

Media Use and Health Outcomes in Adolescents: Findings from a Nationally Representative Survey

Hygiea Casiano MD, FRCPC¹, D. Jolene Kinley MA², Laurence Y. Katz MD, FRCPC³, Mariette J. Chartier RN, PhD⁴, Jitender Saren MD, FRCPC⁵

Abstract

Objective: Examine the association between quantity of media use and health outcomes in adolescents. **Method:** Multiple logistic regression analyses were conducted with the Canadian Community Health Survey 1.1 (youth aged 12-19 (n=9137)) to determine the association between hours of use of television/videos, video games, and computers/Internet, and health outcomes including depression, alcohol dependence, binge drinking, suicidal ideation, help-seeking behaviour, risky sexual activity, and obesity. **Results:** Obesity was associated with frequent television/video use (Adjusted Odds Ratio (AOR) 1.10). Depression and risky sexual behaviour were less likely in frequent video game users (AOR 0.87 and 0.73). Binge drinking was less likely in frequent users of video games (AOR 0.92) and computers/Internet (AOR 0.90). Alcohol dependence was less likely in frequent computer/Internet users (AOR 0.89). **Conclusions:** Most health outcomes, except for obesity, were not associated with using media in youth. Further research into the appropriate role of media will help harness its full potential.

Key words: media, adolescent health, depression, help-seeking

Résumé

Objectif: Examiner l'association entre la quantité d'utilisation des médias et les résultats de santé chez les adolescents. **Méthode:** Des analyses de régression logistique multiple ont été menées d'après l'Enquête sur la santé dans les collectivités canadiennes 1.1 [adolescents de 12 à 19 ans (n=9137)] afin de déterminer l'association entre les heures d'utilisation de la télévision/vidéos, des jeux vidéo, et des ordinateurs/Internet et les résultats de santé, notamment la dépression, la dépendance à l'alcool, la consommation d'alcool excessive occasionnelle, l'idéation suicidaire, le comportement de recherche d'aide, l'activité sexuelle à risque, et l'obésité. **Résultats:** L'obésité était associée à une utilisation fréquente de la télévision/vidéos [rapports de cotes corrigés (RCC) 1,10]. La dépression et l'activité sexuelle à risque étaient moins probables chez les fréquents utilisateurs de jeux vidéo (RCC 0,87 et 0,73). La consommation d'alcool excessive occasionnelle était moins probable chez les fréquents utilisateurs de jeux vidéo (RCC 0,92) et d'ordinateurs/Internet (RCC 0,90). La dépendance à l'alcool était moins probable chez les fréquents utilisateurs d'ordinateurs/Internet (RCC 0,89). **Conclusions:** La plupart des résultats de santé, excepté l'obésité, n'étaient pas associés à l'utilisation des médias chez les adolescents. D'autres recherches sur le rôle approprié des médias contribueront à en capter le plein potentiel.

Mots clés: médias, santé des adolescents, dépression, recherche d'aide

¹Assistant Professor of Psychiatry, University of Manitoba

²Doctoral Student, Clinical Psychology, University of Manitoba

³Associate Professor of Psychiatry, University of Manitoba

⁴Assistant Professor of Community Health Sciences, University of Manitoba

⁵Professor of Psychiatry, Psychology, and Community Health Sciences, University of Manitoba

Corresponding e-mail: hygiea_casiano@hotmail.com

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Introduction

The Canadian Paediatric Society (CPS) released a position statement in 2003 recommending less than one to two hours daily of television viewing for youth, as well as removing media sources in their bedrooms. Media use among young people is on the rise despite these guidelines (Rideout et al., 2010). Media's influence may be understood as an extension of social learning principles, where people learn by observing, modeling, and imitating the behaviour of others seen or heard in media (Grusec, 1992). While there are some articles pointing out beneficial effects of media, such as decreased loneliness (Derrick et al., 2009) and improved school readiness for disadvantaged children using educational media (Fisch & Truglio, 2001), the majority of research points to detrimental effects on youth (Villani, 2001).

Media has been espoused to negatively influence youth in a number of ways. Television and video games have been associated with obesity (Taveras et al., 2006; Dennison et al., 2002; Stettler et al., 2004), though other research has shown no relationship or mixed results (Vandewater et al., 2004; Robinson, 2001; Burke et al., 2006). Media content has also been linked to such risky behaviours as alcohol consumption (Strasburger, 2002; Anderson et al., 2009) and sexualized behaviour (L'Engle et al., 2006) in youth. Thus far, the quantity of media has not been studied as an influential factor in the engagement of such behaviour.

Media use has also been associated with mental health problems. Primack et al. (2009) found that adolescent television use was associated with depression. To date, no studies have examined the relationship between depression and other forms of media. It is also not known whether media use influences help-seeking behaviour for mental health problems in adolescents or has an influence on suicidal behavior. It has been hypothesized that adolescent suicidality could be a modelled phenomenon that is influenced by media content (Insel & Gould, 2008).

The aim of this study was to examine the quantitative effects of television/video watching, video game playing, and computer/Internet use on youth health outcomes including depression, risky sexual practices, mental health service use, suicidal behaviour, obesity, binge drinking, and alcohol dependence. The focus of the study centered mainly on mental health outcomes as this has been understudied in the literature.

Method

Design

The Canadian Community Health Survey (CCHS) 1.1 was conducted by Statistics Canada from September 1, 2000 through November 3, 2001 from a sample of 131,535 people and achieved a response rate of 84.7% (Gravel &

Béland, 2005). The standardized in-person interviews were conducted with participants aged 12 or older in the provinces and territories, except members of the regular Forces, residents of institutions, First Nations reserves and other Aboriginal settlements, and some remote areas. For these analyses we examined respondents from the ages of 12 to 19 years (N=9137). The majority of our sample was in the 15 to 19 age group (65%) and were white (85%). There was a fairly equal split between male and female respondents (51% and 49%, respectively).

Media Exposure

Three types of media exposure were examined, including television/video watching, video game playing, and computer/Internet use. Respondents were asked the number of hours per week that they had spent using media in the last three months. There were eight choices: none, less than 1 hour, 1 to 2 hours, 3 to 5 hours, 6 to 10 hours, 11 to 14 hours, 15 to 20 hours, and more than 20 hours. Variables for media use were treated as continuous variables because the models conformed to the assumptions of the logistic regression based on the Hosmer-Lemeshow goodness-of-fit test (Bender, 2009).

Health Outcomes

The Composite International Diagnostic Interview (CIDI)-Short Form was used to identify symptoms of depression and alcohol dependence (Kessler et al., 1998). The sensitivity and specificity for depression was 89.6 and 93.9 percent, respectively. Depressive symptoms that occurred for at least two weeks in the past year were assessed and scores were converted to a probability of major depression score ranging from 0 to 0.90. A cut off score of 0.90 was chosen for a diagnosis of probable depression consistent with previous studies (Currie and Wang, 2004). Although not all the persons reaching this cut off score would meet the criteria for major depressive disorder (Patten, 1997), depression may be considered a spectrum of symptoms with important functional implications even when full criteria for major depression are not met (Andrews et al., 2007). For alcohol dependence, the sensitivity and specificity of the CIDI was 93.6 percent and 96.2 percent, respectively (Kessler et al., 1998). Based on seven questions, respondents were classified as meeting or not meeting criteria for alcohol dependence during the past year.

To assess binge drinking, respondents were asked "How often in the past 12 months have you had five or more drinks on one occasion?" Responses of once a month or more were considered positive.

Respondents were considered positive for suicidal ideation in the past year if they answered yes to the following statements: "Have you ever seriously considered committing suicide or taking your own life?" and "Has this happened in the past 12 months?"

Table 1. Demographic information for survey participants		
Covariate	N (%)	95% CI
Sex		
Male	4544 (51.30)	49.84 to 52.75
Female	4593 (48.70)	47.25 to 50.16
Age, years		
12 to 14	3331 (35.12)	33.75 to 36.51
15 to 19	5806 (64.88)	63.49 to 66.25
Income		
No income	30 (0.38)	0.23 to 0.65
< \$15,000	455 (7.21)	6.40 to 8.11
\$15,000–\$29,999	1009 (13.26)	12.23 to 14.37
\$30,000–\$49,999	1677 (20.39)	19.18 to 21.66
\$50,000–\$79,999	2418 (29.49)	28.09 to 30.92
\$80,000 +	2252 (29.27)	27.85 to 30.72
Racial origin		
White	8157 (84.56)	83.24 to 85.80
Visible minority	828 (15.44)	14.20 to 16.76
Unweighted N's, weighted %'s.		

Help-seeking was elicited by the question, “In the past 12 months...have you seen, or talked on the telephone to a health professional about your emotional or mental health?”

Condom use was studied in those who indicated being sexually active in the past year. Participants were asked: “For those relationships that lasted less than a year, how often did you use a condom in the past 12 months?” Responses were categorized into always, usually, occasionally, and never. For the purpose of our study, responses were dichotomized into always/usually and occasionally/never because the number of respondents who answered in the never and occasionally categories was too small to be evaluated separately.

Respondents were asked to state their height and weight. The obesity variable was created by first calculating a body mass index (BMI) score with the formula $BMI = (\text{weight in pounds} \times 703) / \text{height in inches}^2$. Scores were dichotomized into obese/not obese based on the Centers for Disease Control and Prevention charts (2002) of the normal distribution of BMI scores for girls and boys based on age. Obesity was defined as being in the 95th percentile or higher in the appropriate distribution (Centers for Disease Control and Prevention, 2009).

Data Analysis

Due to the complex multi-stage sampling design of the CCHS 1.1, we applied statistical weights from the public use data and use Taylor Series Linearization for variance estimation using SUDAAN software (Shah et al., 1995; Lin et al., 1996). Multiple logistic regressions were used to

examine the relationship between health outcomes and media use. Adjusted odds ratios (AOR) and 95% confidence intervals (95% CI) were calculated for each type of media based on ordinal groupings of the number of hours spent using each type of media weekly. All calculations were adjusted for household income and sex. The dichotomized health outcomes were also analyzed as continuous variables. The results remained consistent and for ease of interpretation, we have presented them as categorical. The results of the continuous analysis are available upon request.

Results

Table 1 provides sociodemographic information on the sample studied. There were 4544 boys (51.3%) and 4593 girls who responded. A large proportion of adolescents (58.8%) lived in households with an annual income of \$50,000 or over. The majority of participants were white (84.6%) and between the ages of 15-19 (64.9%).

Table 2 lists the frequency of use of specific forms of media, including television/video watching, video game playing, and computer/Internet use.

Table 3 presents the frequency of measured health outcomes. Approximately 6% of adolescents met criteria for depression in the past year. Almost 14% of adolescents reported binge drinking at least monthly and 2.5% had alcohol dependence. A little over 6% of adolescents consulted a mental health professional and 1.4% stated they had suicidal thoughts in the past year. Over 17% of sexually active

Table 2. Frequency of specific media use

Time spent using media	TV/Video use (N=8046)	Video game use (N=8043)	Computer/Internet use (n=8048)
	N (%) [95% CI]	N (%) [95% CI]	N (%) [95% CI]
None	184 (2.14%) [1.74 to 2.61]	4265 (53.59%) [52.05 to 55.13]	1561 (17.78%) [16.65 to 18.97]
< 1 hour	226 (2.59%) [2.16 to 3.10]	1007 (11.67%) [10.75 to 12.65]	859 (10.14%) [9.24 to 11.12]
1 to 2 hours	641 (8.47%) [7.65 to 9.37]	1055 (13.70%) [12.64 to 14.83]	1287 (15.76%) [14.68 to 16.89]
3 to 5 hours	1637 (20.44%) [19.26 to 21.68]	815 (10.34%) [9.46 to 11.29]	1514 (19.27%) [18.11 to 20.49]
6 to 10 hours	2140 (26.39%) [25.08 to 27.74]	453 (5.57%) [4.88 to 6.35]	1309 (16.89%) [15.77 to 18.08]
11 to 14 hours	1105 (14.31%) [13.20 to 15.51]	145 (1.58%) [1.28 to 1.94]	497 (6.81%) [6.03 to 7.68]
15 to 20 hours	766 (9.64%) [8.75 to 10.61]	123 (1.49%) [1.19 to 1.88]	346 (4.49%) [3.86 to 5.21]
> 20 hours	1347 (16.02%) [14.91 to 17.20]	180 (2.06%) [1.64 to 2.58]	675 (8.86%) [8.01 to 9.79]

Unweighted N's, weighted %'s.

Table 3. Frequency of health outcomes

Health outcome	N (%)	95% CI
Depression	566 (5.93%)	5.32 to 6.62
Alcohol dependence	282 (2.53%)	2.18 to 2.93
Binge drinking once a month or more	1387 (13.62%)	12.69 to 14.61
Suicidal ideation past-year	131 (1.35%)	1.04 to 1.76
Consulted mental health professional in the past-year	553 (6.07%)	5.44 to 6.77
Condom use: occasionally/never	69 (17.13%)	12.98 to 22.27
Obese	686 (7.09%)	6.37 to 7.88

Unweighted N's, weighted %'s.

respondents stated they used condoms rarely or never. Seven percent of the population were classified as obese.

Table 4 presents the associations between various types of media use and health outcomes in adolescents. Television use was associated with obesity (AOR 1.10, 95%CI, 1.01 to 1.19). The association between any form of media and suicidal ideation or help-seeking behaviour in youth was not significant. Depression was less likely to be reported in frequent video game users (AOR 0.87, 95%CI, 0.79 to 0.97). Frequent computer/Internet users (AOR 0.90, 95%CI, 0.86 to 0.95) and video gamers (AOR 0.92, 95%CI, 0.87 to 0.97) were less likely to binge drink, and alcohol dependence was less frequent in heavy computer/Internet users (AOR 0.89, 95%CI, 0.81 to 0.98). Frequent video gamers were less likely to report using condoms occasionally or never (AOR 0.73, 95%CI, 0.55 to 0.97).

Discussion

Several important findings are notable in our study. Obesity was associated with increased use of television/videos. This relationship may exist because of the sedentary nature of viewing screen media and the presence of food

advertisements, which is associated with requests for food and drink (Chamberlain et al., 2006). Television/videos also leave the hands free for eating, which is associated with increased food intake (Stettler et al., 2004). Our findings concur with previous studies that have found associations between television viewing and obesity (Taveras et al, 2006; Dennison et al, 2002). Our study highlights the importance of limiting adolescent television/video viewing with the aim of reducing obesity and its related medical complications.

Television/video viewing was not significantly associated with any other negative health outcomes in youth including alcohol dependence or binge drinking, which is in contrast to other studies (Strasburger, 2002; Anderson et al., 2009). We also did not replicate the findings in Primack et al.'s study (2009), which found a significant relationship with television use and depression. Our findings may differ from that of Primack and colleagues due to the cross-sectional design of our study or the difference between our measurement tools for the diagnosis of depression. Primack et al. (2009) used the Centers for Epidemiologic Studies—Depression Scale, which consists of a pen-and-paper self-report questionnaire while the short form of the CIDI was utilized in our study.

Table 4. Media use and association with health outcomes

	TV/Video usage AOR (95% CI)	Video game usage AOR (95% CI)	Computer/Internet usage AOR (95% CI)
Depression	0.94 (0.87 to 1.02)	0.87 (0.79 to 0.97) ^a	1.03 (0.96 to 1.10)
Alcohol dependence	1.07 (0.96 to 1.19)	0.93 (0.83 to 1.05)	0.89 (0.81 to 0.98) ^a
Binge drinking once a month or more	0.99 (0.94 to 1.05)	0.92 (0.87 to 0.97) ^b	0.90 (0.86 to 0.95) ^c
Suicidal ideation past-year	1.05 (0.87 to 1.26)	0.95 (0.81 to 1.12)	0.98 (0.83 to 1.16)
Consulted mental health professional in the past-year	0.99 (0.92 to 1.06)	1.00 (0.90 to 1.11)	1.04 (0.98 to 1.12)
Condom use: occasionally/never	0.97 (0.78 to 1.21)	0.73 (0.55 to 0.97) ^a	0.85 (0.69 to 1.05)
Obese	1.10 (1.01 to 1.19) ^a	1.08 (0.98 to 1.19)	1.02 (0.96 to 1.09)

AOR adjusted for household income and sex.
^a $P < 0.05$, ^b $P < 0.01$, ^c $P < 0.001$

Video game playing was associated with decreased rates of various negative health outcomes in youth including depression, binge drinking, and alcohol dependence. These relationships may exist due to the amount of energy, interest, and concentration required to both participate and be successful in reaching increasingly difficult game levels. During the time that the survey was conducted, high users of video games may have been less likely to socialize in ways that involved heavy alcohol consumption. Frequent video game users were also less likely to engage in risky sexual behaviour. While previous literature indicates earlier sexual initiation with greater exposure to sexualized content in media (L'Engle et al., 2006), we hypothesize that it is the content, rather than the quantity of media, that mediates this relationship.

The use of computers/Internet was associated with decreased rates of alcohol dependence and binge drinking. Similar to the use of video games, the interactive nature of this media form and the high level of alertness and attention required may be a factor in the lower levels of heavy alcohol use.

We did not find an association between media use and help-seeking or the presence of suicidal ideation. Our study was the first to examine the possible influence of computer/Internet use and video games, but no relationship was found. More research would be helpful to ascertain how the content in media may affect adolescent suicidality and help-seeking behaviour.

The results of our study should be considered in light of its strengths and weaknesses. The CCHS 1.1 survey was cross-sectional in design so while we examined the association between media and health outcomes, no causal relationships can be drawn. Institutionalized individuals were under-represented in the survey. Adolescents were asked to state the number of hours of media used on a weekly basis, and responses may have been affected by both recall bias and faulty calculations done by participants. As the survey involved a face-to-face interview, youth may have

minimized their pattern of behaviour for some health outcomes. The age of the dataset may limit some of our ability to generalize to current media usage due to rapid changes in recent years, with movements toward gender-neutral computer and video games as well as increasing use of technology for connecting to others and social networking. However, this large population-based sample of adolescents still provides useful information regarding the influence of media on various health indicators in Canadian youth. Also, the CPS put forth their guidelines on media in 2003, which was within the same timeframe as our survey.

Our study demonstrated that the associations between health outcomes and various forms of media are not universal. Most negative health outcomes were not associated with the use of media with the exception of obesity. Our findings highlight the possibility that the content of media, rather than the amount of exposure, has a greater influence on health outcomes in youth.

Conclusions

Our study demonstrated differences in the association between various health outcomes and use of different forms of media in youth. Although television/video viewing was associated with obesity, other forms of media were associated with lower rates of concerning behaviour such as risky sexual activity and alcohol misuse. Video game users were also less likely to have been depressed. In our increasingly technologically-driven world, the use of media will undoubtedly continue to rise. Our study demonstrates that media use is not universally harmful. Education and further research about the appropriate role of media in the lives of adolescents will help to harness its full potential.

Acknowledgements/Conflicts of Interest

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