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Factors related to Internet and game addiction among adolescents: A scoping review

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Abstract

Background: Understanding factors influencing Internet and game addiction in children and adolescents is very important to prevent negative consequences; however, the existing factors in the literature remain inconclusive.

Objective: This study aims to systematically map the existing literature of factors related to Internet and game addiction in adolescents.

Methods: A scoping review was completed using three databases - Science Direct, PROQUEST Dissertations and Theses, and Google Scholar, which covered the years between 2009 to July 2020. Quality appraisal and data extraction were presented. A content analysis was used to synthesize the results.

Results: Ultimately, 62 studies met inclusion criteria**.** There were 82 associated factors identified and grouped into 11 categories, including (1) socio-demographic characteristics, (2) parental and family factors, (3) device ownership, Internet access and location, social media, and the game itself, (4) personality/traits, psychopathology factors, self-efficacy, (5) education and school factors, (6) perceived enjoyment, (7) perceived benefits, (8) health-compromising behaviors, (9) peers/friends relationships and supports, (10) life dissatisfaction and stress, and (11) cybersafety.

Conclusion: Internet and game addiction among adolescents are multifactorial. Nurses should consider the factors identified in this study to provide strategies to prevent and reduce addiction in adolescents.

Keywords

adolescent; addictive behavior; Internet; gaming; influencing factors; nursing

Internet addiction has become a significant concern in the public and scientific communities today. Although the Internet has become an indispensable tool in the adolescent population for entertainment, communication, information, academic search, and social recognition (Frangos et al., 2011), there is strong evidence that those who addict to the Internet has a negative influence on their lives, such as sleep, academic performance, and relationship with others (Milani et al., 2018). It is also similar to individuals who enjoy games. Although games have become a major leisure activity for releasing stress, heavy users tend to be isolated and lack confidence and social skills (Herodotou et al., 2012).

There have been a wide variety of terms examining the Internet and gaming addiction, such as “Internet gaming disorder”, “problematic online gamers”, “problem video game use”, “problematic Internet use”, “Internet addictive behavior”, “digital game addiction”, “excessive use of the Internet and online gaming”, “online game addiction”, “persistence of Internet addiction”, “smartphone addiction”, “unregulated Internet use”, “pathological Internet use”, and “overuse of Internet”. In this study, we use the terms “Internet and game addiction” for the sake of consistency.

Although the American Psychiatric Association’s Diagnostic and Statistical Manual of Mental Disorders (DSM-5) has described game addiction (American Psychiatric Association, 2013), it is still a lack of evidence to consider the condition as a unique mental disorder. In addition, this condition is only limited to gaming, not including the general use of the Internet, social media,

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smartphones, and online gaming. Therefore, it has led to a degree of ambiguity in understanding the concept of Internet and gaming addiction, which needs further clarification. However, in this review, we did not limit our exploration to gaming only. All terms related to the Internet, social media, and online or offline gaming, with the use of mobile phones, computers, or laptops, were included because all of them were mainly about non-substance addiction, which has a lot in common with substance addictions.

Despite multiple constructs of addiction in the literature, in this study, addiction is defined based on the following four points, including 1) excessive use, or increasing time and frequency, 2) persistent, maladaptive preoccupation, and craving, or feeling an irresistible urge to play computer games, 3) having characteristics of withdrawal behaviors, tolerant behavior, loss of control, negative repercussions, 4) having negative effects on academic or work performance, interpersonal relationships, financial or physical problems, and gaining or losing weight (Chen et al., 2015; Hu et al., 2017; Milani et al., 2018; Müller et al., 2015). If there are no negative consequences, it will not be considered an addiction because it can be an adaptive user instead of a maladaptive user.

It is undebatable that Internet and gaming addiction has tremendous impacts on adolescents. Therefore, its related factors warrant further exploration. Although previous studies have found several factors influencing Internet and gaming addiction, such as individual characteristics (Rho et al., 2016), parenting behavior (Kwak et al., 2018), education (Karaca et al., 2020), and other factors. However, these factors are somewhat inconclusive. Therefore, the aim of this study was to explore the factors related to Internet and game addiction in adolescents. The research question in this review was, “what are the factors associated with Internet and game addiction in adolescents?” This study is expected to help pediatric nurses or mental health nurses to reduce addiction among adolescents.

Methods

Search Methods

Three databases used in this study, including Science Direct, ProQuest, and Google Scholars. The key words include “Internet AND game AND addiction OR addictive behavior OR behavior AND antecedents OR factors AND consequences AND adolescents AND young adolescents AND early adolescents AND children.” The reason we included children due to the fact that many addictions adolescents start during the children period. The search strategy was just limited to ten years, ranged from January 2009 - July 2020 to get the current literature.

Inclusion and Exclusion Criteria

The inclusion criteria of the article were all research studies with qualitative and quantitative approaches, full-text articles and theses or dissertations, and available in English. The exclusion criteria were review articles, editorials, letters to editors, magazines, or gray literature.

Screening

The screening of the article was done by both authors, which included the title, abstract, and full-text. All articles that meet inclusion criteria were included.

Data Extraction

Data were extracted using a table, which consists of the author’s name, year, country, objective, theoretical framework, attributes/dimensions, antecedents, instruments, and study design.

Quality Appraisal

To ensure the quality of each study, a quality appraisal tool adapted from previous studies (Gunawan et al., 2018; Keyko et al., 2016) was used for the correlational study. Each study was categorized as high (10-14), moderate (5-9), and low (0-4) quality. For qualitative studies, the Critical Skills Appraisal Program (CSAP) was used (Casp, 2010). Areas for assessments were research design, measurement, sampling, data collection, ethical issues, and data analysis.

Data Analysis

Content analysis was used to synthesize the results from both the quantitative and qualitative studies (Grove et al., 2012). This content analysis is specifically to merge the factors into categories.

Results

Search Results

There were 36,672 potential articles identified from the initial search (**Table 1**). In the stage of title screening, we removed 30,150 articles due to unrelated topics with Internet and game addiction, and 6,522 articles were left for further evaluation. In the stage of abstract screening, 5,445 articles were excluded due to inadequate in terms of inclusion criteria, and 1,077 articles were retained for further exploration. Ultimately, 62 articles were included (see **Figure 1**). The characteristics of the included studies can be seen in the supplementary file.

Table 1 Database Searching

Database 2009 – July 2020	Retrieved
Science Direct	6,727
PROQUEST Dissertations and Theses	11,945
Google Scholar	18,000
Total retrieved titles	36,672

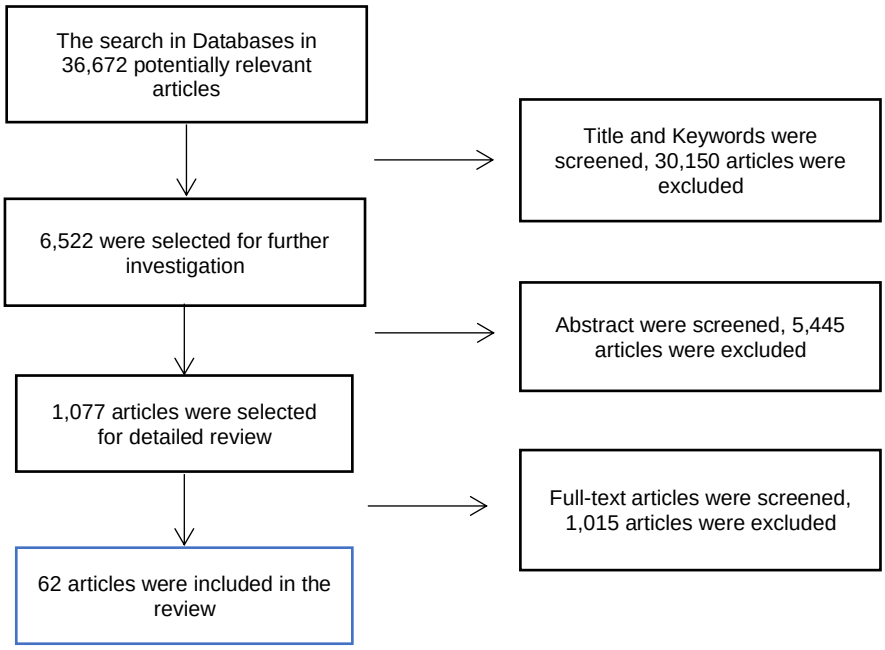

Figure 1 The Review Process based PRISMA Flow Chart

Quality Assessment

Majorities of the studies employed a correlational cross-sectional study design. Six studies used a longitudinal design, and one study was qualitative. Among 62 studies, only 22 studies used probability sampling, 11 studies used non-probability sampling, and 29 studies did not report sampling methods. In the quality assessment of all studies, 52 studies were at medium level and ten studies at a high level. The majority of the studies used three scales for measuring Internet and game addiction as developed by Lemmens et al. (2009), Chen et al. (2003), and Young (1998). There were various countries identified in the studies, including Serbia, Germany, Greece, Iceland, The Netherland, Poland, Romania, Spain, Geneva, Taiwan, Australia, Turkey, United Kingdom, China, Hong Kong, Italy, Norway, Malaysia, Mongolia, Korea, Czech Republic, France, Singapore, Iran, Thailand, India, United States, and Nigeria (see Supplementary file).

Analytical Findings

A total of 82 factors were identified and synthesized into 11 categories, including 1) socio-demographic characteristics, 2) parent and family factors, 3) devise ownership, Internet access, and location, social media, and the game itself, 4) personality/traits, psychopathology factors, self-efficacy, 5) education and school factors, 6) perceived enjoyment, 7) perceived benefits, 8) health-compromising behaviors, 9) peers/friends relationships and supports, 10) life dissatisfaction and stress, and 11) cybersafety (see **Table 2**).

Table 2 Factors related to the game or Internet addiction

Related Factors	Authors
1. Socio-Demographic Characteristics	
Age	(Bianchini et al., 2017; Hyun et al., 2015; Karaca et al., 2020; Lim & Nam, 2018; Müller et al., 2015; Rehbein et al., 2010; Tsitsika et al., 2014)
Gender	(Chen et al., 2015; Choo et al., 2015; Dhir et al., 2015; Frangos et al., 2011; Hyun et al., 2015; Lee et al., 2017; Lin et al., 2011; Müller et al., 2015; Samarein et al., 2013; Spilkova et al., 2017; Sul, 2015; Toker & Baturay, 2016; Walther et al., 2012)
Residence type (alone, with parents, with relatives)	**(**Frangos et al., 2011**)**
Individual marital status	(Rho et al., 2016)
Parental marital status	(Frangos et al., 2011; Müller et al., 2015)
Parental education	(Karaca et al., 2020; Müller et al., 2015; Tsitsika et al., 2014; Wu, Zhang, et al., 2016)
Parental employment status	(Karaca et al., 2020)
Parental economic/income status	(Toker & Baturay, 2016; Walther et al., 2012; Wu, Zhang, et al., 2016)

Table 2 (Cont.)

2. Parent and Family Factors	
Parent factors	
• *Parent-child relationship*	(Choo et al., 2015; King & Delfabbro, 2017)
• *Parental monitor/control*	(Bonnaire & Phan, 2017; Ding et al., 2017; Li et al., 2014; Walther et al., 2012; Wu, Zhang, et al., 2016)
• *Parental conflict*	(Bonnaire & Phan, 2017)
• *Parent positive support*	(Li et al., 2014)
• *Parental neglect*	(Kwak et al., 2018)
• *Parental knowledge*	(Tian et al., 2019)
Family factors	
• *Family relationship*	(Bonnaire & Phan, 2017)
• *Multicultural families*	(Choi & Yoo, 2015)
• *Dual-income families*	(Choi & Yoo, 2015)
• *Family function*	(Charoenwanit & Sumneangsanor, 2014)
• *Family leisure*	(Sul, 2015)
3. Device Ownership, Internet Access, Location, Social Media & Game Itself	
Device ownership	(Smith et al., 2015; Toker & Baturay, 2016)
Access /Subscription to Internet	(Frangos et al., 2011; Wu, Zhang, et al., 2016)
Game itself	
• *Games genre*	(Lee & Kim, 2017; Müller et al., 2015)
• *Online and computer games*	(Toker & Baturay, 2016; Tsitsika et al., 2014)
• *Structural characteristics of video game*	(Hull et al., 2013)
• *Gaming cost*	(Rho et al., 2016)
Social media applications	(Kuss et al., 2013)
Location (such as the bedroom)	(Smith et al., 2015)
4. Personality/Traits, Psychopathology Factors, & Self-Efficacy	
Personality/ traits	
• *Self-esteem*	(Billieux et al., 2015; Charoenwanit & Sumneangsanor, 2014; Hyun et al., 2015; Walther et al., 2012)
• *Impulsivity*	(Walther et al., 2012)
• *Sensation seeking*	(Walther et al., 2012)
• *Aggression/Rule-breaking behavior/irritability*	(Tsitsika et al., 2014; Walther et al., 2012)
• *Extraversion*	(Andreassen et al., 2013; Kuss et al., 2013; Samarein et al., 2013)
• *Introversion*	(Torres-Rodríguez et al., 2018)
• *Neuroticism (anxiety, anger, depression, loneliness, hostility, emotional stability)*	(Andreassen et al., 2013; Dong et al., 2013; Hyun et al., 2015; Jeong et al., 2015; Kuss et al., 2013; Mehroof & Griffiths, 2010; Samarein et al., 2013; Tsitsika et al., 2014; Vukosavljevic-Gvozden et al., 2015; Walther et al., 2012) (Chang et al., 2014; Hyun et al., 2015; Jeong et al., 2015; Laconi et al., 2017; Lin et al., 2011; Moslehpour & Batjargal, 2013; Tsitsika et al., 2014; Vukosavljevic-Gvozden et al., 2015; Walther et al., 2012)
• *Conscientiousness*	(Samarein et al., 2013; Stavropoulos et al., 2016)
• *Agreeableness*	(Andreassen et al., 2013; Kuss et al., 2013; Samarein et al., 2013; Walther et al., 2012)
• *Resourcefulness*	(Kuss et al., 2013)
• *Openness to experience*	(Andreassen et al., 2013)
• *Psychoticism/socialization*	(Dong et al., 2013)
• *Self-control*	(Li et al., 2014)
• *Effortful control*	(Ding et al., 2017)
• *IQ*	(Hyun et al., 2015)
Psychopathology	
• *Obsessive-compulsive*	(Vukosavljevic-Gvozden et al., 2015) (Torres-Rodríguez et al., 2018)
• *Interpersonal sensitivity*	(Vukosavljevic-Gvozden et al., 2015) (Torres-Rodríguez et al., 2018)
• *ADHD*	(Chen et al., 2015; Hyun et al., 2015; Walther et al., 2012)
• *Irrational beliefs/ ubiquitous trait*	(Lee et al., 2017; Vukosavljevic-Gvozden et al., 2015)
• *Autistics traits*	(Chen et al., 2015)
• *Paranoid ideation*	(Torres-Rodríguez et al., 2018; Vukosavljevic-Gvozden et al., 2015)
• *Impaired social adjustment*	(Chen et al., 2015)
• *Self-devaluation*	(Torres-Rodríguez et al., 2018)
• *Borderline*	(Torres-Rodríguez et al., 2018)
• *Attention problem*	(Peeters et al., 2018)
• *Insecure attachment*	(Lin et al., 2011)

Table 2 (Cont.)

• *Somatization*	(Vukosavljevic-Gvozden et al., 2015)
• *Anxiety (trait anxiety, state anxiety, and* • *phobic anxiety)*	(Mehroof & Griffiths, 2010; Torres-Rodríguez et al., 2018; Vukosavljevic-Gvozden et al., 2015)
• *Perseverative errors*	(Hyun et al., 2015)
• *Lie*	(Dong et al., 2013)
Self-efficacy	(Jeong et al., 2015; Lin et al., 2011; Walther et al., 2012)
5. Education & School Factors	
Academic performance	(Chen et al., 2015; Lin et al., 2011; Wu, Zhang, et al., 2016)
School bonding/ Relationship with teachers	(Chang et al., 2014; Lee & Kim, 2017)
School well-being	(Rehbein et al., 2010)
6. Perceived Enjoyment	
The feeling of excitement, relief from negative emotion, passing time	(Billieux et al., 2015)
Entertainment	(Moslehpour & Batjargal, 2013)
Flow	(Hull et al., 2013; Sun et al., 2015)
Leisure environment	(Lee & Kim, 2017)
Gratification, general happiness	(Dhir et al., 2015; Hull et al., 2013)
Perceived visibility & enjoyment	(Sun et al., 2015)
Preoccupation	(Lee et al., 2017)
7. Perceived Benefits	
Using the Internet to communicate on important matters	(Adiele & Olatokun, 2014)
Making money	(Adiele & Olatokun, 2014)
Use for learning	(Lee et al., 2017)
Making friends	(Billieux et al., 2015; Kim & Kim, 2017; Moslehpour & Batjargal, 2013; Porter et al., 2010)
Online self-identity	(Kim & Kim, 2017)
Getting-sex oriented materials	(Adiele & Olatokun, 2014)
8. Health-Compromising Behaviors	
Smoking	(Chang et al., 2014; Frangos et al., 2011; Spilkova et al., 2017; Toker & Baturay, 2016)
Drinking (alcohol & coffee)	(Frangos et al., 2011) (Spilkova et al., 2017)
Using drugs	(Frangos et al., 2011)
9. Peers/Friends Relationships and Supports	
Peer relationship & support	(Kwak et al., 2018; Lee & Kim, 2017; Wu, Ko, et al., 2016; Wu, Zhang, et al., 2016)
Peer affiliation	(Ding et al., 2017)
Community attendance	(Rho et al., 2016)
10. Life Dissatisfaction & Stress	(Moslehpour & Batjargal, 2013; Peeters et al., 2018)
11. Cybersafety	(Smith et al., 2015)

Discussion

There were eleven groups of factors that emerged in the findings of this study as following.

Socio-Demographic Characteristics

There were eight factors of the Internet and game addiction according to socio-demographic characteristics: (1) *Age*, there were seven studies have provided the significant correlation between age and Internet and game addiction (Bianchini et al., 2017; Hyun et al., 2015; Karaca et al., 2020; Lim & Nam, 2018; Müller et al., 2015; Rehbein et al., 2010; Tsitsika et al., 2014). Karaca et al. (2020) revealed that Internet and game addiction was significantly in the older age of adolescents than in the younger age group. Rehbein et al. (2010) found that 15-year-old children were shown the specific risk factors of addiction at the age of ten years; (2) *Gender*, 13 studies discussed the linkage between gender and Internet and game addiction, which predominantly specific to males (Chen et al., 2015; Choo et al., 2015; Dhir et al., 2015; Frangos et al., 2011; Lin et al., 2011; Müller et al., 2015; Samarein et al., 2013; Sul, 2015; Toker & Baturay, 2016; Walther et al., 2012) than females (Lee et al., 2017). Hyun et al. (2015); Spilkova et al. (2017) stated that females are more prone to online communication and social media use, while males are more likely to online gaming; (3) *Residence type*, Frangos et al. (2011) revealed that those who were not staying with parents are highly associated with Internet addiction; (4) *Individual marital status*, Rho et al. (2016) found that those who are single are more prone to Internet addiction than those who are married; (5) *Parental marital status*, Frangos et al. (2011); Müller et al. (2015) revealed that those who have divorced parental condition are more addicted to Internet or game online; (6) *Parental education*, Wu, Zhang, et al. (2016) said mother's and father's education significantly correlate with Internet addiction. Karaca et al. (2020) found that those having parents who completed high school or a higher education level are more likely to be addicted to online game

addiction. Conversely, Müller et al. (2015) revealed that those who have a mother with no formal education (not father's education) are more addicted to Internet gaming addiction; (7) *Parental employment status*, Karaca et al. (2020) found that a mother who is employed is considered a factor of online game addiction in adolescents; (8) *Parental economic/income status*, Toker and Baturay (2016) and Wu, Zhang, et al. (2016) found that socioeconomic status or per capita annual household income is significantly related to the addiction rate. Walther et al. (2012) and Wu, Zhang, et al. (2016) revealed that high economic status tends to have problematic computer gaming in adolescents.

Parent and Family Factors

We discussed parent and family factors separately. For parental factors, there were six factors associated with the Internet and game addiction: (1) *Parent-child relationship,* Choo et al. (2015) revealed that parent-child relationship is an important predictor of the Internet or game addiction although King and Delfabbro (2017) stated that parent-child relationships have a weak correlation with Internet addiction; (2) *Parental monitor/control,* Bonnaire and Phan (2017); Wu, Zhang, et al. (2016) found that parental monitoring is correlated with Internet and game addiction. Walther et al. (2012) emphasize that lower parental monitoring is consistently associated with addictive behaviors. But, Ding et al. (2017) explained it differently that deviant peer affiliation is partially mediated the correlation between parental monitoring and Internet addiction, while Li et al. (2014) said that Internet addiction was explained positively by parents' negative control; (3) *Parental conflict,* Bonnaire and Phan (2017) found that parental conflict is significantly related to Internet gaming addiction; (4) *Parent positive support*, Li et al. (2014) found that parents' positive support was negatively correlated with Internet addiction; (5) *Parental neglect,* Kwak et al. (2018) found that smartphone addiction was significantly influenced by parental neglect; and (6) *Parental knowledge,* Tian et al. (2019) found that those with low parental knowledge are more addicted than those with high parental knowledge.

For family factors, the studies indicated that those with poorer family relationships, multicultural and dual-income families, and poor family function are likely to be addicted more to the Internet and game addiction (Bonnaire & Phan, 2017; Choi & Yoo, 2015; Sul, 2015). In addition, Sul (2015) revealed that family leisure is one factor that correlates with Internet game addiction, in which the adolescents could join the family to enjoy the environment.

Device Ownership, Internet Access, Location, Social Media & Game Itself

According to Smith et al. (2015) and Toker and Baturay (2016), device and computer ownership are related to game addiction. Additionally, Frangos et al. (2011) said that subscription to the Internet is associated with Internet addiction, while Wu, Zhang, et al. (2016) found Internet café where adolescents could access the Internet is related to addiction.

Of course, without online and computer games or social media applications, the addictive behavior will not occur (Kuss et al., 2013; Toker & Baturay, 2016; Tsitsika et al., 2014). Müller et al. (2015) said that all game genres are related to Internet gaming disorder. Lee and Kim (2017) found that simulation, RPG, and casual games were positively correlated with addictive behavior. In addition, structural characteristics of the game influence the level of addiction (Hull et al., 2013), while Rho et al. (2016) revealed that gaming cost is also an important factor of the Internet and game addiction. Besides, Smith et al. (2015) found that bedroom location is associated with video-game play, which leads to addiction.

Personality Factors/ Traits, Psychopathology Factors, and Self-Efficacy

There were 15 personality factors or traits that are related to Internet and game addiction, including low self-esteem (Billieux et al., 2015; Charoenwanit & Sumneangsanor, 2014; Hyun et al., 2015; Walther et al., 2012), high impulsivity and sensation seeking (Walther et al., 2012), aggression/ rule breaking behavior/ irritability (Tsitsika et al., 2014; Walther et al., 2012), extraversion (Andreassen et al., 2013; Kuss et al., 2013; Samarein et al., 2013), introversion (Torres-Rodríguez et al., 2018), neuroticism (anxiety, anger, depression, loneliness, hostility, emotional stability) (Andreassen et al., 2013; Dong et al., 2013; Hyun et al., 2015; Jeong et al., 2015; Kuss et al., 2013; Mehroof & Griffiths, 2010; Samarein et al., 2013; Tsitsika et al., 2014; Vukosavljevic-Gvozden et al., 2015; Walther et al., 2012) (Chang et al., 2014; Hyun et al., 2015; Jeong et al., 2015; Laconi et al., 2017; Lin et al., 2011; Moslehpour & Batjargal, 2013; Tsitsika et al., 2014; Vukosavljevic-Gvozden et al., 2015; Walther et al., 2012), conscientiousness (Andreassen et al., 2013; Kuss et al., 2013; Samarein et al., 2013; Stavropoulos et al., 2016), agreeableness (Andreassen et al., 2013; Kuss et al., 2013; Samarein et al., 2013; Walther et al., 2012), resourcefulness (Kuss et al., 2013), openness to experience (Andreassen et al., 2013), psychoticism/ socialization (Dong et al., 2013), low self-control (Li et al., 2014), and effortful control (Ding et al., 2017), IQ (Hyun et al., 2015).

Specifically, Andreassen et al. (2013) found that extraversion is positively associated with Internet and game addiction, while Kuss et al. (2013); Samarein et al. (2013) found that extraversion is negatively correlated with the addiction. Neuroticism (Andreassen et al., 2013; Samarein et al., 2013) and resourcefulness (Kuss et al., 2013) are positively related to addiction, while conscientiousness (Andreassen et al., 2013; Kuss et al., 2013; Samarein et al., 2013; Stavropoulos et al., 2016), agreeableness (Andreassen et al., 2013; Kuss et al., 2013; Samarein et al., 2013), and openness to experience (Andreassen et al., 2013), are negatively correlated to addiction. For effortful control, Ding et al. (2017) found that

the correlation between parental monitoring and deviant peer affiliation is moderated by effortful control, which in turn increases Internet addiction.

Psychopathology Factor

There were direct and indirect relationships between psychopathology factors and the Internet and game addiction. Vukosavljevic-Gvozden et al. (2015) found that somatization, phobic anxiety, depression, obsessive-compulsive, interpersonal sensitivity, anxiety, paranoid ideation, hostility, and psychoticism are mediating factors of game addiction. In comparison, Torres-Rodríguez et al. (2018) found that obsessive–compulsive, interpersonal sensibility, paranoia, self-devaluation, and borderline are direct factors of Internet and game addiction. Lee et al. (2017) also found that ubiquitous trait is directly associated with addiction. The other direct factors of addiction include ADHD (Chen et al., 2015; Hyun et al., 2015; Walther et al., 2012), autistics traits (Chen et al., 2015), impaired social adjustment (Chen et al., 2015), attention problem (Peeters et al., 2018), insecure attachment (Lin et al., 2011), perseverative errors (Hyun et al., 2015), and lie (Dong et al., 2013). For anxiety, Mehroof and Griffiths (2010) found that online gaming addiction was significantly associated with trait and state anxiety. While phobic anxiety, according to Vukosavljevic-Gvozden et al. (2015), is considered a mediator of game addiction.

In regards to self-efficacy, Jeong et al. (2015) found that game addiction is negatively influenced by general self-efficacy but positively affected by game self-efficacy. Lin et al. (2011) also found that lower refusal self-efficacy of Internet use increases addiction, and Walther et al. (2012) revealed that social self-efficacy is related to game addiction.

Education & School Factors

There are three education and school factors: 1) *academic performance*, Chen et al. (2015) and Lin et al. (2011) found that Internet addiction was significantly correlated with poor academic performance. Wu, Zhang, et al. (2016) emphasized that the adolescents who had very poor academic performance were 2.4 times were more likely to report Internet addiction than those who had first-class academic performance; 2) *school bonding or relationship with teachers*, Chang et al. (2014) found that there was an increase in online activities for those with lower school bonding in grade 10. Similar to Lee and Kim (2017), who revealed that the respondents with less satisfaction with their relationships with teachers were more likely to be game addicts; 3) *school well-being*, Rehbein et al. (2010) revealed that students with low experienced school well-being are related to game addiction.

Perceived Enjoyment

Perceived enjoyment is considered a direct factor of addiction, which consist of the feeling of excitement, relief from negative emotion, passing time (Billieux et al., 2015), entertainment (Moslehpour & Batjargal, 2013), flow (Hull et al., 2013; Sun et al., 2015), leisure environment (Lee & Kim, 2017), gratification (Dhir et al., 2015; Hull et al., 2013), perceived visibility and enjoyment (Sun et al., 2015), and preoccupation (Lee et al., 2017). In terms of flow, Sun et al. (2015) added that flow directly affects addiction but also acted as mediating variable of perceived visibility and enjoyment.

Perceived Benefits

Adiele and Olatokun (2014) found that the benefits or extrinsic factors of Internet addiction were for communication on important matters, making money (especially amongst females), getting-sex oriented materials. Billieux et al. (2015); Kim and Kim (2017); Moslehpour and Batjargal (2013); Porter et al. (2010) revealed that making friends is the reason for addiction. Additionally, Lee et al. (2017) stated that the Internet was used for learning, while Kim and Kim (2017) found that online self-identity is also one of the reasons for addiction.

Health-Compromising Behaviors

The health-compromising behaviors that are associated with the Internet and game addiction are likely related to smoking (Chang et al., 2014; Frangos et al., 2011; Spilkova et al., 2017; Toker & Baturay, 2016), drinking alcohol (Frangos et al., 2011; Spilkova et al., 2017), and using the drug (Frangos et al., 2011). Interestingly, Frangos et al. (2011) also said that drinking coffee is one factor of addiction.

Peers/Friends Relationships and Supports

The relationships between peer and support and Internet and game addiction have been discussed in four studies (Kwak et al., 2018; Lee & Kim, 2017; Wu, Ko, et al., 2016; Wu, Zhang, et al., 2016). Kwak et al. (2018) said that smartphone addiction was negatively influenced by the relational maladjustment with peers, while Wu, Ko, et al. (2016) stated that peer influences (invitation to play, frequency of Internet game use, and positive attitudes toward Internet gaming) were positively associated with Internet gaming addiction. Peer influence was also mediated through the positive outcome expectancy of Internet gaming. According to Ding et al. (2017), peer affiliation is considered a mediating variable of the relationship between Internet addiction and perceived parental monitoring. Rho et al. (2016) stated that Internet gaming community meeting attendance is also the factor of addiction.

Life Dissatisfaction & Stress

Moslehpour and Batjargal (2013) found that stress is the factor that influences Internet addiction among adolescents, while Peeters et al. (2018) found that life dissatisfaction was the predictor of Internet addiction.

Cybersafety

Only one study discusses the relationship between cybersafety and game addiction, as indicated by Smith et

al. (2015). This is, however, considered as an important factor that parents should discuss cyber safety as the protective factor of Internet or game addiction.

Summary of the Findings

The strong evidence of the number of studies in our review can be compared with a large volume of literature on the Internet and gaming addiction among adolescents. To understand the issues related to addiction, it is necessary to understand how factors are correlated with another from 11 categories retrieved by this review. The majority of the factors are found to be directly associated, while some are mediated by the others, specifically between personality/traits, psychopathology factors, and addiction.

However, if all those factors are seen from internal and external categories, socio-demographic characteristics, personality/traits, psychopathology factors, self-efficacy, perceived enjoyment, perceived benefits, health-compromising behaviors, life dissatisfaction, and stress can be considered internal factors. While parent and family factors, devise ownership, Internet access and location, social media, and the game itself, education and school factors, peers or friends' relationships and supports, and cybersafety are considered external factors.

This study provides a comprehensive review of the factors associated with the Internet and gaming addiction among adolescents. However, those factors need further validation and determine how they are related to each other. This study's limitation may include that the Internet and gaming addiction in some studies were not well defined. Hence, it is possible that some important articles might not be included in this study. In addition, if the Internet and gaming addiction is considered different and in terms of the target population between children and adolescents, then the findings of this study are limited. However, this study provides the implication for pediatric nurses or community nurses in dealing with adolescents with Internet and gaming addiction. The factors identified in this study can be used as basic information to provide intervention to decrease addiction levels.

Conclusion

Understanding the factors related to Internet and game addiction can help the development of adolescents. This systematic review shows that factors related to the Internet and gaming addiction are multifactorial and not well understood. There were 82 factors identified and categorized into 11 groups: (1) socio-demographic characteristics, (2) parent and family factors, (3) devise ownership, internet access, and location, social media, and the game itself, (4) personality/traits, psychopathology factors, self-efficacy, (5) education and school factors, (6) perceived enjoyment, (7) perceived benefits, (8) health-compromising behaviors, (9) peers/friends relationships and supports, (10) life dissatisfaction and stress, and (11) cybersafety. Further research is needed to validate the factors and clarify the linkage among factors.

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The authors have no conflict of interest to declare.

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Authors' Contributions

All authors contributed equally to conceptualization, methodology, validation, literature review, data collection, analysis, data interpretation, and writing and editing of the manuscript. Both authors agreed with the final version of the article.

Data Availability Statement

All data generated or analyzed during this study are included in this published article (and its supplementary information file).

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