AIDS Behav
DOI 10.1007/s10461-009-9577-3

BRIEF REPORT

Internet Use and the Network Composition of People Living with HIV/AIDS in an Urban Area in Peru

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Abstract This study examines the association between Internet use and (1) the number of close ties (people with whom a person is closely acquainted), and (2) the percentage of HIV-positive individuals in the personal network of people living with HIV/AIDS (PLHA) in an urban area of Peru. Ninety-four PLHA responded to a survey; 72% were male, and the average age was 36.65 (SD = 7.92). Internet use was not associated with the number of close ties or with a greater number of close ties who are HIV-positive in one's personal network. Internet use was higher among those with greater than a high school education and females reported more social ties than males.

Keywords HIV/AIDS · Internet use · Networks · Close ties · Peru

Introduction

Internet is a communication medium through which individuals search for health information (Boase et al. 2006) or seek out social support (Leimeister and Krcmar 2006). Research focusing on the intersection of Internet use and HIV/AIDS has centered on the study of social support (Davison et al. 2000), spread of the virus (Blas et al. 2007) and AIDS information seeking (Kalichman et al. 2006).

Although researchers have investigated the role of the Internet and public health in Peru, only a few studies have reported on the role of Internet among adults living with HIV. For example, it is known that men who have sex with men search for sexual partners online (Blas et al. 2007), and that people living with HIV not only use the Internet to obtain information about HIV/AIDS or sexually transmitted diseases (Alva et al. 2005), but accept the Internet as a channel for HIV health promotion interventions (Curioso and Kurth 2007). In general, little is known about the positive health consequences of Internet use among people living with HIV, particularly in the Peruvian context where Internet use has been growing steadily (INEI 2008). As of 2008, Internet penetration (the national percentage of the households that report having Internet access) in Peru was 7.8%; yet, nearly 30% of individuals age six and older access the Internet either at home, school, work or the *cabinas públicas* (INEI 2008). The *cabinas públicas* are the Peruvian version of Internet cafes, and draw the majority of the Internet users (71.1% of the users, INEI 2008). At these venues, Peruvians use the Internet for a variety of purposes, ranging from searching for health information to looking for sex partners (Curioso et al. 2007). The purpose of this study is to explore the association between Internet use and the composition of the personal networks of people living with HIV/AIDS in an urban area of Peru.

In face-to-face encounters, close ties—one indicator of strong social relationships with other people—can provide

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Published online: 02 June 2009

access to emotional support significantly more than weak ties (Wellman and Wortley 1990). In mediated encounters, increasing levels of online communication can improve one's sense of well-being (Kraut et al. 2002). It has been found that Internet users tend to report more social relationships, including both close and distant, than non-users (Boase et al. 2006). Research shows that Internet users who conduct social activities online, as opposed to solitary activities, tend to have more social relationships than non-Internet users or non-social users of the Internet (Zhao 2006). In addition, Internet use appears to be positively associated with indicators of social involvement, such as participating in community activities or feeling part of a community (Kraut et al. 2002). Taken together, these studies support the claim that Internet use provides an opportunity to build relationships (Wellman and Gulia 1999), especially when individuals experience difficult circumstances in life (Leimeister and Krcmar 2006). Thus, while the Internet can help create social relationships that transcend time and space, it is not known how Internet use contributes to the creation or maintenance of relationships among people living with HIV/AIDS in Peru. The first objective of this study is to determine if individuals who are frequent Internet users will report more close social relationships than those who are infrequent Internet users.

In addition, research suggests that support-seeking is high for stigmatized diseases, such as AIDS, and low for non-stigmatized diseases, such as heart diseases (Davison et al. 2000). In the domain of HIV/AIDS, it has been suggested that stigma results in selective disclosure of HIV status (Shelley et al. 1995). Without explicitly stating this, Shelley et al. (1995) showed that people living with HIV exhibited homophilic patterns of communication. Homophily is the tendency to build social relationships with others who share similar attributes such as gender, age, attitudes or behavior (McPherson et al. 2001). Shelley et al. (1995) found that HIV-positive people tended to associate with others similar in race and age. Further, experiential similarity (i.e., sharing a similar experience) has been identified as another predictor of homophilic patterns of communication, especially when those experiences are difficult (Suitor and Pillemer 2000). Thus, because people living with HIV selectively disclose their status while going through an extremely difficult life-experience, they can use the Internet to disclose their status and to build social ties with others experiencing the same condition (Mimiaga et al. 2008). The second objective of this study is to determine if frequent Internet users will report a higher proportion of HIV-positive individuals in their personal network than those who are infrequent Internet users.

Methods

Adults living with HIV were contacted through a non-profit organization working with this population in Callao, an urban province next to Lima, Peru. This study received IRB approval from the University of Pennsylvania and approval by the DISA-Callao, a regional office of the Peruvian Ministry of Health. All participants, recruited through peer members of the non-profit organization in August 2007, provided informed consent before enrolling in the study. After completing the anonymous, 20-min, self-administered survey, participants were compensated with 25 Peruvian soles (about eight US dollars).

Measures

We used a modified questionnaire based on two previous validated surveys to assess Internet usage, knowledge and treatments of HIV, health behaviors, personal networks and demographics (e.g., Kalichman et al. 2002; Seeking and Scanning Research Group 2006). The present study reports the analysis of the questions related to Internet use, personal networks and demographics. To achieve face and content validity, all questions were pre-tested with seven Peruvian adults living with HIV and then were discussed between the authors. In addition, the personal network section was discussed with two network analysis experts.

Two outcome variables were used in the analyses. The first was the number of individuals regarded as close in the respondents' personal network. Respondents were asked to write down the initials of all the people they considered close. The variable close ties was created by adding up the total number of close individuals indicated by their initials. In addition to writing the initials of their close ties, participants were asked to indicate the gender, age and the HIV status of those being listed as close ties. The second variable, network members with HIV, measured the percentage of individuals in the personal network who were HIV-positive.

The main independent variable in the analyses was Internet use. This was a composite variable measuring the number of times the respondent used the Internet during the last week. It was based on two survey items. The first item asked: *Have you ever used Internet at least once in your life*? With two response categories: *yes* and *no*. The second item asked: *Indicate the number of times you used Internet last week. Pick only one of the following*, with response categories *between 1 and 2 times*, *between 3 and 5 times*, and *more than 5 times.* Those never using the Internet were categorized as *no use at all*, and those using the Internet were categorized as using it between 1 and 2 times, between 3 and 5 times, and more than 5 times. Lee et al.

(2008) have shown the reliability of a related time-spent measure of Internet use. A total of six other variables were used in the analyses that have been examined in association with Internet use (e.g., Kalichman et al. 2002): gender, sexual orientation, age, education, number of visits to the doctor and number of years living with HIV.

Statistical Analysis

Chi-square, *t*-tests, and logistic regression were conducted to examine the characteristics of those using the Internet. Then, to evaluate the first objective of this study, a series of *t*-tests and ANOVA were conducted between all variables with the first outcome variable: close ties. Similarly, to evaluate the second objective of this study, *t*-tests and ANOVA were conducted between all variables with the second outcome variable: network members with HIV. For all analyses a P value less than .05 was considered statistically significant.

Results

A total of 108 HIV-positive adults completed the survey. Of these, 94 provided full responses to all questions. Table 1 shows the characteristics of the sample. From the 94 participants, 72% were male; 48% were heterosexual, 43% were homosexual and 9% were bisexual. The most common educational level was some superior education (some college) and over half of the sample visited the doctor more than seven times in the last 12 months. The average age was 36.65 (SD = 7.72), and the average number of years living with HIV was 4.66 (SD = 3.88). A little more than a third of the sample (34%) reported using the Internet between 1 and 2 times. The average number of close ties among the sample was 4.37 (SD = 2.58). The average proportion of network members who are HIV-positive in the personal network of closes ties was .51 (SD = .28)—only 75 of the 94 participants provided information about the HIV status of their network members.

Internet use was only associated with the level of education when comparing those reporting greater than high school versus those with high school or less (OR = 1.97, $P < .01$). We found that only gender was associated with the number of close ties. Females reported more close ties than males ($M = 5.38$, SD = 2.93; and $M = 3.99$, SD = 2.35, respectively; $t(37.946) = -2.184$, $P < .05$). In contrast, Internet use, age, education, sexual orientation, number of years living with HIV, and number of visits to the doctor were not significantly associated with the number of close ties. Thus, the main effect of Internet use on close ties was not significant.

Table 1 Sample characteristics, Internet use, number of close ties and percent of people living with HIV in the personal network of close ties ($N = 94$)

	Frequency (%)
Sample characteristics	
Gender	
Male	68 (72.3)
Female	26 (27.7)
Sexual orientation	
Heterosexual	45 (47.9)
Homosexual	40 (42.6)
Bisexual	9 (9.6)
Education	
Some high school or less	14 (14.9)
High school	21 (22.3)
Some superior education	36 (38.3)
Superior education	23 (24.5)
Age	
23–29	17 (18.1)
30–39	52 (55.3)
40–49	19 (20.2)
50–64	6 (6.4)
Number of years living with HIV	
0–2	34 (36.2)
3–5	24 (25.5)
6–8	23 (24.5)
9–21	13 (13.8)
Number of visits to the doctor in the past 12 months	
1–2	10 (10.6)
3–4	12 (12.8)
5–7	19 (20.2)
>7	53 (56.4)
Internet use	
Number of times using the Internet in the last weak	
No use at all	22 (23.4)
1–2	32 (34.0)
3–5	17 (18.1)
>5	23 (24.5)
Close ties	
Number of people in personal network	
1–2	24 (25.5)
3–5	36 (38.3)
5–9	34 (36.2)
Network members with HIV[a]	
Percent of people who are HIV-positive in personal network	
.11–.25	17 (22.7)
.26–.50	31 (41.3)
.51–.75	14 (18.7)
.76–1.00	13 (17.3)

[a] 75 respondents provided information on the HIV status of the members of their personal network of close ties

Similarly, Internet use, gender, sexual orientation, age, education, the number of visits to the doctor and the number of years with HIV were not associated with the proportion of HIV-positive people in the personal network of close ties. Thus, the main effect of Internet use on the proportion of HIV-positive individuals in their personal network was not significant.

Discussion

The purpose of this study was to understand what role, if any, the Internet plays in the construction of social, close ties for people living with HIV in an urban area in Peru. First, Internet use was higher among those with greater than a high school education, which supports findings from Kalichman et al. (2002). Second, the results revealed that female HIV-positive individuals were more likely than their male counterparts to report more close ties. This finding is not surprising in light of the evidence suggesting that females have discussion networks that are larger than males' discussion networks (McPherson et al. 2006).

Most importantly, we found that the use of Internet was not associated with reporting more close ties. In fact, our findings suggest that Internet use is not associated with reporting more close ties with others experiencing a similar condition, an expected association based on research on experiential similarity (Suitor and Pillemer 2000). Finally, we did not find statistical associations between Internet use and age, and Internet use and number of years living with HIV, which is consistent with Kalichman et al. (2002). However, the lack of association between Internet use and sexual orientation contrasts with results from that same study (Kalichman et al. 2002). Evidently, while no other associations emerged in this sample of people living with HIV, these findings may not necessarily indicate a general pattern among all people living with HIV.

This study is not free of limitations. The study design used a convenience sample recruited through one organization in one specific location in Peru; thus it cannot be considered representative of people living with HIV/AIDS in Peru. In addition, the selection of our questionnaire item to assess Internet use may have not differentiated between individuals using the Internet a few times but for long periods from those using it frequently but for short time spans. Similarly, an item such as "How often do you use the Internet to look for information about HIV" would have elicited stronger associations between the variables on interest. Clearly, the associations noted in this study may increase as Internet use becomes diffused across the country. Moreover, the data were collected through self-reports, which may add bias to the findings reported here. Finally, the study design was cross-sectional and thus the results cannot support causal claims.

Despite these limitations, we suggest two recommendations that can guide future research. First, studies should increase the sample size in order to detect those effects that this study was only able to suggest. Second, studies should focus on the types of Internet use (e.g., to distinguish use of email, instant messaging, blogs, social networking websites, or discussion boards) in order to identify patterns that can be more directly related to increasing social ties. These patterns may shed light on the outcome variables that were considered in this study.

Acknowledgments This study was possible due to a 2007-summer fellowship provided by the Dean of the Annenberg School for Communication of the University of Pennsylvania. The authors want to thank Dr. Keith Hampton, at the Annenberg School for Communication of the University of Pennsylvania; the DISA-Callao of the Peruvian Ministry of Health; and Corazones Chalacos, an organization working to improve the quality of life of people living with HIV/AIDS in Callao, Peru. Finally, the authors would like to acknowledge Rupa Patel and Brooke Duffy for editorial assistance. WHC is supported by the Fogarty International Center/NIH Grant No. R01TW007896.

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