Adolescent cybersurfing for health information: A new resource that crosses barriers

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ARTICLE

Adolescent Cybersurfing for Health Information

A New Resource That Crosses Barriers

Dina L. G. Borzekowski, EdD; Vaughn I. Rickert, PsyD

Objective: To examine adolescents' use of and attitudes toward accessing health information through the Internet.

Design: Cross-sectional, school-based survey.

Participants: A socioeconomically and ethnically diverse sample of 412 suburban New York 10th graders (mean [SD] age, 15.8 [0.68] years).

Main Outcome Measures: Accessing the Internet for health information.

Results: Half (49%) of the sampled adolescents had used the Internet to get health information. Topics most often explored through the Internet included sexually transmitted diseases; diet, fitness, and exercise; and sexual behaviors. Adolescents found Internet information to be of high value (using a composite gauging worth, trustworthiness, use, and relevance), with no significant differences related to sex, ethnicity, or mother's education. When considering 11 separate health topics, girls found it more valuable to have information on birth control, diet and nutrition, exercise, physical abuse, sexual abuse, and dating violence. Only for alternative medicine were there differences by ethnicity, and there were no differences based on mother's education for the value of having specific health information available through the Internet.

Conclusion: For adolescents, the Internet is an accessed and valued information source on a range of sensitive health issues.

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MOST HEALTH behavior change models stress the importance of individuals gaining knowledge about specific health issues and incorporating this information into their daily activities.[1] For adolescents, accessible, relevant, and accurate health information can clearly help guide decision making,[2] such as identifying alternative options or possible consequences.[3] Adolescents readily accept information on topics from smoking cessation[4] to reproductive health.[5] Although conveying information may or may not reduce adolescent risk behaviors, gains in knowledge can occur[1] and serve as an initial step in health promotion.[6]

In 1998, more than 17 million US adults used the Internet to obtain health information, and the expectation is that this number will grow substantially.[7] A recent online survey of more than 3200 Internet users found that 82% had used the Internet to obtain health information (5% daily, 15% weekly, 23% monthly, and 39% less than once a month).[8] Women and older individuals were more likely to report using the Internet as a health source.[8] Information on the following topics was retrieved by those accessing health information through the Internet: diseases, 52%; diet and nutrition, 36%; pharmaceuticals, 33%; online health newsletters, 32%; women's health, 31%: fitness, 29%; children's health, 15%; and illness support groups, 13%.[7]

Although there is little doubt that adolescents of different backgrounds, ethnic groups, and socioeconomic status levels can and will use the Internet to gather health information, hardly any data exist on whether adolescents currently use this medium for health information.

For adolescents, the Internet can serve as an important tool in acquiring health information for several reasons. First, adolescents can easily access this medium[9]; a December 1999 survey of 625 respondents who were 10 to 17 years old found that three quarters had home access and practically all had school access to the Internet.[10] Second, the Internet offers adolescents a confidential and less threatening way to get information that might otherwise be difficult or compromising to obtain. Third, the

PARTICIPANTS AND METHODS

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Participants were 10th-grade students from East Ramapo, NY, a community located approximately 40 km (25 mi) northwest of New York City that is both ethnically and economically diverse. All students, except for those not in mainstream classes (eg, special education), were eligible to participate. Passive parental and active student consent were obtained.

In May 2000, students completed media use surveys during a single class period. Adolescents responded to 136 close-ended questions and this one-time-only, 18-page, anonymous survey took a half hour to complete. This study was approved by The Mount Sinai School of Medicine Panel on Human Subjects in Medical Research.

MEASURES

We customized a self-report survey used in an earlier study of adolescent Internet use (n=319),[11] and adolescent health researchers reviewed this instrument to ensure its readability and ease of understanding. The final instrument began with a demographic section and then assessed adolescent media ownership and use.

Regarding health information sources, the instrument first assessed a range of potential sources across 3 different health content areas: (1) birth control and safer sex; (2) diet, nutrition, and exercise; and (3) dating and family violence. Then, the questions focused on whether adolescents use and how they perceive the Internet as a health information source. Students chose from 17 health topics those that they had ever tried to get information on from the Internet. Then, the students selected the one area that they had "tried to get the most health information on from the Internet." Four questions measured the Internet's value as a general health information source, assessing its worth, trustworthiness, usefulness, and relevance ($\alpha=.81$). Lastly, we asked students to rank on a 5-point scale how worthwhile it was to have health information available on the Internet for 11 different health areas.

STATISTICAL ANALYSES

Owing to this study's descriptive nature, we provide univariate statistics for the sample's demographics and media use, focusing on Internet use. We describe the most frequently cited health information sources and indicate whether associations were observed between the source type and adolescent characteristics. We report overall percentages for Internet use and perceptions and use association tests to determine whether differences exist across adolescent groups. We performed the statistical analyses using SAS statistical software, version 8 (SAS Institute Inc, Cary, NC) and considered results significant at $\alpha=.05$.

interactive nature of the Internet can provide adolescents "personalized" information. With this medium, an adolescent can enter data on his or her specific concerns and receive individualized advice.

This study's purpose was to explore and provide current information, drawn from a diverse sample of 10th graders, on adolescent use of the Internet as a health information source. To begin, we offer comparative data on adolescent use of health information sources for different content areas. Next, we describe whether adolescents use the Internet for health information for personal use. Then, we consider which adolescent characteristics relate to using the Internet as a health information source. We also describe the value adolescents ascribe to the Internet as a health information source, noting whether adolescents find the conveyed information to be trustworthy, useful, and relevant. Lastly, we present information on how worthwhile adolescents perceive it is to have Internet information on 11 health issues.

RESULTS

For this study, 412 students in the 10th grade, of whom 46% were male, participated. The sample was 40% African American, 30% white, 10% Latin American, 10% Asian American, 5% multiethnic, and 5% "other" ethnic students, and the average age was 15.8 years (SD, 0.68 years). For mother's education, 29% of the students reported a high school education or less, 36% reported some college or completed college, and 25% reported education beyond college. A little more than half (55%) lived in households with 4 or 5 people, whereas 18% had fewer than 4 people and 27% had more than 5 people. A third (33%) of these students had a job. A total of 70% were born in the United States, and 87% indicated that English was the main language spoken in their homes. More than half (57%) of the students reported to be in "good" or "very good" health, and 41% said they exercised rigorously 3 to 5 days a week.

This sample owned and frequently used all types of electronic media. On average, there were 5.7 radios, 4.0 televisions, and 1.4 computers per household. Most (88%) of these adolescents had a home computer, with 40% having 2 or more computers. The most common place to use the Internet was one's own home, with 72% saying this was where they accessed the Internet most often. The next most common place was one's school (17%), followed by a friend's home (4%). Places of Internet access differed by ethnicity ($\chi^2_{25}=92.8$, $P<.001$), mother's education ($\chi^2_{10}=22.9$, $P=.03$), number of household members ($\chi^2_{15}=38.0$, $P<.001$), and citizenship ($\chi^2_5=12.6$, $P=.04$). White and Asian American students, those whose mothers had an education beyond college, those with fewer people in their households, and those born in the United States usually accessed the Internet from home. Close to a third (31%) had a computer in their bedroom, and no differences were observed across demographic groups.

Practically all (96%) of these 10th graders used the Internet: 26% used the Internet less than 1 day a week, 39% 2 to 5 days a week, and 35% 6 to 7 days a week. More boys (44%) than girls (28%) said they used the Internet 6 to 7 days a week ($\chi^2_5=12.4$, $P=.048$), and higher percentages of Asian American (43%) and white (46%) students com-

Table 1. Adolescents' Use of Different Sources for Birth Control and Safer Sex Information

Source	Adolescents, %	Differences	χ^2	*df*	*P*
Boyfriend/girlfriend	29.4	None	. . .	. . .	. . .
Siblings or cousins	31.6	Sex	5.4	1	.02
Friends	63.1	Sex	16.6	1	<.001
Public health campaigns	9.5	Sex	5.6	1	.02
Television	19.7	None	. . .	. . .	. . .
Health class	21.1	Ethnicity	12.0	5	.04
Books	26.9	Sex	7.4	1	.006
Magazines	31.3	Sex	15.5	1	<.001
Internet	31.6	Ethnicity	12.1	5	.03
Other	1.4	None	. . .	. . .	. . .
Clergy	3.9	Sex	5.6	1	.02
Teachers or coaches	17.0	None	. . .	. . .	. . .
Other adults	24.3	Mother's education	7.2	5	.03
Health care provider or clinic	28.9	Sex	22.8	1	<.001
Parents	29.6	None	. . .	. . .	. . .

Table 2. Adolescents' Use of Different Sources for Diet, Nutrition, and Exercise Information

Source	Adolescents, %	Differences	χ^2	*df*	*P*
Boyfriend/girlfriend	11.4	None	. . .	. . .	. . .
Siblings or cousins	22.1	None	. . .	. . .	. . .
Friends	39.8	Sex	7.6	1	.006
Public health campaigns	11.9	None	. . .	. . .	. . .
Television	27.7	None	. . .	. . .	. . .
Books	30.3	Sex	5.2	1	.02
Internet	34.0	Ethnicity	15.1	5	.02
Health class	35.4	Mother's education	7.9	2	.02
Magazines	43.5	Sex	16.8	1	<.001
Clergy	1.7	Ethnicity	21.9	5	<.001
Other	2.4	None	. . .	. . .	. . .
Teachers or coaches	21.4	None	. . .	. . .	. . .
Other adults	22.6	None	. . .	. . .	. . .
Health care provider or clinic	32.5	Sex	8.5	1	.004
Parents	45.2	Sex	6.4	1	.01
		Ethnicity	3.3	5	.02

pared with African American (26%) and Latin American (30%) used the Internet 6 to 7 days a week ($\chi^2_{25}=46.0$, $P=.003$). Among these students, 74% said they were "pretty" or "extremely" comfortable and 75% "pretty" or "very much" liked using this medium. Boys were more comfortable ($\chi^2_4=14.9$, $P=.007$) and liked the Internet more than did girls ($\chi^2_4=19.7$, $P<.001$) but no other significant differences appeared among student groups.

Adolescents use a range of health information sources (**Tables 1**, **2**, and **3**). For different health content areas, the media sources most often accessed were magazines and the Internet. In addition to reporting the sources they use, adolescents selected the sources they thought were most valuable. For birth control and safer sex, the top 4 most valuable sources were friends, parents, siblings or cousins, and then health care providers or clinics. For diet, nutrition, and exercise, the most valuable sources were parents, health care providers or clinics, friends, and magazines, and for dating and family violence, the most valuable sources were parents, friends, teachers or coaches, and siblings or cousins. Of the 15 different sources, the Internet ranked as the sixth or seventh most valuable for these health areas.

We observed numerous associations by sex regarding health information sources. When getting information on birth control and safer sex, girls were more likely than boys to use as a source friends, siblings or cousins, books, magazines, public health campaigns, and health care providers or clinics. Boys more frequently than girls said that they used clergy as a source of birth control and safer sex information. On diet, nutrition, and exercise information, girls more frequently than boys used friends, books, magazines, parents, and health care providers or clinics. For dating and family violence, girls were more likely than boys to get information from friends, siblings or cousins, books, and magazines. Boys more frequently than girls indicated that they used health classes as an information source on these violence issues. We did not observe sig-

Table 3. Adolescents' Use of Different Sources for Dating and Family Violence Information

Source	Adolescents, %	Differences	χ^2	*df*	*P*
Boyfriend/girlfriend	19.7	None	. . .	. . .	. . .
Siblings or cousins	30.6	Sex	10.5	1	.001
Friends	52.7	Sex	10.1	1	.002
Public health campaigns	7.5	None	. . .	. . .	. . .
Health class	10.9	Sex	8.6	1	.003
Books	23.8	Sex	6.8	1	.009
Internet	24.5	Ethnicity	11.8	5	.04
Television	25.0	Mother's education	7.3	2	.03
Magazines	27.7	Sex	24.9	1	<.001
Other	2.1	None	. . .	. . .	. . .
Clergy	7.3	None	. . .	. . .	. . .
Health care provider or clinic	12.1	None	. . .	. . .	. . .
Teachers or coaches	24.5	None	. . .	. . .	. . .
Other adults	28.9	None	. . .	. . .	. . .
Parents	37.6	None	. . .	. . .	. . .

Table 4. Health Topics Accessed Through the Internet

Topics	Among Students Accessing Health Information for Personal Use, % (n = 178)
Illness support groups	5.6
Parenting or children's health	9.0
Mental health issues	14.6
Sexual or physical abuse	16.9
Heart disease	17.4
Violence (among peers, gangs)	17.4
Medicines and pharmaceuticals	20.2
Tobacco and smoking	20.8
Cancer	20.8
Other diseases	22.5
Dating violence or rape	23.0
Alcohol and other drug use	24.7
Diet and nutrition	36.5
Sexually transmitted diseases	37.0
Fitness, exercise	41.6
Sex (sexual activity, contraception, pregnancy)	42.1

nificant differences for any health topic by sex for using boyfriends/girlfriends, television, the Internet, other adults, teachers or coaches, or "other" as information sources.

Across ethnicity, we found significant differences for those getting information on birth control and safer sex from the Internet and health classes. For diet, nutrition, and exercise information, ethnic group differences were seen for using the Internet, parents, and clergy. On dating and family violence information, we found significant differences for the percentage of adolescents who used the Internet. We found no differences by ethnicity for the percentages of adolescents using friends, siblings or cousins, boyfriends/girlfriends, books, magazines, television, public health campaigns, other adults, teachers or coaches, health care providers or clinics, or "other" as information sources.

When considering groupings based on an adolescent's mother's education, we observed significant associations for those obtaining birth control and safer sex information from another adult; diet, nutrition, and exercise information from health classes; and dating and family violence information from television. Across education level groups for the 3 different health areas, we found similar percentages of adolescents using friends, siblings or cousins, boyfriends/girlfriends, books, magazines, public health campaigns, the Internet, parents, teachers or coaches, health care providers or clinics, clergy, and "other" sources.

Half (49%) had tried to get some type of health information from the Internet. Notably, seeking Internet health information was not significantly associated with sex, ethnicity, or mother's education. **Table 4** presents the percentages of students who tried to get information on a range of different topics. Students indicated that they most frequently used the Internet for sexual information (eg, sexual activities, contraception, and pregnancy) followed by fitness and exercise and then sexually transmitted diseases.

Using a composite assessing perceptions of worth, trustworthiness, use, and relevance of general health information on the Internet, we found that adolescents value this medium with no significant differences related to sex, ethnicity, or mother's education. We observed, however, that those who had tried to get health information through the Internet had significantly higher scores for this composite than those who had not tried to get health information through the Internet ($t=4.5$, $P<.001$).

On 11 separate health topics (smoking, alcohol use, drug use, birth control, diet and nutrition, exercise, physical abuse, sexual abuse, dating violence, alternative medicine, and antiviolence), students rated from 1 to 5 how worthwhile it would be to have information available through the Internet. Girls gave significantly higher scores for having available Internet information on birth control, diet and nutrition, exercise, physical abuse, sexual abuse, and dating violence. Only for alternative medicine were there significant differences among ethnic groups ($F=2.4$, $P=.04$), with white students rating it the highest. No significant differences were observed across mother's education groups for how worthwhile it would be to have Internet information for these health topic areas.

COMMENT

Whereas interpersonal health sources involve considerable time and cost outlays, mass media can and have been used to reach adolescents with health information without such requirements. In the past decade, studies have documented that television,[12-14] videogames,[15] and computer technology[16,17] can offer solutions to constraints inherent in the health care system. A persistent concern, however, with these media and now the Internet, has been access.

Our data, along with those of other studies[18,19] on media use among youth, show that adolescents own and use all types of electronic technology. Among this diverse sample of 10th graders, we found Internet use to be prevalent, with reportedly high levels of access, use, and comfort. Although other studies have found discrepancies among demographic groups, this sample found frequent use for most of the surveyed adolescents. The "digital divide" that appears in other research[9] does not appear for adolescents[11] and was not observed in this study.

Besides turning to interpersonal sources, such as friends, relatives, or health care providers, adolescents access the Internet for health information. Along with magazines, this medium is used frequently and valued. Although we found associations related to sex for various health information sources, such was not the case with the Internet. In contrast to our expectation that there would be differences in how adolescents of various groups used and perceived Internet health information, we observed strikingly few differences in adolescents using this source. Our data reveal that most adolescents not only use the Internet for health information but also consider this medium to be valuable. Interestingly, although both sexes report high levels of use, girls thought it was more worthwhile than boys for there to be Internet information on a range of health topics.

The Internet can serve as a useful supplement to existing health care services and systems. It allows consumers to educate themselves on a variety of health-related topics from diseases to prescription drugs. The Internet also offers patients suggestions of questions that they can ask their physicians, additional opinions and options regarding treatments, and links to online support groups and individuals.[20,21] Especially for adolescents, who can feel marginalized by restricted access to available health care resources[22,23] or anxious asking about sensitive health issues, this medium can provide suggestions for approaching a medical practitioner with frequently asked questions.

Measurement limitations, including reliance on self-report, memory errors, and perceived bias for and against the Internet, potentially influence the strength and validity of these results. The media use survey, which occurred in a school setting, asked adolescents to provide information on Internet use; however, we did not monitor actual Internet use and behaviors. We would recommend a naturalistic, observational study to provide actual descriptions of whether and how adolescents use the Internet for health information; however, such research seems implausible, since it would require deceiving subjects and concealing the study's true objectives. Such barriers, though, should not thwart researchers in their continued efforts to better understand how adolescents use the Internet for health information. Examining other samples that differ by geography, age, and experience with different risk behaviors may also advance our knowledge of how people use the Internet. Lastly, more research on how adolescents use the Internet, for both general and specific health information, can provide scholars with data to rethink and provide insights on how adolescents get health information and the ways that educators might present Internet health information.

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