Internet gaming disorder and its association with selected psychological problems among medical students

Akankshya Arunima[1]   Jyotiranjan Sahoo[2]   Venkatarao Epari[2*]

[1]*Institute of Medical Sciences and SUM Hospital, Siksha 'O' Anusandhan Deemed to be University, Bhubaneswar, Odisha, India.*
[2]*Department of Community Medicine, Institute of Medical Sciences and SUM Hospital, Siksha 'O' Anusandhan Deemed to be University,*
 Bhubaneswar, Odisha, India.

ARTICLE INFO

ABSTRACT

Background: Playing games on the internet/smart devices has become an intrinsic part of our daily routine. Students and adolescents are identified as risk groups for Internet Gaming Disorder (IGD). Students of professional courses like medicine seem to be at a higher risk of the deleterious effects of IGD, but evidence for it is scarce.

Objectives: This study was conducted to find the prevalence of IGD, its risk factors, and its association with common psychological health problems among undergraduate medical students.

Materials and methods: In this cross-sectional study, the calculated sample were chosen through simple random sampling from each batch of undergraduate medical students. A semi-structured, pre-tested, self-assessment questionnaire was used to collect information. IGD was determined through the IGD-20 test scale and psychological problems using the DASS-21 scale.

Results: We included 220 students in the final analysis. The prevalence of IGD was 3.2% among the total population and 5.6% among those having risk. Students with IGD had significantly higher body mass indexes compared to those without IGD. A significant proportion of students with IGD had depression (85.7%) (*p*=0.007). Other psychological problems like anxiety and stress did not show a significant association with IGD in our study.

Conclusion: IGD is a newer disease entity, and since the at-risk population for IGD is growing day by day, this may pose a significant public health concern soon.

Introduction

Playing games on the internet/smart devices has become an intrinsic part of our daily routine. The gaming industry is booming as it provides services with many options/genres. Online or offline gaming is now highly accessible as one can play games on smartphones, tablets, laptops, desktop computers, and gaming consoles. It can be played alone, or with friends, the requirement of an internet connection is optional, and one can watch the other player playing in real time. Even the gaming platform is updated every few months with a high processing power chipset and an internet plan with fast internet surfing speed.[1]

In the last two decades, internet gaming has become the preferred leisure activity among kids and adults. Computer or smartphone-based games are pushing the world into a virtual reality as the gaming industry is rising exponentially

*   **Corresponding author.**
     Author's Address: *Department of Community Medicine, Institute of Medical Sciences and SUM Hospital, Siksha 'O' Anusandhan Deemed to be University, Bhubaneswar, Odisha, India.*
**   E-mail address:** e.venkata.rao@gmail.com

to such an extent that in 2016 there were 120 million online gamers, and the estimated market value was around 290 million USD in India. At this pace, by 2021, it was speculated that the Indian gaming industry will add 190 million gamers and will become a one-billion-dollar industry.[2]

Internet gaming has its pros and cons. Few researchers found its positive effects like cognitive benefits, social benefits, and the development of leadership qualities among the players.[3] Some researchers even tried using games in pain management as a therapeutic measure.[4] The problem arises when these games are played excessively and create a possibility of addiction. There is now a considerable amount of evidence which states that heavy gamers develop psychological symptoms, which negatively impact their functional and social life.[5] The American Psychiatric Association recently recognized Internet Gaming Disorder (IGD) as a potential disease condition and found a place in the appendix of the Diagnostic and Statistical Manual, fifth edition (DSM-5), to encourage future research. World Health Organisation-International Classification of Diseases 11 (WHO-ICD 11) defined IGD as a "pattern of gaming behaviour ("digital-gaming" or "video-gaming") characterized by impaired control over gaming, increasing priority given to gaming over other activities to the extent that gaming takes precedence over other interests and daily activities, and continuation or escalation of gaming despite the occurrence of negative consequences".[6]

The prevalence of IGD varies widely. It is as low as 0.6% in Spain, to as high as 19.9% among adolescents in England.[7,8] Most of the studies worldwide have found a low prevalence of below 6%, while only a few studies reported a high prevalence of more than 10%.[9] Although Asian countries showed a high prevalence, India-specific data is lacking.[1] Studies have shown internet gaming to have a male preponderance and has been associated with poor self-esteem, increasing age, the academic performance of students, and disrupted family life.

In comparison to other internet-related disorders, gaming appears to be more associated with addiction and behavioural changes like depression, anxiety, stress, insomnia, irritability, loss of cognitive function, loss of appetite, social exclusion, and low productivity.[10,11] Students and adolescents are identified as risk groups for IGD. Students of professional courses like medicine seem to be at a higher risk of the deleterious effects of IGD, but evidence for it is scarce.[12] Moreover, associated risk factors and outcomes of IGD are yet to be revealed. Even identifying the vulnerable population to IGD may also help in designing preventive strategies in the future. This study was conducted to find the prevalence of IGD, its risk factors, and its association with common health problems in undergraduate medical students.

Materials and methods

A cross-sectional study was conducted in the Institute of Medical Sciences and SUM hospital with currently admits 150 students each year under the Bachelor of Medicine and Bachelor of Surgery (MBBS) course. All the undergraduate students of the MBBS course in the institute were our study population. The study was carried out under the short-term

studentship program at the Indian Council of Medical Research (ICMR), India, from April to October 2019. The study was approved by the institutional ethical committee (Ref. No./DMR/IMS-SH/SOA/180058) and adhered to the Declaration of Helsinki's tenets. The sample size was calculated using STATA software version 13.

To the best of our knowledge, there were no studies (during the inception of the current research) eliciting the prevalence of internet gaming disorder in India. Studies in European countries showed a prevalence of 5% in the adolescent age group.[9] With an expected prevalence of 5%, alpha of 5%, power of 80%, and an absolute margin of error of 3%, the sample size was 203. The sample size was increased by 15% to 232 to compensate for the non-response or missing information. There are four batches (namely 3rd, 5th, 7th, and 9th semester) of undergraduate students in the institute, and to avoid bias, we selected 58 students from each batch for equal representation. Students from each batch were selected randomly by a computer-generated sequence (Microsoft excel 2007 software) using university roll numbers.

A semi-structured questionnaire was used to collect information and was pre-tested on 20 students (10% of the calculated sample size) for necessary correction and modification. The questionnaire was then incorporated into a digital platform using the Google form application and circulated among the selected students through email. Students were contacted twice telephonically or personally with a 7-day interval to submit their responses and those students who did not submit their responses after two contacts were categorized as dropouts/non-responders. The study rationale was clearly explained at the beginning of the questionnaire, and the students' consent was taken digitally as a binary response (yes/no) to fill out the form. We did not collect any identifying information through questionnaires, and the information given was anonymized.

The questionnaire/form was divided into five sections. The first section was used to collect general information like gender, residence status, type of family, family income, and academic performance in the last professional examination. The second section was intended to collect information on the health and lifestyle factors of the study participants like self-reported anthropometric parameters (height and weight), use of eyeglasses for refractive error, physical activity, food habits, and current disease conditions. Anthropometric parameters were used to calculate body mass index (BMI) in kg/m^2. The third section was to collect information on gaming behaviour like current habits, type of device used, online/offline gaming, duration, and type of game/genre played. The fourth section was to collect information regarding IGD using the IGD-20 test, which is a validated tool among adolescent and adult populations, summarizing six domains: salience, mood modification, tolerance, withdrawal symptoms, conflict, and relapse.[13-15] It has 20 questions, and responses to each question were captured on a 5-point Likert scale from strongly disagree to strongly agree. Two questions are reverse-coded before adding up all responses to questions to get the final score. The suggested cut-off point for the IGD was 71.[16] The fifth section collected information regarding common psychological

problems like depression, anxiety, and stress using the DASS 21 (depression, Anxiety, Stress Scale 21) scale, which is a well-established validated and reliable scale.[17,18]

The data collected was exported as a Microsoft excel file and analysed using SPSS version 20. All the categorical variables were expressed in terms of numbers and percentages. The association between the categorical variable was determined using the chi-square test/Fischer exact test. All the quantitative variables were expressed in terms of mean and standard deviation. The difference in mean in the two groups was obtained by using the t-test/ Mann-Whitney test. P-value <0.05 was considered statistically significant.

Results

Of 233 students, three students did not consent, four students dropped out of the study, and six students had some missing information. So, we included 220 students in the final analysis (non-response rate=5.6%). We got a 100% (58 of 58) response from 5th Semester students, followed by 7th (96.5%), 3rd (94.8%) and 9th-semester (87.9%) students.

Table 1 General characteristics of the study population.

Characteristics	Frequency (%) or mean (SD)
Age (years) #	21.36 (1.42)
Gender	
Male	106 (48.2)
Female	114 (51.8)
Residence	
Hostel	151(68.6)
Home	45 (20.5)
Own arrangement	24 (10.9)
Family type	
Nuclear	173 (78.6)
Joint	47 (21.4)
Family income (per annum in million INR)	
<1	61 (27.7)
1-2	105 (47.7)
2-3	26 (11.8)
>3	28 (12.7)
Body mass index (kg/m^2) #	24.57 (4.39)
Academic performance (out of 100) #	63.70 (6.62)
Physical Activity	
Regularly	55 (25.0)
Irregularly	131 (59.5)
Not at all	34 (15.5)
Eating junk foods habit	
Mostly (>once/week)	82 (37.3)
Sometimes (once/week)	125 (56.8)

Table 1 General characteristics of the study population. (continued)

Characteristics	Frequency (%) or mean (SD)
Not at all	13 (5.9)
Habits*	
Smoking	24 (10.9)
Drinking alcohol	22 (10.0)
Other substance addiction	5 (2.8)
No addiction	187 (85.0)
Refractive Error	
Present	137 (62.3)
Absent	83 (37.7)
Other health problems*	
Hypertension	2 (1.0)
Asthma	11 (5.0)
Others	25 (11.4)

*Multiple responses, # variables represented in mean (SD).

The mean age of the participants was 21.36±1.42 years and a slightly higher proportion of females (51.8%). The majority resided in the hostel (68.6%) and belonged to a nuclear family (78.6%). More than half of the participants were involved in irregular physical activity (59.5%) and eating junk food once a week. A considerably higher proportion (85%) had no addiction to substances and the rest were either addicted to smoking or alcohol or other substances. Almost one-third of the participants had a refractive error (62.3%). Other characteristics were shown in Table 1. Depression, anxiety, and stress were found in 43.2%, 44.1% and 27.7% of the students, respectively. Details of which were given in Table 2.

More than half of the students (57.3%) indulged themselves in online/offline gaming. We collected information regarding possible gaming devices present with the students and found that 71.4% had smartphones, 18.6% had desktop or laptop computers, and only 3.2% had gaming consoles. The majority of students involved in gaming played for less than 2 hours online (69.1%) and offline (50.8%) games. Most of them play action/combat games and discuss their gaming performance with fellow students (67.5%). Table 3 details the gaming behaviour of the study population. The prevalence of IGD was 3.2% among the total population and 5.6% among those having risk (Table 4).

Table 2 Prevalence of depression, anxiety and stress among the study population (N=220).

Severity	Depression N (%)	Anxiety N (%)	Stress N (%)
Normal	125 (56.8)	123 (55.9)	159 (72.3)
Mild	20 (9.1)	16 (7.3)	27 (12.3)
Moderate	47 (21.4)	45 (20.5)	18 (8.2)
Severe	18 (8.2)	13 (5.9)	10 (4.5)
Extremely severe	10 (4.5)	23 (10.5)	6 (2.7)

Among students suffering from IGD, 85.7% were male compared to 46.9%, not suffering from IGD without any statistical difference (*p*=0.058). We did not find any statistically significant difference for batch, residence status, type of family, and family income of the students with IGD (Table 5). Students with IGD had significantly higher BMI (28.0±5.26 kg/m^2) compared to those without IGD (*p*=0.035). Although the academic performance was lower in students with IGD, the difference was not significant (*p*=0.145). Lifestyle factors like physical activity, eating junk food, and addiction did not show any significant difference. Refractive errors and health problems were comparable between the students with and without IGD. A significant proportion of students with IGD were having depression (85.7%) than normal students (*p*=0.007). Other psychological problems, like anxiety and stress, did not show a significant association with IGD (Table 5).

Table 3 Gaming behaviour of the study population.

Gaming behaviour	Frequency (%)
Prevalence of online/offline gaming	126 (57.3)
Having assets for gaming *#	
Smartphones	157 (71.4)
Computers or laptops	41 (18.6)
Gaming console	7 (3.2)
No device for gaming	58 (26.4)
Average hours of online gaming per day#	
<2	87 (69.1)
2-5	15 (11.9)
>5	2 (1.6)
Average hours of offline gaming per day#	
<2	64 (50.8)
2-5	11 (8.7)
>5	1 (0.8)
The genre of games played*#	
Action/combat/real-time strategic	76 (60.3)
Massive multiplayer online	46 (36.5)
Sports	39 (30.9)
Roleplaying	10 (7.9)
Educational	16 (12.7)
Recreational/others	39 (30.9)
Discuss gaming performance with friends#	
Yes	85 (67.5)
No	41 (32.5)

Multiple responses, # percentage regarding participants involved in gaming (126).

Table 4 Prevalence of Internet Gaming Disorder (IGD) among the study population.

Population under consideration	Number	Prevalence (%)
Total population (N+220)	7	3.2
Those playing online/offline games (N=126)	7	5.6

Table 5 Association of different risk factors with IGD (N =220).

Variables	IGD present	IGD absent	χ² / t-value	*p* value
Gender				
Male	6 (85.7)	100 (46.9)	4.709	0.058
Female	1 (14.3)	113 (54.1)		
Semester				
3rd	2 (28.6)	53 (24.9)	3.098	0.377
5th	2 (28.6)	56 (26.3)		
7th	0 (0)	56 (26.3)		
9th	3 (42.8)	48 (22.5)		
Residence				
Hostel	4 (57.1)	147 (69.0)	0.448	0.799
Home	2 (28.6)	43 (20.2)		
Own arrangement	1 (14.3)	23 (10.8)		
Type of family				
Nuclear	7 (100.0)	166 (77.9)	1.964	0.350
Joint	0 (0)	47 (22.1)		
Family income per annum (in Million INR)				
<1	3 (42.8)	58 (27.3)	1.590	0.662
1-2	3 (42.8)	102 (47.9)		
2-3	1 (14.3)	25 (11.7)		
>3	0 (0)	28 (13.1)		
Academic performance (*mean±SD*) *	60.14±2.12	63.82±6.69	- 1.45	0.145
BMI (*mean±SD*) *	28.0±5.26	24.45±4.33	2.12	**0.035**
Regular physical exercise				
Absent	6 (85.7)	159 (74.6)	0.443	0.683
Present	1 (14.3)	54 (25.4)		
Eating behaviour				
No Junk food	3 (42.8)	135 (63.4)	1.221	0.429
Junk food	4 (57.1)	78 (36.6)		
Addiction				
Addiction	4 (57.1)	30 (14.1)	9.617	0.012
No addiction	3 (42.8)	183 (85.9)		
Refractive error				
Present	3 (42.8)	134 (62.9)	1.160	0.430
Absent	4 (57.1)	79 (37.1)		
Other health problems				
Present	5 (71.4)	(83.6)	0.714	0.335
Absent	2 (28.6)	35 (16.4)		
Depression				
Present	6 (85.7)	69 (32.4)	8.57	**0.007**
Absent	1 (14.3)	144 (67.6)		
Anxiety				
Present	3 (42.8)	78 (36.6)	0.113	0.710
Absent	4 (57.1)	135 (63.4)		
Stress				
Present	2 (28.6)	32 (15.0)	0.952	0.296
Absent	5 (71.4)	181 (85.0)		

Mann-Whitney U test was used to calculate the p-value, and for the rest of the variables, a chi-squared/Fisher exact test was used.

Discussion

The current study was an attempt to determine the prevalence of IGD and its associated risk factors among medical students. It is one of the few studies on students of professional courses in India. Studies conducted in Australia found a prevalence ranging from 1.8% to 7%,[17,18] those in Germany found a prevalence ranging from 1.2% to 7.1%.[22,23] A recently conducted meta-analysis found the prevalence to be 5% with a 95% CI of 3 to 6% (9). Although all these studies support our study findings but used other scales to determine IGD rather than the IGD-20 test. Recently conducted studies by Singh *et al*. and Aggarwal *et al*. on Indian medical students found a prevalence of IGD at 3.6% and 9%, respectively.[24,25] Both of these studies used IGD-Short Form (IGDS9-SF) to determine IGD. The higher prevalence by Aggarwal *et al*. may be due to a higher proportion (79.2%) of the study population involved in gaming compared to 57.3% in our study. Given the same socio-economic background, assets for gaming, social group, and prevailing student culture, IGD should be comparable among males and females. Our study failed to find a significant gender difference for IGD supported by other studies.[24,26]

Internet gaming disorder has been recognized as a behavioural disorder, which is gradually progressive and is thought to deteriorate over its chronic course. Literature suggests that such behavioural disorders may give rise to a wide array of physical and mental health problems. Psychopathological problems, especially depression, were more pronounced among addicted gamers than normal individuals, as reported by Lehenbauer-Baum *et al*.[27] Li *et al*.,[28] in their study, reported addicted gamers were more depressed and showed an escapist attitude. They concluded that the escapism attitude is mediated by their depression. Pathological gaming was significantly associated with substance abuse, as suggested by our study. A study conducted by Van Rooij *et al*.[29] found that adolescent boys using substances like alcohol, tobacco, and others had two times higher chances of becoming pathological gamers than the controls. They also found the same pattern among adolescent girls. Another significant study finding was the association of IGD with body mass index, which may be due to the long-time idleness among pathological gamers with reduced physical activity and disordered eating behaviour.[30]

The current study's strength lies in its methodology of selecting students using a simple random sampling method, which eliminates the bias of non-probability sampling reported in other studies.[24,25] Moreover, the non-response rate was low, at 5.6%. The use of a self-administered well-established validated questionnaire to determine IGD and psychological problems is an acceptable research method. Cross-sectional studies fail to establish causality or temporality but can pave the path for future research with a robust design to generate evidence for a causal association. The limitation of the study lies in its generalizability as the study was conducted on an elite group of the student population at a single centre.

Conclusion

After inclusion into the DSM 5 and WHO-ICD 11 classification, the current study is an attempt to explore IGD. We found a low prevalence of IGD in the study population, which was strongly associated with substance abuse, overweight/obesity, and psychological problems like depression. IGD is a newer entity, and since the at-risk population for IGD, is growing day by day, this may pose a significant public health concern soon. Hence, constant watch over it and future research to identify its health outcomes are needed.

Conflicts of interest

None declared.

Ethical approval

Approved by the institutional ethics committee of IMS & SUM Hospital, Bhubaneswar, Odisha, India.

References

[1] Naskar S, Victor R, Nath K, Sengupta C. "One level more:" A narrative review on internet gaming disorder. Ind Psychiatry J. 2016; 25(2): 145.

[2] KPMG, Google. Online gaming in India: reaching a new pinnacle. 2017.

[3] Granic I, Lobel A, Engels RCME. The Benefits of Playing Video Games. 2013.

[4] Griffiths M. Video games and health. British Medical Journal. 2005; 331(7509): 122-3.

[5] Gentile DA, Bailey K, Bavelier D, Brockmyer JF, Cash H, Coyne SM, et al. Internet Gaming Disorder in Children and Adolescents. Pediatrics. 2017; 140 (Suppl 2): S81-5.

[6] Higuchi S, Nakayama H, Mihara S, Maezono M, Kitayuguchi T, Hashimoto T. Inclusion of gaming disorder criteria in ICD-11: A clinical perspective in favor. J Behav Addict. 2017; 6(3): 293-5.

[7] Müller KW, Janikian M, Dreier M, Wölfling K, Beutel ME, Tzavara C, et al. Regular gaming behavior and internet gaming disorder in European adolescents: results from a cross-national representative survey of prevalence, predictors, and psychopathological correlates. Eur Child Adolesc Psychiatry. 2015; 24(5): 565-74.

[8] Griffiths MD, Hunt N. Dependence on computer games by adolescents. Psychol Rep. 1998; 82(2): 475-80.

[9] Fam JY. Prevalence of internet gaming disorder in adolescents: A meta-analysis across three decades. Scand J Psychol. 2018;59(5): 524-31.

[10] Wang CW, Chan CLW, Mak KK, Ho SY, Wong PWC, Ho RTH. Prevalence and correlates of video and internet gaming addiction among Hong Kong adolescents: A pilot study. Sci World J. 2014; 2014.

[11] Wartberg L, Kriston L, Kammerl R. Associations of Social Support, Friends Only Known Through the Internet, and Health-Related Quality of Life with Internet Gaming Disorder in Adolescence. Cyberpsychol Behav Soc Netw. 2017; 20(7): 436-41.

[12] Mihara S, Higuchi S. Cross-sectional and longitudinal epidemiological studies of Internet gaming disorder: A systematic review of the literature. Vol. 71, Psychiatry and Clinical Neurosciences. Blackwell Publishing, 2017. p. 425-44.

[13] Pontes HM, Király O, Demetrovics Z, Griffiths MD. The Conceptualisation and Measurement of DSM-5 Internet Gaming Disorder: The Development of the IGD-20 Test. Liu Y, editor. PLoS One. 2014; 9(10): e110137.

[14] Hawi NS, Samaha M. Validation of the Arabic Version of the Internet Gaming Disorder-20 Test. Cyberpsychology, Behav Soc Netw. 2017 Apr 1; 20(4): 268–72.

[15] Fuster H, Carbonell X, Pontes HM, Griffiths MD. Spanish validation of the Internet Gaming Disorder-20 (IGD-20) Test. Comput Human Behav. 2016; 56: 215-24.

[16] Pontes HM, Griffiths MD. The development and psychometric evaluation of the Internet Disorder Scale (IDS-15). Addict Behav. 2017; 64: 261-8.

[17] Jafari P, Nozari F, Ahrari F, Bagheri Z. Measurement invariance of the Depression Anxiety Stress Scales-21 across medical student genders. Int J Med Educ. 2017; 8: 116-22.

[18] Dreyer Z, Henn C, Hill C. Validation of the Depression Anxiety Stress Scale-21 (DASS-21) in a non-clinical sample of South African working adults. J Psychol Africa. 2019; 29(4): 346-53.

[19] Thomas NJ, Martin FH. Video-arcade game, computer game and Internet activities of Australian students: Participation habits and prevalence of addiction. Aust J Psychol. 2010 Jul; 62(2): 59–66.

[20] King DL, Delfabbro PH, Zwaans T, Kaptsis D. Clinical features and axis I comorbidity of Australian adolescent pathological Internet and video game users. Aust N Z J Psychiatry. 2013; 47(11): 1058-67.

[21] King DL, Delfabbro PH. The Cognitive Psychopathology of Internet Gaming Disorder in Adolescence. J Abnorm Child Psychol. 2016; 44(8): 1635-45.

[22] Rehbein F, Kliem S, Baier D, Mößle T, Petry NM. Prevalence of Internet gaming disorder in German adolescents: diagnostic contribution of the nine DSM-5 criteria in a state-wide representative sample. Addiction. 2015; 110(5): 842-51.

[23] Scharkow M, Festl R, Quandt T. Longitudinal patterns of problematic computer game use among adolescents and adults--a 2-year panel study. Addiction. 2014; 109(11): 1910-7.

[24] Singh S, Dahiya N, Singh A, Kumar R, Balhara YS. Gaming disorder among medical college students from India: Exploring the pattern and correlates. Ind Psychiatry J. 2019;2 8(1): 107.

[25] Aggarwal A, Pandian JD. Internet gaming disorder in undergraduate medical and dentistry students. CHRISMED J Heal Res. 2019; 6(4): 237-41.

[26] Donati MA, Chiesi F, Ammannato G, Primi C. Versatility and addiction in gaming: the number of video-game genres played is associated with pathological gaming in male adolescents. Cyberpsychol Behav Soc Netw. 2015; 18(2): 129-32.

[27] Lehenbauer-Baum M, Klaps A, Kovacovsky Z, Witzmann K, Zahlbruckner R, Stetina BU. Addiction and Engagement: An Explorative Study Toward Classification Criteria for Internet Gaming Disorder. Cyberpsychol Behav Soc Netw. 2015; 18(6): 343-9.

[28] Li D, Liau A, Khoo A. Examining the influence of actual-ideal self-discrepancies, depression, and escapism, on pathological gaming among massively multiplayer online adolescent gamers. Cyberpsychol Behav Soc Netw. 2011; 14(9): 535-9.

[29] Van Rooij AJ, Kuss DJ, Griffiths MD, Shorter GW, Schoenmakers TM, Van De Mheen D. The (co-)occurrence of problematic video gaming, substance use, and psychosocial problems in adolescents. J Behav Addict. 2014; 3(3): 157-65.

[30] Canan F, Yildirim O, Ustunel TY, Sinani G, Kaleli AH, Gunes C, et al. The relationship between internet addiction and body mass index in Turkish adolescents. Cyberpsychol Behav Soc Netw. 2014; 17(1): 40-5.