

## THE INTERNET-BASED HEALTH INFORMATION AND ADOLESCENTS

Biljana Kocić<sup>1,2</sup> and Branislav Petrović<sup>1,2</sup>

The Internet is presently one of the most dynamic communication tools and is expanding fast. Globally, adolescents are active Internet users. Internet is also emerging as a significant source of health information and an attractive medium for the health promotion and delivery of health education among adolescents. The advantages of Internet-based applications over traditional approaches are numerous, especially when considering privacy issues, cost-effectiveness, number of users, data collection and information update. In view of previous researches and present dynamics of development in electronic communications, it seems beyond doubt that the Internet has a great potential to be a useful tool for delivering health prevention and health educational programs among adolescents as well as answers for sensitive and private questions asked online. This method of contemporary Public health services is feasible for reaching general population, and particularly seems suitable for programs aimed at adolescents. Bearing in mind the importance of the Internet as a public health tool, it needs to be constantly re-examined and improved in light on available data.. *Acta Medica Medianae* 2011;50(4):69-73.

**Key words:** adolescents, Internet, health information, health education, health promotion

---

University of Niš, Faculty of Medicine, Niš, Serbia<sup>1</sup>  
Public Health Institute Niš, Serbia<sup>2</sup>

Contact: Biljana Kocić  
University of Niš, Faculty of Medicine  
Bul. dr Zorana Đinđića 81  
18000 Niš, Serbia  
E-mail: biljaizz@yahoo.com

### Introduction

Adolescence is a critical period of human development often characterized by confusion, mixed interpretation and understanding of adult behavior and environment, exuberance and a penchant for experimentation, especially with drugs, alcohol and sex (1). Of all challenges, those associated with sexual maturation are the most distinctive as well as the most problematic (2). This stage of development is accompanied by an upsurge of sex drives, the development of sexual values, and the initiation of sexual behavior (3). The key concern about the health of young people is the extent to which they have access to resources that promote their development. Access to information and communication services is now seen as a universal right, and the United Nations is advocating for a global initiative for such access within this decade (4). The resources that adolescents need include: access to education, information and services; resources that reside in a stable and supportive structure such as the family; resources contained within policy-making and decision-making processes, and many young people do not have access to these resources, new strategies that are attractive

to the youth are beginning to emerge, and they make use of the power, creativity and enthusiasm of adolescents. This is where information technology, such as the Internet, is expected to play a critical role as a source of information (5).

### Adolescence, health information and the Internet

Adolescence is the period, between puberty and adulthood. According to Caldwell, et al. (1998) (6), adolescents are "...postpubertal population younger than 20 years who have a distinct life style". They often want to discuss topics, such as physical fitness, stress, nutrition, STDs, HIV/AIDS, alcohol, good eating behaviors, and contraception with their counselors (7-9). They also hesitate to request personal health information from their physicians (7). Adolescents also struggle with lack of knowledge about reproductive health and healthy sexual relationships (10-12). Adolescents in general are uncomfortable discussing private health issues, such as sexuality and contraception, and younger adolescents are embarrassed, afraid, or uncomfortable discussing certain health issues (e.g., menstruation, pregnancy) than were their older peers in grades 10 to 12 (7).

Considering the attributes of cheapness, availability, ease of use and confidentiality of online resources, adolescent information needs may better be served by the Internet, which allows them to explore sensitive topics online which they may not want to reveal to parents,

physicians, school officials, or acquaintances (13). Web resources such as web pages, bulletin boards, newsgroups, listservs, and chatrooms found on Internet contain health information and provide access to information for a potentially large number of participants worldwide (14).

Globally, adolescents are active Internet users. However, percentages of online teens who use the Internet to access health information vary dramatically by country. For example, 53% of in-school Internet users in Accra, Ghana report trying to get health information from the Internet (15). About a third of urban Chinese youth have browsed for reproductive health knowledge (16), compared with 75% USA youth (9). Web-based education for youth may be especially useful in certain cultural context or for sensitive health content (17, 18) because they may be perceived as more confidential sources of sensitive information (19) and can be easily accessed anytime. Given these possibilities, an array of Internet health education interventions has emerged, ranging from passive absorption of text to more interactive modalities that include pop ups, email, games, videos, and moderated chat groups (20).

Few Internet interventions to increase adolescent knowledge of health topics have been evaluated using rigorous study designs with randomization and/or comparison groups (21). Meta-analysis of quasi-experimental studies has demonstrated modest knowledge acquisition, but modification of behavior via the Internet has been less successful (22, 23). Interventions featuring individually tailored web content targeting specific needs of the learner have shown some promise (16, 23-26).

Skinner, Biscope, and Poland (2003) have noted that "Internet connectivity" alone is not the only pertinent factor in facilitating access to and use of web-based health information for youth (27). Adolescents have trouble locating high quality and relevant information, especially local health service information (28-31). Literacy, privacy, search skills, relevance, bandwidth, and gate-keeping issues shape adolescents' benefit from online health content. The usability of a site is also a critical determinant of effective information acquisition (32). Several studies have noted the difficulties in sustaining youth' attention to reproductive health sites due to other competing content on the web (30, 33).

The modest results reported to date in knowledge and behavior change in industrialized settings have not tempered the enthusiasm for Internet-based distance learning strategies globally. Bilateral and commercial donors increasingly support Internet strategies as potential solutions to Sub-Saharan African and Latin American unmet health educational needs in rural and urban areas where "e-learning" might overcome

teacher shortages and other barriers to health education (34, 35). However, little evidence is currently available on the usefulness of web-based health educational strategies for students in low resource settings.

Many people are optimistic about the Internet as a source of information to young people. Some assert that a primary role of the Internet is to deliver information and improve the health of population, especially in developing countries (36,37). Moreover, several studies have shown that young people are more likely to go online than their older counterparts. Although concern is raised about the quality of online health information (38), the nature of this technology, including ease of access, anonymity and non-punitive attributes, make it an attractive information source for youth, especially for sensitive health issues (18, 28, 39). This observation can be accommodated by the Uses and Gratification Theory, which emphasizes the significance of people's value for independence in the search and use of information and communication media.

Uses and Gratification (U&G) theory due to Blumler and Katz (1974) (40) is fast becoming an influential tradition in media research because it focuses on why people use the media rather than on the content of the media. The theory assumes that the individual user of the media is in control, active, and goal-directed, as opposed to simply receiving media messages. The media user has been seen as part of broader trend among media researchers, which is more concerned with what people themselves do with media, allowing for a variety of responses and interpretations. The media user consciously or subconsciously takes the initiative to link gratification needs with his or her media choice and use, from among alternative media and other available sources based on the fact that such is able to decide on the information required, select such information and use it (40,41). U&G views the media in terms of the gratification of social or psychological needs of the individual (40). An empirical study in the U&G tradition typically involves audience members completing a questionnaire about why they use the media.

Bearing in mind the fact that youth remain at high risk for contracting and transmitting human immunodeficiency virus (HIV) and other sexually transmitted diseases (STD) (42), we must note that, the Internet may provide access to the most current and most scientifically accurate information available on all aspects of HIV/AIDS, from risk factors for transmission and acquisition to early signs and symptoms to HIV testing and treatment (43). Web sites such as The Body ([www.thebody.com](http://www.thebody.com)) and POZ ([www.poz.com](http://www.poz.com)) are dedicated to education and clinical information on HIV/AIDS testing, diagnosis, treatment, and prevention for consumers and include access to experts, forums, blogs, and other digital media.

In addition to traditional informational Web sites, a number of interactive safer sex educational Web sites, many targeted to teens (44), and non-traditional sites, such as "Kicesie's Sex Ed-What They Don't Teach You In School" on YouTube (45), have been developed.

HIV/STI behavioral interventions using digital media have been developed in many forms, ranging from complex computer-tailored multimedia interventions that take into account individual behaviors and stages of change to brief untailored video interventions (44, 46-48). Effective HIV prevention interventions that use digital media are likely to be highly cost-effective because they are easily replicated after development, require minimal staffing, and have unlimited geographic reach (49).

The development of online HIV prevention interventions of proven efficacy is an area of intensive research although it lags far behind online interventions for smoking (50), obesity (51), and mental (52) and physical health problems (53).

## Conclusion

In conclusion, the Internet is emerging as a significant source of health information and an attractive medium for the health promotion and delivery of health education among adolescents. In view of previous research and present dynamics of development in electronic communications, it seems beyond doubt that the Internet has a great potential to be a useful tool for delivering health prevention programs. This method of contemporary Public health services is feasible for reaching general population, and particularly seems suitable for programs aimed at adolescents. In common with any other method, it needs to be constantly re-examined and improved in light on available data.

## Acknowledgments

This work was supported by grants, No III 46013 and III No 43014, from the Ministry Sciences and Technological Development of the Republic of Serbia.

## References

- Alubo O. Research paper No 166. Takemi program in international health. Boston, MA: Harvard School of Public Health; 2000.
- Katchadourian H. Sexuality. In: Feldman SS, Elliott GR (Eds). At the threshold: The developing adolescent. Cambridge, MA: Harvard University Press; 1990: 330-51.
- Moore S, Rosenthal D. Sexuality in adolescence. London: Routledge; 1993.
- UN development programme (2000, april): Report of the meeting of the high-level panel of experts on information and communication technology. New York 2000. Available from: <http://www.undp.org/info2/new/n-ccosoc.html>
- Nwageu WE. The internet as a source of reproductive health information among adolescent girls in an urban city in Nigeria. BMC Public Health 2007;7:354. Available from: <http://www.biomedcentral.com/1471-2458/7/354> [CrossRef] [PubMed]
- Caldwell J. The construction of adolescence in a changing world. Studies in family planning 1998; 29(2):137-53. [CrossRef] [PubMed]
- Ackard DM, Neumark-Sztainer D. Health care information sources for adolescents: age and gender differences on use, concerns, and needs. J Adolesc Health 2001;29(3):170-6. [CrossRef]
- Joffe A, RADIUS S, Gall M. Health counseling for adolescents: what they want, what they get, and who gives it. Pediatrics 1988;82(3):481-5. [PubMed]
- Rideout V. Generation Rx.com: how young people use the internet for health information. Menlo Park, CA: Kaiser Family Foundation: 2000.
- Andrew G, Patel V, Ramakrishna J. Sex, studies, or strife? What to integrate in adolescent health services. Reprod Health Matters 2003;11(21):120-9. [CrossRef]
- Banister E, Schreiber R. Young women's health concerns: Revealing paradox. Health Care for Women Int 2001;22(7):633-47. [CrossRef] [PubMed]
- Borzekowski DL, Rickert VI. Adolescent cyber surfing for health information: a new resource that crosses barriers. Arch Pediatr Adolesc Med 2001; 155(7):813-7. [PubMed]
- McKenna KYA, Bargh JA. Plan 9 from cyberspace: the implications of the internet for personality and social psychology. Pers Soc Psychol Rev 2000; 4(1):57-75. [CrossRef]
- White M, Dorman SM. Receiving social support online: implications for health education. Health Educ Res 2001;16(6):693-707. [CrossRef] [PubMed]
- Borzekowski DLG, Fobil JN, Asante KO. Online access by adolescents in Accra: Ghanaian teens' use of the internet for information. Developmental Psychology 2006;42(3):450-8. [CrossRef] [PubMed]
- Lou CH, Zhao Q, Gao ES, Shah IH. Can the Internet be used effectively to provide sex education to young people in China? J Adolesc Health 2006;39(5):720-8. [CrossRef] [PubMed]
- Barak A, Fisher WA. Toward an Internet-driven, theoretically based, innovative approach to sex education. J Sex Res 2001;38(4):324-33. [CrossRef]
- Gould MS, Munfakh JLH, Lubell K, Kleinman M, Parker S. Seeking help from the Internet during adolescence. J Am Acad Child Adolesc Psychiatry 2002;41(10):1182-9. [CrossRef]
- Berger M, Wagner TH, Baker LC. Internet use and stigmatized illness. Soc Sci Med 2005;61(8):1821-7. [CrossRef]
- Halpern CT, Mitchell EMH, Farhat T, Bardsley P. Effectiveness of web-based education on Kenyan and Brazilian adolescents' knowledge about HIV/AIDS, abortion law, and emergency contraception: Findings from TeenWeb. Soc Sci Med 2008;67(4):628-37. [CrossRef]
- Etter JF. Comparing the efficacy of the Internet-based, computer-tailored smoking cessation programs: a randomized trial. J Med Internet Res 2005;7(1):e2. [CrossRef] [PubMed]

22. Bruning Brown J, Winzelberg AJ, Abscal LB, Taylor CB. An evaluation of an Internet-delivered eating disorder prevention program for adolescents and their parents. *J Adolesc Health* 2004;35(4):290-6. [[CrossRef](#)] [[PubMed](#)]
23. Wantland DJ, Portillo CJ, Holzemer WL, Slaughter R, McGhee EM. The effectiveness of web-based vs. non-web-based interventions: a meta-analysis of behavioral change outcomes. *J Med Internet Res* 2004;6(4):e40. [[CrossRef](#)] [[PubMed](#)]
24. Flicker S, Goldberg E, Read S, Veinot T, McClelland A, Saulnier P, et al. HIV-positive youth's perspectives on the Internet and eHealth. *J Med Internet Res* 2004; 6(3):e32. [[CrossRef](#)] [[PubMed](#)]
25. Oenema A, Tan F, Brug J. Short-term efficacy of a web-based computer-tailored nutrition intervention: main effects and mediators. *Ann Behav Med* 2005;29(1):54-63. [[CrossRef](#)] [[PubMed](#)]
26. Stretcher V, Shiffman S, West R. Randomized controlled trial of a web-based computer-tailored smoking cessation program as a supplement to nicotine patch therapy. *Addiction* 2005;100(5): 682-8. [[CrossRef](#)] [[PubMed](#)]
27. Skinner H, Biscope S, Poland B. Quality of Internet access: barrier behind Internet use statistics. *Soc Sci Med* 2003;57(5):875-80. [[CrossRef](#)]
28. Gray NJ, Klein JD, Noyce PR, Sesselberg TS, Cantrill JA. Health information-seeking behaviour in adolescence: the place of the Internet. *Soc Sci Med* 2005;60(7):1467-8. [[CrossRef](#)]
29. Hansen DL, Derry HA, Resnick PJ, Richardson CR. Adolescents searching for health information on the Internet: an observational study. *J Med Internet Res* 2003;5(4):e25. [[CrossRef](#)] [[PubMed](#)]
30. Skinner H, Biscope S, Poland B, Goldberg E. How adolescents use technology for health information: Implications for health professionals from focus group studies. *J Med Internet Res* 2003;5(4):e32. [[CrossRef](#)] [[PubMed](#)]
31. Zeng QT, Kogan S, Plovnick RM, Crowell J, Lacroix EM, Greenes RA. Positive attitudes and failed queries: an exploration of the conundrums of health information retrieval. *Int J Med Informatics* 2004;73(1):45-55. [[CrossRef](#)] [[PubMed](#)]
32. Kojanl SJ, Ballely RW, Nall JR. Research-based web design and usability guidelines. Washington, D.C.: National Institutes of Health; 2003.
33. Goold PC, Ward M, Carlin EM. Can the Internet be used to improve sexual health awareness in web-wise young people? *J Family Planning Reproductive Health Care* 2003;29(1):28-30. [[CrossRef](#)] [[PubMed](#)]
34. Canadian International Development Agency. CIDA's strategy for knowledge development through the use of information and communication technology. Quebec: Canada; 2003.
35. Marker P, McNamara K, Wallace L. The significance of information and communication technologies for poverty reduction. Technical report. London: Department for international development, 2002. Available from: [http://www1.oecd.org/dac/ictcd/docs/matrixdocs/GBR\\_paper1.pdf](http://www1.oecd.org/dac/ictcd/docs/matrixdocs/GBR_paper1.pdf).
36. Edejer TT. Disseminating health information in developing countries: the role of the Internet. *BMJ* 2003;321(7264):797-800. [[CrossRef](#)] [[PubMed](#)]
37. Odutola AB. Developing countries must invest in access to information for health improvements. *J Med Internet Res* 2003;5(1):e5. [[CrossRef](#)] [[PubMed](#)]
38. Arunachalam S. Assuring quality and relevance of Internet information in the real world. *BMJ* 1998;317:1501-2.
39. Borzekowski DLG, Rickert VI. Adolescents, the Internet, and health: Issues of access and content. *J Appl Dev Psychol* 2001;22(1):49-59. [[CrossRef](#)]
40. Blumler JG, Katz E. The uses of mass communications: Current perspectives on gratification research. Beverly Hills, CA: Sage; 1974.
41. Papacharissi Z, Rubin AM. Predictors of Internet use. *Journal of Broadcasting and Electronic Media* 2000;44(2):175-96. [[CrossRef](#)]
42. Bull S, Pratte K, Whitesell N, Rietmeijer C, McFarlane M. Effects of an Internet-based intervention for HIV prevention: the Youthnet trials. *AIDS Behav* 2009;13(3):474-87. [[CrossRef](#)] [[PubMed](#)]
43. Chiasson MA, Hirshfield S, Rietmeijer C. HIV prevention and care in the digital age. *J Acquir Immune Defic Syndr* 2010;55 (Suppl 2):S94-7. [[CrossRef](#)] [[PubMed](#)]
44. Noar SM, Clark A, Cole C. Review of interactive safer sex Web sites: practice and potential. *Health Commun* 2006;20(3):233-41. [[CrossRef](#)] [[PubMed](#)]
45. Rietmeijer CA, McFarlane M. Web 2.0 and beyond: risk for sexually transmitted infections and opportunities for prevention. *Curr Opin Infect Dis* 2009;22(1):67-71. [[CrossRef](#)] [[PubMed](#)]
46. Noar SM, Black HG, Pierce LB. Efficacy of computer technology-based HIV prevention interventions: a meta-analysis. *AIDS* 2009;23(1):107-15. [[CrossRef](#)] [[PubMed](#)]
47. Lustria ML, Cortese J, Noar SM, Glueckauf RL. Computer-tailored health interventions delivered over the Web: review and analysis of key components. *Patient Educ Couns* 2009;74(2):156-73. [[CrossRef](#)] [[PubMed](#)]
48. Marsch LA, Bickel WK, Grabinski MJ. Application of interactive, computer technology to adolescent substance abuse prevention and treatment. *Adolesc Med State Art Rev* 2007;18(2):342-56. [[PubMed](#)]
49. Cohen DA, Wu SY, Farley TA. Comparing the cost-effectiveness of HIV prevention interventions. *J Acquir Immune Defic Syndr* 2004;37(3):1404-14. [[CrossRef](#)]
50. Shahab L, McEwen A. Online support for smoking cessation: a systematic review of the literature. *Addiction* 2009;104(11):1792-804. [[CrossRef](#)] [[PubMed](#)]
51. Enwald HP, Huotari ML. Preventing the obesity epidemics by second generation tailored health communication: an interdisciplinary review. *J Med Internet Res* 2010;12(2):e24. [[CrossRef](#)] [[PubMed](#)]
52. Spek V, Cuijpers P, Nyklicek I, Riper H, Keyzer J, Pop V. Internet-based cognitive behaviour therapy for symptoms of depression and anxiety: a meta-analysis. *Psychol Med* 2007;37(3):319-28. [[CrossRef](#)] [[PubMed](#)]
53. Cuijpers P, Van Straten A, Anderson G. Internet-administered cognitive behaviour therapy for health problems: a systematic review. *J Behav Med* 2008;31(2):169-77. [[CrossRef](#)] [[PubMed](#)].

## ZDRAVSTVENE INFORMACIJE POSREDOVANE INTERNETOM I ADOLESCENTI

*Biljana Kocić i Branislav Petrović*

Internet je trenutno jedno od najdinamičnijih sredstava komunikacije koje se ubrzano razvija. Načelno, adolescenti su aktivni korisnici interneta. Internet, takođe, predstavlja značajan izvor zdravstvenih informacija i atraktivan medijum za promociju zdravlja i obrazovanje među adolescentima. Prednosti zdravstvenih programa baziranih na internetu u odnosu na tradicionalna sredstva su brojna, posebno kada se imaju u vidu pitanja privatnosti, ekonomičnosti, broja korisnika, prikupljanja podataka i ažuriranja informacija. S obzirom na prethodna istraživanja i sadašnju dinamiku razvoja elektronskih komunikacija, van svake sumnje je da internet ima izvanredan potencijal i da se koristi kao sredstvo u zdravstvenom obrazovanju i programima prevencije mnogih bolesti i poremećaja zdravlja među adolescentima. Ovo sredstvo posebno je pogodno za interventne programe, informacije i odgovore na mnoga osetljiva, privatna pitanja adolescenata. Imajući u vidu značaj interneta kao sredstva javnog zdravlja, neophodno je da se stalno unapređuje i poboljšava u svetlu novih saznanja. *Acta Medica Medianae 2011;50(4):69-73.*

**Ključne reči:** *adolescenti, internet, zdravstvene informacije, zdravstvena edukacija, promocija zdravlja*