Psychological Factors of Obesity in Adolescents

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Weight gain and physical health issues are increasing at an alarming rate. The present study was designed to investigate the impact of screen time and sleep quality on obesity in adolescents. The aim of the research was to investigate how increased screen time and poor sleep quality affects weight gain in adolescents. A correlational research design with non-probability purposive sampling strategy was used to investigate. The sample comprised of overweight adolescents (*N*=120) with an age range of 14-18 years (*M*=16.3 *SD*=1.25).The assessment measures included; demographic Information Sheet, Screen Time Addiction Questionnaire (SAQ), Adolescent Sleep Wake Cycle Scale (ASWS) and calculated Body Mass Index (BMI) following the WHO criteria for different ethnicities. The results indicated that increased screen time tends to decrease sleep quality. Further, it was found that increased screen time and poorer sleep quality tends to increase weight in adolescents. The findings indicated that increased screen time and poor sleep quality appear to be significant predictors of obesity. The results also found that mediating role of sleep quality between screen time and weight gain after controlling covariates in adolescences. The present study implicates significant effect of screen time and sleep quality on weight gain in adolescents. Considering the findings, health professionals need to focus on significant factors such as screen time and sleep quality as determinants of weight gain in younger who are at an increasing risk of obesity and consequently Diabetes Type II.

Keywords. Screen time, Sleep quality, Obesity, and Adolescent

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Introduction

Obesity is a global health issue. The increasing rate of overweight and obesity has stretched its highest rate in developed as well as in underdeveloped countries in the region of the Asia Pacific (Stiglic & Viner, 2019). Amongst all countries, it was observed that Pakistan ranked 10th with 50% of the population being overweight. Overall, it is estimated almost more than one billion people fall in the category of overweight and maximum three hundred million people are obese because their BMI is above or equivalent to 30 (World Health Organization, 2015). It has been observed since the past 20 years that adolescents are three times more vulnerable to gain weight as compared to adults which can be consequent to physical health but also to the adolescent's mental health as how one appears is a major concern during adolescents (Lorenzo et al., 2016).

Many factors such as hereditary, psychological and social factors interrelate to affect the weight gain. But according to research, the environment contributes the most fundamental role in triggering obesity. With the development of technology that increases comfort in our lives, children spend more time on screens and are involved less in such kind of activities that relate to physical activity and mostly indulged in sitting activities. As a result, sitting for a long time in front of screens leads to sleep disturbance in adolescents. Screen time includes usage of different gadgets and social media apps, television watching, video games as well as the usage of internet for academic purpose. Screen time is the most prevalent cause of sedentary lifestyle. Previous studies also found that excessive screen time is an independent predictor of obesity. It was also found that it also influences children's eating pattern (Patel et al., 2011). Our current era is represented by screens whether it is desktop computer, laptop, smart phone, tablet, I-pad or television. Children are brought up in the era of digital technology and therefore they are so familiar with computers, internet, digital information and entertainment on screens. Gadgets are most important in our children lives as they spent most of their time in front of screens (Stiglic &Viner, 2019). Screen exposure is not healthy for children age one to three years. Screen time recommended for three to four years of children is one hour. However, since the portable digital devices and limited outdoor activities, the usage of screens has been

increased phenomenally becoming a major source of entertainment for children and adolescents. In contrast, it has also been seen that adolescents who spent too much time on screen tend to be less involved in any kind of physical activity that is necessary for physical and mental health (Alqarni et al., 2022).

Sleep is an important element for individual well-being. Nevertheless, it has been seen through many researches that most of the people do not get adequate sleep and many suffer with sleep deprivation and sleep disorders. Also, surveys done by the national sleep foundation (2004) explored that maximum 40 million people living in America have problem of sleep deprivation and they suffer and diagnosed with different type of disorder of sleep. It was also reported that almost 60% adolescents face difficulty in falling asleep and retaining sleep (National Sleep Foundation, 2014). Excessive screen time and poor sleep quality leads to the susceptibility towards weight gain. Obesity is related to several diseases. Individuals with obesity were more vulnerable to diabetes mellitus and various cardiovascular diseases, hypertension, stroke, cancers (throat, stomach, intestinal) and non-infectious situation such as gout, respiratory issues and sterility. Mental health is also being affected by obesity because individuals faced social stigmatization against obesity.

Advertisement and broad communication also impact negatively on individual dietary patterns. Time spent in front of the screens in form of watching television or playing video games are known to be the most prevalent risk factors for weight gain in children and adolescents. Only television viewing is not only a reason of sitting lifestyle but also advertisement and usage of different screen also boost individual to eat more. Screen time replaced free time of children that they spend on physical activities with screens which in turn increased energy consumption because intake of junk food likes snacks and heavy meals while watching screens is become habit of children (Liu, Zhang & Li, 2012). Various investigations have discovered a significant relationship between screen time and body mass index (BMI) among youngsters of United States (Buchanan et al., 2016).

In present study Bronfenbrenner ecological theory of obesity is applicable which states that motivating force for the occurrence of obesity

in people is the exposure of such kind of setting that is obesogenic instead of any disease or hereditary issue (Bronfenbrenner's, 2014). This theory favors overweight or obesity as a typical reaction to an anomalous domain instead of the other way around. The concept should change for accepting obesity as "regular functioning in obsessive environment" (Abraca et al., 2017). In the last few years, ecological rule and community deviations contributes its roles in the increasing the ratio of obesity. Intake of fast food and less involvement in physical based activities is most commonly adopted by children now a days (Cain & Gradisar, 2010). TV is a kind of gadget that plays its role in weight gain. Children who are screen addicted are lazy, because television advertisement impact negatively on physical and mental wellbeing of children (Daniels, 2019). According to previous literature it has been seen that children who have screens in their home will consume heavy calorie food and oily food (Larrinaga et al., 2023).

Rationale

There has been a growing concern about the impact of screen time on children and young people's health. According to different research results it was founded that excessive screen time is linked with harmful effects on health (Stiglic & Vinner, 2019). Screen time keeps adolescents remain seated most of the day, which means it replace their time of physical activity. Usage of screens also effect psychological and physically health of individual as it causes obesity. Role of dietary intake and physical activity is important, but other factors may also contribute its effect on weight gain such as sleep quality. Furthermore, time spend in front of screens such as with smart phones, television or laptop etc. till late at night can affect sleep wake pattern of individual which in turn leads to different sleep disorders and lessened performance (Basu, 2014). Poor quality of sleep may link to increased risk of overweight or obesity by de-regulating hunger patterns which leads to increased energy intake. Also, referring to the context in Pakistan, the sleep patterns of staying up late and binge watching has become a normative trend making it the need of an hour to study the influence that screen time and sleep quality has on weight gain in adolescent.

Objectives of the study

1. To examine the extent to which screen times tends to affect sleep quality and consequent weight gain in adolescents.
2. To examine the mediating role of sleep quality between screen time and obesity.

Research Questions

1. How does excessive screen time, affect sleep quality and obesity in adolescents?
2. Does sleep quality decrease with increased screen time?
3. To what extent Sleep quality mediates the relationship between screen time and obesity.

Method

Research Design

The present study used a correlational research design to investigate the impact of screen time on sleep quality and obesity in adolescents.

Sample

The sample consisted of overweight adolescents (*N*=120) with mean age of (*M*=16.3 *SD*=1.25). The sample determined by G power was (*N*=133) but due to lockdown situation during pandemic Covid-19 researcher was able to collect data only from 126 participants through online Google form and data collected was screened for outliers and missing values. After screening, the data consumed was of 120 participants non-probability purposive sampling strategy was used to recruit the participants.

Inclusion criteria. The participants were included based on the following criteria: (i) participants were recruited from educational institutions with English as medium of instruction, (ii) Individuals with a screen time exceeding 2 hours or more (laptop/desktop computer, handheld videos or TV) per day as calculated by smartphones, (iii) Those with personal smart phones, (iv) with BMI above 25.

Exclusion criteria. Participants were screened out for any chronic health condition other than obesity. Those with a diagnosis of psychological disorder and currently on any medication. Those

with a history of thyroid issues. Those with any history of sleep disorders.

Table 1

General Demographic Characteristics of the Participants (N=120)

Characteristics	***f (%)***	***M(SD)***
Age		16.3(1.25)
Gender		
Boys	51 (42.5 %)	
Girls	69 (57.5%)	
Education		
Matric	57 (47.5%)	
Intermediate	63 (52.5%)	
Birth Order		
First born	27 (22.5%)	
Middle born	76 (63.3%)	
Last born	17 (14.2%)	
Number of Siblings		
Only child	5 (4.2%)	
1-2	19 (15.8%)	
3-4	56 (46.7%)	
5-6	64 (53.3%)	
Father occupation		
Private employ	18 (15.0%)	
Government employ	33 (27.5%)	
Businessman	69 (57.5%)	
Mother occupation		
Housewife	109 (90.8%)	
Private employ	1 (0.8%)	

Government employ	9 (7.5%)
Businesswoman	1 (0.8%)
Family system	
Nuclear	90 (75.0%)
Joint	30 (25.0%)
Monthly Income	
Less than 50,000	0(0.0%)
More than 50,000	44 (36.7%)
More than 1 lac	76 (63.3%)
Number of dependents	
1-5	52 (43.3%)
6-10	68 (56.7%)
Screen use type	
Mobile phone/Ipad	5 (4.2%)
Laptop/Desktop Computer	7 (5.8%)
Mobile phone & Laptop/ Computer	27(22.5)
TV	6(5%)
All	75(62.5%)
Time spend in front of screen per day	
3-4 hours	32 (26.7%)
5-6 hours	36 (30.0%)
7-8 hours	18 (15.0%)
More than 8 hours	34 (28.3%)

Do you involve in any kind of physical activity/sports etc?	
Yes	50 (41.7%)
No	70 (58.3%)
How many times take meal in a day?	
2 times	7 (5.8%)
3 times	75 (62.5%)
More than 3 times	38(31.7%)
Portion size of your meal is (what is the standard for portion size?)	
Medium	26(21.7%)
Large	52(43.3%)
Extra large	54 (35.0%)

Measures

Demographic Information Questionnaires. Demographic information questionnaire consisted of following statements assessing information about age, gender, weight, height, BMI, education, number of siblings, participant's birth order, monthly school fee, father and mother occupations, monthly income, number of dependents on that income. Demographic information questionnaire also consists of statements such as family history of obesity, are you overweight/obese since childhood? Are you diagnosed with any serious health related disorder or any psychological disorder? Screen use type, time spend in front of screen (television, handheld videos, mobile phone or laptop) per day? Do you involve in any kind of physical activity/sports etc. How many times you

take meal in a day? The portion size of your meal? How many times you take junk food in a week?

Screen Time Addiction Questionnaire (SAQ). Screen-Time Addiction Questionnaire is an effective instrument used to measure that how much time individuals spend on screen. It is developed by Katie Singer (2017). Screen Time Addiction Questionnaire has demonstrated internal consistency with reliability coefficient of 0.80. The scoring of this scale is continuous. It is a seven-item questionnaire. The cut of score is 3. Three or more (yes) indicated that individual is screen time addicted.

Adolescent Sleep Wake Scale (ASWS). It is an effective instrument used for measuring the quality of sleep of an individual. It was developed by LeBourgeois (2005). The Adolescent Sleep Wake Scale (ASWS) has established internal consistency with an inclusive reliability coefficient of 0.86. This scale consisted of 10 items and it concerns falling asleep and reinitiating sleep, returning to wakefulness and going to bed. It is a six-point likert scale. This criterion for measuring the quality of sleep is taken as 1 for poor and 6 as good sleep quality. Low score on this scale indicates poor quality of sleep.

Body Mass Index (BMI). Body mass index (BMI) is a statistical measure used to calculate weight of individual based on the measurement of person height and weight. It was created by Belgian polymath in 1850's. Body Mass Index (BMI=weight (kg) / (height2 (m2)) was measured by calculating height and weight of the participant. It was confirmed that all measurements were accurate. It is used to calculate accurately body weight. It does not correctly estimated body lipid. The main advantage of this tool is to easy calculate and diagnose issues of weight problem. It is used to identify whether participant fall in the category of overweight, obese or underweight. According to World Health Organization (WHO), body mass index is classified into three categories (<18.5kg/m2) body mass index is evaluated as underweight, BMI which fall in the range of (18.5–24.9 kg/m2) is considered as normal weight and if range is between (25–29.9kg/m2) then individual is considered as overweight. The category of obese is further classified into three categories class I (30–34.9kg /m2), class II (35–39.9kg /m2) and class III (≥40kg/m2) respectively (WHO, 2000).

Procedure

Authorization letter was given over to the various heads of schools. After getting formal permission from the institution, participants were approached. The researcher briefs participants about privacy of all got data from them and consent was taken. The participants were given demographic information sheet along with all assessment measures to complete. Administration procedure was directed after detailed guidelines. All participants were given forms and obesity was calculated from their BMI's. The data of participants with BMI falling in the category of obese was entered on SPSS and then analyzed using the software.

Ethical considerations

In order to plan this study, some ethical deliberation was conserved in mind. The tools were used after getting acceptance from the concerned author through e-mail. In response to our application, an authority letter was given from the Institute of Applied Psychology, University of the Punjab, Lahore, which represented the rationale of research, presented to the head of the schools for getting acknowledgement of data collection. Consent form was given to all the participants by the researcher to pursue their permission. After getting the formal permission from all relevant sources, data collection was started and questionnaires were given only to those who were eligible as per the inclusion and exclusion criteria. Obscurity of the participants and confidentiality of the data was maintained. After data was collected, the data was analyzed quantitatively using SPSS.21. Means and standard deviation were calculated to assess normal distribution. For finding relationship Pearson product moment correlations were calculated. The mediating role of sleep quality between screen time and obesity after controlling covariates was also calculated.

Results

The present research was conducted with aim to assess the impact of screen time and sleep quality on obesity in adolescents. The mean age of the participants was (M=16.3, SD=1.25). On the basis of gender representation, (n=51) boys and (n=69) girls were recruited in the current study. Overall, 75% of the adolescents spent their screen time on laptops, mobile phones and televisions. Table 2 provides Descriptive statistics of the instruments in the given below.

Table 2

Descriptive Statistics of Instruments used in the Study (N=120)

Variables	*K*	*A*	*M*	*SD*	Ranges	
					Potential	*Actual*
Screen Time Addiction Questionnaire (SAQ)	7	.71	11.7	1.9	7-14	8-14
Adolescent Sleep Wake Scale (ASWS)	10	.81	29.5	6.2	10-60	17-43

Note: α= Reliability Coefficient; k = No. of items on scale; M = Mean; SD= Standard Deviation.

Table 2 indicated number of items, mean, standard deviation, reliability coefficients and actual/potential scores of screen time addiction questionnaire and adolescent sleep wake cycle scale. The Cronbach alpha of Screen time addiction questionnaire and Adolescent sleep wake cycle scales are .71 and .81 respectively. Overall, the reliability measure of each scale of the current study was satisfactory.

To test the hypothesis, Pearson product moment correlation was carried out. Besides the study variables, the relationship of some important demographic characteristics was also explored with screen time, sleep quality and obesity as provided in table 3 given below.

Table 3

Correlation between Demographic and Study Variables for the Adolescent (N=120)

Variables	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1 Age	_	.10	-.05	.03**	-.13	.11	.14	.10	.05	-.05	.08	-.16	.16	.30	-.20	.20
2 Birth Order		_	.03	-.10	.04	-.02	.06	-.03	.11	.03	-.03	-.23	.00	-.04	.10	.03
3 No. of siblings			_	-.04	-.05	.12	-.15	-.05	.16	.06	.11	-.01	.08	.05	.09	-.03
4 Education				_	-.01	.11	.02	-.04	.10	-.05	-.17	.21	.04	.09	-.14	.14
5 Father occupation					_	.01	.18*	.20*	.34	-.05	-.07	.03	.12	.09	-.00	.11
6 Mother occupation						_	-.01	.06	04	-.07	-.03	.00	.10	.04	-.02	.03
7 Monthly Income							_	.12	-.07	-.19	.22*	.19*	.04	.35	-.21	.01
8 No. of dependents								_	.00	-.14	-.00	.06	.04	.02	-.02	.18
9 Screen use type									_	.00	.00	-.09	.32**	.11	-.02	.26**
10 Physical Activity										_	-.42**	-.43**	-.32**	-.55**	.40**	-.32**
11 Meal per day											_	.44**	.25**	.50**	-.29**	.26**
12 Meal Portion size												_	.22*	.43**	-.22*	.20*
13 Time spends in front of screen													_	.45**	-.36**	.93**
14 Screen Time														_	.58**	-.46**
15 Sleep quality															_	-.40**
16 Obesity																_

Note: p< .05, **p< .01, ***p < .001.

As shown in Table 3 monthly income has positive relationship with main meal, portion size of meal which reflects that participants whose belong to upper middle or high socioeconomic status are more indulged and have access to fast food or fatty food. Screen use type has positive relationship with time spend in front of screen as well as with screen time which means participants who have access to more screens were more prone to screen time addicted as compared to those who have less access to different screens. Physical activity was negatively related with main meal per day, portion size of meal, obesity and screen time addiction and positively correlated with sleep quality which means that individuals who were not involved in any kind of physical activity were more overweight or obese and spent more time on screens that ultimately disturbed their sleep quality. Moreover, it was indicated that obesity has significant negative relationship with sleep quality and positively correlated with screen time.

In order to assess the prediction among study variables regression analysis was conducted as shown in table 4 given below.

Table 4

Multiple Liner Regression Analysis predicting Screen Time and Sleep Quality among Obesity Adolescents (N=120)

Variables	*β*		95% Cl	
			LL	UL
Model 1				
Screen time	.29***		.22	.75
Sleep Quality	-.45***		-.32	-.15
R^2	.38	-.39**		
F	3.71***	-.26*		

Note: N = X, R2 = R square, *p< .05. **p< .01. ***p< .001.TSAQ= Total screen time addiction questionnaire; TASWS= Total adolescents sleep wake cycle scale

Table 4 show a multiple linear regression to find out whether screen time and sleep quality predict obesity. The assumption of multicollinearity was fulfilled as the tolerance value of all was above 0.1. Overall model explained 38% of variances. Findings revealed that both screen time and sleep quality predicts obesity in adolescents. Screen time was found to be

a significant positive predictor of obesity in adolescents. While, sleep quality tend to predict obesity negatively.

Mediation Analysis for the Study Variables

The mediation analysis was conducted, which help in identifying the mechanism of how and why a relationship exists between an independent and dependent variable (Hayes, 2013). The mediation analysis was conducted and results are given below:

Table 5

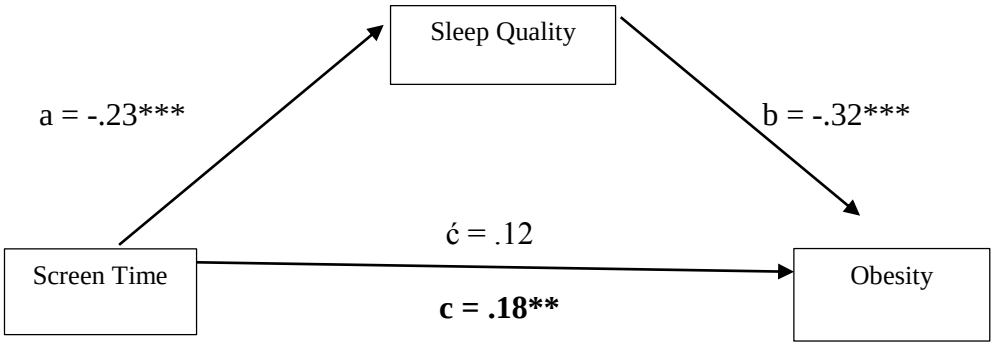
Mediating Role of Sleep Quality between Screen Time and Obesity (N=120)

Predictors	B	ΔR^2	Criterion
Model 1		.08*	Obesity
Screen time	.18**		
F	28.5***		
Model 2		.13**	
Screen time	.12		
Sleep quality	-.32***		
F	33.49***		

Note: B= unstandardized coefficients; ΔR2 = R square change, BMI=Body mass index, *p< .05. **p< .01. ***p< .001.

The above table 5 showed that overall model explained 56% of the variances. Regression analysis found sleep quality as a significant negative mediator between screen time and obesity in adolescents. This finding suggested that poor sleep quality tend to increase obesity in adolescents. It was also reflected that increased screen time leads towards poor sleep quality.

Figure 1: Mediating Role of Sleep Quality between Screen Time and Obesity (N=120)



Discussion

The present research was carried out to investigate the relationship between screen time, sleep quality and obesity in adolescents. The study aimed to investigate how increase screen time and poor sleep quality effect weight gain in adolescents. First, it was hypothesized that there is likely to be an association found between screen time, sleep quality and obesity in adolescents. The findings of the present study indicated that there is a significant positive relationship between screen time and obesity and negative relationship between sleep quality and obesity. This means that adolescent's weight will increase more as their time on screens will increase as well as their quality of sleep will disturbed. These findings are consistent with previous empirical evidence. As Phillipe (2017) observed the how increase screen time cause obesity in school going children. With correlational analysis they revealed that obesity was positively correlated with screen time among adolescents. Moreover, Jonathan, Mitchell, Malik and Schulze (2016) showed a significant association between greater screen time and overweight or obesity in adolescents. Furthermore, a study conducted by Must (2010) concluded that excessive screen time is the most prominent cause of gaining weight in children.

Moreover, hypothesis was also accepted in the case of sleep quality. As results revealed that there was a negative association between sleep quality and obesity which means poor sleep quality impact negatively on individual wellbeing because it leads individual to become obese. In short, adolescent's weight will increase more as their quality of

sleep will be disturbed. The results supported by previous literature. As Nordin and Kaplan (2010) study investigated the impact of decrease sleep quality on physical wellbeing. It was concluded that there is significant association between sleep quality and obesity. Moreover, a research examined by Sallis and Glanz (2016) found that both shorter sleep duration and poor quality of sleep effect overweight or obesity in adolescents.

Secondly, it was hypothesized that sleep quality intends to decrease with increase screen time. Finding of the present research revealed negative association between screen time and sleep quality. These findings were accepted in the light of literature. As study conducted by Garmy et al (2018) found the association of different screen usage (e.g., TV, laptop/computers, video games, and smart phones) and its impact on sleep in sample children and adolescents. Results revealed strong interaction between usage of different screens and sleep outcomes. Moreover, Silva Goodwin and Parthasarathy (2011) also suggested that technology addiction is linked with poor quality of sleep. A study conducted by Buxton et al (2015) recommended that results of the research conducted in united states founded that almost 30% of toddler and 50%- 90% of children who are attending school and adolescents showed disturbance is sleep because they don't get enough sleep as needed for healthy individual. In a current examination related to addiction of gadgets in school-aged children and adolescents founded that almost 90% studies indicated that screen time was harmfully related with health of sleep, such as poor sleep quantity and quality.

Thirdly, it was hypothesized that screen time and sleep quality tend to predict obesity. The findings from the current research showed that screen time and sleep quality are independent predictors of obesity. Results are constant with the study done by Vargas, Flores and Robles (2014) which showed that sleep quality is an independent predictor of body mass index (BMI) in students going to college. Similarly, Kelly and Coughlan (2019) also investigated that lack of physical involvement in activities, screen exposure (i.e. smart phones, video games) and sleep quality are contributing aspects for childhood weight gain or obesity. It was concluded that irrespective of physical activity or dietary intake screen time and sleep are independent predictors of overweight or obesity.

Fourthly, it was hypothesized that sleep quality act as mediator between screen time and obesity. Results of this research demonstrated that sleep quality emerged as a mediator between screen time and obesity. It means individuals who spent more time on screens their pattern of sleep will disturbed and it affect their metabolism and it leads them towards weight gain and obesity. Results of this research are consistent with the study conducted by Barlete et al (2012) which showed that sleep act as a mediator between screens based exposure and health outcomes such as body mass index (BMI). According to this research, individuals who spend more time on screens their sleep quality will disturbed ant it effect their body mass index.

Moreover, findings of the current research also showed significant association with some demographic variables such as physical activity has negative relationship with obesity. Individuals not involved in any kind of physical activity or sports were more overweight or obese. The results are same as the previous study of Seegers and Falissard (2011) which showed that physical activity contributes most fundamental role in the avoidance of being overweight in adolescence, and decrease the probability of obesity in adulthood. Furthermore, results also suggested that dietary intake such as main meal per day, potion size of meal showed significant positive relationship with obesity which means that adolescents who eat more than 3 times per day and their portion size of meal was large they were more overweight and obese because their energy consumption was more and their involvement in any kind of physical activity was less. The results were consistent with the previous study of Silva and Goodwin (2011) who founded the impact of dietary pattern on obesity. According to this research recommendation participants whose dietary intake is more and their diet include junk food or fatty food were more overweight and obese as compared to those participants who take healthy diet.

Conclusion

The present study concluded that there was a significant association found between screen time, sleep quality and obesity in adolescents. It means increase screen time and poor sleep quality effect weight gain in adolescents. It was also founded that screen time and sleep quality were significant predictors of obesity in adolescents as well as sleep quality

mediates the relationship between screen time and obesity after controlling covariates such as physical activity and dietary intake (meal per day, portion size of meal). Findings of the present study suggested that sleep quality has a greater impact on obesity. Therefore, the present research concludes that obesity in adolescents cannot be controlled without considering their sleep quality as it was explored in the present research.

Limitations and Suggestions

- Current research was conducted in lockdown situation during COVID-19 pandemic, so on ground data collection was not possible. Therefore, it was collected through online sources due to which many missing responses were recorded. To increase the generalizability of the results the study could be replicated in post pandemic days.
- The focus of the present research was to identify only the impact of screen time and sleep quality on obesity in adolescents. Gender differences were not analyzed in the present research. Future research can assess the differences in boys and girls in terms of screen time, sleep quality and obesity.
- The present study only assess screen time and sleep quality as a predictors of obesity. Whereas other factors may also play important role in influencing weight gain such as genetics or family history of obesity and stress.

Implications

- These research findings will help in determining the role of screen time and sleep quality on obesity in adolescents. In the light of the outcomes, proper counselling program can be introduced to give them awareness about how screens affect their sleep and physical health.
- This study will help to overcome such factors that can affect the weight gain in adolescents.
- It will help people to educate or cope with the negative impact of screen time on their sleep quality and weight gain.

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