
Health information seeking among Mbararan adolescents: results from the Uganda Media and You survey

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Abstract

To maximize scarce intervention dollars, pediatricians and other adolescent health professionals must position health promotion efforts in mediums that most effectively reach youth. This may be especially true in resource-limited settings where access to primary health care and medications is limited. To improve the efficiency and impact of disease prevention and health promotion efforts in resource-limited settings, we examine sources of health information cited by adolescents in Mbarara Uganda. Participants in the Uganda Media and You survey were students aged 12–18 ($n = 500$) randomly identified in five secondary schools in Mbarara municipality, Uganda. Ninety-three percent of eligible and invited youth completed the cross-sectional, pencil-and-paper survey. Four in five adolescents (81%) indicated they turned to parents, teachers, and other adults while around half read a book/went to the library (56%) or turned to siblings and friends (50%) for information about health and disease. More than one in three (38%) indicated that they used the computer and Internet to search for health information. Older versus

younger respondents tended to rely upon siblings and friends for all types of health questions. On the other hand, younger versus older youth were significantly more likely to turn to parents, teachers, and other adults for their questions about sexual health. Adults may be an important component of effective disease prevention and health promotion campaigns. Multiple delivery methods may be especially effective for reaching older adolescents. Technology also may be an important health promotion tool in resource-limited settings.

Introduction

Adolescence is a critical time for disease prevention and health promotion efforts in order to reduce the impact of various somatic diseases (e.g. sexually transmitted diseases [1]) and mental disorders (e.g. depression [2]) that increase in incidence during this developmental period. Early prevention efforts also are critically important to reduce the impact of diseases and disorders that become more common in young adulthood (e.g. alcohol use disorder [3]). With strong competition for research moneys, pediatricians and other adolescent health professionals must maximize the impact of health promotion dollars by ensuring that the delivery method is able to reach as many young people in the target population as possible. This may be especially true in resource-limited countries where access to primary health care and medications may be the most scarce [4].

Identifying the most effective delivery method for an intervention is an important although often

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ignored component of the program's success [5]. In a community-based health education campaign in rural Uganda, Mitchell *et al.* [5] examined the relative effectiveness of four different delivery methods in an human immunodeficiency virus/acquired immunodeficiency syndrome (HIV/AIDS) intervention: video, plays, leaflets and community educators. Although more than eight in 10 community members surveyed had seen at least one video or play, the intended messages were not always the ones remembered by the target audience. Eight in 10 also said they had seen the leaflets, but fewer had actually read them. Community educators were rated as knowledgeable and trustworthy, but the educators tended to avoid people who were rich and educated. None of the four methods were able to achieve both high saturation and long-term retention levels of intervention messages. The authors conclude that a multimethod approach utilizing several delivery methods may be most effective in reaching the greatest number of people, especially adolescents. Findings highlight the challenge of identifying delivery methods that reach a large number of people and convey health messages in a meaningful way. More importantly, understanding where adolescents typically turn to for information in the absence of direct intervention will help identify where young people already 'are' when looking for health information and provide clues for cost-effective delivery methods.

Little information is available about the health information-seeking behavior of adolescents in resource-limited countries. In the United States, Rideout *et al.* [6] report that 85% of young people between the ages of 15 and 24 years trust health information from doctors and 68% trust information from parents 'a lot'. One in three trusts information from siblings and newspapers, while less than one in five trusts information from friends or the Internet 'a lot'. Evidence suggests however that the preferred source of health information may not be the actual source people turn to as a first-line source of inquiry [7]. Among adolescents in resource-rich settings, the Internet seems to be a common source of health information [8]. One in four young people between the ages of 12 and 19 years

in the United States are estimated to have searched for health information on the Internet in the previous year [9], and the Internet is cited as the primary source of health care information for many adolescents [10]. How these results translate to secondary school-aged adolescents living in resource-limited settings is unclear.

To improve the efficiency and impact of disease prevention and health promotion efforts in resource-limited settings, the aim of this study is to examine sources of health information reported by secondary school students in Mbarara Uganda. Data are from the Uganda Media and You survey, a cross-sectional survey of adolescents living in Mbarara conducted to better understand the intersection between technology use and health in this population.

Methods

Subjects

Participants in the Uganda Media and You survey were randomly selected from five secondary schools in Mbarara, the sixth largest municipality in Uganda. Mbarara is ~250 km southwest of Kampala. The municipality has a population of 69 000 (based upon the 2002 census) and is the sixth largest urban center in Uganda [11]. Although the greater Mbarara district is the second most populous district in Uganda, it is in the bottom half of districts in terms of population density. Mbarara municipality is therefore best described as serving mainly a rural population in sub-Saharan Africa.

Access to education in Mbarara is mixed. Mbarara University of Science and Technology is the 18th largest of Uganda's 53 tertiary institutions [11]. Data indicate, however, that Mbarara district's 2004 net secondary enrollment rate is slightly lower than the national average (11.3 versus 14.6%) [11]. The data sampling frame for the current survey included five Mbarara secondary schools chosen to be representative of the different secondary schools in Ugandan municipalities in terms of size, private vs public governance and sex-mix. Three of the five participating schools were public (government sponsored), one was Catholic and the other Muslim.

Two of the five schools were all-boys schools, one was an all-girls school and two were mixed-sex. All adolescents in grades Secondary 1 through Secondary 4 (roughly equivalent of Grades 8–11 in the United States) were eligible ($n = 3630$).

The study was introduced to all students during a general assembly by their respective principals. A sample size of 100 participants per school was targeted. Participants were identified using a list of random numbers applied to the school rosters supplied by the headmasters. Research personnel provided a list of selected students to the principal who then distributed it to the teachers of each class to inform selected students to attend a group discussion with research personnel. At break time, research personnel met with the group of students invited to participate. The study was described and assent forms were distributed to students to return signed at the time of the survey. Surveys were conducted after school following a group discussion of the assent form. Surveys were administered by research assistants and the project director in the general assembly halls and in the absence of the teachers and school administrators.

In total, 100% of adolescents invited to participate at three of the schools agreed to participate. At the remaining two schools (one Catholic, the other public), 13 and 25 students were, respectively, absent at the briefing. They were replaced with the next students on the randomly sorted lists; all additional 38 adolescents approached agreed to participate. Because it is possible that one's absence was a passive refusal to participate, the 38 students are included in the response rate. In total, 93% of those eligible and invited ($N = 538$), participated in the survey for a final sample size of 500 students. We believe that our high response rate is due to multinational efforts to increase access to HIV antiretroviral therapy that have created a climate where people are eager to participate in international research as a way to contribute to the efforts. To avoid coercion, students were informed they had the choice to participate or not, and that non-participation would not affect their school standing.

On average, surveys were completed in 45 min. According to the recommendations of the Mbarara

University Institution Ethical Review Committee, which provided Institutional Review Board approval, adult informed consent was obtained from the school headmasters. All student participants provided written informed assent.

Measures

To understand where young people sought out information about health and well being, three survey questions were asked: (i) When you need more information about health and disease, how do you find it; (ii) When you need more information about sexual health, like having your period or 'wet dreams', how do you find it? and (iii) When you need more information about HIV and AIDS, how do you find it?. Additionally, respondents were asked about specific health topics that they would search for given a hypothetical scenario that Internet access was free.

Participants reported their sex and age, which was categorized into two groups based upon indications of non-linearity: 12- to 14-year olds and 15- to 18-year olds. Respondents additionally reported whether their mother or father attended or graduated from university as well as their self-appraised likelihood of finishing secondary school.

Statistical methods

Descriptive data were explored to better understand sources of health information among adolescents. Logistic regression was then used to estimate the odds of health information-seeking behaviors related to sex, age and parent education while adjusting for underlying differences in school attended (i.e. male: female ratio, school size, private versus public) and demographic characteristics, respectively (i.e. sex, age, self-appraised likelihood of finishing school, mother's highest education and father's highest education).

Results

As reported previously [12], 61% of Uganda Media and You survey respondents were male

with an average age of 15.6 years (SD = 1.5, range = 12–18). Forty-one percent indicated they would definitely finish secondary school. Just over half of fathers (44%) and one-third of mothers (29%) had reportedly attended or graduated from university.

Sources of health information

Respondents were asked when they needed more information about health and disease, how they found it. As shown in Table I, four in five adolescents (81%) indicated they turned to parents, teachers, and other adults and more than one in three (38%) indicated that they used the computer and Internet to search for health information. When young people needed more information about sexual health including sensitive and potentially embarrassing topics, as well as information about HIV/AIDS, a similar distribution of sources was noted. As shown in Fig. 1, 14% of youth had looked for health and disease information using all four sources, as did 13% when looking for information about HIV/AIDS and 6% when looking for information about sexual health. As shown in Table II, the greatest percentage of youth reporting all four sources of health information is found within youth who report using computers and the Internet compared to the other three sources. Alternatively, the greatest percentage of youth reporting using only one source is found within those who go to parents, teachers, and other adults for health information. Findings were consistent for all three types of health information assessed.

Table I. Sources of information for health topics (*n* = 500)

Source of information	Health topic		
	Health and disease information generally	Sexual health	HIV/AIDS
Parent, teacher, or other adult	81% (405)	75% (375)	79% (396)
Book/library	56% (282)	45% (223)	59% (296)
Sibling and friend	50% (249)	56% (280)	51% (256)
Computer/Internet	38% (189)	20% (102)	35% (173)

Differences in health information-seeking behavior by age, sex and parental education

Age significantly discriminated between all sources of sexual health, with older youth twice as likely to endorse all sources except for adults (Table III). Similar trends were noted for information sources about health and disease although no significant differences were noted for most information sources about HIV/AIDS. In contrast, little differences in health information-seeking behavior were noted either by sex or parental education (Table IV).

If the Internet were free

To illuminate the potential for technology as a health information resource, youth were asked to indicate the types of information they would search for if the Internet were free to use. The majority of adolescents reported that they would search for information about HIV/AIDS (66%), while one in four (24%) also reported they would searched for information about alcohol and drug issues online, and 16% would search for information on depression and suicide.

Discussion

Eighty percent of secondary school respondents in the Uganda Media and You survey report relying upon parents, teachers, and other adults when they need more information about health and disease, sexual health and HIV/AIDS. None of the other three sources examined rival this influence. In comparison, around one in two youth report looking in books or going to the library to find more information about their health questions. Similarly, siblings and friends are relied upon as a source of information about half of the time. Around two in five youth report also using the computer or Internet for questions related to health and diseases as well as HIV/AIDS, although half as many use technology to answer sexual health questions.

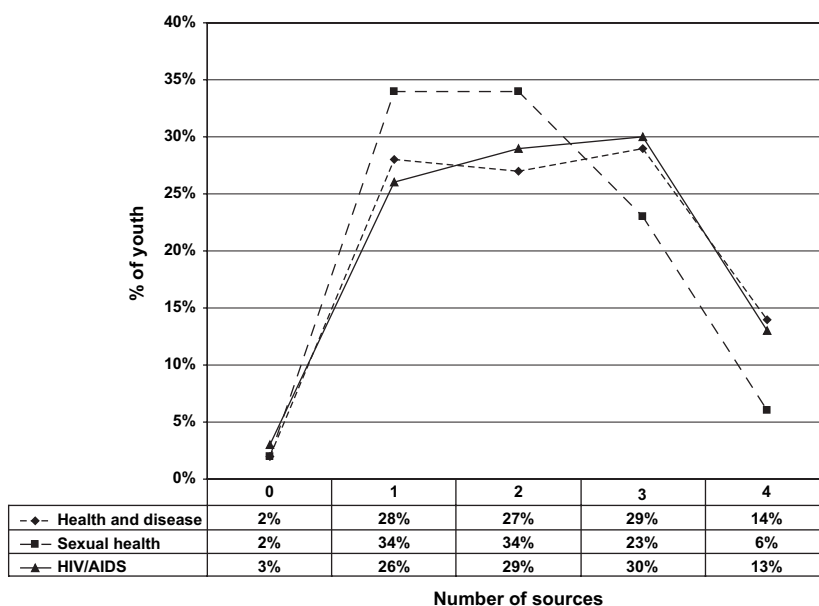


Fig. 1. Number of resources solicited by type of health information sought ($n = 500$).

Table II. The number of different sources cited by type of information sought and cited information source ($n = 500$)

Health topic	No. of sources used	Source of health information			
		Parents, teachers, and other adults	Books and Library	Siblings and friends	Computers/Internet
Health and disease	1	20% (83)	11% (30)	2% (6)	12% (22)
	2	27% (111)	21% (59)	22% (56)	21% (40)
	3	35% (141)	44% (123)	47% (117)	30% (57)
	4	17% (70)	25% (70)	28% (70)	37% (70)
Sexual health	1	28% (106)	11% (24)	12% (33)	8% (8)
	2	35% (130)	32% (72)	40% (113)	28% (29)
	3	29% (109)	44% (97)	37% (104)	34% (35)
	4	8% (30)	13% (30)	11% (30)	29% (30)
HIV/AIDS	1	19% (77)	9% (27)	4% (9)	10% (17)
	2	28% (112)	26% (76)	24% (62)	22% (38)
	3	36% (143)	44% (129)	47% (121)	31% (54)
	4	16% (64)	22% (64)	25% (64)	37% (64)

Percentages sum down the column for each source of health information within each health topic, and reflect the distribution of number of different sources among youth reporting using that specific source. For example, among youth reporting using books/library for information about health and disease, 11% report using only that source for health information.

Table III. *Source of health information by age*

Topic	Source	Age		AOR ^a	95% CI	P-value
		12- to 14-year olds (<i>n</i> = 123)	15- to 18-year olds (<i>N</i> = 377)			
Health and disease						
	Parents, teachers, and other adults	80% (98)	81% (307)	1.1	0.7, 1.9	0.67
	Book/library	51% (63)	58% (219)	1.8	1.2, 2.9	0.009
	Siblings and friends	37% (45)	54% (204)	2.4	1.5, 3.7	<0.001
	Computer/Internet	34% (42)	39% (147)	1.8	1.1, 2.9	0.02
Sexual health						
	Parents, teachers, and other adults	81% (100)	73% (275)	0.6	0.3, 1.0	0.05
	Book/library	39% (48)	46% (175)	1.8	1.1, 2.8	0.01
	Siblings and friends	48% (59)	59% (221)	1.8	1.2, 2.8	0.009
	Computer/Internet	15% (18)	22% (84)	2.0	1.1, 3.6	0.02
HIV/AIDS						
	Parents, teachers, and other adults	76% (94)	80% (302)	1.2	0.7, 2.0	0.51
	Book/library	59% (72)	59% (224)	1.6	1.0, 2.5	0.06
	Siblings and friends	41% (50)	55% (206)	2.1	1.4, 3.3	0.001
	Computer / Internet	35% (43)	34% (130)	1.2	0.8, 1.9	0.39

Bolded font represents statistically significant AOR.

^aAOR: adjusted odds ratio—odds of being 15- to 18-year olds versus 12- to 14-year olds, adjusting for school characteristics, respondent sex, likelihood of finishing secondary school and parental university education.

Adults as an efficient and influential delivery method of health information for youth

With eight out of 10 respondents reportedly asking a parent, teacher, or other adult their health-related questions, perhaps the greatest impact pediatricians and other adolescent health professionals in resource-limited settings might have in preventing and promoting early intervention of disease among adolescents is ensuring that caregivers and other trusted adults in the community are properly informed about effective disease prevention. By doing so, not only we are adopting resources commonly used by our target audience but also we are addressing HIV preventive knowledge deficits that may be common among adults [13]. This is especially important given that the greatest percentage of youth reporting using only one source for health information is found among those relying on parents, teachers, and other adults. Thus, when children turn to adults for information about health and disease, we need to be confident that children are receiving accurate information. As an example of

such a program, Muyinda *et al.* [14, 15] designed a sexual health campaign using ‘modern’ *sengas*. A father’s sister (*senga*) is a traditional source of information about sexual behavior for adolescent females in rural Uganda. The authors integrated this concept into a 12-month intervention aimed at reducing HIV risk behaviors among adolescent women. Peer-nominated women in the community were trained to become *sengas*. Adolescent women then were encouraged to visit them for questions they had about sexual health matters. Although the intervention was targeted to adolescent girls, adolescent boys represented 12% of the *senga* visits, adult women represented 38% and adult men 5% of the visits. At the study end, adolescent women in the two intervention villages demonstrated greater change in HIV/AIDS knowledge, stronger sexual communication skills and consistent use of condoms as compared with those in the control village. Prevalence rates of sexually transmitted diseases (STDs) also decreased in intervention villages. This type of program may therefore be effective in reaching both proximal and secondary health promotion targets. The need

Table IV. Source of health information by sex and household education

Topic	Source	Demographic characteristics									
		Boys (n = 304)	Girls (n = 196)	AOR ^a	95% CI	P-value	Non- university- educated parent (n = 258)	University- educated parent (n = 242)	AOR ^b	95% CI	P-value
Health and disease											
	Parents, teachers, and other adults	81% (245)	82% (160)	0.7	0.4, 1.3	0.29	82% (211)	80% (194)	0.9	0.5, 1.4	0.59
	Book/library	57% (172)	56% (110)	0.8	0.5, 1.3	0.40	50% (128)	64% (154)	1.3	0.9, 2.0	0.20
	Siblings and friends	49% (152)	49% (97)	0.7	0.4, 1.2	0.18	50% (128)	50% (121)	1.0	0.7, 1.6	0.82
	Computer/Internet	35% (106)	42% (83)	1.2	0.8, 2.0	0.40	33% (85)	43% (104)	1.2	0.8, 1.8	0.41
Sexual health											
	Parents, teachers, and other adults	71% (215)	82% (160)	1.2	0.7, 2.1	0.51	78% (200)	72% (175)	0.9	0.6, 1.4	0.65
	Book/library	45% (137)	44% (86)	0.7	0.5, 1.2	0.21	36% (94)	53% (129)	1.9	1.3, 2.8	0.002
	Siblings and friends	53% (161)	61% (119)	1.1	0.7, 1.7	0.81	55% (142)	57% (138)	1.1	0.7, 1.7	0.60
	Computer/Internet	20% (61)	21% (41)	1.0	0.5, 1.7	0.90	19% (48)	22% (54)	1.3	0.8, 2.1	0.32
HIV/AIDS											
	Parents, teachers, and other adults	78% (238)	81% (158)	1.0	0.5, 1.7	0.90	81% (210)	77% (186)	0.9	0.6, 1.4	0.62
	Book/library	56% (171)	64% (125)	0.8	0.5, 1.4	0.98	52% (133)	67% (163)	1.5	1.0, 2.2	0.08
	Siblings and friends	49% (148)	55% (108)	1.3	0.8, 2.1	0.26	52% (133)	51% (123)	0.9	0.6, 1.4	0.66
	Computer/Internet	36% (110)	32% (63)	0.7	0.4, 1.1	0.11	30% (77)	40% (96)	1.2	0.8, 1.8	0.45

Bolded font represents statistically significant AOR.

^aAOR: adjusted odds ratio—odds of being a girl versus a boy, adjusted for private versus public school, age, likelihood of finishing secondary school and parental university education.

^bAOR: odds of reporting a university education parent versus not, adjusted for school characteristics, respondent sex, age and likelihood of finishing secondary school.

for similarly innovative interventions that integrate adults as health information resources for adolescents is supported by the current findings.

The number of sources used based upon the health topic of interest

The majority of adolescents report relying upon multiple sources when they need more information about health topics, supporting the conclusion of Mitchell *et al.* [5] that a multimethod approach utilizing several delivery methods may be most effective in reaching the greatest number of people, especially adolescents. A trend is observed, however, for a fewer number of different resources to be used when seeking answers to sexual health questions as compared with general health and disease and HIV/AIDS specific questions. On one hand, this may be good news, indicating that HIV/AIDS

is a topic that youth feel free to seek information about without fear of being stigmatized. On the other hand, this may signal that sexual health questions are perhaps not socially acceptable or are difficult to talk about, leading youth to rely upon fewer sources. Abstinence-only messages are the most frequent theme of adolescent HIV prevention programs in Uganda [16], suggesting that sexual health and family planning information may not always be a component of HIV programs. Kiapi-Iwa and Hart [17] collected qualitative data in northern Uganda to better understand the sexual health issues of young people. They report that some adolescents who went to health centers to obtain free condoms were told to ‘wait until they were older’. Results also suggest that adolescents have knowledge of STDs but are often misinformed about how they are contracted. For example, many

adolescents thought that sharing public bathrooms and toilets could spread diseases. These findings are mirrored by those reported by Muyinda *et al.* [14, 15] in interviews with youth in western Uganda. This suggests that in addition to integrating adults into health promotion efforts, attention also should be paid to addressing potential misperceptions or prejudices that adults bring to the table, especially in the context of sexual health promotion efforts.

Health information seeking based upon demographic characteristics

Health information-seeking resources appear similar for boys and girls, and youth with and without a university-educated parent among otherwise similar secondary school students in Mbarara. These data suggest each of the four delivery methods would likely reach a similar number of secondary school students of both sexes and of different parental education respectively. In contrast, findings reveal many differences in health information-seeking behavior between older and younger youth. Youth between the ages of 12 and 14 years are significantly more likely than youth between the ages of 15 and 18 years to turn to parents, teachers or other adults with questions they have about sexual health. On the other hand, older youth are twice as likely as otherwise similar younger youth to report asking a sibling or friend about general health, sexual health and HIV/AIDS-related questions they may have. More generally, older youth endorse all sources other than adults to find more information about health and disease, and sexual health to a higher degree than younger youth. This might be reflective of developmental changes during adolescence. The information needs of increasingly exploratory older adolescents are extensive and frequently entail access to a wider range of resources beyond people in their immediate environment [18]. Moreover, As youth grow older, the influence that adults have on adolescents is counterbalanced by the influence of siblings and other resources [18]. These data further argue for the need for multiple delivery methods [5] to acknowledge the varying sources to which young people, especially older adolescents, turn and to increase the likelihood of uptake across various sources within the

family and community, which then have the opportunity to cross-infect other sources.

Technology as a health information resource

Computers and the Internet appear to be enhancing rather than replacing other sources of health information among secondary school students in Mbarara. Youth who cite technology as a health information resource are least likely to indicate that this was their only source of information and more frequently indicate that they rely upon all four sources of information for all three types of health issues examined. This pattern is similar to that observed in resource-rich countries, where consumers are using technology to expand and enhance rather than replace their existing sources of health information [9]. Findings also suggest that mental health topics such as drug and alcohol abuse and depression and suicidality may be amenable to technology-based health education efforts targeted to adolescents in resource-limited settings. One in four young people report they would use the Internet to look for information about substance use and mental health issues if access were free. This is similar to findings among current youth Internet users reported by Rideout [6], suggesting that as Internet access becomes more widely spread, perhaps so too will the search for sensitive adolescent health topics in resource-limited settings. Self-directed online interventions for depression have been developed and evaluated by researchers in Australia [19] and the United States [20]. Use of the Web sites is associated with significant alleviation in symptom severity for some consumers. A sizable minority of Uganda Media and You respondents already rely upon computers and the Internet as a health information resource. Technology-based intervention/prevention Web sites thus may have the potential to reach many adolescents more and more where they are already looking for information about these issues, both in resource-rich and resource-limited settings.

Implications

The current investigation reports health information-seeking behavior among adolescents in a re-

source-limited setting outside of a major capital city. Findings may be generalizable to secondary school students in other municipalities of medium size, including those not living in major urban settings such as Kampala. Responses indicate that both traditional and untraditional sources of health information are sought out, highlighting the computer and Internet as potential yet largely untapped health education tools in rural settings. Areas of future inquiry also are revealed. Given the frequency that adults are cited as resources among Uganda Media and You respondents, understanding better what specific adults are commonly trusted, how they are identified, etc. is a critical area of future research. Similarly, understanding what factors influence the number of different types of resources sought is important. Do youth who rely upon only one source do so because they are able to get all of the information they need through the sole source, because they do not know where else to look, or because they have been discouraged or shamed to look further, etc. Also, linkages between the source of information and changes in health knowledge or behaviors are an important area of further inquiry. Given indications that individual preferences for information can influence acquisition of health-related knowledge [21–23], future research should identify personal preferences for health information that drive health-seeking behavior among adolescents in Uganda. Future research also might explore the ways in which youth are exploring the Internet and interpreting the information they find, as well as the accuracy of the health information they are choosing to access. Answers will further help direct efficient health education efforts.

Limitations

Our findings should be assessed within the limitations of the data. The survey was not piloted and the items were not validated by direct observation. The survey was, however, reviewed by researchers in Mbarara who had familiarity with students in the target age group for understandability and applicability. The focus of the survey was to better understand Internet use among adolescents. As such, our

measurement of health information resources is somewhat crude and responses were restricted to four options. Future studies should include more specific sources, especially newspapers given the paper-based Straight Talk HIV/AIDS intervention aimed at adolescents available in Uganda. Additional information about how information seeking is linked to other key health behaviors was not included in the current survey. Such information is an important next step in this area of survey research. Our sample is one of the few based upon respondents outside of a major capital in sub-Saharan Africa. Nonetheless, current findings may not be generalizable to populations with less access to educational resources or more rural settings especially those lacking access to the electricity grid.

Conclusions

Data from the Uganda Media and You survey suggest that adults may be the most efficient delivery method of disease prevention and health promotion efforts aimed at adolescents in resource-limited settings. Of the four potential resources examined, parents, teachers, or other adults are the most frequently relied upon source of health information among Mbararan secondary school students. As youth grow older, they are more likely to broaden their sources of information to include siblings or friends, books and the library, and computers and Internet. Multiple delivery methods may be a useful strategy to increase the impact of health messages and ensure receipt of information by older adolescents. New and innovative delivery methods also should be utilized to maximize the reach potential of the health education campaign, including those targeting mental health issues.

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Conflict of interest statement

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References

1. Centers for Disease Control and Prevention. *STD Surveillance 2004 Special Focus Profiles: Adolescents and Young Adults*. Available at: <http://www.cdc.gov/std/stats/adol.htm>. Accessed: 28 March 2006.
2. Lewinsohn PM, Hops H, Roberts RE *et al.* Adolescent psychopathology: I. Prevalence and incidence of depression and other DSM-III-R disorders in high school students. *J Abnorm Psychol* 1993; **102**: 133–44.
3. Anthony JC, Echeagaray-Wagner F. Epidemiologic analysis of alcohol and tobacco use. *Alcohol Res Health* 2000; **24**: 201–8.
4. Jong-Wook L. Global health improvement and WHO: shaping the future. *Lancet* 2003; **362**: 2083–8.
5. Mitchell K, Nakamanya S, Kamali A *et al.* Community-based HIV/AIDS education in rural Uganda: which channel is most effective? *Health Educ Res* 2001; **16**: 411–23.
6. Rideout V. *Generation Rx.com: How Young People Use the Internet for Health Information*. Menlo Park, CA Kaiser Family Foundation, 2001.
7. Hesse BW, Nelson DE, Kreps GL *et al.* Trust and sources of health information: the impact of the Internet and its implications for health care providers: findings from the first Health Information National Trends Survey. *Arch Intern Med* 2005; **165**: 2618–24.
8. Borzekowski DL, Rickert VI. Adolescent cybersurfing for health information: a new resource that crosses the barriers. *Arch Pediatr Adolesc Med* 2001; **155**: 813–7.
9. Ybarra M, Suman M. Help seeking behavior and the Internet: a national survey. *Int J Med Inform* 2005; **75**: 29–41.
10. Gray NJ, Klein JD, Noyce PR *et al.* Health information-seeking behaviour in adolescence: the place of the internet. *Soc Sci Med* 2005; **60**: 1467–78.
11. Uganda Bureau of Statistics. *2005 Statistical Abstract*. Kampala, Uganda: Uganda Bureau of Statistics, 2005
12. Ybarra M, Kiwanuka J, Emenyonu N *et al.* Internet use among Ugandan adolescents: implications for HIV intervention. *PLoS Med* 2006; **3**: e433.
13. UNAIDS. *2004 Report on the Global AIDS Epidemic: 4th Global Report. Vol. 4*. Geneva: UNAIDS, 2004.
14. Muyinda H, Nakuya J, Pool R *et al.* Harnessing the *senga* institution of adolescent sex education for the control of HIV and STDs in rural Uganda. *AIDS Care* 2003; **15**: 159–67.
15. Muyinda H, Nakuya J, Whitworth J *et al.* Community sex education among adolescents in rural Uganda: utilizing indigenous institutions. *AIDS Care* 2004; **16**: 69–79.
16. Blum R. Uganda AIDS prevention: A, B, C, and politics. *J Adolesc Health* 2004; **34**: 428–32.
17. Kiapi-Iwa L, Hart GJ. The sexual and reproductive health of young people in Adjumani district, Uganda: qualitative study of the role of formal, informal, and traditional health providers. *AIDS Care* 2004; **16**: 339–47.
18. Thornburgh D, Lin HS. *Youth, Pornography, and the Internet*. Washington, DC: National Academy Press, 2002.
19. Griffiths KM, Christensen H, Jorm AF *et al.* The effect of web-based depression literacy and cognitive behaviour therapy interventions on stigmatising attitudes to depression: a randomised controlled trial. *Br J Psychiatry* 2004; **185**: 342–9.
20. Clarke G, Eubanks D, Reid E *et al.* Overcoming Depression on the Internet (ODIN) (2): a randomized trial of a self-help depression skills program with reminders. *J Med Int Res* 2005; **7**: e16.
21. Krantz DS, Baum A, Wideman MV. Assessment of preferences for self-treatment and information in health care. *J Pers Soc Psychol* 1980; **39**: 977–90.
22. Miller SM. Monitoring and blunting: validation of a questionnaire to assess styles of information seeking under threat. *J Pers Soc Psychol* 1987; **52**: 345–53.
23. Miller SM, Mangan CE. The interacting effects of information and coping style in adapting to gynecologic stress: should the doctor tell all? *J Pers Soc Psychol* 1983; **45**: 223–36.

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