

Effect Of Screen-Time on Obesity: A Cross-Sectional Study



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Abstract

Background: Within few years, there is a quick increase in ratios showing more than quarter of Pakistani adults is obese which is a serious concern to their health. This obesity is often associated with increased usage of screen such as mobile, TV and computers. The objective of the study was to assess the association between screen-time and obesity co-relating with factors such as snack and fizzy drink uptake, exercise and mental health.

Methods: A cross-sectional study was performed on 257 participants of Karachi, Pakistan, aged 5 to 60 years from both genders. A questionnaire was filled asking about their screen usage, eating habits, exercise routine and BMI. The data was analyzed by using Student T test & ANOVA to assess the significance of obesity with screen-time and other often associated factors.

Results: On statistical analysis, the results showed that the P-value between obese and non-obese group for screen-time was $p=0.557$ in females and $p=0.488$ in males respectively. Similarly, P-value for eating habits and physical activity between the obese and non-obese group were insignificant.

Conclusion: Based on the given statistical data increase in screen-time lacks direct and indirect association with obesity and its risk factors. Hence further research needs to be conducted to find a scientific co-relation between the two factors.

Keywords: BMI, obesity, screen time, snacks, cell phone use

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Introduction

Screen time is an amount of time spent using devices such as smartphones, computers, televisions, or video game consoles. Over the recent years, screen time has become very common due to the easy availability of electronic media devices throughout the world that can affect the physiological and psychological behavior of individuals.(1, 2)

Screen based devices have become an attainable source for entertainment, advertising, and information technologies. It is estimated that around 66.7% of world population uses mobile phone and 86% of Pakistani household own a mobile phone. Screen time has shown a great association with obesity for both developed and developing countries and its relationship has been widely studied.(3-5) Although screen time is something completely different from obesity it somehow leads to higher BMI which also lead to disruption of psychological wellbeing in both children and adults. (6)

When using screens, one is typically inactive and uses up little energy which displaces the time that could be spent being more physically active. (7-9) This inactivity upsets one's normal appetite signaling, causing an increase in more consumption of foods and drinks that promote

weight gain.(10, 11) Screens themselves don't contribute to weight gain, but its overuse is a marker of an overall inactive lifestyle. (12-14)

Obesity is a common medical condition in which excess body fats accumulate to an extent that it may have a negative effect on health.(15) It is determined by the BMI, which is a value calculated by dividing the body mass by a square of body height. It is universally expressed in units of kg/m². Obesity is mostly caused by a combination of excessive food intake, lack of physical activity, and genetics.(16-18) Obesity itself is not a disease but increases the risk of certain diseases such as diabetes type 2, sleep apnea, cardiovascular disorders, arthritis, and other diseases.(19-22) Obesity has been observed throughout human history.

Aim of this study was to assess the association between screen-time and obesity co-relating with factors such as snack and fizzy drink uptake, exercise and mental health.

Methodology

It was a Cross sectional study conducted in different areas of Karachi including Gulshan-e- Iqbal, Bahadurabad, North Nazimabad & Korangi. This survey was done to assess effect of screen time on obesity after getting the ethical approval from Ethical Review Committee (ERC) Jinnah Medical & Dental College, Karachi, Pakistan.

A questionnaire was developed for both genders aged 5 – 60 years consisting of basic biodata and primary information of the participants. Questionnaires were filled after getting the informed written consent.

Sample size of 257 was calculated using OpenEpi calculator. Simple random sampling was employed for the collection of data. We excluded those individuals from the study who were below 5 years or above 60 years or suffering from any metabolic diseases.

SPSS Version 25 was used to enter data. Qualitative variables were presented as frequencies and percentages, and Quantitative variables were presented as mean and standard deviation. Students’ T test was applied for mean screen time in dichotomous variables and ANOVA was used for comparing mean screen time with different demographic variables.

Results

A total of 257 participants from different institutes of Karachi, Pakistan were included in this study, amongst which there were 131 males and 126 females. The mean age ± SD was 20.96±8.004 years with the mean BMI of 22.8 ± 5.53 (Kg/m²). The majority of the survey respondents (53.31%) were in normal weight category whereas only (10.12%) were obese. (Figure 1)

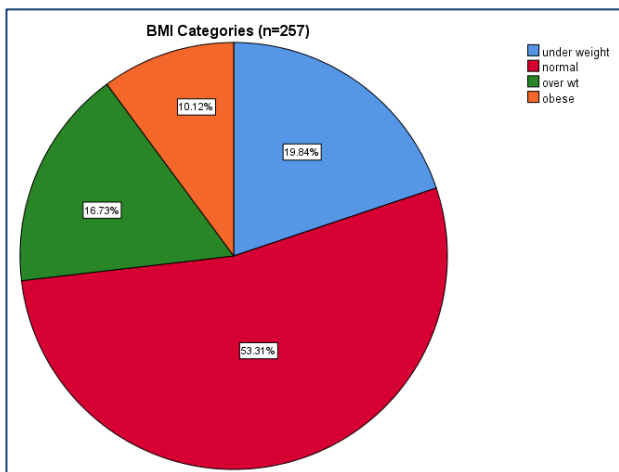


Figure 1: Showing BMI categories of study Respondents.

It was noted that 27.2% of respondents used mobile on weekdays for around 3-4 hrs/day and on weekends the percentage increased to 28% using their mobile phones for more than 6 hours. The mobile usage was found to be more as compared to TV and desktop. (Table 1)

Table 1: Showing different variables related to the screen time of respondents (n=257)

Variable	Frequency (n)	Percentage (%)
Mobile Usage on weekdays		
Less than 1 hr/day	33	12.8
1-2 hr/day	53	20.6
3-4 hr/day	70	27.2
5-6 hr/day	44	17.1
>6 hr/day	57	22.2
Mobile Usage on weekends		
Less than 1 hr/day	15	5.8

1-2 hr/day	51	19.8
3-4 hr/day	61	23.7
5-6 hr/day	58	22.6
>6 hr/day	72	28.0
TV Usage on weekdays		
None	64	24.9
Less than 1 hr/day	90	35.0
1-2 hr/day	78	30.4
3-4 hr/day	23	8.9
>5 hr/day	2	0.8
TV Usage on weekends		
None	59	23.0
Less than 1 hr/day	73	28.4
1-2 hr/day	67	26.1
3-4 hr/day	46	17.9
5-6 hr/day	8	3.1
>6 hr/day	4	1.6
PC Usage on weekdays		
None	55	21.4
Less than 1 hr/day	31	12.1
1-2 hr/day	60	23.3
3-4 hr/day	62	24.1
5-6 hr/day	23	8.9
>6 hr/day	26	10.1
PC Usage on weekend		
None	60	23.3
Less than 1 hr/day	30	11.7
1-2 hr/day	57	22.2
3-4 hr/day	64	24.9
5-6 hr/day	27	10.5
>6 hr/day	19	7.4

Intake of snacks and fizzy drinks along with watch time did not prove to be the major factor leading to obesity. If we compare figure 2 with figure 3 it can be clearly seen that snacks were more often consumed even when there is no use of screen. (Figure 2a & 2b)

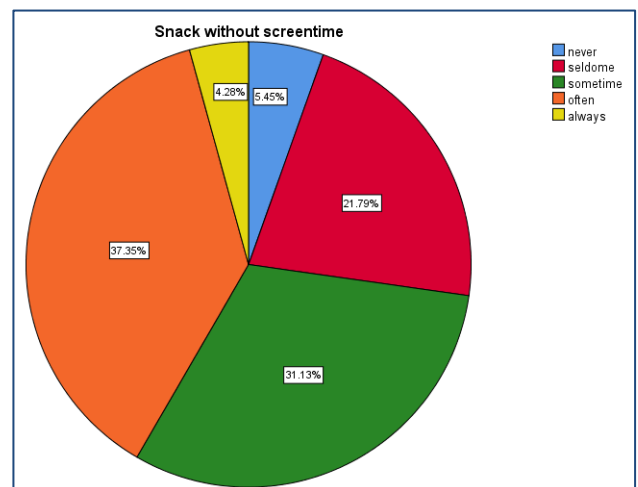


Figure 2a: Snack consumption without screen-time of respondents (n=257)

Table 2 shows that the highest mean mobile screen time was seen among the obese. Participants aged 16-25 years had the significantly high mean mobile screen time as compared to other age groups (p <0.001). Screen time was found to be significantly lower in school going participants (p <0.001). (Table 2)

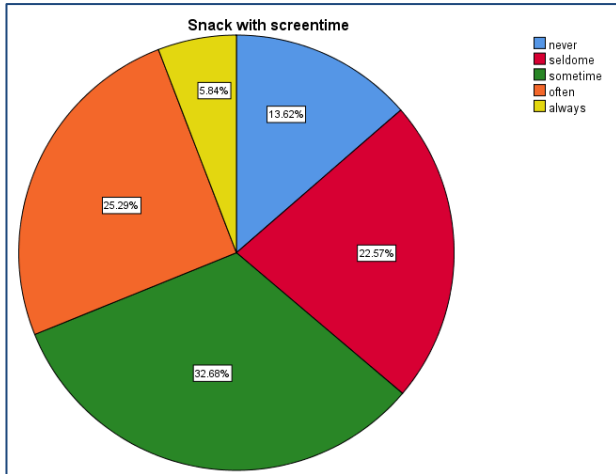


Figure 2b: snack consumption with screen-time of respondents (n=257)

Table 2 shows that the highest mean mobile screen time was seen among the obese. Participants aged 16-25 years had the significantly high mean mobile screen time as compared to other age groups ($p < 0.001$). Screen time was found to be significantly lower in school going participants ($p < 0.001$). (Table 2)

Table 2: Comparing mean screen time with Demographic Variables using ANOVA.

Characteristics	N	Mean Mobile screen time \pm SD (hrs/week)	P-Value
BMI categories			
under weight	51	28.11 \pm 17.888	0.637
normal	137	27.89 \pm 15.353	
overweight	43	25.91 \pm 13.573	
obese	26	30.09 \pm 12.486	
Age Categories			
5-15	58	11.54 \pm 8.283	<0.001
16-25	162	33.94 \pm 13.157	
26-35	23	29.91 \pm 14.041	
>35	14	21.03 \pm 11.385	
Education Level			
school	63	13.68 \pm 11.371	<0.001
College	33	32.71 \pm 16.032	
University	161	32.35 \pm 13.003	

* Significant

69 out of 257 participants were obese and the mean mobile screen time was found to be lesser than that from non-obese. Females were found to have significantly greater mean screen time than males ($p = 0.003$). Mean screen time for participants who had comorbids was significantly lesser than those who had no comorbidities ($p = 0.037$). Snack and fizzy drink consumption showed no significant relation with screen time and obesity. (Table 3)

Table 4 shows that mean mobile screen time was insignificantly higher in non-obese females whereas it was insignificantly higher in obese males. Other variables such as age groups, physical activity, snack consumption and fizzy drinks intake did not show significant differences in mean mobile screen time when compared between obese and non-obese groups of each variable. (Table 4)

Table 3: Comparing mean screen time with Dichotomous Demographic Variable using t-test.

Characteristics	N	Mean Mobile screen time \pm SD (hrs/week)	P-Value
Obesity			
Non obese	188	27.95 \pm 16.031	0.815
Obese	69	27.48 \pm 13.240	
Gender			
Female	126	30.67 \pm 15.914	0.003*
Male	131	25.08 \pm 14.225	
Comorbidities			
yes	32	22.54 \pm 15.313	0.037*
no	225	28.57 \pm 15.192	
Snacks with screen time			
No	70	27.73 \pm 13.759	0.942
yes	187	27.87 \pm 16.161	
Snacks without Screen time			
No	70	24.50 \pm 14.299	0.33
Yes	187	29.06 \pm 15.523	
Fizzy Drink with Screen Time			
No	163	28.96 \pm 14.387	0.116
Yes	94	25.84 \pm 16.680	
Fizzy Drink without Screen Time			
No	144	28.22 \pm 14.768	0.639
Yes	113	27.31 \pm 16.021	

Table 4: Comparing mean mobile screen time with obesity among various demographic variables.

Variable	Mean Mobile screen time \pm SD (hrs/week)		P-value
	Non obese	Obese	
Gender			
Female	31.06 \pm 16.611	29.26 \pm 13.255	0.557
Male	24.48 \pm 14.691	26.34 \pm 13.263	0.488
Age group			
5-15	11.47 \pm 8.408	12.07 \pm 7.892	0.859
16-25	35.09 \pm 13.278	30.86 \pm 12.451	0.069
26-35	30.32 \pm 14.0	29.27 \pm 14.929	0.867
>35	20.80 \pm 16.887	21.16 \pm 8.246	0.957
Physical activity			
No	35.67 \pm 14.113	25.59 \pm 14.978	0.054
Yes	26.54 \pm 15.998	27.84 \pm 12.998	0.578
Snack consumption with screen time			
No	27.61 \pm 14.778	28.00 \pm 11.426	0.892
Yes	28.12 \pm 16.696	27.11 \pm 14.546	0.733
Snack consumption without screen time			
No	24.34 \pm 15.337	24.88 \pm 11.860	0.887
Yes	29.21 \pm 16.131	28.62 \pm 13.763	0.820
Fizzy drink consumption with screen time			
No	28.81 \pm 15.178	29.37 \pm 12.140	0.808
Yes	26.45 \pm 17.418	24.16 \pm 14.647	0.527
Fizzy drink consumption without screen time			
No	27.71 \pm 15.603	29.64 \pm 12.215	0.441
Yes	28.25 \pm 16.659	24.83 \pm 14.148	0.314

Discussion

Out of 257 study participants 27.2% participants used mobile on weekdays for around 3-4 hrs/day and on weekends the percentage increased to 28% using their mobile phones for more than 6 hours. The mobile usage was found to be more as compared to TV and desktop. (23) Sigmundová et al. also stated same observations in their study conducted in 2021. (24) Liu et al. also stated that there is prolonged use of mobile phone on weekends and this prolonged use is associated with an increased risk of depressive symptoms and sleep disturbances.(25) It was mentioned in another study by

Robinson et al. that all forms of screens are most frequently used by the younger age brackets particularly young children. Majority of the participants aged from 12–15 years reported daily usage of TV rather than mobile phone.(26)

Intake of snacks and fizzy drinks along with watch time did not prove to be the major factor of causing obesity in our study. Although we found many studies contrary to our findings. Hicks et al. found out that increased screen time is associated with increases beverage and snack consumption. They also emphasized upon the need for future research to further reveal how these factors impact BMI. (27) Shqair et al. in their systematic review of 19 articles also found the same association of intake of snacks and screen time and added to their conclusion that these foods prove to be cariogenic. (28) Another study by Rocha et al stated that the ultra-processed food consumption was found to be greater in those who are in a habit of eating in while in front of screen. This was observed in Brazilian adolescents.(29)

Out of total of 257 participants, 69 participants were obese and 188 participants were non obese. The mean mobile screen time usage in obese was found to be lesser than from non-obese. Similarly, a three level meta-analysis by Caroline et al. showed no association between screen-time and obesity although they had a larger group of respondents. (30) Another study supported this negative correlation of screen time and obesity. (31) Rocka et al. in their study commented that majority of the participants were exposed to screens during meals, which accounts for risk factor of obesity.(32)

Contrary to our findings, Kehong Fang et al. in their study showed a significant association of screen time more than 2 hrs/day with increased weight/obesity in children and adolescents. (4) Another study by Miguel et al. found the same association of physical activity and screen time in their study.(33)

A three level meta-analysis published on 9th June 2019 by Caroline Marker (Et al) was based on meta-analysis of sedentary video gaming and body mass. The analysis revealed a small positive relationship between non-active video game use and body mass. The results were more pronounced for adults compared to adolescents and children. Although an association was found between screen-based activity and obesity, but it wasn't significant as the p value was < 0.1. The study included a large group of people of different age, race and gender making the results more precise but since it was a meta-analysis the drawbacks of previous studies weren't worked upon. (34). Our study showed that the mean screen time was significantly higher in females as compared to males. In certain studies, association of screen-time with obesity was also linked with gender, for instance a study by MacDonald et al. showed results that females have a higher association of screen-time with obesity and tend to get more obese than males with equal or increased screen-time.(35)

In a study by Tambalis et al. it was stated that insufficient sleep duration has positive association with obesity, screen time and dietary habits. The results showed that more males reported of insufficient sleep duration than females and insufficient sleep was related to diet, increased screen time and being overweight. (3)

Conclusion

The survey results nullified our hypothesis showing no correlation between increased risks of obesity with increased screen time.

The study was conducted to assess the association between screen-time and obesity which is a global leading concern. However, the results were insignificant to prove the association. Similar studies on larger scale should be performed with more detailed questions about the participants eating habits, sleep patterns and mental health for a better more accurate outcome.

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