Patient Attitudes Regarding Online Sources of Health Information

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Background

Health literacy, generally defined as an individual's skill in obtaining and understanding information related to their health, has been shown to have significant impact on patient outcomes. Low health literacy is associated with higher rates of hospitalization and health care resource utilization, higher prevalence and severity of chronic disease, and worsened global measures of health including mortality. Poor health literacy is prevalent in the United States; as many as 36 percent of the population demonstrates limited health literacy. Rates are higher in certain subgroups such as the elderly, minorities, and those of low educational or socioeconomic status (1). Given the wide prevalence and far-ranging effects on long-term health outcomes, efforts to improve health literacy nationally clearly offer significant benefits across the population.

An emerging focus of study is the role of online sources of health information. A growing majority of patients report using information found online as a factor in their health care decisions (2,3,4). These sources include not only websites published by traditional authorities such as medical associations and hospitals, but a wide variety of sources including blog postings, online forums, or YouTube videos. These alternative sources tend to outnumber expert sources (8), and this is amplified by disproportionate circulation on social media sites such as Facebook and Instagram. Overall, non-expert sources are more visible online than expert sources. When examined, the general quality of information available online, especially regarding more specialized topics, has been generally found to be poor or misleading (8,9,10,11). This is presumably more problematic in the context of poor health literacy, which implies a decreased ability to discriminate between credible and misleading sources.

Understanding current patterns of online use of health information sources is made difficult by the many different types and platforms found online. While a growing body of research has contrasted patterns of Internet usage relative to traditional sources, few studies have investigated differences between online sources themselves. An understanding of whether specific sources are used differently by patients would allow efforts to provide high-quality online health information to be more effective, by highlighting platforms and formats that are more visible and trusted. This study investigates variation in patient attitudes regarding different, specific sources of online health information, attempting to begin to map the landscape of online health information as seen by patients.

Methods

This study surveyed ambulatory patients at four clinic sites within the UCSD health care system. Patients were offered participation in the survey based on availability while waiting for clinical appointments; no compensation or other reward for participation was offered. The survey included ten different platforms or categories of online source; for each source patients were asked to rate how often they used it, their level of trust in the source, and degree to which that

source ultimately impacted their health care decisions. The order that sources were listed within survey questions was varied between copies of the survey.

Responses were analyzed using repeated measures ANOVA to establish the significance of variation in responses for each measure. Recruitment was targeted at 100 responses based on estimation of the sample necessary to achieve 80% power to detect statistical significance of differences with ANOVA, using the standard computation included with GPower.

Results

113 surveys were distributed to patients over 4 weeks. 7 surveys were not returned, and 27 were incompletely filled out, leaving 79 fully completed surveys which were included in the analyzed responses.

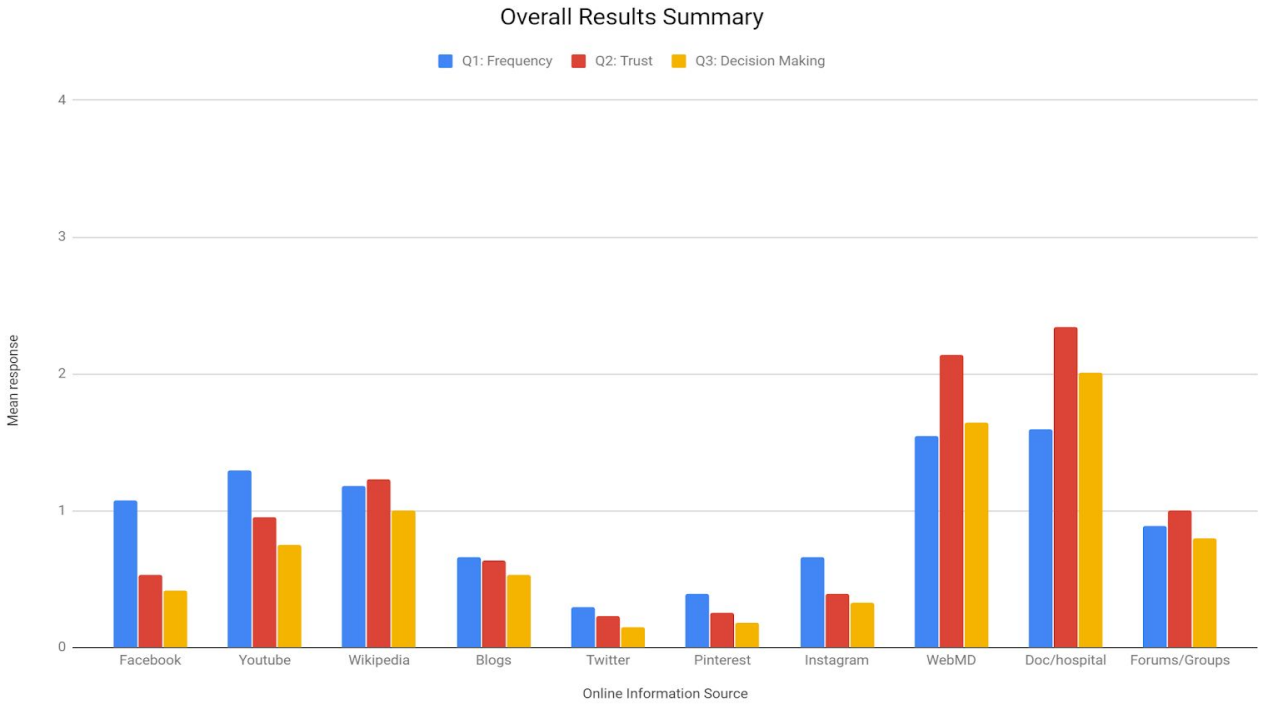
Average age of respondents was 49.7. Other demographic characteristics are summarized below. Of note, 51 respondents self-identified as female compared with only 28 self-identifying as male; this may be due to a disproportionately female clinic population but bias in sampling must also be considered.

Respondent Demographics		
Mean Age	49.7	
Gender		
	Female	51 (64.5%)
	Male	28 (35.5%)
Ethnicity		
	African-American	4 (5%)
	Asian/Pacific Islander	19 (24%)
	Caucasian	52 (65.8%)
	Hispanic/Latino	9 (11.4%)
	Other	1 (1.2%)
Educational Level		
	High School	13 (16.4%)
	Bachelor's	37 (46.8%)
	Master's	17 (21.5%)
	Doctorate	11 (13.9%)

Frequency of general internet use was asked using a 5-point Likert scale with responses coded numerically ranging from “Never or almost never” = 0 to “Frequently throughout the day” = 4. The mean response was 3.11, corresponding to slightly above “Every day.”

Survey questions 1 (“How often do you read or watch videos about health information on the following websites?”), 2 (“How much do you trust health information from the following

websites?") and 3 ("How much does information from the following websites influence your decisions about your health?") were coded with similar 5-point Likert scale responses translated to numeric values ranging from 0-4. Mean responses to each question are illustrated below:



Mean Responses by Online Source			
Online Source	**Q1: Frequency**	**Q2: Trust**	**Q3: Decision Change**
Facebook	1.08	0.53	0.42
YouTube	1.29	0.95	0.75
Wikipedia	1.18	1.23	1
Blogs	0.66	0.63	0.53
Twitter	0.29	0.23	0.15
Pinterest	0.39	0.25	0.18
Instagram	0.66	0.39	0.33
WebMD	1.54	2.14	1.65
Doctors' or hospitals' websites	1.59	2.34	2.01
Online forums or discussion groups	0.88	1	0.8

The significance of the variation in survey responses to all three questions was analyzed via one-way repeated measures ANOVA, performed in R using standard libraries. Variation in all

three questions was found to be significant with p values much less than 0.001. ANOVA also yielded estimations of effect sizes that exceeded those used in preliminary power calculations, with minimum generalized eta-squared of 0.14.

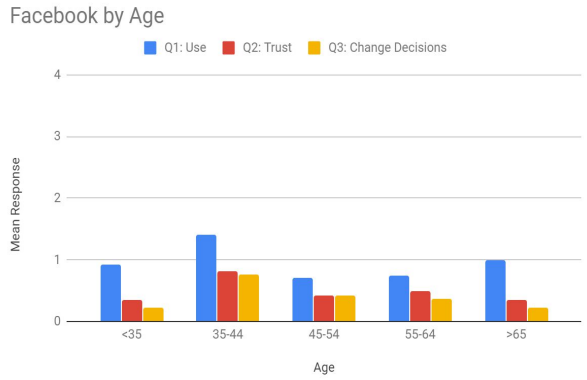
Demographic information was used to examine results across age, gender and educational level:

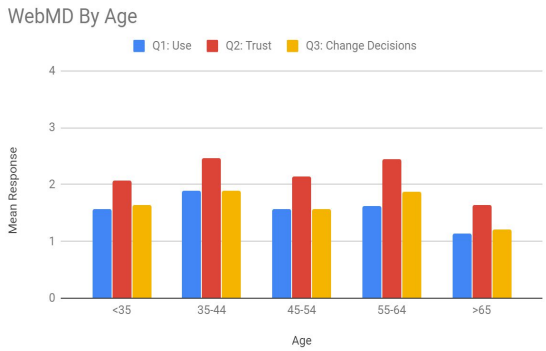
Age:

11 surveys out of the 79 which included full answers to the three website assessment questions did not include age data. This is likely because of the layout of the study questionnaire. All other questions were multiple choice with ovals whereas age was asked with a blank space to write in. In retrospect, this was easy to miss visually when completing the survey quickly. Of the remaining 68 surveys, respondent ages were grouped using standard demographic categories:

Age group	Number of Participants
< 35	14
35-44	17
45-54	7
55-64	16
> 65	14

General internet use was high across age groups, though lower in the >65 group, which was consistent with existing literature. Mean responses across all sources did not show noticeable variation across age brackets. Some variation was seen in responses to specific sources. In particular, use and trust in Facebook and YouTube appear to be lower in respondents under 35, and those >65 appeared to respond lower to all three questions about WebMD.



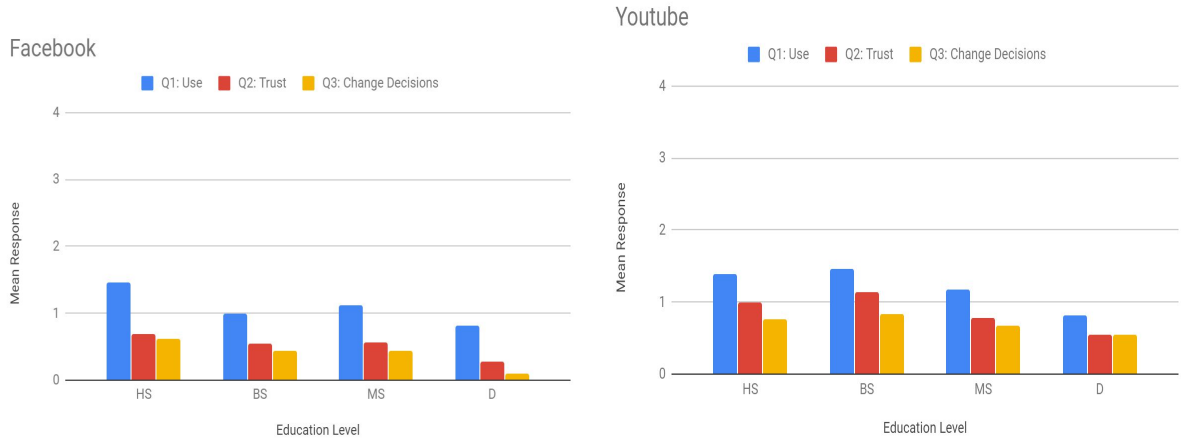


Education Level

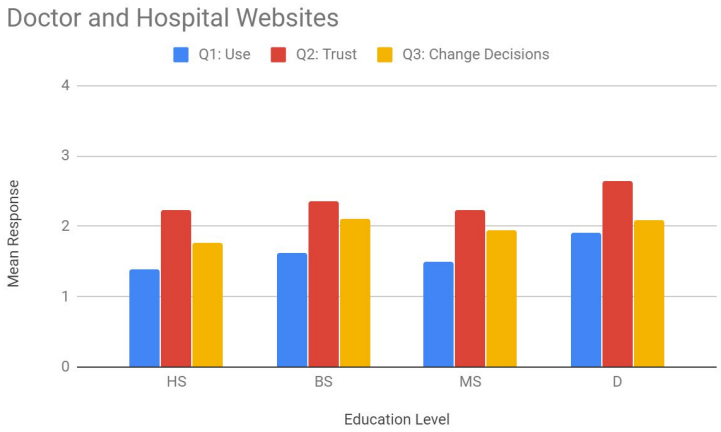
78 participants provided their educational level:

Educational Level	Number of respondents
High School	13
Bachelor's	37
Master's	18
Doctorate or professional degree	11

Mean responses across all websites did not appear remarkably different across educational groups. Data for individual online sources similarly showed few apparent variations. Most notably, responses for Facebook were lower in the highest educational group, with a similar though less pronounced pattern for YouTube:

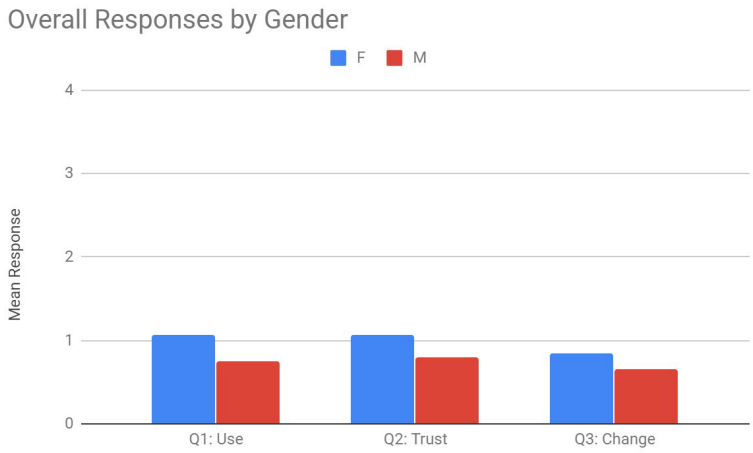


There is also a suggestion that those in the highest educational level use doctor and hospital websites more frequently and find them more trustworthy, though this may not translate to any change in decisions:

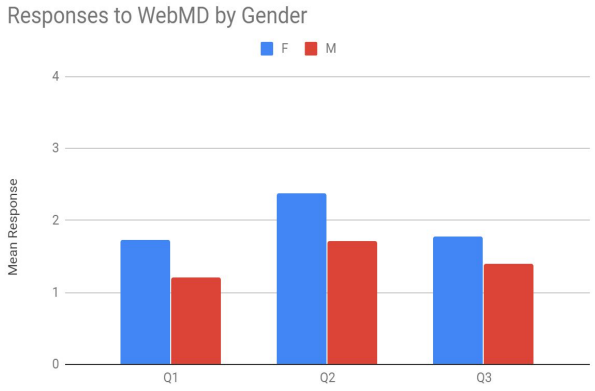


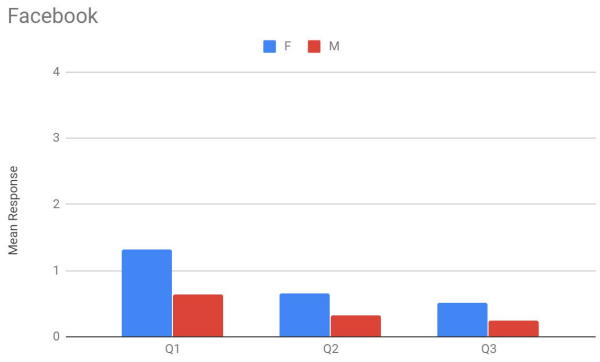
<u>Gender</u>

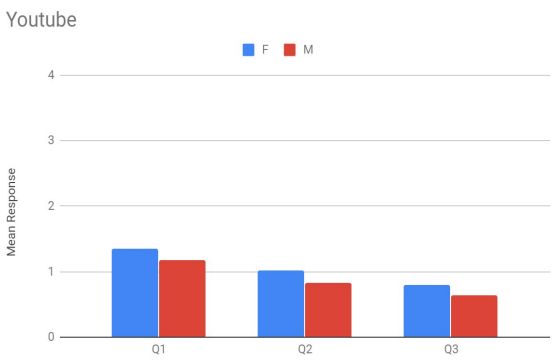
The 79 completed surveys included 51 female and 28 male participants. This marked discrepancy could be due to the underlying patient population, but is suspicious for sampling error. Gender is the only demographic category with variation seen in mean responses across all online sources, with males giving lower responses to all three questions:

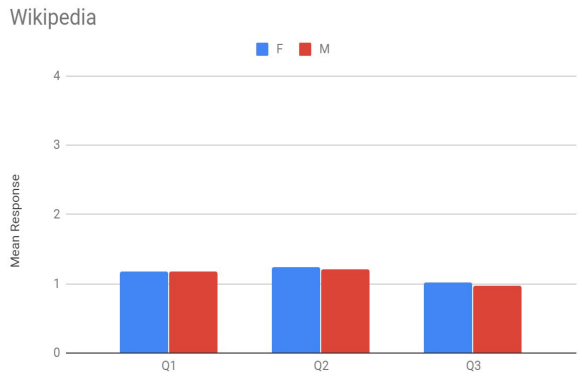


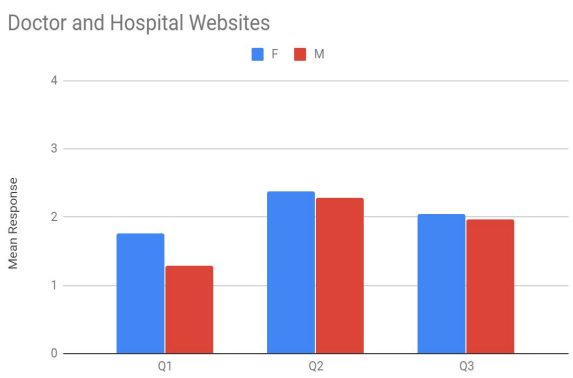
This pattern is likewise seen in responses to some specific sources, including Facebook, YouTube, and WebMD though absent for Wikipedia and medical authority websites.











Statistical testing for subgroup results was deferred as the complexity of analysis and interpretation exceeded available expertise. Analysis of results broken down by ethnicity was similarly deferred given the difficulty of resolving responses that included more than one reported ethnicity.

Discussion

This pilot study investigated variation in patient attitudes toward different, specific online sources of health information, hypothesizing that patients would report differing usage, trust, and influence on their health care decisions depending on the source of information. Results show that significant variation in attitudes does in fact exist between online sources, with additional variation seen in demographic subgroup analysis. These outcomes invite further work to characterize and understand these differences.

The p-values for each set of responses are far less than the threshold for significance, suggesting that this study was powered in excess of that necessary to achieve meaningful results. This is most likely due to very conservative estimates for effect size that were used to prospectively estimate sample size requirements. Future investigations will benefit from effect sizes calculated from this data set, allowing more accurate estimates which will reduce the effort needed to secure meaningful results.

Despite surveyed patients consistently rating their general internet use as quite high, responses to survey questions concerning health information were lower than anticipated, with mean responses all on the lower end of the scale. This may be due to online sources being seen as less trustworthy than others, or simply reflect that patients spend relatively little time acquiring health information in general. In any case, this demonstrates there is substantial room for increased utilization by patients of online health information resources.

It is encouraging to see that traditionally authoritative sources produced by physicians and hospitals are the most highly rated by patients, since these are presumably the sources with the most accurate information and guidance available. Nevertheless, the fact that authoritative sources are only somewhat trusted suggests skepticism from patients. Understanding the reason for and limitations of this skepticism may illuminate opportunities to improve online health information given to patients by the medical community.

Of the other listed sources, WebMD stands out as highly rated, with similar levels of use, trust and influence on decisions as sources produced by medical authorities. Whether this is due to WebMD simply being well-known as a health information source, to the quality and accessibility of information presented, or to some other factor is unknown and presents a clear target for further investigation. It would likely also be useful to examine information available on WebMD on a number of common health topics, contrasted with medically authored sources such as the Mayo Clinic.

The discrepancy between rates of usage and rates of trust in information found on social media sites (Facebook, Instagram, YouTube) is notable in light of prior research that has shown information on these sites to be of generally poor quality. These results suggest that patients may be exposed to poor health information during normal social media use while not necessarily accepting its validity.

Results seen across demographic subgrouping are suggestive, though their interpretation is limited. By design, this pilot study takes a broad approach to investigation and therefore the accuracy of very focused results must be approached with some caution. Further statistical analysis to determine significance will provide more clarity, but it is probably wise to view subgroup results as indicative of further avenues of study rather than conclusive in their own right.

It is surprising that age and educational level did not seem to substantially affect response rates to any survey question. There is a small trend towards lower ratings for social media sites in the highest education group, which combined with the discrepancy between reported levels of use vs trust for these sources may further imply that patients are critically evaluating information encountered on social media.

More interesting are the substantial differences seen in most responses across gender, as well as the almost 2:1 ratio of female to male respondents. This could be due to disproportionate sampling of female patients or possibly reflective of different cultural patterns around health care use between men and women in general. Some of this variation is likely due to differences in the user base for certain sites (eg Pinterest). If there is in fact a difference in how online sources of health information are used and perceived across genders, understanding the reasons for this would likely be critical in efforts to better reach patients with quality information.

Conclusion

Overall, this pilot study demonstrates that online health information sources are not uniformly used or perceived by patients, with differences seen in rates of use, trust, and influence on decisions that are marked and significant. This validates the necessity for further investigation into this topic, while also providing statistical information on variance and effect size that will facilitate future research.

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