Addictive Behaviors 61 (2016) 8–15

Contents lists available at ScienceDirect

Addictive Behaviors

journal homepage: www.elsevier.com/locate/addictbeh

Associations between problematic gaming and psychiatric symptoms among adolescents in two samples

Sofia Vadlin *, Cecilia Åslund, Charlotta Hellström, Kent W. Nilsson

Centre for Clinical Research, Uppsala University, Västmanlands County Hospital, Västerås, Sweden

HIGHLIGHTS

- Boys were five times more likely to have gaming problems
- Boys have more than eight times the probability of having problematic gaming
- Having symptoms of ADHD, depression, or anxiety increased the probability of problematic gaming
- Screening for problematic gaming and psychiatric symptoms is important, not to overlook co-existing symptoms

ARTICLE INFO

Article history:
Received 9 February 2016
Received in revised form 25 April 2016
Accepted 2 May 2016
Available online 3 May 2016

Keywords:
Problematic gaming
Gaming addiction
ADHD
Depression
Anxiety
Psychotic-like experiences

ABSTRACT

The aim of the present study was to investigate associations between problematic gaming and psychiatric symptoms among adolescents. Data from adolescents in the SALVe cohort, including adolescents in Västmanland who were born in 1997 and 1999 (N = 1868; 1034 girls), and data from consecutive adolescent psychiatric outpatients in Västmanland (N = 242; 169 girls) were analyzed. Adolescents self-rated on the Gaming Addiction Identification Test (GAIT), Adult ADHD Self-Report Scale Adolescent version (ASRS-A), Depression Self-Rating Scale Adolescent version (DSRS-A), Spence Children's Anxiety Scale (SCAS), and psychotic-like experiences (PLEs). Multivariable logistic regression analyses were performed, and adjusted for sex, age, study population, school bullying, family maltreatment, and interactions by sex, with two-way interactions between psychiatric measurements. Boys had higher self-rated problematic gaming in both samples, whereas girls self-rated higher in all psychiatric domains. Boys had more than eight times the probability, odds ratio (OR), of having problematic gaming. Symptoms of ADHD, depression and anxiety were associated with ORs of 2.43 (95% CI 1.44–4.11), 2.47 (95% CI 1.44–4.25), and 2.06 (95% CI 1.27–3.33), respectively, in relation to coexisting problematic gaming. Problematic gaming was associated with psychiatric symptoms in adolescents; when problematic gaming is considered, the probability of coexisting psychiatric symptoms should also be considered, and vice versa.

1. Introduction

Problematic gaming is an increasing public health concern. The international prevalence of gaming addiction ranges from 0.3% to 12%, with the highest prevalence occurring in Asian countries, according to the DSM-5 (American Psychiatric Association, 2013), although rates as high as 34–50% have been reported (Griffiths et al., 2015; Kuss, 2013). The differences in prevalence reflect variations in study design, study population, measurement used, and classification breadth of problematic gaming (Király, Nagygyörgy, Koronczai, Griffiths, & Demetrovics, 2015a). In a Swedish community study of adolescents, the self-rated prevalence of gaming addiction was 1.3%, but increased to 2.4% when the parents rated their adolescents (Vadlin, Åslund, Rehn, & Nilsson, 2015). Studies evaluating the suggested criteria of Internet gaming disorder (IGD), which were included in section 3 of the DSM-5, regarding "Conditions for Further Study" in 2013, have reported a prevalence of 1.6% in a cross-national sample of European adolescents (Müller et al., 2014), 4–5% in a study of adolescents and adults (Lemmens, Valkenburg, & Gentile, 2015), 1.2% in a general adolescent population (Rehbein, Kliem, Baier, Mößle, & Petry, 2015), and 5.3% in a study of predominately male adult online gamers (Pontes & Griffiths, 2015).

The worldwide pooled prevalence of mental disorders in children and adolescents is estimated to be 13.4% (Polanczyk, Salum, Sugaya, Caye, & Rohde, 2015), and adolescent mental disorders are also highly comorbid (Kessler, Avenevoli, Costello, & Georgiades, 2012). Furthermore, associations between problematic gaming/gaming addiction and psychiatric symptoms, including attention-deficit hyperactivity disorder (ADHD), depression and anxiety, and psychosomatic

* Corresponding author: Centre for Clinical Research, Västmanlands County Hospital, S-721 89 Västerås, Sweden.
E-mail address: sofia.vadlin@ltv.se (S. Vadlin).

http://dx.doi.org/10.1016/j.addbeh.2016.05.001
0306-4603/

symptoms, have been reported in several studies (Andreassen et al., 2016; Brunborg, Mentzoni, & Frøyland, 2014; Gentile et al., 2011; Griffiths & Pontes, 2014; Hellström, Nilsson, Leppert, & Åslund, 2015; Kim et al., 2016; Király et al., 2015a; Kuss & Griffiths, 2012a; Lemmens et al., 2011; Liau et al., 2014; Mentzoni et al., 2011; van Rooij et al., 2014; Walther, Morgenstern, & Hanewinkel, 2011). However, a study of 5- to 7-year-old children found that playing electronic games was not associated with increased risk of conduct problems (Parkes, Sweeting, Wight, & Henderson, 2013). It is unclear whether problematic gaming causes psychiatric symptoms, or some of the psychiatric symptoms cause problematic gaming or gaming addiction (Griffiths & Pontes, 2014; Kuss & Griffiths, 2012a). It has been suggested that problematic gaming is secondary to psychiatric problems, and that gaming can be seen as an attempt to escape problems in the real world, or as a maladaptive coping strategy (Ferguson & Ceranoglu, 2014; Kardefelt-Winther, 2014). The opposite has also been suggested; that gaming can develop into an addiction and that some psychiatric symptoms, such as depression and anxiety, are a result of gaming problems (Gentile et al., 2011; Király et al., 2015b). A third alternative theory is that a reciprocal relationship exists between problematic gaming and psychiatric disorders (Király et al., 2015b; Kuss, 2013; Topor et al., 2011). Research regarding sex differences in adolescent gaming suggests that males spend more time gaming and seem more susceptible to developing gaming problems (Brunborg et al., 2014; Király et al., 2015b; Kuss & Griffiths, 2012b; Vadlin, Åslund, Rehn, & Nilsson 2015).

In child and adolescent psychiatric populations, depression, anxiety, and ADHD are associated with Internet addiction (Bozkurt, Coskun, Ayaydin, Adak, & Zoroglu, 2013). In a study of patterns of computer and gaming station use, it was found that adolescents with psychiatric disorders spent more leisure time at a computer or gaming station, and had more addictive features of the use associated with impairment than those with fewer psychiatric problems (Baer, Bogusz, & Green, 2011). Furthermore, impairment in functioning factors has been highly associated with suicidality, hopelessness, anxiety, depression, and dissociation (Topor et al., 2011). Two reviews and a meta-analysis have shown that associations between Internet addiction and psychiatric symptoms of depression, anxiety, and ADHD are similar to those between problematic gaming and the same psychiatric symptoms (Carli et al., 2013; Ho et al., 2014; Ko, Yen, Yen, Chen, & Chen, 2012). In a prospective study of adolescents, depression, anxiety, and ADHD were found to predict the occurrence of Internet addiction (Ko, Yen, Chen, Yeh, & Yen, 2009), and the importance of early detection, comorbidity, and the development of interventions for coexisting Internet addiction and psychiatric disorders have also been highlighted (Yen, Chou, Liu, Yang, & Hu, 2014). However, because Internet addiction includes different online activities, such as social networking, pornography, and shopping, it is difficult to separate general online activities from gaming. This makes comparison between studies problematic, because it is unclear which latent construct has been studied. It has also been suggested that problematic Internet use/Internet addiction and problematic online gaming/gaming addiction are two distinct and separate nosological entities (Andreassen et al., 2016; Király et al., 2014; Montag et al., 2015), although this is not universally recognized by the research community.

To our knowledge, the prevalence of problematic gaming in adolescent psychiatric outpatient samples has not yet been reported. The present study is the first to compare associations between problematic gaming and psychiatric symptoms in two independent adolescent populations, using the same measurements, to make accurate comparisons.

The aim was to investigate associations between problematic gaming and psychiatric symptoms of ADHD, depression, anxiety, and psychotic-like experiences (PLEs), and sex differences, in a community adolescent sample and a psychiatric clinical adolescent sample.

2. Methods

2.1. Participants

2.1.1. Study population 1: community sample

Adolescents born in 1997 and 1999 and living in the county of Västmanland in Sweden, and their parents, were included in a prospective cohort study (the SALVe cohort). The adolescents were contacted by regular mail and asked to participate in the study by completing a self-report questionnaire. The total study population consisted of 1868 adolescents (1034 girls, 55.4%) aged 12–16 years (mean age = 13.9, median age = 14). The total response rate was 40% (Fig. 1).

2.1.2. Study population 2: clinical sample

A consecutive sample of 242 adolescents (169 girls, 69.8%) aged 12–18 years (mean age = 15.39, median age = 15) from the child and adolescent psychiatric clinics in the county of Västmanland, Sweden answered the Electronic Psychiatric Intake Questionnaire (EPIQ) (Fig. 1). The total response rate was 65%. The EPIQ is a computer-assessed self-report questionnaire including psychiatric screening measures and questions regarding gaming, family situation, and school and leisure time, and is completed as a standard procedure at the psychiatric clinics in Västmanland.

2.2. Ethics

The studies were approved by the Ethical Review Board in Uppsala and in accordance with the Declaration of Helsinki. All the adolescents and their parents gave written informed consent to participate in the study.

2.3. Measures

For further details on measures, see the online supplementary material.

2.3.1. Problematic gaming and psychiatric measures

The Gaming Addiction Identification Test (GAIT) is a screening instrument for symptoms of gaming addiction in adolescents (Vadlin, Åslund, & Nilsson, 2015). The GAIT consists of 15 items on a 5-point scale ranging from 0 = disagree to 4 = completely agree, with a possible total of 52 points, because the first two items are not included in the scoring (Vadlin, Åslund, & Nilsson, 2015). The GAIT has been reported to have high internal consistency ($\alpha = 0.906$), high concordance in adolescent–parent ratings ($\rho = 0.704$), and high concurrent validity ($\rho = 0.834$) (Vadlin, Åslund, & Nilsson, 2015), with the 7-item version of the Gaming Addiction Scale for Adolescents (GAS) (Lemmens, Valkenburg, & Peter, 2009). In the present study, we used a cutoff of 19 points or more (+1.5 SD) for problematic gaming, derived from the community sample.

The Adult ADHD Self-Report Scale Adolescent version (ASRS-A) is an 18-item self-rating scale on the symptoms of ADHD, with response options ranging from 0 = never to 4 = very often (Kessler et al., 2005). Having ADHD symptoms was defined by a cutoff of ≥9 points for the ASRS-A, as suggested by Kessler (Kessler et al., 2005).

The Depression Self-Rating Scale Adolescent version (DSRS-A) is a self-rating scale based on the DSM-IV criteria for major depressive disorder, and consists of 22 dichotomous items (Svanborg, 2003). Having symptoms of depression was defined as meeting DSM-IV A-criteria, including at least one of the general criteria and at least four other symptoms.

The Spence Children's Anxiety Scale (SCAS) is a self-rating scale designed to measure anxiety symptoms in children and adolescents (Spence, 1998). It consists of 38 point-generating items, with response options ranging from 0 to 3. Symptoms of anxiety were defined by a cutoff of ≥33 points (Olofsdotter, Sonnby, Vadlin, Furmark, & Nilsson, 2015).