

The Impact of Playing Video Games on Physical Activities with Relation to Obesity among Majmaah Intermediate Students

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ABSTRACT

Background/Introduction: Playing video games is considered as a major way of passing times among adolescents in different parts of the world. The time spent on playing video games could interfere with the physical wellbeing of adolescents. This could be a reduction in the level of physical activity and following unhealthy food habits which might lead to obesity. Obesity has been shown to be a factor in developing multiple cardiovascular, musculoskeletal, and other diseases risk factors, such as hypertension, hyperlipidemia, atherosclerosis, and hyperinsulinemia.

Objectives: To evaluate the time spent on playing video games and its effect on the level of physical activities in relation to obesity.

Methodology: This is a cross-sectional study which was done by recruiting 381 male intermediate students at Majmaah city. A basic measurement of body weight and height with closed-ended interview-based questionnaire was used to collect data from participants.

Results: The study showed that 56% of participants played >7 hours of video games per week. In addition, 31.5% and 12.3% of participants played an average of 4-7 and 1-3 hours per week respectively. 46.7% of those participants prefer to play video games than do physical activities. The study also showed 156 (40.9%) participants were in normal weight, 102 (26.8%) were underweight 75 (19.7%) were overweight and 48 (12.6%) obese. Among the overweight and obese group, there was a significant association between the hours spending on playing video games and the level of physical activities with $P < 0.05$.

Conclusion: Playing video games as a source of leisure among intermediate students is more preferential than doing physical activities which would result in spending more time playing video games than doing physical activities. Overall, playing videogames would increase a sedentary lifestyle which could result in less body energy expenditure and weight gain over a period of time. This would increase the risk of developing cardiovascular diseases. Increase the level of awareness with planning a public measure to promote physical activities and reduce hours playing video games can modify such risk factors.

Key words: Video games, Physical activities, Obesity, Intermediate students, Majmaah school

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INTRODUCTION

Playing video games is considering a major way of passing times among adolescents in different parts of the world. There is a wide use of playing time as a way of leisure among youth. In the literature, it has been shown there is an increase in the time spent on playing video games among

adolescents. It has been shown the average hour of spending on video games is 6 hours per week, it can be more than 10 hours [1,2]. According to a study which was conducted on 477 Iranian adolescents students showed 93% of them playing video games with an average of 6.3 hours per week [1]. The study also showed 15% of those students spend more than 10 hours playing video games. In a survey conducted in 2018 in Saudi Arabia, the average hours spent on playing video games in 25% of participants were 3 hours, 23% was 10 hours and 7% was 15 hours per week. [2].

There is a widespread concern in obsessive video games among youth. According to a number of studies which were conducted in the US, and China which reported 8-14% of their participants who played video games developed a pathological symptom [3,4]. The time spent on playing video games could interfere with the physical wellbeing of adolescents. This could be a reduction in the level of physical activity and following unhealthy food habits. It has been established in the literature the association between physical activities and food habits in developing obesity.

Obesity is a complex condition that has been shown to be a factor in developing multiple cardiovascular disease risk factors, such as hypertension, hyperlipidemia, atherosclerosis, and hyperinsulinemia [5,6]. It has been shown that physical activities can reduce the risk of developing cardiovascular diseases and consequently reduces the related causes of mortality [7]. Furthermore, regular physical activities are important in adolescents as part of their normal growth and development. In addition, regular physical activity for adolescents is important in maintaining good health among them [8].

Spending hours on video games could be associated with changes in lifestyle among players. These changes include low physical activities, having unstructured meals, and consuming unhealthy snacks and beverages with high-level sugars [9,10]. In regard to the physical activity, it can be defined as any skeletal muscle movement, which leads to energy expenditure [11]. There was an association between physical inactivity and developing obesity among youth. In addition, physical inactivity in relation to obesity has been shown to be associated with morbidity and chronic disease in youth [12,13].

According to the WHO, for the improvement of cardiorespiratory and muscle fitness the recommended level of physical activities for children aged 5-17 years old is at least 60 minutes of moderate exercise daily [14]. For measuring the bodyweight the body mass index (BMI) (kg/m^2) is widely used (15). The body weight can be classified into normal, normal (BMI $<25 \text{ kg}/\text{m}^2$), overweight (BMI between 25- $<30 \text{ kg}/\text{m}^2$), and obesity (BMI $\geq 30 \text{ kg}/\text{m}^2$). Obesity can be defined as an increase in the accumulation of body fat

in the body, and it is the result of an imbalance between the food intake and the expenditure of energy through skeletal muscle movements.

The prevalence of increased obesity among youth due to physical inactivity was reported in a study, which was conducted in the US. It showed the prevalence of obesity and overweight as 31.8% and 16.9% respectively among their youth participants [16]. According to the world health organization (WHO) report, the prevalence of obesity is considered the highest in the world in the Gulf countries. The WHO reported that Saudi Arabia, Kuwait, Bahrain, and United Arab are on the top list [17].

According to a study conducted in 19317 Saudi students age 5 to 18 years old, the prevalence of overweight, obese, and very obese were 23.1%, 9.3%, and 2% respectively [18]. The presence of obesity in any age is a risk of continuation obesity at the subsequent age [19]. It is important to evaluate the association of playing video games with the level of physical activity in relation to obesity. Identifying the relation could increase the level of awareness and could introduce prevention measures to the public.

The success in obesity prevention during adolescents by identifying and modifying the risk factor, such as low level of physical activities due to the time spending on playing video games, could lead to improve quality of health and life expectancy among them. The main aim of the study is to evaluate the time spent on playing video games and its effect on the level of physical activities in relation to obesity.

METHODOLOGY

An ethical approval was obtained from the Research Ethical Committee at Mjammah University.

Design

The study was observational cross-section study to evaluate the impact of playing video games on physical activity in relation to obesity among Majmaah intermediate school students. The information was collect using a questionnaire.

Setting and participants

The study was conducted over period of 5 weeks. Five Majmaah intermediate schools were chosen using a cluster sampling methods. Only male

schools were included in the current study. A total of 381 students were recruited in the study with age 12-14 years old. The sample size was determined using the following equation: $N = Z^2 \times PQ / D^2$.

The inclusion criteria included only healthy intermediate male students with no physical or mental challenges and play video games. The questionnaire was filled with the help of the researches.

Instruments and procedures

All data was collected using a questionnaire which was revised and approved by the research committee in the college. 6 researches visited the chosen schools. The helped students in filling the questionnaire. Before conducting the questionnaire, comprehensive explanation of the questionnaire was given to the students. In addition a formal consent was obtained from the recruited students. The questionnaire had three main sections. The first one was collecting anthropometric information (Height, weight, and BMI). The second section was focused on type, habits and time spending on playing video games. The third section was focused on the type, level of physical and time spending of doing physical activities. It also evaluated if playing video games would interfere with doing physical activities.

Statistical analysis

The analysis of the study was based on qualitative and quantitative analysis. All collected data was entered into the statistical software (SPSS) version 25 and the significant relation between

playing video games and physical activities was tested. In addition, the following analysis were done using the software:

Descriptive analysis of the collected parameters.

Correlation analysis between hours playing video games and physical activity.

Correlation of the obesity with hours playing video games and physical activities.

RESULTS

The study showed that 225 (59.1%) of participants using consoles, In addition 145 (38.1%) and 11 (2.9%) of participants using cell phones and computer.

In term of BMI, the study showed only 156 (40.9%) had normal weight. In the other hand 102 (26.8%), 75 (19.7%) and 48 (12.6%) of participants were underweight, overweight and obese respectively (Table 1).

The study also showed that 214 (56.2%) of participants played >7 hours video games per week. In addition, 120 (31.5%) and 47 (12.3%) of participants played an average of 4-7 and 1-3 hours per week respectively (Table 1).

The study also showed that 101 (26.5%) participants do physical activities of an average of 1-3 hours per week. In addition, 128 (33.6%) and 77 (20.2%) of participants do an average physical activities of 4-7 and >7 hours per week respectively (Table 1). They study also showed 75 (19.7%) out of 381 students did not do any physical activities. The study showed that 157

Table 1: Type of device used for, body mass index (BMI), average playing hours and Average hours of physical activities per week among participants.

	Type of device	Number of Students
	Consoles	225 (59%)
	Computer	11 (2.9 %)
	Cellphones	145 (38%)
Category	BMI category	
BMI	Underweight	102 (26.8%)
	Normal weight	156 (40.9%)
	Overweight	75 (19.7%)
	Obese	48 (12.6%)
	Hours per Week	
Average playing hours per week	1-3 hours	47 (12.2%)
	4-7 hours	120 (31.5%)
	4-7 hours	214 (56.2%)
Average hours of physical activities per week	1-3 hours	101(26.5%)
	4-7 hours	128 (33.6%)
	> 7 hours	77 (20.2%)
	No physical activities	75 (19.7%)

(41.2%) playing video games for 2-4 years, In addition 116 (30.4%) playing video games for > 4 years and 108 (28.3%) playing video games for 0-2 years (Table 2).

The study also showed that 214 (56.2%) of participants consumed 2-3 meals per day, In addition 122 (32%) consumed > 3 meals per day and 45 (11.8%) consumed 1-2 meals per day (Table 2). The study showed that 306 (80.3%) of participants do regular physical activity and 75 (19.7%) of participants denied involving regular physical activity (Table 2).

The study also showed that 197 (51.7%) did not eat while playing video games, While 184 (48.3%) were eating when they were playing video games (Table 2).

Relation of hours playing video games with hours doing physical activities

Chi-Square test has shown a significant association between hours spent doing physical activities regularly per week and hours spent in

playing video games per week, (p=0.000) (Table 3). A total of 214 (56.3%) students spend > 7 hours playing video games. The study showed that 59 (27.6%), 52 (24.3%), and 53 (24.8% (of them spend an average of 1-3 hours, 4-7 hours, and >7 hours on regular physical activities, respectively. In addition, 50 (23.4%) of them do not do any physical activities (Table 3).

A total of 120 (31.4%) students spend 4-7 hours playing video games. The current study showed that 27 (22.5%), 61 (50.8%), and 12 (10%) of them spend an average of 1-3 hours, 4-7 hours, and >7 hours on regular physical, respectively. In addition, 20 (16.7%) of them do not do any physical activities (Table 3).

A total of 47 (12.3 %) students spend 1-3 hours playing video games. It was shown that 15(31.9%), 15 (31.9%) and 12 (25.5%) of them spend an average of 1-3 hours, 4-7 hours and >7 hours on regular physical, respectively. In addition, 5 (10.6%) of them do not do any physical activities (Table 3).

Table 2: Years of playing video games and meals consumption per day, Doing regular physical Activity and eating habits while playing video games.

Category	Number of years	Number of students
Years of playing video games	0-2	108 (28.3%)
	2-4	157 (41.2%)
	>4	116 (30.4%)
Meals consumption per day	Number of meals	
	1-2	45 (11.8%)
	2-3	214 (56.2%)
	>3	122 (32%)
Doing regular physical Activity	Participant's Answer	
	YES	306 (80.3%)
	NO	75 (19.7%)
Eating while playing video game	YES	184 (48.3%)
	NO	197 (51.7%)

Table 3: Relation of hours playing video games with hours doing physical activities per week and BMI.

The group involve	Physical Activities per week	Hours playing video games per week			Total	Chi-Square	P
		3-Jan	7-Apr	>7			
All the students	1-3 hours	15 (31.9%)	27 (22.5%)	59 (27.6%)	101(26.5%)	30.523	0
	4-7 hours	15 (31.9%)	61 (50.8%)	52 (24.3%)	128 (33.6%)		
	>7 hours	12 (25.5%)	12 (10.0%)	53 (24.8%)	77 (20.2%)		
	Not Applicable	5 (10.6%)	20 (16.7%)	50 (23.4%)	75 (19.7%)		
	Total	47	120	214	381		
The overweight group	1-3 hours	4 (50.0%)	5 (27.8%)	14 (28.6%)	23 (30.7%)	16.083	0.013
	4-7 hours	1 (12.5%)	10 (55.6%)	9 (18.4%)	20 (26.7%)		
	>7 hours	3 (37.5%)	1 (5.6%)	11 (22.4%)	15 (20.0%)		
	Not Applicable	0 (0.0%)	2 (11.1%)	15 (30.6%)	17 (22.7%)		
	Total	8	18	49	75		
The obese group	1-3 hours	2 (33.3%)	2 (12.5%)	16 (61.5%)	20 (41.7%)	17.03	0.009
	4-7 hours	1 (16.7%)	9 (56.3%)	3 (11.5%)	13 (27.1%)		
	>7 hours	1 (16.7%)	1 (6.3%)	0 (0.0%)	2 (4.2%)		
	Not Applicabl	2 (33.3%)	4 (25.0%)	7 (26.9%)	13 (27.1%)		
	Total	6	16	26	48		

Relation of hours playing video games with physical activities in relation to BMI

Chi-square test in the current study showed only overweight and obese groups had a significant association with hours spending on playing video games and doing physical activities with $P=0.013$ and 0.009 respectively.

Overweight group

The study showed a total of 75 overweight students. Firstly, 23 (30.7%) of those overweight students, who do physical activity of an average 1-3 hours, were playing video games of an average of 1-3 hours (4/23 students), 4-7 hours (5/23 students), and >7 hours (14/23 students) (Table 3).

Secondly, 20 (26.7%) of the overweight students, who do physical activity of an average 4-7 hours, were playing video games of an average 1-3 hours (1/23 students), 4-7 hours (10/23 students), and > 7 hours (9/23 students) (Table 3).

Thirdly, 15 (20%) of the overweight students who do physical activity of an average >7 hours, were playing video games of an average 1-3 hours (3/15 students), 4-7 hours (1/15 students), and > 7 hours (11/15 students) (Table 3).

Finally, 17 (22.7%) of those students who did not do any physical activities, were playing video games of an average of 4-7 hours (2/17 students) and > 7 hours (15/17 students) (Table 3).

Obese group

The study showed a total of 48 obese students. Firstly, 20 (41.7%) of those obese students, who do physical activity of an average of 1-3 hours, were playing video games of an average 1-3 hours (2/20 students), 4-7 hours (2/20 students) and >7 hours (16/20 students) (Table 3).

Secondly, 13 (27.1%) of the obese students, who do physical activity of an average 4-7 hours, were playing video games of an average of 1-3 hours (1/13 students), 4-7 hours (9/13 students) and > 7 hours (3/13 students) (Table 3).

Thirdly, 2 (4.2%) of the obese students who do physical activity of an average >7 hours, were playing video games of an average of 1-3 hours (1/2 students) and 4-7 hours (1/2 students) (Table 3).

Finally, 13 (27.1%) of those students who did not do any physical activities, were playing

video games of an average of 1-3 hours (2/13 students), 4-7 hours (4/13 students) and > 7 hours (7/13 students) (Table 3).

DISCUSSION

The current study was conducted on 381 male intermediate students. The study showed the majority of participated students played an average of >7 hours per. This study is consistent with a previous study that showed the majority of its adolescents' participants played an average of 6.3 hours and more [1]. However, according to a survey which was conducted in 2018 in Saudi Arabia, only 30% of its participants showed an average of greater than 10 hours per week of playing videogames. This discrepancy between the current study and the previous survey can be due to the number and age of recruited participants. The current study recruited 381 male students with a mean age of 14 years old while the previous survey was conducted on 6641 participants with an age of 18 years and older.

The current study also showed that the prevalence of overweight and obese among intermediate students were 19.7% and 12.6%. Because of the sample size and gender of participants, the current study findings of the prevalence of overweight and obese were different from a Saudi study, which showed a prevalence of 23.1% and 9.3% [18], respectively.

The present study also showed only 20.2% of participants did the recommended level of physical activities, which is greater than 7 hours a week. The rest of the participants did less than the WHO recommended level of physical activities. In addition, 19.7% of them did not do any kind of physical activities.

The current study has shown a significant association between the level of physical activities and hours playing video games. It has shown that increasing the hours of playing video games greater than 7 hours would decrease the hours of doing physical activities. This indicates playing video games would induce a sedentary lifestyle. Moreover, the study showed that 75 and 48 of the students were overweight and obese. The study showed an association between BMI, physical activities, and playing video games. This was shown as a majority of both groups

(overweight and obese) spending more hours playing video games than performing physical activities. These current findings confirm the finding of a previous study that was conducted on 2831 children aged 9-12 years old. It showed children with high body weight used computers for video games for a long period while children with low body weight used computers for games for moderate time [19,20].

The association between hours playing video games and body weight can be contributed by an increasing tendency toward the video games is a major distraction for performing the recommended physical activities resulting in sedentary lifestyles and weight gain. This was shown in a study that was conducted in Saudi Arabia as the prevalence of overweight students between the age of 1-18 years was 10.7% which was attributed to factors such as lack of physical activities, diet, and other environmental and social factors [6]. Another factor, which might contribute to the association between playing video games and body weight, is the relation between seated playing video games and lipid level. According to Canadian cross-sectional study on 282 participants aged 14-18 years, there was a significant association between sitting and playing video games for a long period and elevated levels of lipid [21].

The current study finding of an association between hours playing video games and increase body weight contradicts the finding of a previous study that showed video games can be used to manage weight in a pediatric group. The previous study was a randomized clinical trial on 75 participants over 16 weeks. During their clinical trial, video games that required a physical activity were introduced to their participants. This could be the main reason for the discrepancy between the previous study and the current study findings.

CONCLUSION

The current study was aimed to identify the association between the hours spending on playing video games and physical activities in relation to the BMI. It was found that playing video games as a source of leisure among intermediate students is more preferential than doing physical activities. In addition, spending time playing video games would decrease the

hours spent on doing physical activities. Overall, playing videogames would increase a sedentary lifestyle, which could result in less body energy expenditure and weight gain over a period of time. This would increase the risk of developing cardiovascular diseases.

LIMITATIONS OF THE STUDY

The study only involved male intermediate students. So the findings of this study cannot be generalized on primary and high school's students and female students in all age groups.

RECOMMENDATIONS

The current study recommends raising the level of awareness among children and their guardians about the risk of spending a lot of time on videogames and avoiding physical activities. This could be achieved by providing health education for both children and their guardians about the risk factors of cardiovascular disease especially low physical activities and obesity. Furthermore, the current study recommends promoting the importance of physical activities on health among children. This could be achieved by the involvement of schools and their leaders to encourage physical activities by enrollments of students in sports activities. Also by encouraging students to have a daily physical activity no less than 60 minutes a day. Finally, it is recommended to do a similar study on primary and high schools students.

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