Mental- and Physical-Health Indicators and Sexually Explicit Media Use Behavior by Adults

James B. Weaver, III, PhD, MPH,* Stephanie Sargent Weaver, PhD, MPH,* Darren Mays, PhD, MPH,* Gary L. Hopkins, MD, DrPH,† Wendi Kannenberg, MPH,† and Duane McBride, PhD†

*Centers for Disease Control and Prevention, Atlanta, GA, USA; †Center for Media Impact Research, Institute for the Prevention of Addictions, Andrews University, Berrien Springs, MI, USA

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ABSTRACT

Introduction. Converging evidence from culturally diverse contexts indicates that sexually explicit media use behavior (SEMB; i.e., pornography consumption) is associated with risky sexual health perceptions and behaviors, many that involve high risks of HIV/STD transmission.

Aim. Essentially unexplored, and the focus here, are potential relationships between SEMB and nonsexual mental- and physical-health indicators.

Main Outcome Measures. Variability in six continuously measured health indicators (depressive symptoms, mental- and physical-health diminished days, health status, quality of life, and body mass index) was examined across two levels (users, nonusers) of SEMB.

Methods. A sample of 559 Seattle–Tacoma Internet-using adults was surveyed in 2006. Multivariate general linear models parameterized in a SEMB by respondent gender (2 ¥ 2) factorial design were computed incorporating adjustments for several demographics.

Results. SEMB was reported by 36.7% (n = 205) of the sample. Most SEMB users (78%) were men. After adjusting for demographics, SEMB users, compared to nonusers, reported greater depressive symptoms, poorer quality of life, more mental- and physical-health diminished days, and lower health status.

Conclusions. The findings show that mental- and physical-health indicators vary significantly across SEMB, suggesting the value of incorporating these factors in future research and programmatic endeavors. In particular, the findings suggest that evidence-based sexual health promotion strategies simultaneously addressing individuals’ SEMB and their mental health needs might be a useful approach to improve mental health and address preventable sexual health outcomes associated with SEMB. Weaver JB, III, Weaver SS, Mays D, Hopkins GL, Kannenberg W, and McBride D. Mental- and physical-health indicators and sexually explicit media use behavior by adults. J Sex Med 2011;8:764–772.

Key Words. Health-Risk Factors; Mental Health; Pornography; Sexually Explicit Materials; X-Rated; Sexual Attitudes

Introduction

Public health professionals have long recognized the potential adverse consequences resulting from using sexually explicit media content for entertainment purposes (i.e., reading and/or watching pornography) as substantial public health concerns [1–4]. Almost four decades ago, for instance, Calderone [5] speculated that media portrayals of sexually explicit behaviors yielded undesirable consequences for “various members of the community” and stressed the need for public health to address the issue “in behavioral and value terms.” Almost 25 years ago, Koop [3], reporting on his Surgeon General’s Workshop on Pornography and Public Health, concluded that sexually explicit media use stimulates “attitudes and behavior that... impair the mental, emotional, and physical health of children and adults and may thus contribute significantly to the
morbidity burden in our society.” More recently, such concerns were reaffirmed by Perrin and his colleagues [6], who concluded that “Pornography is . . . a problem with ramifications for the public’s health.”

Although published [7,8] prevalence estimates of sexually explicit media use vary widely (20–65%), the behavior appears widespread among American adults. Evidence from 14 recent surveys in the General Social Survey Series [9], for instance, reveals an average overall sexually explicit media use behavior (SEMB) prevalence estimate of 24.7% (standard deviation [SD] = 2.1%, range = 7.7%), with men (mean [M] = 32.9%, SD = 3.1%, range = 12.5%) more likely (odds ratio [OR] 2.31, 95% confidence interval [CI] 2.16–2.47) to report SEMB than women (M = 17.3%, SD = 2.5%, range = 8.9%).1 In other words, millions of Americans, particularly males, use sexually explicit media.

The health and social consequences of SEMB are evident within an extensive and diverse research literature. Initial studies of adults, for instance, demonstrated that exposure to pornography is capable of altering perceptions and dispositions toward sexuality and relationships formed on its basis [10,11]. Several experimental studies showed that repeated exposure to common, nonviolent pornography significantly shifted sexual norms toward “greater acceptance of pre- and extramarital sex and greater tolerance of nonexclusive sexual access to intimate partners,” [12,13] diminished the “societal significance assigned to the institution of marriage” and perceptions of its “future viability” [13], and changed “values to the effect that men ought to dominate women – and not only in the sexual realm” [13]. These shifts emerged for both male and female research participants, although at times to differing degrees. Controlled investigations have also revealed that exposure to pornography can elevate sexual callousness towards women [14,15], trivialize rape as a criminal offense [16], and facilitate aggressive attitudes and behaviors [17–20]. Corresponding associations between SEMB and risky sexual health attitudes and perceptions are evident in studies of adolescents and emerging adults [8,21–31].

More importantly, several recent studies—many spurred by concerns that adolescents and emerging adults might model health impacting sexual behaviors observed in pornography [32–34]—suggest a more direct link between SEMB and many sexual behaviors. Specifically, it has long been recognized that pornography portrays sexual behaviors that are inconsistent with “safe sex” recommendations [35], typically presenting sexual acts that involve high risks of HIV/STD transmission [36,37] and other preventable health outcomes including unintended pregnancy, physical trauma, and violence [38]. In heterosexual pornography, for example—this is a high predictive risk factor for sexually transmitted infections [39–42]—is commonly portrayed while risk-reducing behaviors such as condom use are uncommon [43]. Within this light, converging evidence from around the world suggests a correspondence between SEMB and sexual risk perceptions and behaviors among adolescents and emerging adults including earlier onset of oral sex and sexual intercourse [22,44,45]; greater likelihood of having multiple sexual partners, having sex more frequently, and engaging in anal sex [23,45–50]; more negative attitudes toward condoms and less frequent condom use [45,47,50,51]; and sexual harassment and violence [52–55].

Although the existing research illustrates strong linkages between SEMB and sexual perceptions and behaviors, it fails to illuminate the possibility of associations between SEMB and mental- and physical-health indicators. Yet, earlier studies suggest that there may be associations between SEMB, risky sexual behaviors, and physical- and mental-health indicators. Prior research, for instance, shows that several markers of poor mental health, including depression, are associated with risky sexual behaviors [56–62]. Further, there is some clinical [63,64] and population-based [65,66] evidence indicating possible linkages between depression and SEMB; however, clear evidence that depression is associated with SEMB is lacking. From a public health perspective, scrutiny of these associations is crucial to inform the development and implementation of sexual health intervention programs targeting behaviors associated with high risks of HIV/STD transmission and other preventable sexual health outcomes.

Against this backdrop, we explored whether selected mental- and physical-health indicators are associated with SEMBs in an Internet-using adult sample. Consistent with the expectations of others [3,6], we hypothesized that adults reporting SEMB

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1The 14 General Social Survey administrations were conducted between 1986 and 2006 with nationally representative samples of U.S. adults who were asked if they had seen “an X-rated movie in the last year.” Data analysis was conducted by the authors using GSS Nesstar analytics (http://www.norc.org/GSS+Website/Data+Analysis/).
would also report poorer perceptions of their mental and physical health. We further hypothesized that different patterns of linkages between SEMB and health risk indicators would emerge by gender.

Method

Participants and Setting
The institutional review boards at all affiliated institutions approved the protocol for this study. An informed consent statement was incorporated as the introductory page of the survey instrument. Along with the other basic required elements of informed consent, potential respondents were told the purpose of the study was “to examine mass media use practices.” It was explained that they would be asked about the time they spent using the mass media and the media content they consumed. They were also told that they would be asked questions about themselves and their “view of the world.” Respondents acknowledged being presented the informed consent statement prior to participation.

An Internet-based survey was conducted in summer 2006 among adults living in the Seattle–Tacoma designated market area (DMA). The Seattle–Tacoma DMA, which includes 18 counties encompassing most of the western half of Washington where approximately 72% of the state population (4.6 million people) lives, was selected for its size (13th largest U.S. media market) and the prevalence of Internet use (ranked first in the nation) [67].

The sample was drawn from a panel of more than 60,000 participants maintained by e-Rewards Marketing Research [68]. This panel was chosen, in part, because it was constructed and is maintained using a “by invitation only” recruitment methodology designed to facilitate effective demographic normalization while reducing the potential for self-selection bias [69]. A subset of panel members (n = 3,140) were solicited via e-mail by e-Rewards to complete a consented survey, linked via a separate secure server, about their self-perceptions and media use. e-Rewards managed a stratified, multiwave invitation procedure with oversampling of less responsive demographic groups that was designed to maximize sample representativeness. No other eligibility requirements were incorporated. This process yielded an American Association of Public Opinion Research-adjusted response rate [70] of 23.7%, which is comparable with other single-invitation online surveys [71,72], and satisfied the survey quota in approximately 48 hours.

Responses were analyzed from 559 adults with the majority being between 35 and 54 years old (48.5%), female (51.9%), white (82.2%), married (62.9%), a college graduate (63.7%), and reporting a household income of $75,000 or more (56.5%). These sample characteristics were consistent with those derived via random-digit-dialing sampling in the Seattle–Tacoma DMA [67] with two exceptions: sample respondents reported both higher household income and educational achievement (see Table 1). These differences were anticipated, however, based on demographic estimates of Internet users [73].

Sexually Explicit Media Use Behavior (SEMB)
Respondents engaging in SEMB were distinguished from nonusers depending on their rating of the importance of using “sexually explicit content including images, videos, and/or chat rooms.” Responses were recorded as either “I don’t use” (0) or ranked on a scale that ranged from “Not at all important” (1) to “Extremely important” (9). A dichotomous SEMB variable was created by collapsing all responses greater than or equal to 1 as sexually explicit media users and all responses equal to 0 as nonusers.

Health Indicators
Self-reported depression (i.e., depressive symptoms) was also assessed using a 10-item version of the Center for Epidemiologic Studies Depression Scale [74]. Respondents were asked to report how often they had felt or behaved consistent with each item during the past week on a scale ranging from “None of the time” (0) to “Every day” (7). Two items were reverse-coded before the 10-item average was computed to produce a single scale (M = 1.3, SD = 1.0, Cronbach’s α = 0.84).

Four questions derived from the 2006 Behavioral Risk Factor Surveillance Survey instrument [75] assessed respondents’ perceptions of their health [76]. These included health status (M = 3.8, SD = 0.86; “Would you say that in general your health is excellent [5], very good [4], good [3], fair [2], or poor [1]?”); diminished physical health (M = 2.4, SD = 6.2; “Now thinking about your physical health, which includes physical illness and injury, for how many days during the past 30 days was your physical health not good?”); diminished mental health (M = 2.7, SD = 5.9; “Now thinking about your mental health, which includes stress, depression, and problems with emotions, for how
many days during the past 30 days was your mental health not good?"; and poor quality of life (M = 1.4, SD = 4.3; “During the past 30 days, for about how many days did poor physical or mental health keep you from doing your usual activities, such as self-care, work, or recreation?”). The variables for diminished physical health (skewness = 3.4; kurtosis = 11.5), diminished mental health (skewness = 3.2; kurtosis = 10.1), and poor quality of life (skewness = 4.6; kurtosis = 22.2) were transformed using a base-10 logarithm to improve normality.

Respondents were also asked their height and weight. The body mass index (M = 27.2, SD = 5.6) was then calculated using a standard formula [77]. Missing data were apparent for 16 respondents (females, n = 9; males, n = 7).

Covariates
Building from prior research [7,45,78,79], six measures were incorporated as covariates. These were respondent age, household income, overall Internet use, race/ethnicity, marital status, and educational achievement. Respondent age (M = 44.7, SD = 13.1) was assessed with the question: “What is the YEAR of your birth?” Household income (M = $86,829.84, SD = $58,194.34) was measured by asking respondents to “please indicate your gross annual family income.” To improve normality, the household income measure (skewness = 4.1, kurtosis = 33.5) was transformed using a base-10 logarithm.

Respondents were asked how much time they spent during a typical week “surfing the Internet” outside of work or school responsibilities to assess overall Internet use (M = 7.39 hours/week, SD = 8.77). A base-10 logarithm transformation was used to improve the normality of the Internet use measure (skewness = 2.9, kurtosis = 12.0).

Questions measuring race/ethnicity (white, other), marital status (single, married, unmarried), and educational achievement (high school or less, post-high school, college graduate) were transformed using a base-10 logarithm to improve normality.
also assessed (Table 1). These variables were reference cell dummy-coded prior to inclusion in subsequent analyses.

**Statistical Analyses**

The primary exposure variable for all analyses was SEMB (nonuser, user). The six continuously measured health indicators were the response variables. Bivariate analyses (see Table 1) revealed a relationship between respondent gender and SEMB. In light of this finding and prior research [9,79–82], respondent gender was examined as a moderator of SEMB in subsequent analyses. Consequently, the focal relationships between SEMB and the six health indicators were tested using multivariate general linear models parameterized in a SEMB by respondent gender (2 ¥ 2) factorial design with covariate adjustment.

**Results**

Of the 559 adult respondents, 36.7% reported SEMB. More men (78%) than women (22%) reported SEMB (see Table 1; OR 7.99, 95% CI 5.4–11.9). Continuous measures for age (OR 0.97, 95% CI 0.95–0.99) and Internet use (OR 1.84, 95% CI 1.27–2.67) both varied significantly across SEMB, indicating that younger respondents and those spending more time online were more likely to engage in the behavior.

Results from the SEMB (nonuser, user) by gender (female, male) factorial models, adjusting for the covariates, are detailed in Table 2. The SEMB main effects were significant for five of the six health indicators examined: depressive symptoms (η² = 0.03), health status (η² = 0.02), diminished physical health days (η² = 0.01), diminished mental health days (η² = 0.01), and poor quality of life (η² = 0.01). Significant gender main effects were evident for diminished mental health days (η² = 0.02) and poor quality of life (η² = 0.02). None of the interaction effects were significant. The age, income, and overall Internet use covariates were significant contributors to some models as indicated in Table 2.

The means associated with the significant SEMB main effects, displayed in Table 3, reveal that sexually explicit media users, compared to nonusers, reported the most negative health indicators (i.e., higher depressive symptoms, lower health status, more diminished physical and mental health days, and poorer quality of life). Additionally, female respondents reported more diminished mental health days (M = 0.37) and

<table>
<thead>
<tr>
<th>Source (F)</th>
<th>Depression</th>
<th>Health status</th>
<th>Diminished physical health</th>
<th>Diminished mental health</th>
<th>Poor quality of life</th>
<th>Body mass index</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fixed effects</td>
<td>2.38</td>
<td>0.74</td>
<td>3.81†</td>
<td>8.31**</td>
<td>9.43**</td>
<td>2.57</td>
</tr>
<tr>
<td>SEMB</td>
<td>15.46***</td>
<td>8.46**</td>
<td>6.97**</td>
<td>5.94*</td>
<td>5.52*</td>
<td>0.73</td>
</tr>
<tr>
<td>Gender ¥ SEMB</td>
<td>2.16</td>
<td>1.42</td>
<td>0.37</td>
<td>2.04</td>
<td>0.53</td>
<td>0.16</td>
</tr>
<tr>
<td>Covariates</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Overall Internet use</td>
<td>1.76</td>
<td>(-)</td>
<td>0.53</td>
<td>0.48</td>
<td>4.22*</td>
<td>5.95*</td>
</tr>
<tr>
<td>Age</td>
<td>(-)</td>
<td>11.87***</td>
<td>(-)</td>
<td>1.33</td>
<td>0.90</td>
<td>(-)</td>
</tr>
<tr>
<td>Income</td>
<td>(-)</td>
<td>1.05</td>
<td>0.96</td>
<td>(-)</td>
<td>3.33</td>
<td>(-)</td>
</tr>
<tr>
<td>R/E: White</td>
<td>(-)</td>
<td>3.63</td>
<td>0.12</td>
<td>1.30</td>
<td>0.39</td>
<td>0.67</td>
</tr>
<tr>
<td>Unmarried</td>
<td>0.00</td>
<td>0.01</td>
<td>(-)</td>
<td>0.01</td>
<td>(-)</td>
<td>0.21</td>
</tr>
<tr>
<td>Married</td>
<td>(-)</td>
<td>0.95</td>
<td>(-)</td>
<td>0.03</td>
<td>0.01</td>
<td>0.00</td>
</tr>
<tr>
<td>Education</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>High school or less</td>
<td>Ref.</td>
<td>Ref.</td>
<td>Ref.</td>
<td>Ref.</td>
<td>Ref.</td>
<td>Ref.</td>
</tr>
<tr>
<td>Post-high school</td>
<td>0.00</td>
<td>(-)</td>
<td>2.58</td>
<td>0.61</td>
<td>1.13</td>
<td>0.30</td>
</tr>
<tr>
<td>College graduate</td>
<td>(-)</td>
<td>1.80</td>
<td>0.47</td>
<td>(-)</td>
<td>0.00</td>
<td>(-)</td>
</tr>
<tr>
<td>Model R²</td>
<td>0.11</td>
<td>0.06</td>
<td>0.03</td>
<td>0.09</td>
<td>0.06</td>
<td>0.07</td>
</tr>
</tbody>
</table>

The referent categories of dummy-coded variables are indicated by “Ref.” The model covariates with negative regression coefficients are indicated by (–).

*P < 0.05.
**P < 0.01.
***P < 0.001.

R/E = race/ethnicity.
poorer quality of life (M = 0.23) than their male counterparts (mental health, M = 0.25; quality of life, M = 0.13).

Discussion

The findings demonstrate that SEMB is prevalent among adult Seattle–Tacoma Internet users. Over one-third of the sample (36.7%), with more men (78%) than women (22%), reported SEMB. These estimates are over twice as large as those observed in the General Social Survey Series [9] which, most likely, is a consequence of the Internet-user only sampling frame of this study and differences between the studies in how SEMB was operationalized.

More importantly, the findings provide primary evidence that fundamental health risk factors are correlated with SEMB among adults. Consistent with our hypothesis, sexually explicit media users evidenced more impaired mental and physical health than nonusers. Specifically, SEMB was associated with greater depressive symptomatology, a greater number of diminished mental and physical health days per month, a lower health status, and a poorer quality of life.

Contrary to our second hypothesis, in covariate-adjusted factorial models, respondent gender did not emerge as a significant moderator of the association between SEMB and the health indicators. Gender differences were evident for SEMB (men were more likely to report use) and on two health indicators (women reported more days of diminished mental health and a poorer quality of life). All interaction effects explained only trivial variability, however, suggesting that the health indicators associated with SEMB are relatively stable for both males and females.

While this study illustrates that health correlates of SEMB extend well beyond enactment of health-risky sexual behaviors, there are some caveats to acknowledge. That this investigation used a cross-sectional design is foremost, and the reader is reminded that attribution of causality is ill-advised. All study measures were based on respondent self-report which may represent a source of bias. Furthermore, the SEMB measure did not enable us to distinguish between varying degrees of sexually explicit media use or isolate specific characteristics of the sexually explicit media content selected and consumed by respondents; either of which could impact the observed relationships with health assessments. In addition, sample characteristics (e.g., concentrated in western Washington State, drawn from an Internet-based panel) may limit generalizability. While the sampling procedures were constructed to minimize potential biases, the response rate may have affected the findings due to selection bias. Finally, the significant, but relatively small, associations between SEMB and health self-assessments raise the question of practical significance. Recognizing that small research effects may translate into important social and practical significance across larger populations [83], we believe the observed associations have instrumental "real-world" implications. These limitations notwithstanding, the current findings highlight important areas for future research.

Most obviously, our understanding about interrelationships among mental health indicators, SEMB, and sexual risk behaviors among adults requires further development. Indeed, while our findings point to depressive symptomatology as a determinant associated with SEMB, the specific nature and directionality of the relationship between depression and SEMB remains uncertain. Similarly, clearer articulation of the interrelationships between mental health distress, SEMB, and risky sexual health perceptions and behaviors is needed. Given that reciprocal relationships are probable, future research explicating these possibilities will require more extensive research designs (e.g., longitudinal studies); inclusion

Table 3 Health indicators as a function of sexually explicit media use behavior (SEMB), Seattle–Tacoma, WA, USA, 2006

<table>
<thead>
<tr>
<th>Health indicators (M/SE)</th>
<th>SEMB nonusers</th>
<th>SEMB users</th>
<th>Difference between means</th>
<th>95% CI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Depression</td>
<td>1.18*, 0.06</td>
<td>1.58*, 0.08</td>
<td>0.40*</td>
<td>0.20, 0.60</td>
</tr>
<tr>
<td>Health status</td>
<td>3.84*, 0.05</td>
<td>3.59*, 0.07</td>
<td>−0.26*</td>
<td>−0.43, −0.08</td>
</tr>
<tr>
<td>Diminished physical health</td>
<td>0.21*, 0.02</td>
<td>0.32*, 0.04</td>
<td>0.01*</td>
<td>0.03, 0.20</td>
</tr>
<tr>
<td>Diminished mental health</td>
<td>0.26*, 0.02</td>
<td>0.37*, 0.04</td>
<td>0.11*</td>
<td>0.02, 0.19</td>
</tr>
<tr>
<td>Poor quality of life</td>
<td>0.14*, 0.02</td>
<td>0.22*, 0.03</td>
<td>0.08*</td>
<td>0.01, 0.15</td>
</tr>
<tr>
<td>Body mass index</td>
<td>27.10, 0.32</td>
<td>27.60, 0.48</td>
<td>0.50</td>
<td>−0.65, 1.65</td>
</tr>
</tbody>
</table>

The missing data on body mass index excluded 16 respondents (N = 543; SEMB nonuser, n = 343; SEMB user, n = 200; female, n = 281; male, n = 262). Least square means having different lowercase superscript letters, also indicated by an asterisk (*) for difference between means, differ at P < 0.05 by the two-tailed t-test. M = mean; SE = standard error; CI = confidence interval.
of more extensive environmental (e.g., social support) \cite{24,84,85} and personal (e.g., individual differences) determinants \cite{86–88}; and more sophisticated analytical strategies (e.g., multilevel models, structural equation models). Nevertheless, the findings suggest that evidence-based sexual health promotion strategies simultaneously addressing individuals’ SEMB and their mental health needs might be a useful approach to improve mental health and address preventable sexual health outcomes associated with SEMB.

Conclusions

Among a sample of Internet-using adults, we found that over one-third (36.7\%) reported sexually explicit media use and that individuals indicating engagement in this behavior evidenced higher depressive symptoms, more diminished mental and physical health days per month, a lower health status, and a poorer quality of life. These associations did not vary significantly by gender. Self-reported depressive symptoms, corresponding with prior research on sexual risk behaviors, was most strongly linked with sexually explicit media use. Further exploration of these relationships may contribute to public health efforts targeting behaviors associated with high risks of HIV/STD transmission and/or other preventable sexual health outcomes.

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Corresponding Author: James B. Weaver, III, PhD, MPH, Centers for Disease Control and Prevention, 1600 Clifton Road, NE, MS E-21, Atlanta, GA 30333, USA. Tel: 404-498-0976; Fax: 404-498-0945; E-mail: Jim.Weaver@cdc.gov

Conflict of Interest: None.

References
