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Sleep Disorders and Electronic Games Addiction among Jordanian Adolescents

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Abstract
This study aimed to examine the relationship between electronic game addiction and sleep disorders among Jordanian adolescents. Sample of the study were 576 adolescents (325 males and 251 females) their age between 14 to 17 years. Lemmens., Valkenburg, and Peter scale for electronic games addiction and the Albana scale for adolescents' sleep disorder were used. The study considers the frequent links between severe internet addiction and the emergence of addictive-like traits in adolescents. The results suggested a higher level of electronic game addiction which was significantly associated with a higher level of sleep disorder. Results also showed that withdrawal, mood modification, and silence explained 69.30% of sleep disorders among Jordanian adolescents. Moreover, total electronic game addiction explained 40% of the variance in sleep disorder among Jordanian adolescents.
Keywords: sleep disorder, electronic games, addiction, Jordanian adolescents.
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Introduction

The dramatic change in the pace of life and the intensive integration of technology in every aspect of life has affected all generations all over the world and Jordan is no exception. Adolescents growing up in Jordan today would not have the opportunity to be open to the world without the internet's connectivity. The term '*being connected*' has an entirely different connotation for Adolescents in Jordan than it did for their parents when they were children.

Additionally, a pedagogical approach has emerged in Jordan, where regular computer use is now part of the curriculum starting in pre-primary, with 93 % of 6–17 years old spending time in different activities in online education (Johnson, Lawrence, Hafekost, et al., 2016). Consequently, the successful implementation of learning activities based on digital technology has directed adolescents' attention to the Internet as a main and basic source of knowledge and as a lawful method to spend most of their time on. Nevertheless, there are many worries regarding a possible link between bad online activity behavior outside of the classroom and higher levels of psychological discomfort among adolescents (Rathi, Guha, and Neogi, 2022). Researchers have investigated how the Internet and electronic gaming affect children, adolescents, and adults' mental health almost since the invention of the Internet (Lam, Peng, Mai, and Jing, 2009). It has been shown that some young individuals find electronic gaming or online use to be addictive to the point where it becomes detrimental to their mental health. Thus, addiction to the Internet and electronic gaming can result in negative effects on their life, such as wasting time that should be dedicated to more important activities like interaction with friends and family, or schoolwork which in turn, can lead over time to feelings of loneliness and distress (Johnson, Lawrence, Hafekost, et al., 2016).

An electronic game is that utilizes electronics to create an interactive system with others with whom a player can play simultaneously. Electronic video games are the most popular form of gaming nowadays. As a result, the two terms are often used ininterchange. There are other popular models of electronic games which include standalone systems (e.g. slot machines, pinball, or electro-mechanical arcade games), handheld electronic games, and exclusively non-visual products or audio games (Farchakh, Haddad, Sacre, Obeid, Salameh and Hallit, 2020). "The earliest form of computer games to employ mainstream was the text-based Teletype game. Teletype games lacked video display screens and instead presented the game to the player by printing a series of characters on paper which the player reads as it emerged from the platen". This would mean that each action taken would require a line of paper, and thus a hard-copy record of the game should be kept after the game has been played (Teng, Nie, Guo, Zhang, Liu, and Bushman, 2019). "This naturally tends to reduce the size of the gaming universe or require

a great amount of paper".

Later, "text-based command line-driven language parsing Teletype games evolved into visual interactive fiction" when computer displays became the norm with the emergence of the third generation of computers, enabling more in-depth gameplay and requiring less paper. (Rathi, Guha, and Neogi, 2022). Throughout this transition, the environment was simultaneously changed "from the mainframe to the personal computer". As a result, several of these later games were converted to platforms with video displays, which did not require teletype printers (Farchakh, Haddad, Sacre, Obeid, Salameh, and Hallit, 2020).

Previous studies

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Sleep problems were thought to be a typical symptom of internet addiction. Other psychological conditions such as depression, psychosomatic, symptoms anxiety, and pain have all been linked to sleep disorders (Farchakh, Haddad, Sacre, Obeid, Salameh, and Hallit, 2020). Generally, psychologists posit that sleep disorders were about a decline in general health that resulted in changes to cognitive functions, depression, and emotional instability (Kök and Örsal, 2018). Up to 79% of cases reported sleep disturbance throughout the internet addiction time, and sleep issues are frequently cited as the most distressing symptoms of internet addiction (Choi, Huh, Kim, Suh, Lee, and Potenza, 2019). Additionally, these sleep issues in people with internet addiction are linked to major medical and psychological symptoms such as reduced quality of life, increased depressive symptoms, impaired social and vocational functioning, and early mortality (Teng, Nie, Guo, Zhang, Liu, and Bushman, 2019).

Additionally, one of the most prevalent psychological comorbidities in those with internet addiction is anxiety and depression. According to studies, its typical prevalence ranges between 13 and 26% (Evren, Evren, Dalbudak, Topcu, and Kutlu, 2019). Sleep issues are regarded as either a symptom of depression and anxiety (hypersomnia or insomnia) or as a distinct condition (Obeid, et al., 2019). Due to internet addiction, people's physical and psychological health may significantly suffer. Physical issues brought on by an internet addiction include insomnia, body aches, Carpal Tunnel Syndrome, weight gain or loss, and visual issues. Whereas psychological issues consist of dishonesty, social isolation, anxiety, violence, depression, mood swings …etc. (Ko, Yen, Chen, Yeh and Yen,

2009).

Technological developments have made electronic games adolescents' primary pastime activities, including being prone to addiction. Currently, electronic games are the most popular gaming genre. among adolescents everywhere (Lemmens, Valkenburg, and Peter, 2009). According to Rathi, Guha, and Neogi (2022), the total amount of hours spent playing electronic games each week quickly rose. from (5.1 hr. to 6.3 hr.), respectively, in 2011 and 2013. "The American Psychiatric Association" was recently aggressively urged by the "American Medical Association" to take into consideration adding electronic game addiction" as a formal diagnostic diagnosis in the future edition of the DSM (Farchakh, Haddad, Sacre, Obeid, Salameh and Hallit, 2020).

In fact, despite the positive effects that electronic games have, such as entertainment and socialization, clinical and empirical studies have repeatedly shown that excessive use of video games may have negative effects in various areas of psychological development and can lead to addiction (Charlton and Danforth, 2007). An indication of electronic gaming; addiction may be diminished self-control and an increase in the importance of gaming over everyday tasks and other hobbies (Chiu and Huang, 2004). Additionally, there have been growing public worries about potential negative effects, including the possibility that video games could affect adolescents' memories (Du et al., 2017): as numerous reports of impaired cognitive processes for cognitive skills such as comprehension, memory updating, and working memory in populations with addiction and behavioral disorders (Lim, et al., 2016). Even though some research investigates how video games affect adolescents' cognitive abilities and academic performance, the effects on memory are still a hotly debated topic. There is a pooled meta-analysis and systematic review of research on the "relationship between internet addiction and sleep disorders".

In (2021) Tereshchenko, Kasparov, Smolnikova, Shubina, Gorbacheva, and Moskalenko determined Russian Adolescents' Internet Use and Sleep Issues: A Field-Based School-Based Study. Results reported that teens who "use the Internet excessively typically have late bedtimes and early rises, shorter nightly sleep durations, longer sleep onset latency, more frequent nighttime awakenings, and more marked daytime" drowsiness. "Regardless of the medium used, the indicators of daytime sleepiness and night awakening scales have the most effects on adolescents who use the Internet" excessively. "Teens who are hooked to the internet exhibit substantial overnight sleep problems and excessive daytime tiredness, which calls for proper psychological treatment".

Nguyen, Wan-Tran, and Wong (2021) studied "the impact of video game addiction on sleep disorders in young adults and adolescents. employed the PRISMA standards and the Priority Reporting Section to get a systematic review" and analyze reports using meta-analysis". To find the research that would be available, the researchers examined all the relevant literature in six electronic databases. The results of the study presented findings of a positive correlation between sleep disorders and gaming addiction. Farchakh, Sacre, Salameh, Obeid, Haddad, and Hallit (2020) investigated the "correlations between video game addiction and a sample of Lebanese schoolchildren's memory, attention, and learning abilities". The findings revealed that worse problem-solving abilities, episodic memory written expression abilities, fundamental reading skills, and clinical attention were all significantly worse when video game addiction was more salient. Significant correlations have been shown between a higher tolerance for video game addiction and poorer attention and novel problem-solving. Significantly inferior attention, visual-spatial organization, factual memory, processing speed, working memory, sustained sequential processing, new problem solving, and worse written expression skills were all significantly correlated with higher levels of video game addiction.

Zaman, Baber, Baber, Sabir, Ashraf, Tahir, et al. (2018) Studied the prevalence of gaming addiction and how it affects sleep quality in Pakistan. The study reported that 57.0% (N=352) of the 618 participants played online games. According to GAS scores, 12.5% (N = 44) of gamers were classified as gaming addicts. Participants "with a gaming addiction had significantly worse subjective sleep quality, more sleep disturbance, shorter sleep duration, and more daytime dysfunction than those without a gaming addiction". Males were also more likely than females to develop a gaming addiction. Tokiya, Itani, Otsuka, and Kaneita (2020) examine internet addiction and irregular sleep patterns among high school students. The study finds out that high "*Young Diagnostic Questionnaire for Internet Addiction*" scores were linked to both boys' and girls' high prevalence of sleep disturbance. These results remained true even after the multiple regression model was adjusted for other variables.

It can be concluded that adolescents diagnosed with electronic game addiction had a lot more difficulty managing their daily tasks. These covered aspects of their home life, obligations from jobs "or school, and their capacity for social interaction outside of the house. Additionally, those who struggled with these electronic game addictions showed noticeably more signs of worry and melancholy". There is disagreement regarding whether such mental health difficulties are a result of using computers, mobile devices, or electronic game addiction. Adolescents with electronic game addiction frequently exhibit symptoms of sleep disorder, such as trouble planning, high levels of attentional impulsivity, and weak time management.

Despite being a leisure activity, playing electronic games on a computer or other electronic device can interfere with some adolescents' ability to sleep. sleep disorder electronic game addiction has been linked, according to Ho, Chan, and Tang's (2016) meta-analysis and Palagini, Tani, Mauri, Carli, Vagnani, Bombardieri, Gemignani, and Mosca (2014) systematics review; even after controlling for the effects of depressive and anxiety

symptoms, as well as personality traits, many other studies confirmed this finding and demonstrated a strong relationship between internet addiction/electronic game addiction and sleep disorder. The current study aims to explore the associations between sleep disorder and electronic game addiction among adolescents.

Questions

The current study is designed to answer the following questions:

RQ1: What are the levels of sleep disorder and electronic game addiction among Jordanian adolescents?

RQ2: To what extent does electronic game addiction contribute to the prediction of sleep disorder amongst Jordanian adolescents?

RQ3: Is there any influence of gender on sleep disorder and electronic game addiction among Jordanian adolescents?

Methodology

This study used a descriptive correlational design for its suitability for the subject and the intended aims of the study. Additionally, this method is thought to be more trustworthy for studies that investigate a variety of variables that affect sleep disorders and addiction to electronic games. This method has also been applied in several similar previous research.

Sample of study

The participants of the study were 576 adolescents (325 males and 251 females). The range of their ages is 14 to 17 years. They were randomly invited to participate in the study. All the participants reported that they regularly play electronic games daily on mobiles, computers, and other electronic devices.

Tools

First, "the game addiction scale for adolescents Lemmens., Valkenburg, and Peter (2009) consisted of 21 items have been used to measure: - 1) Salience: Teenagers' lives are dominated by video games, which rule their thoughts (preoccupation), feelings (cravings), and actions (excessive use)". 2). Tolerance: The process by which someone begins to play games more frequently. 3). Mood modification: The subjective experiences that people report because of engagement in games.4). Withdrawal: unpleasant feelings and/or physical reactions when gaming is abruptly decreased or stopped.5). Relapse: the propensity to frequently return to previous gaming patterns. 6). Conflict: This refers to all interpersonal conflicts resulting from excessive gaming".7). "Problems: This refers to problems caused by excessive gameplay." Electronic addiction is shown when an adolescent achieves the specified criteria over the last six months.

Second, the sleep disorder scale Albana (2007) consists of 39 items. The validity of the scales was examined and calculated using internal consistency, and the results presented that the items were statistically significant which reflects that all items are internally consistent. Moreover, the scale's reliability was examined using the Cronbach Alpha way, the results of Cronbach Alpha for the game addiction scale were = 0.883 and for sleep disorder = 0.865.

Data Collection

Adolescents were invited to take part in the study. They were briefed about the aims of the study. Each participant spent about 25 to 30 minutes responding to the items on the questionnaires. Data were analyzed using SPSS software, version 25. For reliability analysis, Cronbach's Alpha and internal consistent values were calculated for each scale. The independent sample t-test for the research variables has been calculated to examine the levels of sleep disorder and electronic game addiction among the participants. Person correlation was used to examine the relationship between the study variables. Furthermore, a t-test was calculated to investigate the effects of participants' gender on levels of sleep disorders and electronic game addiction of the participants based on their gender. Finally, One-Way ANOVA has been used to explore the effects of the guardian qualification variable on sleep disorders and electronic game addiction among participants.

Results

Table (1) one sample test for a sleep disorder and electronic game addiction level.

Dimensions	*df*	Mean	*St.dev*	*t*	*Sig*
sleep disorder	575	4.14	0.67	0.93	0.00*
Relapse	575	3.98	0.78	1.73	0.00*
withdrawal	575	4.17	0.74	1.90	0.00*
mood modification	575	4.29	0.76	1.65	0.00*
Conflict	575	4.08	0.85	1.64	0.00*
Salience	575	4.03	0.73	1.77	0.00*
Problems	575	4.07	0.69	1.13	0.00*
Tolerance	575	3.48	0.73	1.27	0.00*
total electronic games addiction	575	4.01	0.83	1.58	0.00*

**Significant at (α ≤0.01)*

As appears in table (1), the mean of the electronic game addiction level and its seven dimensions: relapse, withdrawal, mood modification, conflict, salience, problems, and tolerance), is high and significant at *(α ≤0.01).* which indicates that the level of electronic game addiction and its dimensions was high among Jordanian adolescents. The withdrawal and mood modification dimensions were the most effective dimension among adolescents, in another hand, the problems and tolerance dimensions were the lowest effect dimension. Furthermore, the mean sleep disorder level is high and significant at *(α ≤0.01)*, which also shows the level of sleep disorder is high among Jordanian adolescents.

Table (2) analysis of multiple regression for predicting the sleep disorder

Independent variables	Dependent variable	Constant	*F*	*R*	R^2	*Beta*	*t*
relapse						-0.013	-0.193
withdrawal						-.0055	0.861*
mood modification						0.465	6.984*
conflict	Sleep disorder	0.013	30.413*	0.721	0.693	0.128	1.660
salience						0.179	2.504*
problems						-0.239	1.461
tolerance						0.195	1.070

**Significant at (α ≤0.01)*

Table (2) presented the analysis of multiple regression of the predicting of sleep disorder through the dimensions of electronic game addiction, results showed a statistical significance for the regression coefficient of withdrawal, mood modification, and salience, *R2 = 0.693* reflects that the withdrawal, mood modification, and salience explain *69.30%* of sleep disorder among Jordanian adolescents. The equation of predicting cab be as: *sleep disorder = 0.013 + (0.861* withdrawal) + (2.504* salience) + (6.984* mood modification).*

According to previous results, withdrawal, mood modification, and salience are good predictors of sleep disorder among the participants. In addition, based on *(Beta)* mood modification was the most important dimension in predicting sleep disorder. Table (3) presents the simple linear regression to predict the sleep disorder through the total degree of electronic game addiction scale:

Independent variable	Dependent variable	Constant	*f*	*R*	R^2	*Beta*	*t*
Electronic game addiction	Sleep disorder	2.383	96.710	0.551	.040	0.593	7.878

**Significant at (α ≤0.01)*

Table (3) indicated that electronic game addiction explains *40%* of the variance in sleep disorder *(R^2 = 0.40).* Thus, the equation can be as *sleep disorder = 2.383+ (0.593* electronic game addiction).*

Table 4: Pearson Correlation coefficient

Dimensions	relapse	withdrawal	mood modification	conflict	salience	problems	tolerance
Sleep disorder		0.519*	0.643*	0.249*	0.334*	0.192*	0.137
			Total electronic games addiction scale 0.665*				

**Significant at (α ≤0.01)*

Table (4) indicated a positive significant correlation between sleep disorders and the sub-dimension of electronic games addiction. The total score of electronic games addiction was found to be strongly positively correlated with a sleep disorder *(r = 0.665, p = 0.01).*

Discussion

This study was conducted on Jordanian adolescents to examine the relationship between electronic game addiction and sleep disorder. The study considers the frequent links between severe internet addiction and the emergence of addictive-like traits in adolescents. The results suggested a higher level of electronic game addiction which was

significantly associated with a higher level of sleep disorder. Results also showed that withdrawal, mood modification, and silence explained 69.30% of sleep disorders among Jordanian adolescents. Moreover, total electronic game addiction explained 40% of the variance in sleep disorder among Jordanian adolescents. The results of the study are a shred of evidence of the sleep-wake schedule that can be significantly impacted by internet addiction and other problematic internet usage behaviors, which can result in insomnia and other sleep problems. Heavy internet use is linked to insomnia and spending more time online has significantly disrupted sleep patterns.

The results of the study on the adverse effect of electronic games addiction on the sleep disorder of adolescents in the current study are comparable to a study carried out by Tereshchenko, Kasparov, Smolnikova, Shubina, Gorbacheva, and Moskalenko (2020) who reported that teens who "use the internet excessively typically have late bedtimes and early rises, shorter nightly sleep durations, longer sleep onset latency, more frequent nighttime awakenings, and more marked daytime drowsiness". Furthermore, the finding of Nguyen, Wan-Tran, and Wong (2021) presented a positive correlation between sleep disorders and gaming addiction. In addition to the findings of Zaman, Baber, Baber, Sabir, Ashraf, and Tahir et al. (2018) they showed that "gaming addiction had significantly worse subjective sleep quality, more sleep disturbance, shorter sleep duration, and more daytime dysfunction than those without a gaming addiction".

This study provides evidence that adolescent sleep issues and video game addiction are related. This analysis supported the notion that adolescent electronic video game addiction is a feasible entity with a negative association, which is an important first step toward a better understanding of the problem. By doing so, the study advocates for schools to expose adolescents to other enjoyable activities to engage in, advocates for parents of adolescents addicted to electronic video games to set specific gaming rules (such as limiting gaming time and avoiding exploration of new games), and emphasizes the significance of consulting a therapist in extreme cases. There are some limitations that researchers of future studies should be aware of. First, because all scales were self-rated, they may simply indicate a high risk of video game addiction rather than a specific diagnosis. Second, residual confounding bias is also conceivable given that this study did not account for variables related to video gaming such as pre-existing attention issues and an ADHD diagnosis. Participants may have overestimated or underestimated the answers, which could have contributed to information bias. Further research is advised to conduct a longitudinal study to better follow up on cognitive functions and other personal factors that affect adolescents' behaviours over a long period.

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