

Internet Use and Social Support in Women With Breast Cancer

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Many Web sites offer information to breast cancer patients, who are increasingly using these sites. The authors investigated the potential psychological benefits of Internet use for medical information by breast cancer patients. Of the 251 women approached, 188 were successfully interviewed (74.9%). Forty-two percent used the Internet for medical information related to breast health issues and did so for an average of 0.80 hr per week. The Interpersonal Support Evaluation List and the UCLA Loneliness Scale, with results controlled for covariates, showed that Internet use for breast health issues was associated with greater social support and less loneliness than Internet use for other purposes or nonuse. Breast cancer patients may obtain these psychological benefits with only a minimal weekly time commitment.

Key words: Internet, information, breast cancer, social support, loneliness, depression

Internet use is becoming increasingly widespread. A 1997 U.S. survey revealed that nearly half of Internet users spend some time looking for health information on the Internet (Eng et al., 1998). In the United States in 2000, 41 million individuals sought health information online (“By the numbers,” 2001) and the corresponding number in 2001 was 100 million (Taylor & Leitman, 2001). Cancer is one of the top three diseases about which the public seeks information on the Internet (Larkin, 2000). Breast cancer patients use reputable Internet sources for medical information (Fogel, Albert, Schnabel, Ditkoff, & Neugut, 2001).

Psychological Effects of Internet Use

One of the first studies of the psychological effects of Internet use was conducted by Kraut et al. (1998). Frequent Internet users

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This article is based in part on the doctoral dissertation research of Joshua Fogel for his doctorate in clinical health psychology at the Ferkauf Graduate School of Psychology, Yeshiva University. Funding was received through an American Psychological Association Dissertation Research Award, December 2001. Portions of this article were presented at the conference “Quality of Life Measurement: Building an Agenda for the Future,” sponsored by the Kessler Medical Rehabilitation Research and Education Corporation, Parsippany, New Jersey, November 2001.

We thank Joel Erblich (Mount Sinai School of Medicine), Barbara Melamed, and Vance Zemon (Yeshiva University) for their comments on earlier versions of this article.

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exhibited decreased rates of family communication, greater loneliness, a greater number of daily life stressors, and increased depression at a later time. Although high Internet use led to a decrease in the size of the local social circle (i.e., network size–structural social support), no relationship was observed for social support (i.e., functional social support).

More recent studies have also shown negative psychological aspects of Internet use. A study of college undergraduates showed that pathological users (i.e., those whose Internet use resulted in academic, work, or psychological difficulties) were significantly more lonely than those with either no symptoms or limited symptoms of pathological use (Morahan-Martin & Schumacher, 2000). A study of adolescents suggested that frequent Internet users have weaker social ties (Sanders, Field, Diego, & Kaplan, 2000). A recent survey of Internet use concluded that it affects social contacts. At just 2 to 5 hr per week of use, people report less social contact. Among those who spend 10 hr a week, up to 15% report a decrease in social activities. Heavy users also report spending less time talking with friends and family (Nie & Erbring, 2000).

Whereas these studies indicate a deleterious impact, other studies show a positive relationship between increased Internet use and social support. One study measured the perceived stigma of parents of children with developmental disabilities and how they seek social support. These parents had not received adequate social support from their family, friends, and acquaintances. According to cross-sectional and follow-up results 4 months later, the parents’ Internet support group offered them an adequate level social support, one that they had not received elsewhere (Mickelson, 1997). A study of elderly individuals residing in assisted and independent living facilities showed that greater Internet use resulted in higher levels of perceived social support (Cody, Dunn, Hoppin, & Wendt, 1999). Another study of elderly individuals living in a retirement community showed that greater Internet use resulted in a trend toward decreased loneliness (H. White et al., 1999).

Numerous qualitative studies of support groups demonstrate that Internet use offers greater social support. These include studies of cancer patients with various diagnoses (Fernsler & Manchester, 1997; Klemm, Hurst, Dearholt, & Trone, 1999), breast cancer patients (Sharf, 1997), individuals coping with disability issues (Finn, 1999), caregivers of Alzheimer's disease patients (M. H. White & Dorman, 2000), widows experiencing bereavement (Bacon, Condon, & Fernsler, 2000), patients with implantable cardioverter defibrillators (Dickerson, Flaig, & Kennedy, 2000), and elderly individuals (Wright, 2000). Also, Internet use has been shown to be helpful in forming new relationships (McKenna & Bargh, 2000; Parks & Floyd, 1996).

With the exception of the study of H. White et al. (1999), none of these studies were randomized controlled trials. Further research is needed to understand the relationship of Internet use with social support and psychological symptoms. To our knowledge, no studies have examined medical information seeking on the Internet and the psychological benefits it offers to people. In the present cross-sectional, self-report study, we investigated psychological benefits associated with Internet use among breast cancer patients seeking information related to breast health issues. We used standardized, valid, and reliable self-report measures as outcomes. We primarily hypothesized that medical information use by breast cancer patients would be related to greater social support. We also hypothesized that this medical information use would be related to less stress, fewer depressive symptoms, less loneliness, and greater coping.

Method

Participants

Participants were patients seen by two breast surgeons at Columbia-Presbyterian Medical Center in New York City. Inclusion criteria included a diagnosis of ductal carcinoma in situ (DCIS) or invasive breast cancer within the past 3 years. Those more than 65 years of age at diagnosis were excluded, because elderly individuals are unlikely to use the Internet. All patients who met these criteria were invited to participate. Individuals with a psychiatric-substance abuse history and those who did not speak English were excluded from participation by their physician. Institutional review board approval and informed consent were obtained.

Procedure

Participants were identified from hospital tumor registry records and mailed a letter describing the study, along with a postal card to return if they were not interested in participating. Those who did not return the postal card were called, and the nature of the study was described. Those who agreed to participate were mailed a packet with a questionnaire containing demographic, medical, and standardized psychological questionnaires. A postage-paid envelope was provided. Two follow-up telephone calls were made to remind participants, if necessary. Medical information was obtained from hospital tumor registry records. All data collection took place between October and December 2000.

Psychosocial Measures

Social support. The Interpersonal Support Evaluation List (ISEL; S. Cohen & Hoberman, 1983) is a 40-item scale that measures social support. Response options range from *definitely false* (0) to *definitely true* (3); higher scores indicate greater social support. In addition to the overall score, there are four subscales. The appraisal subscale measures the perceived availability of someone to talk to about one's problems. The

belonging subscale measures the perceived availability of people with whom one can do things. The self-esteem subscale measures the perceived availability of a positive comparison when comparing oneself with others. The tangible subscale measures the perceived availability of material aid. The ISEL was shown to have adequate reliability in the original study ($\alpha = .77$) as well as the present sample ($\alpha = .93$).

Stress. The Perceived Stress Scale (PSS; S. Cohen, Kamarck, & Mermelstein, 1983) is a 10-item scale that measures perceived stress; higher scores indicate greater stress. Response options range from *never* (0) to *very often* (4). Scale reliability levels were adequate in both the original study ($\alpha = .85$) and this sample ($\alpha = .87$). Participants also completed a single item, with 10 choices ranging from *no stress* (1) to *a lot of stress* (10), assessing their perceived stress level.

Depression. The Center for Epidemiologic Studies Depressed Mood Scale (CES-D; National Institute of Mental Health, 1971; Radloff, 1977) is a 20-item scale that measures depressive symptoms; higher scores indicate greater depressive symptoms. Response options range from *rarely or none of the time* (0) to *most or all of the time* (3). Scale reliability levels were adequate in the original study ($\alpha = .85$ to $.90$) as well as this sample ($\alpha = .91$).

Loneliness. The UCLA Loneliness Scale (Version 3; Russell, 1996) is a 10-item scale that measures loneliness symptoms; higher scores indicate greater loneliness. Response options range from *never* (1) to *always* (4). Scale reliability levels were adequate in both the original study ($\alpha = .89$) and this sample ($\alpha = .89$).

Coping. The Brief COPE (Carver, 1997) is a 28-item scale that measures various aspects of coping. Response options range from *I haven't been doing this at all* (1) to *I've been doing this a lot* (4). In addition to the overall score, there are 14 subscales of 2 items each. Scale reliability levels were adequate in the original study ($\alpha = .50$ to $.82$) and in this sample ($\alpha = .86$).

Internet Measures

Participants were asked to respond yes or no to the question "Do you use the Internet?" If they answered yes, they were asked to indicate locations of use (home, work, library, or a friend's residence). They were also asked to indicate their use or nonuse of the World Wide Web, e-mail, listservs, news groups-chat groups, and Internet self-help-support groups. If they reported that they used any of these options, they were asked "Do you use it for information regarding breast health/women's health issues?" If they responded yes, they were asked to estimate, for each type of use, current number of hours weekly and number of hours weekly before surgery that they used the Internet. In regard to e-mail use, participants were asked about number of messages rather than hours of use. The hours-number estimation involved one value for all places of access.

Statistical Analysis

Analyses of variance (ANOVAs) were used to evaluate differences in outcome variable (total scale and subscale) scores without control for possible covariates, whereas analyses of covariance (ANCOVAs) controlled for all of the possible covariates. Covariates included race/ethnicity, household income, education, age, length of time since diagnosis, and stage of breast cancer. All analyses were conducted with SPSS (Version 9; SPSS, 1998). An a priori power analysis was conducted with GPOWER (Erdfelder, Faul, & Buchner, 1996); total ISEL score was the primary outcome measure.

Results

Descriptive Statistics

Descriptive statistics for the continuous variables in this sample were as follows. Mean age was 51.46 years ($SD = 8.35$), mean

education level was 15.49 years ($SD = 3.13$), and mean length of time since diagnosis of breast cancer was 1.86 years ($SD = 0.81$). Percentages were used in measuring categorical variables. In terms of race/ethnicity, 76.5% of the respondents were white, 8.6% were African American, 11.2% were Hispanic American, and 3.7% were Asian American. Breast cancer stages were as follows: DCIS, 23.7%; Stage 1, 42.5%; Stage 2, 29.6%; and Stage 3, 4.3%. In regard to household income, 26.9% had incomes below \$60,000, 33.5% had incomes between \$60,000 and \$100,000, and 39.5% had incomes above \$100,000. Locations of Internet use were home (53.7%), work (35.1%), a friend's residence (5.9%), and library (5.3%).

Of 251 eligible respondents, 188 (74.9%) who were approached agreed to participate (18 initially declined, 25 declined after one of the telephone calls, and 20 did not return their questionnaires). Three groups were formed: those not using the Internet ($n = 74$), those using the Internet only for general use ($n = 36$), and those using the Internet for both general use and breast health issues ($n = 78$). The group of those using the Internet only for general use was formed after questionnaire collection, because a number of individuals indicated general Internet use but not breast health use, and some of the empirical literature discusses psychological effects of general Internet use.

Power Analysis

The power analysis for the three groups showed that 66 participants were necessary to detect a large effect ($f = .40$; J. Cohen, 1992) with an alpha of .05 and a power of .80. For a more stringent analysis, 159 participants were necessary to detect a medium effect ($f = .25$; J. Cohen, 1992) with an alpha of .05 and a power of .80. One of the three groups contained less than 53 participants, and a revised power analysis showed that 108 participants were necessary to detect a medium effect ($f = .25$) with an alpha of .17 and a power of .83.

Psychological Scale Outcome Measures

Table 1 shows the psychological outcome variable ANOVA and ANCOVA results. Without control for the covariates, Internet

use was associated with differences in social support, $F(2, 185) = 8.85, p < .001$; depressive symptoms, $F(2, 186) = 4.44, p < .05$; and loneliness, $F(2, 185) = 5.16, p < .01$. There was no association with coping, $F(2, 184) = 0.82, ns$; PSS stress scale score, $F(2, 187) = 0.84, ns$; or score on the item assessing stress, $F(2, 170) = 1.20, ns$.

Bonferroni post hoc analyses indicated that, in regard to social support, Internet use for breast health issues significantly differed from general Internet use ($p = .001$) and nonuse ($p < .01$); general Internet use and nonuse did not differ from each other ($p < .05$). Those using the Internet for breast health issues had higher social support scores than general Internet users and nonusers. Also, in the case of depressive symptoms, Internet use for breast health issues significantly differed from nonuse ($p < .05$). Finally, in terms of loneliness, Internet use for breast health issues significantly differed from general use ($p < .05$).

After control for the covariates, Internet use was associated with significant differences in social support, $F(2, 162) = 4.27, p < .05$, and loneliness, $F(2, 162) = 4.23, p < .05$. Planned Helmert contrasts indicated that in terms of social support and loneliness, Internet use for breast health issues significantly differed from general use and nonuse ($p < .05$), whereas general use and nonuse differed from each other in the case of loneliness ($p < .05$) but not social support ($p > .05$). When the covariates were controlled, Internet users for breast health issues still had higher social support scores and lower loneliness scores than general users and nonusers. Also, general users had higher loneliness scores than nonusers. There was no association with coping, $F(2, 161) = 0.31, ns$; depressive symptoms, $F(2, 163) = 0.76, ns$; PSS stress scale score, $F(2, 164) = 0.26, ns$; or score on the item assessing stress, $F(2, 152) = 0.94, ns$.

ISEL Subscale Outcome Measures

Table 2 shows the social support subscale ANOVA and ANCOVA results. Without control for the covariates, Internet use was associated with significant differences in scores on each of the

Table 1
Psychological Outcome Variables for Breast Cancer Patients Using the Internet

Measure	Web use: Breast health ($n = 78$)		Web use: General ($n = 36$)		No Web use ($n = 74$)		Not controlling for covariates ^a (ANOVA)		Controlling for covariates ^a (ANCOVA)	
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>F</i>	<i>df</i>	<i>F</i>	<i>df</i>
ISEL	99.87	11.92	88.89	17.49	91.52	16.77	8.85***	2, 185	4.27*	2, 162
UCLA	17.85	4.57	21.28	6.02	18.94	5.63	5.16**	2, 185	4.23*	2, 162
CES-D	10.08	8.62	13.09	9.23	14.92	11.72	4.44*	2, 186	0.76	2, 163
PSS	15.57	5.44	15.10	6.60	16.61	7.21	0.84	2, 187	0.26	2, 164
Stress	6.10	2.06	5.42	2.25	5.61	2.73	1.19	2, 170	0.94	2, 152
Brief COPE	63.77	11.98	62.19	12.67	63.27	12.73	0.20	2, 184	0.31	2, 161

Note. Sample sizes varied slightly for the demographic variables and psychological measures as a result of omissions by participants. Exact sample sizes are reported in the Results section of the text. ANOVA = analysis of variance; ANCOVA = analysis of covariance; ISEL = Interpersonal Support Evaluation List; UCLA = UCLA Loneliness Scale; CES-D = Center for Epidemiologic Studies Depressed Mood Scale; PSS = Perceived Stress Scale; Stress = one-item stress scale.

^a Covariates included race/ethnicity, household income, education, age, length of time since diagnosis, and stage of breast cancer.

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

Table 2
Social Support Subscale Outcome Variables for Breast Cancer Patients Using the Internet

ISEL subscale	Web use: Breast health (n = 78)		Web use: General (n = 36)		No Web use (n = 72)		Not controlling for covariates ^a (ANOVA)		Controlling for covariates ^a (ANCOVA)	
	M	SD	M	SD	M	SD	F	df	F	df
Belonging	25.85	3.80	22.47	5.44	23.17	5.20	8.93***	2, 185	4.45*	2, 162
Appraisal	25.81	4.73	22.41	5.83	23.51	5.55	6.30**	2, 185	4.46*	2, 162
Tangible	24.37	3.18	21.86	4.72	23.03	4.09	5.59***	2, 185	2.53	2, 162
Self-Esteem	23.84	3.46	22.14	3.40	21.81	4.39	5.78**	2, 185	1.49	2, 162

Note. Sample sizes varied slightly for the demographic variables and psychological measures as a result of omissions by participants. Exact sample sizes are reported in the Results section of the text. ISEL = Interpersonal Support Evaluation List; ANOVA = analysis of variance; ANCOVA = analysis of covariance.

^a Covariates included race/ethnicity, household income, education, age, length of time since diagnosis, and stage of breast cancer.

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

ISEL subscales: belonging, $F(2, 185) = 8.93, p < .001$; appraisal, $F(2, 185) = 6.30, p < .01$; tangible, $F(2, 185) = 5.59, p < .01$; and self-esteem, $F(2, 185) = 5.78, p < .01$.

Bonferroni post hoc analyses indicated that, in the case of belonging and appraisal social support, Internet use for breast health issues significantly differed from general Internet use ($p = .001$ and $p < .01$, respectively) and nonuse ($p < .01$ and $p < .05$), whereas general Internet use and nonuse did not differ from each other ($p > .05$). Internet users of breast health information had greater belonging and appraisal social support scores than general users and nonusers.

Also, Bonferroni post hoc analyses indicated that, in terms of tangible social support, Internet use for breast health issues significantly differed from general Internet use ($p < .01$) but not from non-use ($p > .05$). In regard to self-esteem social support, Internet use for breast health issues differed from general Internet use at a trend level ($p = .09$) and significantly differed from nonuse ($p < .01$).

After control for the covariates, Internet use for breast health issues was associated with significant differences in scores on the belonging, $F(2, 162) = 4.45, p < .05$, and appraisal, $F(2, 162) = 4.46, p < .05$, ISEL scales but not the tangible, $F(2, 162) = 2.53, ns$, and self-esteem, $F(2, 162) = 1.49, ns$, scales. Planned Helmert contrasts indicated that, in the case of belonging and appraisal social support, Internet use for breast health issues significantly differed from general use and nonuse ($p < .01$); general use did not differ from nonuse in terms of belonging ($p > .05$) but exhibited a trend to differ from nonuse in terms of appraisal ($p = .09$). When the covariates were controlled, Internet users for breast health issues had higher belonging and appraisal social support scores than general users and nonusers.

Internet Use Characteristics

Table 3 shows aspects of Internet use among users. Approximately 57% of the participants accessed the World Wide Web, yet only 41.5% used it for breast health issues. Participant self-reports, assessed retrospectively, indicated that World Wide Web use dropped after surgery from 1.37 hr per week to 0.80 hr. Slightly more than 50% of participants used e-mail, yet only about 10%

used it for breast health issues. E-mail use before and after surgery was approximately the same. Listserv, news group, and self-help group use was of minimal interest, ranging from 3.7% to 7.4% of the sample.

Hours and Location of Internet Use

Current hours of Internet use for breast health issues did not correlate with scores on any of the psychological outcome measures: ISEL, $r(175) = .12, ns$; PSS, $r(177) = -.01, ns$; stress, $r(162) = .06, ns$; UCLA scale, $r(175) = .03, ns$; Brief COPE, $r(174) = .11, ns$; and CES-D, $r(176) = .09, ns$. Hours of Internet use for breast health issues correlated with the ISEL belonging subscale score, $r(175) = .15, p = .05$, but did not correlate with scores on the other ISEL subscales: appraisal, $r(175) = .07, ns$; self-esteem, $r(175) = .07, ns$; and tangible, $r(175) = .12, ns$.

Hours of Internet use significantly correlated with use at home, $r(177) = .31, p < .001$, and at work, $r(177) = .28, p < .001$. No relationship was observed for use at a friend's residence, $r(177) = -.003, ns$, or at a library, $r(177) = -.01, ns$.

Treatment Status, Support Groups, and Psychotherapy

Almost all of the respondents had completed treatment and were in follow-up. Only 11 (5.9%) were receiving chemotherapy at the time of the study and there was no correlation with Internet use, $r(188) = .06, ns$. Because of the lack of correlation and the small group size, this variable was not included as a covariate in any of the analyses.

Rates of support group attendance were lower than expected. Of those using the Internet for breast health issues, using the Internet for general use, and not using the Internet, 14 (7.4%), 2 (1.1%), and 9 (4.8%), respectively, participated in such groups; mean length of time since diagnosis was 1.71 years ($SD = 0.81$). Percentages did not differ among groups, $\chi^2(2, N = 188) = 3.42, ns$. Receipt of individual psychotherapy or counseling was also lower than expected. Of those using the Internet for breast health issues, using the Internet for general use, and not using the Internet, 9 (4.8%), 5 (2.7%), and 16 (8.5%), respectively, underwent psychotherapy or counseling; mean length of time since diagnosis

Table 3
Internet Use Characteristics of Breast Cancer Patients

Type of Internet access	Users		Time spent (hours weekly)			
			Before surgery		Current	
	No.	%	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
Internet						
General	114	60.6				
World Wide Web						
General	108	57.4				
Breast health	78	41.5	1.37	3.63	0.80	2.22
E-mail						
General	99	52.7				
Breast health	25	13.3	0.62	4.21	0.82	4.28
Listserv						
General	14	7.4				
Breast health	8	4.3	0.02	0.17	0.08	0.49
News group						
General	10	5.3				
Breast health	10	5.3	0.23	1.72	0.12	0.86
Self-help group						
General	7	3.7				
Breast health	7	3.7	0.12	1.14	0.14	1.00

Note. E-mail reflects number of messages weekly, not hours weekly. Percentages represent percentages of users from the overall sample.

was 1.83 years ($SD = 0.85$). Again, percentages did not differ among groups, $\chi^2(2, N = 188) = 3.02, ns$, and thus they were not included in any of the analyses as covariates.

Discussion

Social Support and the Internet

In this study, we found that use of the Internet for information on breast health issues was associated with greater social support and less loneliness in women with breast cancer. There was no association of Internet use with state measures of depression, stress, and coping. This study included the same social support, depression, and loneliness measures as the landmark study of Kraut et al. (1998), which showed no association between general Internet use and social support but did reveal an association with increased loneliness and depressive symptoms. As did Kraut et al. (1998), we found that general Internet use was associated with greater loneliness but was not associated with differences in social support; however, our results differed in that we found no association with depressive symptoms. Our findings suggest that general Internet use and use for medical information seeking differ in that medical information seeking is associated with higher scores on measures of social support and lower scores on measures of loneliness.

As with any cross-sectional design, there is the question of a cause-effect relationship. It is possible that Internet use does not provide greater social support and less loneliness but rather, that those who have more social support or who are less lonely are more likely to seek information over the Internet. This is suggested from the extensive literature on diffusion of innovations (e.g., Rogers, 1995). Rogers (1995) suggested that innovations are more likely to be used by socially connected individuals. This implies

that those who are more likely to use the innovative Internet technology are those who originally had greater social support and less loneliness and that Internet use is not offering them greater social support or less loneliness.

Our results involving the ISEL subscales showed that Internet use for breast health issues was associated with greater belonging and appraisal social support but was not associated with self-esteem or tangible social support. The finding that those using the Internet for breast health information do not believe they obtain self-esteem social support might be due to the ISEL subscales definition of such support as the "perceived availability of a positive comparison when comparing oneself to others" (S. Cohen & Hoberman, 1983, p. 104). Internet users do not physically see these others, and this may be the limitation of an Internet environment. In the future, with the proliferation of Internet video capabilities, self-esteem social support may become significantly related to Internet use for breast health issues.

Surprisingly, those using the Internet for breast health issues did not benefit from tangible social support (perceived material aid). Internet users may simply use the information obtained to give them a psychological sense of control rather than ordering specific treatments or following treatment recommendations without consulting their physicians. Our analysis of the ISEL subscales should be considered exploratory in that, statistically, the greater number of tests performed, the greater the possibility of Type I error.

Our results show the importance of the inclusion of these covariates. Without their inclusion, Internet use was associated with fewer depressive symptoms and more tangible and self-esteem social support. After control for the covariates, these associations were no longer valid.

Characteristics and Time Spent Using the Internet

The characteristics of our sample showed that the World Wide Web was the preferred method of use. Only 32.1% of Internet users for breast health issues chose e-mail as a helpful source for their breast health, whereas 91.7% of individuals used e-mail for general use. Listservs, news groups, and Internet self-help groups were underused by this sample. Our results show that even less than an hour of weekly Internet use is associated with greater social support and less loneliness among breast cancer patients.

We sought to understand the relationship of hours spent on the Internet with the outcome variables. No relationship existed for any variable except for the belonging subscale of the ISEL. It is possible that belonging social support is an important aspect of the social support obtained on the Internet. However, the possibility of Type I error exists. Furthermore, the variability of hours was minimal. Almost half of the participants indicated that they used the Internet for 1 hr per week. As expected, those who used the Internet primarily did so at their home and office; however, we do not know the exact proportions of use, in that we did not measure exact times for each location.

Lack of Psychosocial Service Use

Consistent with the earlier literature, our results show that patients underuse regular support care services. Eakin and Strycker (2001) showed that 70% of physicians refer their cancer patients to various support services. Nonetheless, patient use of these services

is quite low, ranging from 2% to 8%. Our study involved slightly higher participation rates, ranging from 3.7% to 16.0% (face-to-face support groups, 13.3%; Internet support groups, 3.7%; and individual psychotherapy or counseling, 16.0%).

Future Directions

The strengths of this study include that it was the first, to our knowledge, to attempt to understand the relationship of Internet use with psychological aspects among medical patients. Also important were the high participation rate and the multiethnic population. However, we relied on self-reports and did not have a way of independently validating the rates of use reported. We evaluated use at only one point in time and relied on participants' memories to estimate presurgery use. We did not inquire about time spent for general Internet use or various locations of Internet use for breast health issues, which would have allowed us to fine-tune the exact benefits of Internet use. Also, we did not compare the use of other mediums (i.e., books or television) with use of the Internet for information seeking. Our limited response rate regarding use of Internet self-help groups did not allow us to explore the relationship between such groups and social support.

The generalizability of our findings may be limited to women who have early-stage breast cancer, are 65 years of age or less, are at higher income and education levels, and are approximately 2 years postdiagnosis. Although they were not deliberately screened out, there were no patients with Stage 4 breast cancer. It is possible that many of these late-stage patients died during the time interval from diagnosis to study completion or refused to participate. Improved mammography screening rates result in many women being diagnosed at an early stage rather than a late stage. Furthermore, our participants were selected from only two surgeons' practices, and income and education levels were much higher than in the general breast cancer population.

Longitudinal research should investigate Internet use among breast cancer patients at various stages and times since diagnosis; only then can a cause-effect relationship be determined. Time sampling of Internet use at various intervals in an objective manner can improve these self-report results. As elderly women become more comfortable with Internet use, their use should be studied. More knowledge is needed about the quality of the Web sites used, the types of information sought, and the involvement of Internet use in patient decision making. Finally, research should evaluate whether patients or physicians believe that there are potential clinical benefits of the social support obtained from Internet use.

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