

ORIGINAL RESEARCH

Duration of Electronic Media Use May Correlate Negatively with Quality of Life of Turkish Youth with Attention Deficit Hyperactivity Disorder Diagnosis: A Single-Center, Cross-Sectional, Case-Control Study

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Abstract

Objective: First purpose of the current study is to compare the duration of electronic media usage of children with attention-deficit/hyperactivity disorder (ADHD) with healthy controls. Second aim is to investigate the effects of electronic media use on quality of life (QoL) in both groups.

Methods: Ninety-nine individuals aged between 6 and 18, diagnosed with ADHD after psychiatric examination, were investigated with regard to electronic media usage duration and QoL and compared with control group.

Results: No significant difference was found between groups regarding average daily electronic media usage (ADHD group 5.42±4.08 hours, control group 5.60±4.68 hours; $z=0.30$, $p=0.762$) except for tablet use which was higher in the control group. Adolescents used computers and cell phones significantly more than pre-adolescent children. Tablet usage duration is found to have a negative relationship with school QoL ($r=-0.399$, $p<0.001$) in ADHD group and computer use duration has a negative relationship with physical QoL ($r=-0.339$, $p<0.001$) in the control group.

Conclusion: Excessive electronic media usage may have different detrimental effects on QoL both for healthy children and children with ADHD. Taking preventive measures against excessive electronic media usage may be crucial for the healthy development and improved QoL among children instead of clinical diagnosis.

Keywords: Electronic Media, Quality of Life, Children, Adolescent, ADHD

INTRODUCTION

Electronic media devices (TV, cell phone, computer etc.) play an important role in children's daily life. Children aged between 8 and 10 years are reported to use electronic media devices for 8 hours a day. As for older children and adolescents, average daily usage exceeds 11 hours (1). Studies from Turkey revealed similar results. A nationwide research showed that children use electronic media for an average daily time of 7 hours (2). In another study, around 30% of adolescents between 12-18 years were shown to watch TV at least 4 hours a

day. In the same study, it is reported that 30% of parents did not check their children's TV watching and among the parents who check, only 22.8% were controlling the content of programs on TV (3).

There is a huge amount of data in literature about unfavorable effects of electronic media usage on children's health. Duration of TV watching was shown to have a relationship with social problems among children (4). Average TV watching duration was found to be related with obesity among girls (5). Attention problems (6), difficulties about executive functions (7), sleep problems (8), obesity (9) substance use (10) and other risky behaviors (11) were reported to be related with excessive and uncontrolled electronic media use.

Attention-deficit/hyperactivity disorder (ADHD) is a common neurodevelopmental disorder in which attention problems, impulsivity and hyperactivity are at a level incompatible with the age of the child and functionality of the child is negatively affected. ADHD is among the most frequent neurodevelopmental

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disorders of childhood and its frequency is about 7% among children (12). Longitudinal studies demonstrated that, being exposed to TV in early life is associated with ADHD signs in later years (13-14). Electronic media usage is related specifically with attention problems in ADHD (15). Related studies showed that watching TV before 2 years of age, watching adult content, watching alone are associated with ADHD in children (16-18).

There is a clearly shown link between ADHD and electronic media usage in literature, however, there are not enough studies comparing electronic media usage of children with and without ADHD. (19) Children with ADHD may have a tendency to use electronic media devices more than their neurotypical peers, since children with ADHD has attention problems and impulsivity which make them more prone to watch electronic media devices. Effects of electronic media devices on QoL of the children with ADHD is an important but poorly studied topic. Using electronic media devices may have detrimental effects on physical QoL and school QoL because of the clearly shown effects of these devices on sleep (8), body weight (9) and attention (6). To the best of our knowledge, there has not yet been a study about the relationship of QoL and electronic media usage among children with ADHD.

First aim of the current study is to compare electronic media usage duration of school age children and adolescents with ADHD and control subjects. Second aim is to evaluate the relationship of electronic media usage with QoL among children with ADHD and healthy controls.

METHODS

Participants

The sample of the current study is composed of 99 children diagnosed with ADHD and 116 children without ADHD. Children with ADHD were recruited from children who were referred to Bezmialem Foundation University Child and Adolescent Psychiatry clinics. Nearly 40% (n=38) of the children with ADHD was using medication regularly (Most of them to be long acting methylphenidate). Control group were enrolled from children who were referred to Bezmialem Foundation University Pediatric Clinic. Children with chronic health problems were excluded from the study. Written and verbal informed consents were obtained from parents and children. The study was approved by Bezmialem Foundation University Ethical Committee for Non-Interventional Studies. (20.09.2018, 54022451-050.05.04)

Procedure and Measures

The subjects who agreed to participate were evaluated with semi-structured psychiatric interview to detect psychiatric diagnoses. Then, sociodemographic data form was filled by parents. Parent form of QoL Inventory (pedsQL) was used to assess the QoL of children.

Sociodemographic Data Form: The form was arranged by researchers to inquire about sociodemographic characteristics of the sample and information about electronic media usage. Sociodemographic data consist of parental age, education, monthly income and number of children. The form also contained questions about average electronic media usage durations (TV, cell phone, tablet, computer) both for weekdays and weekends. The average media usage duration was calculated by dividing the sum of usage durations of weekdays (multiplied by 5) and weekends (multiplied by 2) to 7.

Schedule for Affective Disorders and Schizophrenia for School – Age Children – present version (K-SADS):

The K-SADS is a semi-structured psychiatric interview developed by Kaufman et al (20). The instrument was used to determine psychiatric diagnoses according to DSM-IV-TR criteria in children aged between 6 and 18 years. In the current study, we used this schedule for diagnosing ADHD. Turkish translation of this schedule was shown to be valid and reliable (21).

Pediatric Quality of Life Inventory (PedsQL): The PedsQL is a likert type measurement tool composed of 23 items (22). Each item is graded between 0 – 4 (0= “never a problem”; 4= “almost always a problem”). Among 23 items; 8 items are about physical QoL, emotional, social and school QoL have 5 items. Scores are converted to life quality score (100= “never a problem”; 0= “almost always a problem”). Total QoL is calculated by summing up the scores of subscales. We used the parent form of this inventory to determine the QoL of the subjects. Turkish translation of the inventory was found to be valid and reliable (23).

Statistical Analyses

The data of the study were analyzed with SPSS version 21.0 (Statistical Package for the Social Sciences, IBM Inc., Armonk, NY). Chi-square test is used for comparing categorical variables between groups. Shapiro Wilk test was used to determine normality of the continuous variables. Student’s t-test or Mann-Whitney U test is used for comparing continuous variables between groups. The relationships of continuous variables were analyzed by using Pearson or Spearman correlation analyses. A p value of ≤ 0.05 is used for statistical significance in all analyses.

RESULTS

Mean age of ADHD group (10.21±2.62 years) and control group (10.74±2.58 years) did not differ significantly (t=1.49, p=0.138). Sociodemographic data of ADHD and control groups did not differ significantly between the two groups. The only exception was maternal age which was significantly higher in the control group (36.93±5.18 for ADHD group, 39.09±6.36 for control group; t=2.73, p=0.007) (table 1).

Average daily electronic media usage is found to be 5.42±4.08 hours for ADHD group and 5.60±4.68 hours for control group (z=0.30, p=0.762). No significant difference was detected between groups in terms of electronic media usage durations apart from tablet usage which was higher in the control group (0.65±1.50 for ADHD group, 0.78±1.15 for control group; z=2.00, p=0.046) (table 2).

There were significant age effects on the electronic media usage for computer duration (z=4.14, p<0.001), cell phone (z=5.56, p<0.001) and total media duration (z=5.93, p<0.001). Adolescents used computer and cell phone more than preadolescents. (Figure 1)

The relationships of electronic media usage duration and QoL score in both groups were analyzed with partial correlation analyses controlled for age and gender. (table 3) There were different patters of correlations between electronic media usage duration and QoL in both groups. There were significant negative correlations between tablet use and school QoL (r=-0.399, p<0.001) in the ADHD group and computer use and physical QoL (r=-0.339, p<0.001) in the control group after multiple testing correction.

Table 1. Sociodemographic variables of the two groups

	ADHD (n=99)	Control (n=116)	Statistics
Age (years, mean±SD)	10.21±2.62	10.74±2.58	t=1.49, p=0.14
Sex (M/F)	86/13	97/19	X ² =0.44, p=0.50
Paternal age(years, mean±SD)	42.16±5.68	43.22±6.87	t=1.23, p=0.22
Paternal education (≥high school)	45.9% (n=45)	48.2% (n=54)	X ² =0.11, p=0.74
Maternal age(years, mean±SD)	36.93±5.18	39.09±6.36	t=2.73, p=0.007
Maternal education (≥high school)	36.7% (n=36)	31.0% (n=36)	X ² =0.77, p=0.38
Income (≥6000\$/year)	25.3% (n=25)	30.2% (n=35)	X ² =0.64, p=0.42
Family status (intact family)	89.9% (n=89)	93.1% (n=108)	X ² =0.72, p=0.40
Number of children	2.60±1.20	2.84±1.02	t=1.64, p=0.10

Table 2. Electronic media usage duration in the two groups

	ADHD (n=99)	Control (n=116)	Statistics
TV duration (hours, mean±SD)	2.34±2.26	2.05±1.84	z=0.88, p=0.38
Computer duration (hours, mean±SD)	1.02±1.89	0.97±1.69	z=1.30, p=0.19
Cell phone duration (hours, mean±SD)	1.41±1.82	1.80±3.01	z=0.32, p=0.75
Tablet duration(hours, mean±SD)	0.65±1.50	0.78±1.15	z=2.00, p=0.046
Total media duration(hours, mean±SD)	5.42±4.08	5.60±4.68	z=0.30, p=0.762
Total media duration (≥6 hours)	34.3% (n=34)	27.6% (n=32)	X ² =1.15, p=0.284

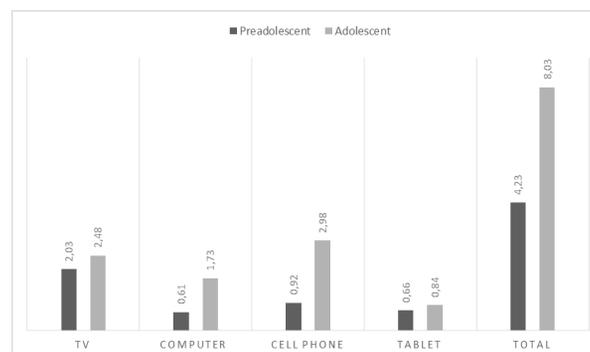


Figure 1. Comparison of electronic media usage between preadolescent and adolescent groups

*Computer duration (z=4.14, p<0.001), cell phone (z=5.56, p<0.001) and total media duration (z=5.93, p<0.001) were significantly higher in the adolescent group.

Table 3. Partial correlations between electronic media usage and quality of life (controlled for age and gender)

		Physical QoL	Emotional QoL	Social QoL	School QoL	Total QoL
ADHD group	TV duration	r=-0.055, p=0.96	r= -0.058, p=0.581	r=-0.096, p=0.365	r=-0.035, p=0.741	r=-0.081, p=0.441
	Computer duration	r=-0.237, p=0.023	r=-0.202, p=0.054	r=-0.253, p=0.015	r=-0.192, p=0.067	r=-0.300, p=0.004
	Cell phone duration	r=-0.005, p=0.96	r=-0.048, p=0.647	r=0.081, p=0.443	r=-0.104, p=0.323	r=-0.034, p=0.744
	Tablet duration	r=-0.082, p=0.439	r=-0.211, p=0.043	r=-0.094, p=0.375	r=-0.399, p<0.001	r=-0.281, p=0.007
	Total media duration	r=-0.182, p=0.083	r=-0.240, p=0.021	r=-0.181, p=0.084	r=-0.323, p=0.002	r=-0.323, p=0.002
Control group	TV duration	r=-0.067, p=0.482	r= 0.044, p=0.647	r=-0.016, p=0.863	r=0.153, p=0.106	r=0.043, p=0.65
	Computer duration	r=-0.339, p<0.001	r=0.036, p=0.706	r=-0.116, p=0.223	r=-0.001, p=0.989	r=-0.129, p=0.173
	Cell phone duration	r=-0.115, p=0.226	r=0.058, p=0.539	r=-0.18, p=0.056	r=0.089, p=0.347	r=-0.033, p=0.732
	Tablet duration	r=-0.098, p=0.304	r=-0.198, p=0.036	r=0.119, p=0.211	r=-0.159, p=0.093	r=-0.198, p=0.035
	Total media duration	r=-0.267, p=0.004	r=0.016, p=0.863	r=-0.206, p=0.029	r=0.08, p=0.398	r=-0.11, p=0.248

DISCUSSION

The results of the present study showed that children with ADHD and their non-ADHD peers do not differ in respect to electronic media usage durations except tablet use which was higher in the control group. Adolescent subjects used electronic media devices more than preadolescents in both groups.

Electronic media use duration was more than 5 hours a day in both groups, although, adolescents used electronic media devices more than a third of their day. A previous study with Turkish children (aged 6-18 years) showed an average daily electronic media usage duration of 7 hours. Although, they did not compare the duration of electronic media usage, they reported a similar pattern (increasing with age) with the present study (2). A study from USA reported a comparable pattern where adolescents are reported to use media devices more than children (1). Adolescents may have more amount of uncontrolled time by their parents. Moreover, they may have their own electronic media devices (cell phones, computers etc.). Lastly, adolescents may need to stay connected with their peers, thus this may enhance the probability to use electronic media devices for longer durations. These reasons may explain the difference between adolescents and children; however, longer duration of media use is shown to be associated with possible harmful outcomes like lower grades (1, 24), adiposity (9) and substance abuse (10,11) in adolescents. Future studies are needed to find out the reasons of high loads of media consumption among adolescents.

The present study did not show any significant difference of electronic media usage duration between children with ADHD and control group except tablet use which was higher in the control group. A study from USA with younger children reported that subjects with ADHD

watch TV and involve TV-related activities for longer time than controls (19). Another study reported that children with ADHD did not differ from non-referred children in terms of amount of TV watching (25). Therefore, total media consumption may not differ between children with ADHD and neurotypical children, however, watching patterns and detrimental effects of electronic media consumption may change. Future studies are needed to enlighten the difference of electronic media use between children with and without ADHD.

The current study revealed different correlations between electronic media use duration and QoL in two groups. Children with ADHD showed a negative correlation between tablet use duration and total media duration and school QoL which was insignificant in the control group. A study from Turkey reported lower school grades in children with ADHD who use electronic devices more than 6 hours daily (24). Electronic media use can negatively affect attention (6), executive functions (7) and sleep (8) thus school functioning in children with ADHD. Additionally, decreased physical activity may affect school functioning in children with ADHD. A study from China reported indirect relationship with physical activity and school functioning in children with ADHD (27). Interestingly, this significant relationship did not present in the control group. Children with ADHD may be vulnerable for harmful effects of electronic media use on school functioning. The present study is a cross-sectional study therefore these findings do not show a cause and effect relationship. Furthermore, we did not control possible covariates like IQ, emotion regulation, severity of ADHD symptoms. Future studies with larger samples and longitudinal design may shed light to the relationship between electronic media use and school functioning in children with ADHD.

Children without ADHD showed a different pattern of correlation between electronic media use and QoL in

which computer use duration is negatively associated with physical QoL in the control group. The relationship between electronic media use and physical functioning may be linked with heightened risk of obesity (9) or other risky behaviors (11). A study from Germany demonstrated worse QoL associated with increasing durations of computer/internet and cell phone usage (28). Another study with Australian adolescents showed that electronic media use (especially video gaming) was associated with poorer quality of life (28). The mechanism of the link between physical QoL and electronic media use is not clear, more studies focusing on mediators and moderators of this link may enlighten this relationship. Interestingly, this relationship was not present in the ADHD group. Children with ADHD may be more vulnerable for school functioning though more resilient for physical functioning, which may be opposite in typically developing children. Differential effects of electronic media use on functioning in children with ADHD and healthy subjects is an issue that requires further research.

The present study has several limitations. At the onset, sample size was relatively small. Secondly, cross-sectional design of the study limits the ability to infer cause and effect relationship. Thirdly, we did not search for different components of media usage in our study such as content and environment. Fourthly, we did not measure electronic media usage duration directly, we simply asked the parents about duration. Fifthly, we did not evaluate for confounding factors (motor competence, sleep problems etc.) which may have effects on our results. Lastly, all of the sample were collected from one center which may restrict generalizability of the findings. However, Bezmialem University Hospital is a large reference center in Istanbul, thus, children may have come from different parts of Istanbul and nearby cities. Additionally, control group was selected from the same population which is an appropriate group to compare. Future studies with more sophisticated and detailed design and preferably with larger samples are needed to clarify the negative relationship between electronic media usage duration and life quality.

CONCLUSION

Our research showed that electronic media usage durations of children with ADHD group were not higher than non-ADHD controls. However, they may have kind of risks which may underlie worsening functioning with higher duration of electronic media usage. Heavy electronic media use

and its detrimental effects on children's functioning should have more attention since electronic media use has shown to increase year by year in children.

Ethics Committee Approval: The study was conducted according to the guidelines of the Declaration of Helsinki and approved by the Bezmialem Foundation University Non-Interventional Clinical Research Ethics Committee (protocol number: 54022451-050.05.04 on 2018).

REFERENCES

- [1] Rideout VJ, Foehr UG, Roberts DF. Generation M: Media in the Lives of 8-to 18-Year-Olds. A Kaiser Family Foundation Report, Menlo Park, CA, 2010.
- [2] Radio and Television Supreme Council (RTUK). A Study on Children's Media Usage Habits in Turkey. RTUK Public Opinion, Broadcast Research and Measurement Department, Istanbul, 2013.
- [3] Ministry of National Education (MEB). Television Watching Habits of Students. Ministry of Education, Research and Development Department, Ankara, 2008.
- [4] Ozmert E, Toyran M, Yurdakok K. Behavioral correlates of television viewing in primary school children evaluated by the child behavior checklist. *Arch Pediatr Adolesc Med.* 2002; 156(9):910-914.
- [5] Toyran M, Ozmert E, Yurdakok K. Television viewing and its effect on physical health of school-age children. *The Turkish Journal of Pediatrics.* 2001; 44(3):194-203.
- [6] Swing EL, Gentile DA, Anderson CA, Walsh DA. Television and video game exposure and the development of attention problems. *Pediatrics.* 2010; 126(2):214-221.
- [7] Hummer TA, Kronenberger WG, Wang Y, Anderson CC, Mathews VP. Association of television violence exposure with executive functioning and white matter volume in young adult males. *Brain Cogn.* 2014; 88: 26-34.
- [8] Becker SP, Lienesch JA. Nighttime media use in adolescents with ADHD: links to sleep problems and internalizing symptoms. *Sleep medicine.* 2018; 51: 171-178.
- [9] Staiano AE, Harrington DM, Broyles ST, Gupta AK, Katzmarzyk PT. Television, adiposity, and cardiometabolic risk in children and adolescents. *Am J Prev Med.* 2013; 44(1): 40-47.
- [10] Hanewinkel R, Sargent JD. Longitudinal study of exposure to entertainment media and alcohol use among German adolescents. *Pediatrics.* 2009; 123(3): 989-995.
- [11] Gruber EL, Wang PH, Christensen JS, Grube JW, Fisher DA. Private television viewing, parental supervision, and sexual and substance use risk behaviors in adolescents. *J Adolesc Health.* 2005; 36(2):107.
- [12] Thomas R, Sanders S, Doust J, Beller E, Glasziou P. Prevalence of attention-deficit/hyperactivity disorder: a systematic review and meta-analysis. *Pediatrics* 2015; 135(4): e994-e1001.
- [13] Foster EM, Watkins S. The value of reanalysis: TV viewing and attention problems. *Child Dev.* 2010; 81(1):368-375.

- [14] Zimmerman FJ, Christakis DA. Associations between content types of early media exposure and subsequent attentional problems. *Pediatrics* 2007; 120(5):986-992.
- [15] Nikkelen SW, Valkenburg PM, Huizinga M, Bushman BJ. Media use and ADHD-related behaviors in children and adolescents: A meta-analysis. *Dev Psychol.* 2014; 50(9):2228-2241.
- [16] Anderson CA, Bushman BJ. Effects of violent video games on aggressive behavior, aggressive cognition, aggressive affect, physiological arousal, and prosocial behavior: A meta-analytic review of the scientific literature. *Psychol Sci.* 2001; 12(5):353-359.
- [17] Lang A, Zhou S, Schwartz N, Bolls PD, Potter RF. The effects of edits on arousal, attention, and memory for television messages: When an edit is an edit can an edit be too much? *J Broadcast Electron Media* 2000; 44(1):94-109.
- [18] Beaver KM, DeLisi M, Vaughn MG, Wright JP, Boutwell BB. The relationship between self-control and language: evidence of a shared etiological pathway. *Criminology.* 2008; 46(4):939-970.
- [19] David Acevedo-Polakovich I, Lorch EP, Milich R. Comparing television use and reading in children with ADHD and non-referred children across two age groups. *Media Psychology* 2007; 9(2); 447-472.
- [20] Kaufman J, Birmaher B, Brent D, Rao U, Flynn C, Moreci P. Schedule for affective disorders and schizophrenia for school-age children-present and lifetime version (K-SADS-PL): Initial reliability and validity data. *J Am Acad Child Adolesc Psychiatry* 1997; 36(7):980-988.
- [21] Gokler B, Unal F, Pehlivanurk B, Kultur EC, Akdemir D, Taner Y. Reliability and validity of Schedule for affective disorders and schizophrenia for school age children-present and lifetime version Turkish version (K-SADS-PL-T). *Turkish Journal of Child and Adolescent Mental Health* 2004; 11(3):109-116.
- [22] Varni, James W.; Seid, Michael; Kurtin, Paul S. PedsQL™ 4.0: Reliability and validity of the Pediatric Quality of Life Inventory™ Version 4.0 Generic Core Scales in healthy and patient populations. *Medical care.* 2001; 39(8): 800-812.
- [23] Sonmez, S.; Basbakkal, Z. Validity and Reliability Study of the Pediatric Quality of Life 4.0 Inventory of Turkish Children (PedsQL 4.0). *Türkisch Clinics J Pediatr.* 2007; 16: 229-237.
- [24] Gormez, V, Orengul AC. Assessment of electronic media use in children and adolescents with attention deficit hyperactivity disorder. *Anadolu Psikiyatri Dergisi* 2017; 18(5): 495-503.
- [25] Milich R, Lorch EP. Television viewing methodology to understand cognitive processing of ADHD children. In T. H. Ollendick & R. J. Prinz (Eds.), *Advances in Clinical Child Psychology* 1994; Vol. 16, pp. 177–201, New York: Plenum.
- [26] Christakis DA, Zimmerman FJ, DiGiuseppe DL, McCarthy CA. Early television exposure and subsequent attentional problems in children. *Pediatrics* 2004; 113: 708–713.
- [27] Li R, Liang X, Liu F, Zhou Z, Zhang Z, Lu Y, Yang, B. Mediating Effect of Motor Competence on the Relationship between Physical Activity and Quality of Life in Children with Attention Deficit Hyperactivity Disorder. *BioMed Research International*, 2021.
- [28] Poulain Tanja, et al. Reciprocal Longitudinal Associations Between Adolescents' Media Consumption and Psychological Health. *Academic pediatrics.* 2018 ;19(1):109-117.