Original Article

Screen media and academic performance in the seventh graders

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Abstract

Background Excessive screen media exposures have many negative impacts on children, including academic performance. Studies on the impacts of screen media on academic performance have been limited, especially in Indonesia.

Objective To assess screen media use and academic performance of 7th graders in a junior high school, and to evaluate other factors potentially affecting student academic performance.

Methods This was a cross-sectional study using surveys, questionnaires, and 12-day logbooks, conducted from May to July 2012. Students were 129 students in the 7th grade of Junior High School 115 in Jakarta and selected by consecutive sampling. Chi square test and multivariate analyses with logistic regression calculations were used for statistical analysis.

Results The prevalences of students using screen media for >2 hours per day were 39.5% on weekdays and 64.3% on weekends. The prevalence of students using screen media that was not appropriate for their age was 69% on weekdays and 63.6% on weekends. Screen media content on weekdays and weekends had no impact on academic performance (OR 0.56; 95%CI 0.26 to 1.20; P=0.136 and OR 0.97; 95%CI 0.47 to 1.00; P=0.934, respectively). In addition, the duration of screen media use on weekdays and weekends had no association with academic performance (OR 0.60; 95%CI 0.30 to 1.23; P=0.161 and OR 0.90; 95%CI 0.44 to 1.86; P=0.782, respectively). Factors significantly associated with students' above average academic performance were female gender (OR 3.26; 95%CI 1.38 to 7.74; P=0.007), superior intelligence quotient (IQ) compared to average IQ (OR 4.63; 95%CI 1.66 to 12.9; P=0.003), highly superior IQ compared to average IQ (OR 5.45; 95%CI 1.51 to 19.64; P=0.009), as well as achievement motivation and existence of learning strategy, including intermediate vs. low motivation (OR 4.09; 95%CI 1.14 to 14.7; P=0.031), and high vs. low motivation (OR 61.1; 95%CI 7.42 to 502.95; P<0.001); lack of emotional and behavioral problems (OR 0.45; 95%CI 0.37-0.54; P=0.01); and democratic parenting style (OR 0.45; 95%CI 0.37 to 0.55; P=0.022).

Conclusion There is no association between screen media use and academic performance in junior high school students. Factors significantly associated with above average academic performance are female gender, superior and very superior IQ score, middle and high achievement motivation and learning strategy, lack of emotional and behavioral problems, and democratic parenting style. [Paediatr Indones. 2014;54:155-61.].

Keywords: screen media, academic performance, student

Many children spend more time watching television (TV) than other activities, including learning. Data obtained by AC Nielsen in 2002 showed that Indonesian children spent about 30-35 hours/week or 1,560-1,820 hours/year watching TV,[1] far higher than the American Academy of Pediatrics (AAP) recommendation of not more than 2 hours per day.[2] Time spent watching TV should be used to engage in other activities, such as learning and playing.[3]

The negative impacts of excessive TV viewing has been well documented in various studies: children who watch TV longer than the recommended duration may have excess weight,[4] tend to engage in violence,[5] early sexual intercourse,[6] and attention problems.[7] However, the impacts of watching TV on academic performance is unclear, as other factors may affect students' academic performance, not only watching TV.[8] As more types of screen media, such as the internet and computer games, became popular, children's use of screen media has increased.[9]

Studies on the impacts of screen media on academic performance have been limited, especially in Indonesia. The majority of existing studies examined only one type of screen media, TV, and their results are mainly discussed in terms of the time spent, regardless of the content.[10] The primary objective of this study was to investigate the patterns of screen media use, both the duration and content, by 7th grade students in a junior high school, and assess for an association to their academic performance. The secondary objective was to evaluate other factors that may affect their school performance.

Methods

This cross-sectional study was conducted in Junior High School 115, Jakarta, between May to July 2012. We included 7th grade students whose parents/guardians allowed them to join the study and agreed to answer the questionnaires honestly. We excluded students with chronic diseases. Students were collected by consecutive sampling. We chose only one school to avoid school bias as the quality of education in different school affecting students' academic achievement. We chose Junior High School 115 in Jakarta due to its ease of access, ease of obtaining permission for the study, and IQ score data availability. Seventh graders were chosen as students of our study. The youngest students were 11 year old, an age at which questionnaires can be filled independently.

We used surveys completed by students' parents to determine the characteristics of students. We also used three kinds of questionnaires. The first was a parenting style questionnaire designed by Robinson *et al*. in 1995.[11] We translated it into Indonesian and performed a reliability test using Cronbach's α. The questionnaire was completed by students' parents, who were then classified by their responses into either democratic, authoritarian, or permissive parenting style. The achievement motivation and learning strategies questionnaire was designed by Winedar in 2003,[12] a modification of the *motivated strategies for learning questionnaire* (MSLQ) by Pintrich *et al*. in 1991.[13] The students completed this questionnaire, after which the results were classified into low, medium, and high motivation. The strength and difficulties questionnaire (SDQ) was used to measure emotional and behavioral problems and was completed by the students.

We also asked students to record their screen media use for 12 days in a log book. The log book contained types of screen media (TV/video games/computer games/internet), the title of the screen media program, the age-appropriateness of the screen media, the duration of screen media use, and the person who accompanied the subject. We divided the screen media use period into ≤ 2 hours/day and >2 hours/days. We then established whether the type of screen media program was appropriate for their age, using the provisions of the Movie Censors Institution of Indonesia, Motion Picture Association of America (MPAA), entertainment software rating board (ESRB) for video games, and a variety of websites such as *www.commonsense.com*. We also collected students' IQ score data assessed during the first school semester. The second semester report card scores were used to assess academic performance.

Data was processed with SPSS version 19.0. Descriptive data is presented in text and tables. The first step of statistical analysis was bivariate analysis between dependent and independent variables (including screen media content and duration on weekdays and weekends) using Chi square test. Subsequently, independent variables with P < 0.25 were used for a multivariate analysis with logistic regression test. This study was approved by the Ethics Committee of Cipto Mangunkusumo Hospital.

Results

A total of 129 students met the study criteria. The mean report card score was 86.9 (SD 2.5), with 61 under average (47.3%) and 68 above average students

(52.7%). Characteristics of the subjects are shown in **Table 1**.

For 12 days (5 weekend days and 7 weekdays) all students filled their logbooks. Among the variety of screen media, students on average used more time to watch TV, both on weekdays and weekends. On weekdays, students spent an average of 64.8% of their screen media time watching TV, 18.5% on the internet, and 16.8% on video games. On weekends, students spent 64.6% of their screen media time watching TV, 15.9% on the internet, and 19.5% on video games. They also spent more time using screen media on weekends (168 minutes per day) than on weekdays (115 minutes per day). The occurence of

Table 1. Subjects' characteristics

Characteristics	n = 129
Gender, n (%)	
Male	60 (46.5)
Female	69 (53.5)
Age, n (%)	
11 years	4 (3.1)
12 years	76 (58.9)
13 years	49 (38)
Mother working outside home, n (%)	
Yes	71 (55)
No	58 (45)
Maternal education level, n (%)	
Primary	0 (0)
Secondary	20 (15.5)
Tertiary	109 (84.5)
Family income, n (%)	
Low	1 (0.8)
Low-middle	39 (30.2)
Middle-high	78 (60.5)
High	11 (8.5)
Family structure, n (%)	
Single parent	2 (1.6)
Nuclear family	98 (76)
Extended family	29 (22.5)
Parenting style, n (%)	
Democratic	124 (96.1)
Non-democratic	5 (3.9)
Achievement motivation and learning strategy, n (%)	
Low	20 (15.5)
Middle	92 (71.3)
High	17 (13.2)
Emotions and behavior, n (%)	
Normal	123 (95.3)
Abnormal	6 (4.7)
IQ score, n (%)	
Average	11 (8.5)
Above average	27 (20.9)
Superior	67 (51.9)
Very superior	24 (18.6)
Extra curriculum lessons, n (%)	
Yes	98 (76)
No	31 (24)

Table 2. Students' screen media use

Characteristics	n = 129
TV in home, n (%)	
Yes	129 (100)
No	0 (0)
Computer in home, n (%)	
Yes	127 (98.45)
No	2 (1.55)
TV in room, n (%)	
Yes	53 (41.1)
No	76 (58.9)
Computer in room, n (%)	
Yes	79 (61.2)
No	50 (38.8)
Internet access in room, n (%)	
Yes	66 (51.2)
No	63 (48.8)
The first age of screen media use, n (%)	
<2 years old	63 (48.8)
≥2 years old	66 (51.2)
Parental restriction of screen media time use on weekdays, n (%)	
Yes	122 (94.6)
No	7 (5.4)
Parental restriction of screen media content on weekdays, n (%)	
Yes	121 (93.8)
No	8 (6.2)
Parental restriction of screen media time usage on weekend, n (%)	
Yes	91 (70.5)
No	38 (29.5)
Parental restriction of screen media content on weekend, n (%)	
Yes	108 (83.7)
No	21 (16.3)
Duration of screen media use (weekdays), n (%)	
≤2 hours/day	78 (60.5)
>2 hours/day	51 (39.5)
Duration of screen media use (weekends), n (%)	
≤2 hours/day	46 (35.7)
>2 hours/day	83 (64.3)
Screen media content (weekdays), n (%)	
Age-appropriate	40 (31)
Including not age-appropriate	89 (69)
Screen media content (weekends), n (%)	
Age-appropriate	47 (36.4)
Including not age-appropriate	82 (63.6)

students using screen media for >2 hours per day were 39.5% on weekdays and 64.3% on weekends. The occurence of students using non-age appropriate screen media was 69% on weekdays and 63.6% on weekends. Subjects' screen media use is shown in **Table 2**.

The relationship between academic performance and potentially affecting factors are shown in **Table 3**. Of the independent variables considered to be factors

affecting academic performance, nine variables had a value of P <0.25 in bivariate analysis, so these were included in a multivariate analysis. The nine factors were gender, IQ scores, achievement motivation and existence of learning strategies, maternal education level, maternal occupation, family structure, family income, duration of screen media use on weekdays, and screen media content on weekdays. Multivariate analysis revealed the factors that significantly

Table 3. Association between independent variables and academic performance

Variables	Report card scores		OR (95%CI)	P value
	Under average	Above average		
Gender				
Male	38	22	3.46 (1.67 to 7.14)	0.001
Female	23	46		
IQ score				
Average	26	12	2.25 (0.66 to 7.64)	0.007
Superior	27	40	5.75 (1.22 to 27.17)	
Very superior	8	16		
Achievement motivation and learning strategy				
Low	15	5	5.03 (1.25 to 20.25)	0.001
Middle	44	48	99.76 (7.58 to 1313.5)	
High	2	15		
Emotional and behavioral problems				
Normal	55	68	0.45(0.37 to 0.54)	0.01
Abnormal	6	0		
Extra curriculum lessons				
Yes	47	51	1.12(0.5 to 2.52)	0.786
No	14	17		
Maternal education level				
Secondary	13	7	2.36(0.87 to 6.38)	0.084
Tertiary	48	61		
Working mother				
Yes	37	34	0.65(0.32 to 1.30)	0.224
No	24	34		
Family structure				
Nuclear family	42	56	0.47(0.21 to 1.08)	0.073
Non-nuclear family	19	12		
Parenting style				
Democratic	56	68	0.45(0.37 to 0.55)	0.022
Non-democratic	5	0		
Family income				
Low-middle	17	23	0.24(0.06 to 0.93)	0.222
Middle-high	41	37	2.23 (0.18 to 27.63)	
High	3	8		
Duration of screen media use (weekday)				
≤2 hours/day	33	45	0.60(0.30 to 1.23)	0.161
>2 hours/day	28	23		
Duration of screen media use (weekend)				
≤2 hours/day	21	25	0.90(0.44 to 1.86)	0.782
>2 hours/day	40	43		
Screen media content (weekday)				
Age-appropriate	15	25	0.56(0.26 to 1.20)	0.136
Including not age-appropriate	46	43		
Screen media content (weekend)				
Age-appropriate	22	25	0.97(0.47 to 1.99)	0.934
Including not age-appropriate	39	43		

associated with students' above average academic performance were female gender, superior and highly superior IQ score, middle and high achievement motivation and learning strategy, lack of emotional and behavioral problems, and democratic parenting style.

Discussion

Our results can be used to provide an overview of screen media use by junior high school students of similar characteristics, and their academic performance. Since we used students from only one school, school as an important factor influencing academic performance can be removed. The results of this study do not represent all junior high school students in Jakarta since students were from only one school, a top school in Jakarta.

We used students' second semester grades to assess their academic performance. Student report cards containing teacher assessments, based on the students' test results and daily activities, are indicators of academic performance that are easy to assess.[14]

Barr-Anderson *et al.* found that two-thirds of their students had TVs in their rooms,[15] while in our study almost half of the students had TVs in their rooms. All students in our study had TVs in their homes, and 41.1% of students had TVs in the bedroom. This finding indicates that TV is no longer considered to be a luxury item, but a necessity, as corroborated by a survey conducted by the Central Statistics Bureau of Indonesia in 2009, in which 90.27% of the population aged over 10 years watched TV.[16]

Approximately half of our students (51.2%) had internet access in their rooms. In addition, almost all students (98.45%) had computers at home and 61.2% of students had computers in their room. The large number of students with a home computer indicated that the computer was a necessity for them, probably due to computer courses and schoolwork requiring a computer. This finding was far above the results of a BPS Indonesia survey in 2010, which found that only 18.53% of households in Jakarta had computers and 16.5% had laptops.[16]

The AAP recommended screen media use for children from the age of 2 years upwards and not prior to 2 years.[2] In our study, based on the answers of students' parents, almost half of students used screen media for the first time prior to reaching 2 years of age.

We distinguished between screen media use on weekdays and weekends. Almost all students' parents stated that they limited their children's time and content of screen media use on weekdays, although we did not determine the details of parents' restrictions or the permissible screen media content. According to Vandewater *et al.*, TV and other screen media presence in students' rooms reduced parents' supervision and increased students' screen media use.[17]

Various factors can influence a child's screen media use, such as the cognitive development, interest, and motivation of a child, screen media presence in a child's room, and family factors (family screen media use, parental education level, family structure, and parental employment status).[18] We did not analyze the factors affecting students' screen media use.

Based on multivariate analysis, factors that were significantly associated with students' above average academic performance were female gender, superior and very superior IQ scores, middle and high achievement motivation and learning strategies, lack of emotional and behavioral problems, and democratic parenting style. Screen media content and duration of use on weekdays and weekends, maternal education level, maternal working outside the home, family income, and engage in extra curriculum lessons were not associated with above average academic performance.

We found no association between duration of students' screen media use and academic performance. In contrast, Hancox *et al.*[19] and Sharif *et al.*[9] found that risk ratios for each hour of TV viewing per weeknight, adjusted for IQ and gender, were 1.43 (95%CI 1.24 to 1.65) and 0.75 (95%CI 0.67 to 0.85), respectively (both, P <0.001). Sharif *et al.* also found that the cumulative odds of poorer school performance increased with higher weekday TV screen time and cable movie channel availability.[9] These results may differ due to the IQ superiority of most of the students in our study.

We also found no association between screen media content and academic performance. In contrast, Sharif *et al.* found that school children who watched adult movies had poorer academic performance.[9] Several possible reasons may explain

these differences. First, we determined the type of screen media content based on age appropriateness, not based on its educational value. Determination based on age was not necessarily suitable for all children, since age appropriate screen media did not necessarily mean the content was of high quality. It is difficult to determine the educational value of screen media content, as it is subjective. Second, although some students were accompanied by adults during the use of screen media, these adults did not necessarily co-view the contents. Third, determination of screen media age category may be differ between countries.

Although there was no association between screen media use and academic performance, we do not believe that children can use screen media without restriction. Other influences, such as violent content, have been shown to negatively affect behavior.[5,20] Adequate information and education should be provided to parents and children.

Many factors affect academic performance, making it difficult to assess quantitatively. As such, a qualitative study may be an option, as its approach for data gathering uses various means, and not obtained through statistical procedures or other forms of calculation. Qualitative tools include observation and in-depth interviews in the form of groups, documents, books, video tapes, and data collected for other purposes, such as census data. Qualitative research is more subjective than quantitative research and its quality depends on the ability, experience, and sensitivity of the researcher or moderator.[21]

In conclusion, screen media use is not associated with academic performance of junior high school students. We suggest further studies on students of public schools as well as qualitative studies.

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