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USE OF E-TECHNOLOGY, PHYSICAL ACTIVITY AND OBESITY AMONG ADOLESCENTS OF RAWALPINDI AND ISLAMABAD

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ABSTRACT

Objective: To determine the relationship of e-technology use and physical activity with obesity among adolescents of Rawalpindi and Islamabad.

Study Design: Cross sectional study.

Place and Duration of Study: Different schools of Islamabad and Rawalpindi, from Mar to Aug 2015.

Material and Methods: A cross sectional study was conducted among 305 adolescents between ages 17-19 years, from different schools of Islamabad and Rawalpindi, selected through consecutive sampling technique. Structured close-ended questionnaire was administered and data obtained was analyzed by SPSS version 22. Correlation test was used to ascertain association between BMI, time spent using e-technology and physical activity duration.

Results: The mean age of the participants was 15.7 ± 2.4 years. It was revealed that 13.3% of the respondents were underweight, 64.5% were of normal weight, 17.3 % were overweight and 9.5% were obese. The majority of females were found watching television (73.1%) and using cell phone (60.6%) whereas majority of the males were fond of playing videogames (63.7%) and using computer (72%). A positive correlation of 0.64 was found between e-technology use and BMI of individuals whereas physical activities were having negative correlation of -0.231 with BMI.

Conclusion: The current study concluded that use of e-technology was directly associated and physical activity was inversely associated with obesity, suggestive of elevated consequences of sedentary activities on adiposity during adolescence. This issue must be addressed by raising awareness among adolescents about healthy lifestyle practices for their healthy and productive life in future.

Keywords: Adolescents, E-technology, Obesity, Physical activity.

INTRODUCTION

The prevalence of obesity has reached an alarming level in both developed and developing countries, described as an "escalating global epidemic" by WHO[1]. There has been an astonishing increase in obesity rates, prediction is that two third of the world's population could be overweight (2.2/3.3 billion) or obese (1.1/3.3 billion) by 2030[1]. Obesity is a double burden disease in childhood and adolescence increasing rapidly in developing countries[2]. The majority recognizes it as a significant public health problem currently as compared to early 2000s, when obesity was not considered as an important health issue[3]. Obesity leads to an elevation of the individual's risk of developing non-communicable diseases and reduced quality of life among individuals of younger age groups[3]. It may lead to social, economic and psychological consequences which may include failures in academic performance and psychosocial functioning in youngsters[4]. Noticeable discrimination and stigma has led to worsening of outcomes in obese individuals aside from co-morbid diseases[5]. Over the past 25 years, a potential deluge is evident across the globe with obesity rates increasing more than twofold[6]. In the past 10 years in US and England there is more than two-fold increase in obesity, simultaneously four-fold in Egypt over a similar timeframe[6,7]. In Pakistan the disease pattern is currently in a transition phase, clearly showing the double burden of under

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nutrition and overweight and obesity in adolescents and adults[8]. While potential contributors to the predicament of adolescent obesity are multiple and complex, mounting use of e-technology (computers, internet, tablets and cell phones) including television viewing in adolescents had been implicated[8]. Globalization and modernization paradigms have forced the use of electronic technology for ease and conveniences of modern living. studies have proved that the use of e-technology has increased rapidly in the recent past, decreasing physical activity, reduction in resting energy expenditure compared to other activities and consequent increased caloric intake[9]. The public health significance of the effects of sedentary activities on adolescent obesity is manifested by augmentation in the risk of adult obesity and its future health implications[10,11]. As excessive e-technology use is considerably a new phenomenon in Pakistan, little research has been done on its harmful effects, specifically in the age group selected. This study was done to assess the implications of excessive use of e-technology and diminished physical activity on obesity among adolescents.

PATIENTS AND METHODS

A cross-sectional study was conducted from Mar to Aug 2015. A total of 305 adolescents in the age group 12-19 years from different schools of Rawalpindi and Islamabad were selected through non-probability consecutive sampling technique. The sample size was calculated by open Epi sample size calculator. Keeping confidence interval at 95%, population size of 100,000 and anticipated frequency of obesity to be 25% (found in our pilot study) the calculated sample size was 288. We increased the sample to 305 adolescents. Ethical approval was taken from ethical review board of Yusra Medical & Dental College. Permission was taken from administration of the schools; the response rate of students was 100%. Informed consent was taken from the respondents explaining them the purpose of this study and confidentiality of data was ensured. Structured close ended questionnaire was administered and the analysis of data was done by using SPSS version 22. Weight and height were measured, using same standard tools for every school. Body mass index (BMI) calculated and the participants were classified as overweight and obese based on WHO BMI classification. Chi square test was employed to establish gender difference and time spent daily on watching television, playing digital games, using cell phone, computer use and physical activities. Pearson correlation test was used to ascertain association between BMI, e-technology usage time and physical activity duration. To check if there is any mean difference in the BMI scores of the individuals spending more time using e-technology, ANOVA with post hoc was used. A *p*-value less than 0.05 considered as a significant value.

RESULTS

There was a total of 305 participants with mean age of 15.7 ± 3.4 years, from different schools of Islamabad/Rawalpindi, out of which 145 respondents were males (48%) and 160 were females (52%). The respondents predominantly belonged to upper socioeconomic class (91%). The average BMI of respondents was 23.1, with a minimum of 12.9 and maximum of 41.9. It was revealed that 8.5% of the respondents were underweight, 64.5% were of normal weight, 17.3% overweight and 9.5% were obese as depicted in table-I. The female respondents (59%) were found to be more overweight and obese as compared to males (41%). The obese individuals had BMI with a mean of 29.57 ± 3.91, hours spent during exercise had a mean of 4.94 ± 1.87 and hours spent using e-technology with a mean of 14.07 ± 2.25. According to our study majority of the respondents used e-technology for the purpose of entertainment (68%). Most of the females were found watching television (73%) and using cell phone (61%) whereas majority of the males were fond of playing videogames (64%) and using computer (72%). The amount of time spent performing various activities are shown in fig-1. The female respondents were found to be more involved in the practice of watching

television and using cell phone as compared to males. The male respondents were more interested in playing video games and using computer as compared to females. Most of the females did not participate in any physical activity as compared to males, findings shown in table-II. A strong positive pearson correlation (correlation coefficient=0.64 with *p*-value<0.000) was found between BMI of individuals and number of hours spent using e-technology as shown in fig-2. Positive correlation shows the more the time spent using e-technology, more is the BMI. Similarly, the more the physical activity less is the BMI or i.e. inversely related. There was a weak negative pearson correlation (correlation coefficient of -0.23 with *p*-value=0.012) between duration of physical activity and BMI of individuals shown in fig-3. To check if there is any mean difference in the BMI scores of the individuals spending more time using e-technology, ANOVA with post hoc was used. The results are shown in the table-III below. In the Post Hoc analysis there was significant difference seen between group 1 and 2 (p=0.023), group 1 and 3 (p<0.001) 1 and 4 (p<0.001). The only non-significant difference was between group 3 and 4 (p=1.00).

Table-I: Categories of participants according to BMI results.

Categories	Frequency	Percentage
Obese participants	29	9.5%
Overweight participants	53	17.3%
Normal weight participants	197	64.5%
Underweight participants	26	8.5%

Table-II: Comparison of outcome variable between males and females.

Activities	Male		Female		*p*-value
	Yes N (%)	No N (%)	Yes N (%)	No N (%)	
Television watching	73 (52)	67 (48)	117 (73)	43 (27)	0.017
Video games	89 (64)	51 (36)	42 (26)	118 (74)	<0.000
Computer use	101 (72)	39 (28)	96 (60)	64 (40)	<0.003
Cell phone use	65 (46)	75 (54)	97 (61)	63 (39)	0.025
Physical activity	119 (85)	21 (15)	45 (28)	115 (72)	<0.002

Table-III: BMI and time consumed using e-technology.

Groups	Number of individuals (%)	Mean	Standard Deviation	Standard Error	F	*p*-value
Group-1 BMI	69 (23.0%)	8.43	1.53	0.185	130.82	<0.001
Group-2 BMI	152 (50.7%)	9.34	2.01	0.163		
Group-3 BMI	50 (16.7%)	14.20	2.53	0.358		
Group-4 BMI	29 (9.7%)	14.24	1.99	0.370		

DISCUSSION

There are escalating concerns about the rising prevalence of adolescent obesity world-wide and its future health implications. The problem of obesity has been identified not only in affluent countries also in low and middle income countries as well[8]. A number of studies have demonstrated small but significant positive associations between television viewing and body mass index (BMI) or body fatness of children and adolescents, particularly in adolescent females[9]. The public health importance of this relationship is suggested by our demonstration of an association between television viewing throughout adolescence and adverse health indicators in adulthood, particularly obesity, decreased cardiovascular fitness, high cholesterol levels and even poor educational achievement[10,11]. This study gathered

data on sedentary or 'screen time' activities like video games, computing, cell phone use and television watching, these have an increasing influence on children's body weight as the time spent in these activities increases[12]. Males tend to play more video games than females and this provides another potential reason for gender differences in the association between television viewing and BMI in adolescence. The strength of these associations was consistent with those found in previous studies[12,13]. The lifestyle factors that may influence BMI are dietary preferences, socioeconomic status, physical activity or other sedentary activities[14]. However, the associations are consistent with longitudinal studies that demonstrate a temporal sequence between television viewing and the development of overweight and also with intervention research that shows that reducing viewing time can slow the increase in BMI in adolescence[15]. The stronger association between television viewing and obesity in adolescent females has been noted in previous studies[16,17]. Although adolescent females watched more television than males, behavioral differences could also explain the weaker association in males in that adolescent males are more physically active than females, mitigating the effect of sedentary behavior on BMI[17]. The overall results of this study reinforce the findings of previous studies, where there is a relationship

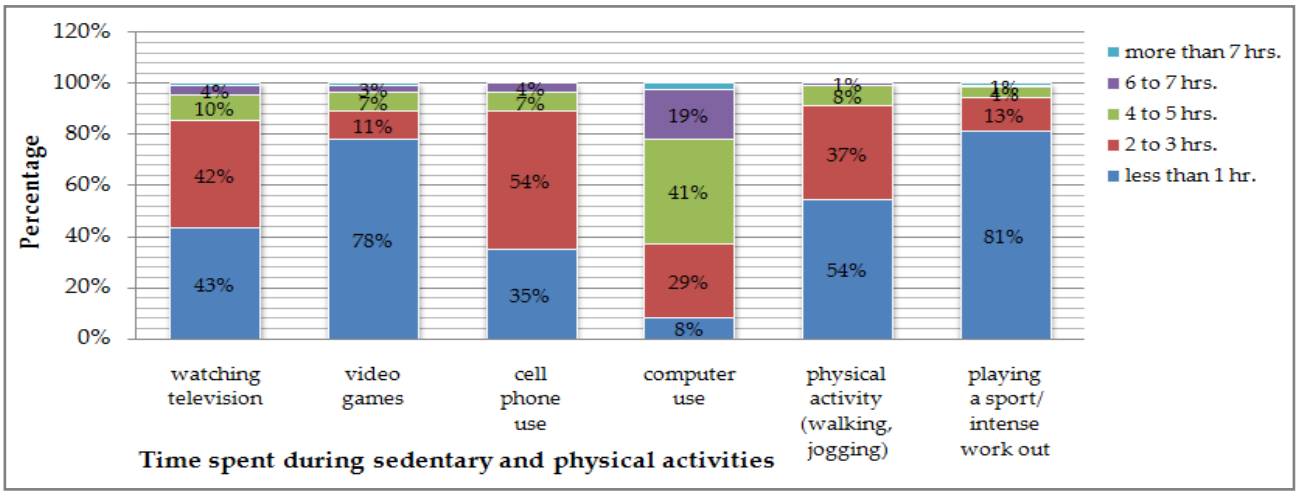

Figure-1: Total time spent performing sedentary and physical activities.

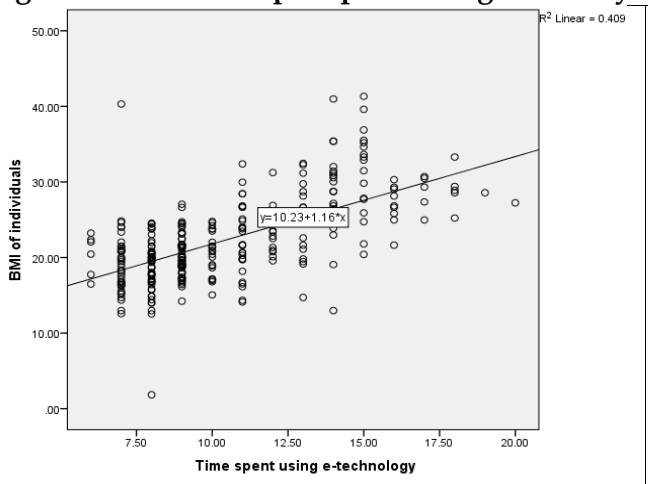

Figure-2: Correlation between BMI of individuals and total hours spent using e-technology.

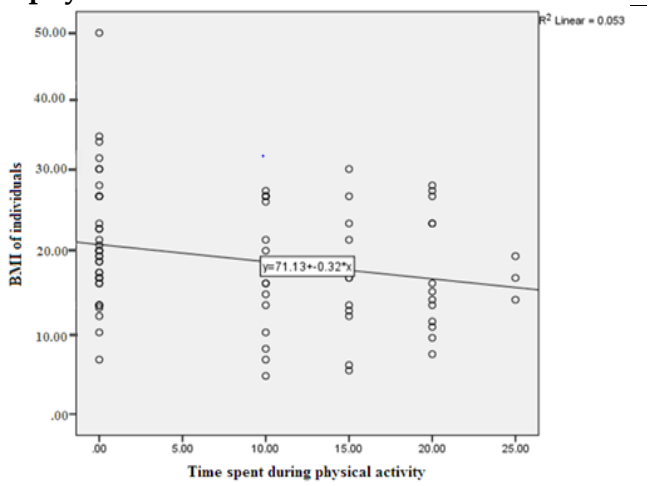

Figure-3: Correlation between duration of physical activity and BMI of individuals.

between television viewing and body fatness/ BMI, most particularly in adolescent females[9-11,16,17]. This study had also shown that long periods of television viewing are increasing substantially in adolescents, a finding consistent with that have been reported in previous studies from affluent countries as well as from middle and low income nations[18]. Our finding replicates the findings of other studies according to which obesity was found in children/adolescents who do not indulge in physical activities[18,19]. A study conducted in Australia showed physical inactivity is causing obesity in females, which differed from our study which did not show any significant gender difference and sedentary activities were responsible for obesity in both genders equally[20]. In our study we did not prove the effect of lowering the sedentary lifestyle and use of e-technology on the respondents whereas some studies showed that lowering sedentary time leads to reduction of BMI[15,16]. Some studies used CDC growth charts while we used BMI formula in our research[8,13]. The limitations of this study were that it was difficult to infer a causal relationship and was impossible to determine its direction from cross-sectional data. Although several potential confounders such as gender, age group, study location and parental socio-economic status were accommodated, certain other unmeasured confounders such as total caloric intake, genetic variation, and other socio-cultural factors need to be considered while interpreting the findings of this study. In this current study only the quantitative approach was adopted but in future a mixed method approach with a qualitative element including open ended questions as well as focus group discussion will help us give a greater insight and an in-depth thematic analysis would be valuable addition in identifying reasons for excessive e-technology use.

CONCLUSION

The current study concluded that use of e-technology was directly associated and physical activity was inversely associated with obesity, suggestive of elevated consequences of sedentary activities on adiposity during adolescence. The adolescence being a crucial period for controlling obesity, potential health education measures must be employed for raising awareness about healthy lifestyle practices among adolescents to lead a healthy, productive life and to decrease the burden of obesity related diseases in our society.

CONFLICT OF INTEREST

This study has no conflict of interest to be declared by any author.

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