context-specific components of eHealth literacy that assisted participants in their assessment of online health information. Therefore, the findings of this study showed that the participants indeed used all aspects of eHealth literacy when it came to searching for sexual health information online.

### Limitations and Future Research

Although qualitative methods allowed for an in-depth understanding of sexual online health information seeking and evaluation through the lens of eHealth, eHealth literacy, and social media, a major limitation is the actual topic of study. Because sexual preferences, activity, and STDs are very intimate and personal experiences, participants may not have been as comfortable responding as honestly as they would with a close friend [44] - in particular, participants may have been hesitant to openly discuss their sexual health matters, or they may have inflated their experiences to make them sound more sexually experienced than they actually are, which happens most frequently with men [45]. In addition, another limitation is that college students may not be totally representative of all online health information seekers. Although they do comprise a majority of the young adult population, which was the population of interest for this study, future studies could explore this phenomenon with additional populations to determine



whether or not there are similarities or differences with the findings. In a similar vein, interviews have been critiqued for being contrived and unnaturalistic, occurring in an artificial setting developed by the researcher [46]. Future research could also explore other aspects of sexual health not covered in this study, such as healthy relationships, additional forms of contraception, and negotiating open communication between partners about topics such as STD history or birth control. Future work could also further explore the difference between young adults in the US vs. other countries, as the social and political context within different areas could play a role in online information seeking behaviors, especially sexual health.

### Conclusion

The use of the Internet and technology for health purposes is a growing area for both scholarship and practice that has strong implications for health consumers, medical professionals, and

communicators alike. Because the realm of eHealth is relatively new, there are great opportunities to explore this phenomenon through in-depth research, which was the major goal of this study. Specifically, this research explored how young adults made meaning of online health information via eHealth and eHealth literacy. The findings that emerged through 50 in-depth interviews with young adults demonstrated that the online space is an acceptable channel through which they can find and share information. However, in spite of the almost universal usage of social media by this particular group, the findings showed that young adults were hesitant and wary of the channel, not seeing it as a resource for health information but more of a channel for networking and entertainment. In spite of this, this study shows that the online health information seeking behaviors of young adults is an area that warrants further exploration. As the number of individuals on the Web continues to increase, so does the need for more research on online health information.

### Conflicts of Interest

None declared.

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