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Full Length Research Paper

Dietary intake, watching television, playing games internet and academic achievement in selected Indonesian Elementary School Children

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Dietary intake and children's daily habits affect children concentration and academic achievement. Television and internet are kind of media which have positive and negative impacts. The purpose of this study was to determine correlation between dietary intake, watching television, playing game and academic achievement. It was also hypothesized that type of school correlated with children's academic achievement. A cross-sectional study was conducted on a total of 89 children in the sixth grade at different school types (Islamic, private and public). Subjects from three (3) classes of sixth grade were listed for each school and were collected by a simple random sampling. Academic achievement was derived from four (4) subjects, Mathematics, Indonesian language, Natural and Social sciences for one (1) year. Dietary intake was assessed by means of 24-hour recall. The highest mean score of academic achievement was private (86.41), followed by Islamic (81.46) and public school (77.00). In general, the mean intake of energy, carbohydrate and protein among all students are still below the recommended dietary allowance, particularly in public school. Results from the multivariate analyses showed the most dominant variable associated with academic achievement was playing game after controlled by the types of school, length of watching television, nutritional status, protein intake, snack habit and parent's educational level. These results suggest that an increasing children's academic achievement need collaboration between policymakers, educators, parents, and others who work with school children about the impact of games internet and television and implement school meal programs on children particularly public and Islamic school.

Key words: Dietary intake, television, game internet, academic achievement, children.

INTRODUCTION

Being future of nation, children need to grow and develop. Serious concern providing balance and adequate nutrient intake are essential to support their growth. Lack of supporting nutritional and environmental factors interfere their development and performance during school age. Research on child development showed that malnutrition is associated with delay in motor skills, cognitive deficits and decrease in school performance. Negative academic and psychosocial outcomes are associated with family-level food insufficiency (Alaimo, 2001).

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Since health and learning are related, academic achievement can't be obtained with poor health condition. Sick children can't learn the lessons well, and without good education their knowledge and behavior will be affected. Food intake is directly related with nutritional status. Kesari (2010) concluded that undernourished children have deficit on cognitive development, such as attention, executive function, the ability to compute, visual-perceptual ability, long-term learning, memory and intelligence. Kleinman (2002) found that children with lower dietary intakes had lower academic score than children with 'adequate dietary intakes.

School meal programs play important role in nutritional adequacy of students' diets. Adequate nutrient intake at breakfast is associated with increasing academic score, reducing the possibility of coming late and being absent

from school. No breakfast habit has been reported in substantial deficits in dietary intake of a variety of essential nutrients (Chen, 2000).

Energy is required to sustain life, growth and physical activity. Basic Health Research in Indonesia has reported that children aged 7-12 years consume energy and protein below the minimum requirement. That study also showed that high prevalence of wasting at the age of 6-12 years indicates learning disorders of approximately one third elementary school students (Ministry of Health Indonesia, 2010).

Television and internet are quite common in the lives of children and influence their development. For school children, their habit in watching television and playing games during the school day can interfere with their learning activities. Borzekowski DL (2005) found that having a bedroom television set was significantly and negatively associated with students' test scores, while home computer access and use were positively associated with the scores.

One of the recent vigorous developments is the using of internet as game online. At present, the internet has become a part of life, and the internet café becomes an emerging industry and has brought about many unexpected social problems and negative effects especially for school children both in urban and rural areas. Chan (2006) reported that there was significant association between time spent playing games for more than one hour a day and YIAS (Young's Internet Addiction Scale) ($p<0.001$). A study in Taiwan children found that males get higher internet café addiction scores than females (Wu, 2007).

Educational programs are positively associated with overall measures of achievement and with potentially long-lasting effects, while purely entertainment content particularly violent content, is negatively associated with academic achievement (Kirkorian, 2008). Anderson (2005) found that children's exposure to television during the preschool years is predictive of academic outcomes during adolescence. Adolescents whose parents permitted their children to watched more educational programming when they were young are more likely to have higher grades, read more books, place greater value on achievement and show more creativity. The purpose of this study was to determine correlation between dietary intake, watching television, playing game and academic achievement of elementary school children.

MATERIALS AND METHODS

Study design

This study was carried out in three (3) different types of elementary schools (public, private and Islamic schools) in Depok city, West Java, Indonesia. Data for this cross sectional study on the sixth grade of children in three different school types in Depok City, West Java were collected by a simple random sampling method. The selection of school was based on the highest academic score among each type of school (Islamic, private and public) made by Ministry of Education Office at district level. Based on sample size calculations, the required sample size was found to be 30 subjects for each school. The subjects were taken from their score in the sixth grade, followed with the national examination level. Subjects from three (3) classes of sixth grade were listed for each school. Academic achievement was measured by the average score of students for one (1) year. The score was derived from four (4) subjects, Mathematics, Indonesian language, Natural and Social sciences. Of the total of 90 subjects, 89 were eligible and were included in the study.

Permission and other administrative requirements for conducting the study were obtained from relevant institutions. Ethical clearance was obtained from the Ethics Committee of the Faculty of Public Health at the University of Indonesia. Prior to the study, the respondents were informed about the purpose of the study and requested to give a signed informed consent form for voluntary participation. All information obtained from the respondents was considered as confidential.

Data collection

Data were collected by the researcher and three (3) trained nutritionists through individual interviews using a standardized questionnaire. The general questionnaire asked questions on individual characteristics (sex, age), student behavior (dietary intake, breakfast and snack habit, watching television and playing game) and parental characteristics (level of education and occupation). Dietary intake was assessed using a 24-hour recall questionnaire to estimate total intake of nutrients including carbohydrate, fat and protein. The nutrient intake was quantified using an extended version of the Nutrient Calculation Software as the Indonesian food composition database.

The recommended dietary allowance of energy and protein intake for children aged 7-9 years is 1800 kcal/day and 45 grams/day, while for 10-12 years is 2050 kcal/day and 50 grams/day. Nutrient intakes were compared with recent Indonesian dietary reference values. The intake of energy, fat, carbohydrate and protein were divided into two (2) categories, namely "less" (less than recommended dietary allowance/RDA) and "adequate" (more than RDA).

Weight and height were measured and body mass index (BMI) was calculated as weight in kilograms divided by the square of the height in meters (kg/m^2). Body weight was measured using an electronic personal weight scale (model SECA 843, Volgel and Halke and Co Germany, with

Table 1. Mean of academic achievement score and nutrient intake of subjects among the schools.

Variables	Public school		Islamic school		Private school	
	Mean±SD	Min-Max	Mean±SD	Min-Max	Mean±SD	Min-Max
Mean of score	**77.00±7.56**	**62.50 – 87.50**	**81.46±9.40**	**64.25 – 97.00**	**86.40±7.44**	**65.50 – 95.50**
Energy intake (Kcal)	1344.63±379.66	678.50 – 2235.20	1448.63±298.02	815.60 – 1997.50	1479.87±283.94	988.90 – 2361.60
Carbohydrate intake (%)	48.92±9.82	25.37 – 76.11	50.66±8.43	35.71 – 67.22	51.17±7.51	36.72 – 68.66
Protein intake (g)	48.65±15.46	18.10 – 75.90	47.61±12.36	24.80 – 77.00	57.31±15.30	25.00 – 99.40
Fat intake (%)	36.13±9.83	13.26 – 58.07	35.60±9.07	20.22 – 55.01	32.93±6.87	20.09 – 46.53

an accuracy of 0.1 kg), while height was determined by a microtoise tape (Xenical Orlistat, with an accuracy of 0.1 cm). BMI-for-age was plotted on sex-growth charts. BMI-for-age of the subject was divided into 4 groups: Obese (BMI-for-age≥95th percentile), overweight (85th - 95th percentiles), normal (5th -85th percentiles) and underweight (<5th percentile) (Centers for Disease Control and Prevention, 2000).

Data analysis

Descriptive data analysis was undertaken to determine the proportion of categorical data and mean values of continuous data (univariate analysis). Independent t-test with significant level of $p<0.05$ was performed to identify association between categorical and continuous data (bivariate analysis). All analyses were conducted with SPSS 11.5 for Windows (SPSS Inc., Chicago, IL). As for multivariate analysis, logistic regression was applied to assess the independent variable that is most influential to the dependent variable (academic achievement). The initial regression analysis was performed to select candidate variables. Based on p value of less than 0.250 and theoretical knowledge on factors known to influence on academic achievement, the candidate variables included type of school, sex, nutritional status, dietary intake, snack habit, breakfast habit, watching television, length of watching television playing game, length of playing game, father's educational level and mother's educational level. Then using stepwise method, all candidate variables were entered in the initial analysis of logistic regression. Any variable with p value more than 0.05 was excluded from the model one by one starting from the variable showing the highest p value.

RESULTS

Academic Achievement

The highest score of academic achievement was found from private school (86.41), followed by Islamic school (81.46) and public school (77.00). In general, there were 'less' energy and carbohydrate intake and 'adequate' fat intake. The intake of energy, protein, and carbohydrates in private school students were found higher than among two (2) other schools. The highest intake of fat was found in the public school students. The mean of energy intake was 1423.76 kcal, 51.12 gram of protein, 50.24% of carbohydrates and 34.91% of fat intake among all subjects (Table 1).

Students from public school were found 'less' nourished (16.7%) than Islamic school (13.3%) and private school (10.3%). The proportion of 'obese' (> 95th percentile) was highest among private school students (17.2%) and followed by Islamic (10.0%) and public school students (6.7%). Most of respondents have breakfast daily (77.5%) and snack habit (50.2%) (Table 2).

The highest proportion of the father/mother's educational background from private school was university graduate, while from both the public school and Islamic students were high school graduate. The proportion of working mothers of private school, public school and Islamic school students were 51.7%, 40% and 10% respectively.

The proportion of snacking habit was highest among Islamic school students (60%), followed by public school (46.7%) and private school students (41.4%). The proportion of public school students watched television 'everyday', more than among Islamic and private school students. However, the proportion of playing game was highest among private school students, followed by public and Islamic school students (Table 2).

The mean scores of academic achievement were higher in subjects with 'adequate' protein intake, 'seldom' snacking habit, watching television 'not everyday', playing game 'seldom' and play the game for less than 2 hours a day ($p<0.05$).Table 2 showed that both public school and Islamic school students with 'less' nutritional status have 'low' scores of academic achievement. For public school students, the academic achievement scores of those who have breakfast daily were higher than those who do not.

Table 2. Mean of academic achievement score of subjects by sex, dietary intake, watching televisionand playing game among the schools.

Independent Variables	Public School (n=30) (mean± SD)	Islamic School (n=30) (mean± SD)	Private School (n=29) (mean± SD)	Total (n=89) (mean± SD)
Sex				
Boys	75.7 ± 7.1	80.2± 11.3	84.4 ± 8.7	80.6 ± 9.5
Girls	77.5 ± 7.9	81.9 ± 8.9	87.8 ± 6.3	82.0 ± 8.7
Nutritional Status				
Not Less (≥ 5th percentile)	83.25 ± 3.49	88.31 ± 3.15	78.75 ± 11.91	83.81 ± 6.89*
Less (< 5th percentile)	75.75 ± 7.56	80.40 ± 9.63	87.29 ± 6.53	81.22 ± 9.23
Energy intake				
Less (< RDA)	76.7 ± 7.9	81.1 ± 9.6	84.5 ± 11.1	81.4 ± 9.2
Adequate (≥ RDA)	79.2 ±1.4	86.8 ± 0.7	86.5 ± 7.4	82.9 ± 5.9
Carbohydrate intake				
Less (< RDA)	75.4 ± 9.8	80.6 ± 9.7	86.1 ± 7.8	81.4 ± 8.7
Adequate (≥ RDA)	77.6 ± 6.8	82.7 ± 9.2	87.5 ± 6.6	81.8 ± 9.6
Protein intake				
Less (< RDA)	75.7 ± 8.3	78.0 ± 9.5*	86.2 ± 8.2	78.7 ± 9.1**
Adequate (≥ RDA)	78.7 ± 6.4	86.6 ± 6.7	86.7 ± 5.2	84.2 ± 8.0
Fat intake				
Less (< RDA)	74.7 ± 8.7	81.0 ± 9.7	86.0 ± 8.5	81.1 ± 9.1
Adequate (≥ RDA)	77.6 ± 7.5	82.3 ± 9.2	87.0 ± 5.5	82.2 ± 8.8
Breakfast habit				
Not daily	68.4 ± 2.7**	80.9 ± 12.2	85.2 ± 7.1	79.3 ± 10.8*
Daily	78.7 ± 7.0	81.6 ± 8.5	86.8 ± 7.7	82.2 ± 8.3
Snack habit				
Often	74.8 ± 8.3	80.9 ± 10.2	83.3 ± 8.9*	79.6 ± 9.7*
Seldom	78.9 ± 6.5	82.2 ± 8.4	88.6 ± 5.5	83.5 ± 7.8
Watching television				
Not Everyday	78.0 ± 6.8	83.8 ± 7.9	87.2 ± 5.3	83.0 ± 6.7**
Everyday	76.5 ± 8.0	78.8 ± 10.5	85.4 ± 9.6	79.3 ± 8.5
Length of watching television				
≥2 hours/day	69.9 ± 5.9*	77.7 ± 11.2	85.5 ± 7.1	79.3 ± 10.4*
< 2 hours/day	78.4 ± 7.1	83.3 ± 8.0	86.8 ± 7.7	82.4 ± 8.3
Playing game/internet				
Often	73.6 ± 7.0*	79.5 ± 9.7*	84.8 ± 9.3	80.6 ± 9.3*
Seldom	78.7 ± 3.8	87.8 ± 4.3	88.0 ± 4.5	86.8 ± 4.3
Length of playing game/internet				
≥ 2 hours/day	75.0 ± 7.1	79.5 ± 11.1	83.8 ± 9.7	79.0 ± 7.8*
< 2 hours/day	77.1 ± 7.7	83.1 ± 7.6	88.0 ± 5.3	83.2 ± 7.5
Father's educational level				
≤ 9 years of schooling	76.4±7.8	79.8±7.5	88.0±3.5	78.2±8.7**
> 9 years of schooling	78.3±7.2	84.1±9.4	86.0±7.9	84.2±8.4
Mother's educational level				
≤ 9 years of schooling	76.9±7.6	78.9±10.1	70.5±7.7**	77.4±8.7**
> 9 years of schooling	77.3±7.7	85.4±7.4	87.5±6.0	85.8±7.2

Independent t- test (* = p value less than 0.05; ** = p value less than 0.005).

Table 3. Summary of variables in the final model of logistic regression.

Variables	*B*	*Exp (β)*	*95%CI for Exp (β)*	*Sig.*
Type of elementary school	0.979	2.661	1.061; 6.669	0.037
Length of watching television	1.471	4.355	1.142; 16.600	0.031
Playing game/internet	2.392	10.934	1.785; 66.985	0.010
Nutritional status	1.873	6.510	1.228; 34.509	0.028
Protein intake	0.475	1.609	0.507; 5.108	0.420
Snack habit	0.669	1.953	0.641; 5.945	0.239
Father's educational level	0.999	2.716	0.741; 9.950	0.131
Mother's educational level	0.592	1.808	0.459; 7.118	0.397

Snack habit among private school students was also related to their academic achievement scores ($p<0.05$).

The academic achievement score for who watching television 'everyday' was lower than those who do not ($p<0.005$). Playing game and length of playing game were related to academic achievement scores ($p<0.05$). Students from public and Islamic schools who 'often' play the games have lower academic achievement scores than students who 'seldom' play the games.

The multivariate tests showed that the most dominant variable associated with students' academic achievement score was playing games habit after controlled by the types of elementary school, the length of watching television, nutritional status, protein intake, snack habit and parent's educational level (Table 3).

DISCUSSION

Academic Achievement

Glewwe (2001) stated that there was a causal link between nutrition and academic success after controlled by heterogeneity in learning endowments, home environment, and parental preferences. Academic performance is influenced by internal factors such as physical factors (nutritional status and birth defects) and psychological factors (intelligence, talents, interests, personality, attention and psychiatric disorders). The external factors include family factors (rearing, parental relationships with children, parental attitudes, family and economic atmosphere in the family) and school factors (school buildings, teacher-and-student relationships and school facilities). Park (2007) concluded that there were relationships between internet game addiction and gender, academic performance, location of computer, usage time of internet games, parents' rearing attitude, and self efficacy.

The mean score of academic achievement of private school students is the highest compared to Islamic (p value 0.058) and Public school students (p value 0.000). Learning facilities in Private schools is much better than in the Islamic and Public schools, such as the availability and completeness of library books, language laboratory, computer laboratory and educational games. A study in the elementary school in Malaysia showed that there was association between academic achievement and cognitive ability, socioeconomic status, larger sibship size, male gender and a history of prematurity (Ong, 2010).

Girls score achievement better than boys in language but not in mathematics (Yu, 2007). The present study found that girls had academic achievement higher than boys. Park (2007) also concluded that the risk of being addicted to internet games was 2.22 times higher in males than females. Adolescents with low and middle academic performance had higher risk (2.08 times and 2.54 times) to become addicted to internet games. Borzekowski (2005) found that boys who spent more time playing video games were less academically successful than their peers who played infrequently.

Media can influence child's physical, social, and cognitive development. Electronic media, particularly television have long been criticized for their potential impact on school children (Razel M, 2001). Greater television access and use are associated with less time reading and doing homework. Children with poorer grades are more likely to watch more violent television (Borzekowski, 2005). Their behaviors became more impulsive, which resulted in an eventual decrease in their academic achievement.

Kirkorian (2008) found there was strong evidence that children aged more than two years learned from educational media, and there was moderate evidence that exposure to educational television during the preschool years is positively linked with various measures of academic achievement even ten years later. Moderate evidence also suggests that early exposure to purely entertainment contents, and media violence in particular, is negatively associated with cognitive skills and academic achievement.

One of factors that affect students' ability to absorb the lesson in the class is the fulfillment of nutrient needs. In general, the mean intake of energy, carbohydrate and pro-

tein among all students are still below the recommended dietary allowance, particularly in public school students. The public school score is the lowest compared to private school and Islamic school score. To achieve higher academic scores, the public school students need more energy, protein and carbohydrate intake.

Alaimo (2001) stated that there was a correlation between food insufficiency and lower income family. The present study showed that the socioeconomic level from public school students was lower than Islamic and private students. This result is consistent with the low dietary intake and low academic scores in public school students. Yu (2007) suggested that poor children are particularly vulnerable to risks of poor nutrition, which may curtail poor children's capacity to perform well at school. The present study found that student who attended school with lunch programs, showed a mean percentage of daily calories from total fat, protein and carbohydrate that met recommendations compare than without lunch program. School meal programs play an important role in the nutritional adequacy of students' diets. Neumark-Sztainer (2005) stated that school food policy decrease access to foods high in fats and sugars. Impact of healthy lunch program ensures that all children have access to a healthy food at school to promote healthy eating behaviors. Subjects from private school got school lunch from the catering because they back home at 16.00 pm. Time spent for learning in private school started from 7:00 a.m. to 16:00 pm longer than in public and Islamic schools (07:00 a.m. to 12:00 a.m.).

Nutritional status

Nutritional status is one of the physical factors that influence academic achievement in addition to psychological factors, family and school where students learn. There was a positive relationship between academic performance and nutritional status after controlled by family income, school quality, teacher ability, and mental ability. Food insecurity can adversely affect attention, interest, and learning, even when it is not linked to height, weight, or body mass index (Yu, 2007).

This study found that the highest proportion of subjects have 'less' nutritional status (< 5th percentile) was among public school students. Multivariate test results indicate that the nutritional status was related to academic achievement ($p<0.05$; OR=6.5). Subjects with 'less' nutritional status tend to have lower scores than subjects with 'not less' nutritional status.

The proportion of 'overweight' (> 85th percentile) in private school students was higher than other two schools. Children who are overweight and obese are less likely to perform physical activity, lazier to move, prefer to watch television and playing game while eating snacks. Shore (2008) found differences between non-overweight and overweight students in academic achievement, attendance, discipline and the degree of reading power (DRP) test.

Nutrient Intake

Good nutrition is important to supporting growth and maximizing learning process. Dietary intake affects energy levels, physical stamina, mood, memory, mentally clarity, emotional and mental well-being. Children who had more adequate diets scored, higher on the cognitive tests than those with less adequate intake. Types of food that can affect learning and brain functions are proteins, vitamins and minerals (Yu, 2007).

Subjects with 'adequate' protein intake have higher academic achievement than those with 'less' intake. The highest mean of protein intake was found among private elementary school students who have 'highest' academic achievement ($p<0.05$). Berkman (2002) concluded that malnutrition problems, such as protein-energy malnutrition, micronutrient deficiency, and worm infections affect a child's school performance.

More than 90% of subjects consume 'less' energy intake. Eating habits are generally formed during early childhood and unhealthy dietary habits appear to grow during the years between elementary and high school (Kim, 2010). The present study showed there was no significant relationship between energy intake, carbohydrate and fat with academic achievement. Children require an adequate supply of nutrients for growth, energy and to maintenance of body functions (Al-Oboudi LM, 2010).

Carbohydrate is the main source of producing energy for the body. Carbohydrate is the foods that most often affect blood glucose levels. If blood sugar level is 'low', it will reduce concentration power in learning and affects academic achievement. Fluctuating levels of carbohydrates may cause dizziness and mental confusion, both can affect cognitive performance (Hasz, 2012).

Breakfast as part of a healthful diet and lifestyle can positively impact children's health and well-being. This study found that most students already have breakfast daily. Although there was no relationship between breakfast habit and academic achievement, subjects who have breakfast daily tend to have a higher score than those who do not. Eating breakfast provides children with energy for their brains as it improves their learning skills. Habitually missing breakfast can adversely affect cognitive performance. The gradual decline of insulin and glucose levels could cause a stress response, which interferes with different aspects of cognitive function, such as attention and working memory (Al-Oboudi LM, 2010).

Evidence suggests that breakfast consumption may improve cognitive function related to memory, test grades, and school attendance. A healthful breakfast on

a daily basis consisted of a variety of foods, especially high-fiber and nutrient-rich whole grains, fruits, and dairy products (Rampersaud, 2005).

Different result found among public school students, there was significant difference in academic achievement between subjects who have breakfast daily and those who do not. Private elementary school students who did not have breakfast at home, usually they go to the school canteen to buy food during the break time (9:00 am), such as chicken porridge, fried rice or “uduk” rice. Among public school students, those who do not have breakfast at home will only eat some snacks until noon, meaning they did not get much energy for half a day. A school breakfast program enhanced daily nutrient intake and improvements in attendance, math grade and psychosocial functioning (Kleinman, 2002).

Snack Habit

Islamic school students were the highest in snacking habit compared to public and private school students. Rare snacking habit among private school students is because they utilize catering food provided during the break time. School rules prohibited them to buy food from vendors around the school area.

Snack food usually low in nutrients and high in fats and sugars. School food policies can limit access to these types of foods and beverages and then limit consumption to unhealthy food. Private school’s policy regarding types of foods sold in vending machine caused fewer students purchase snack food. In the contrary, students from public and Islamic schools were free to buy food or snacks around the school area during the break time or after school. Some of vendors use food additives which are not permitted, such as dyes, sweeteners, preservatives and others. Types of food sold by vendors are “cilok”, “cireng”, colorful syrup, fish meatballs, colorful candies, stick ice, and others.

This study showed that subjects who seldom ate snack food have higher academic achievement scores than those who do not ($p<0.05$). This is clearly seen in private school students that have higher score than other school. During the break time, some of students usually go to the library facilities and computer media provided by school. Meanwhile, various types of facilities were not found in public schools and Islamic school. These educational facilities stimulate students' willingness to spend time to read in the library, use the computer media, conduct educational games and others.

Watching Television

Watching television is the most popular entertainment during childhood because many television programs contain interesting things. The proportion of public school students watch television 'everyday' was higher than Islamic and private school students. It is because they have much free time after school to watch television, playing game, and having rest/sleep or play around. The amount of time spent viewing television appears to influence achievement for children from different socioeconomic background. Content of television appears to be crucial. Viewing educational television is linked positively with academic achievement but viewing entertainment television is linked negatively (Schmidt ME, 2008). This study showed that subjects who have ‘good’ academic achievement are mostly less interested in television. The academic achievement scores among subjects who watched television 'everyday' were lower than those who did not ($p<0.005$).

According to Borzekowski (2005), fifth grade student’s academic achievement was significantly related to their household media environment. Consistently, having home computer access was associated with better performance. Studies indicate that children with poorer grades are more likely to watch violent content television. Watching television habit is an activity outside of school that affects the academic achievement (Jackson, 2006).

Many parents assume that television is bad and computers are good, at least when it comes to children’s cognitive development and academic achievement. A common argument is that watching television is passive, promoting zombie-like behaviors, while computer use is active, encouraging problem solving and mental stimulation (Borzekowski, 2005).

The study concluded that the proportion of subjects who watch television for quite a longtime (> 2 hours/day) tended to be overweight (> 85th percent). Children who are overweight tend to be lazy to move and to do exhausting activities such as running, playing football, cycling and others. Lack of playing area for children is also one cause of children’s laziness and more interested in watching television or playing games. Children who use media more heavily are at greater risk for obesity and aggressive behavior (Borzekowski, 2005).

In general, although there was no significant relationship between the length of watching television and academic achievement , students who watch television for more than 2 hours/day tend to have lower academic achievement than those who watch television for less than 2 hours/day. A significant relationship was seen in public school students ($p <0.05$). Watching television habit for children cannot be separated from the lack of parental supervision, especially when the children come home earlier from school or the children imitate the parents’ habit of watching television.

Television programs which are not for children can give negative effects such as violence, consumerism in some advertisements, soap operas for adults and others. Children is fast learner, they are good at imitating what they see through television programs and movies from VCD/DVD. Television and internet are quite common in

children's live and can influence their development. The role of parents/care givers is important for the children development. Parenting is a major factor in determining both television viewing patterns and educational outcomes (Anderson, 2005). Multivariate test results showed that parent's educational level, protein intake and snack habits as confounding variables. Yu (2007) showed that poorer children and children with less educated mothers have low accessibility to various nutritious foods. The present study found that subjects who watch television for more than 2 hours/day has a chance to get 4.3 times 'low' academic achievement compared to the subjects who watch television for less than 2 hours/day. Critics of television have long blamed the medium for various ills, including declines in standardized test scores, mental inactivity, and reduced attention and concentration. Video games, computers, and the internet have drawn similar charges (Schmidt ME, 2008).

Playing Games

Recently, the online games can be played at home or internet cafes. It becomes a trend among children, teens and even adults. Children who enjoy playing games tend to forget eating and learning even skipping from school. From the observations indicated that the majority of users of online games in internet cafes are boys of 8-12 years old. Types of games played among others were adventures, shooting and war that indirectly promote violence in children. The present study found that the boys who spent more time playing video games have less academic score than their peers who played infrequently.

Study result from Ko et al. (2005) found that students who had previously played online games were predominantly male. Gender differences were also found in the severity of online gaming addiction and motives for playing. Older age, lower self-esteem, and lower satisfaction with daily life were associated with much severe addiction among males, but not among females.

Although only 15.7% students who 'often' playing game, it is still worrying, because playing games habit will bring students to be lazy to think of learn and to do the homework. The proportion of private school students who play the games for more than 2 hours/day' was higher than public and Islamic school students. The high proportion of the game players for more than 2 hours/day was private school students because most of the students have online facilities at home, and they did not need to come to the internet cafes. This remains a concern for parents who worked and did not monitor the children directly.

The study also showed that the students whose mothers are working have a chance to play games 'often' by 3.2 times and play the games for more than 2 hours/day by 5.9 times longer compared to subjects whose mothers did not work. The online game is a challenging thing for parents, especially for the busy parents and those who give "less attention" to their children. The pocket money from their parents can be used to play the online games in the internet cafe.

Multivariate test results showed that subjects who 'often' play the games have a chance to get 'low' the score of academic achievement of 10.9 times compared to the subjects who 'do not often' play the games. These types of games can make the children addictive and it can affect academic achievement score. Studies of interactive media have found that video game play may enhance spatial cognition (Kirkorian, 2008). Cheap package prices are lured by the owners of the internet cafes and they become one of the attractions of children, so that the children either individually or in groups can play up to five (5) hours, by only paying for 10.000 rupiahs/child.

CONCLUSION

The most dominant variable associated with student achievement was the habit of playing games after controlled by the type of elementary schools, the length of watching television, nutritional status, protein intake, snack habits and education level of parents (father and mother). Subject who 'often' play the game, watching television for > 2 hours/day, getting 'less' protein intake, 'less' the nutritional status tended to obtain low academic achievement scores. The parents need to think carefully about the role of television in the lives of their children. Parents should proactively create an approach to television watching that works for their family.

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