Investigating the Influence of Screen Time on Physical Health Amongst Adults

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Declaration

I, Raghav Madhwal, declare that all tables, figures, and images that I cited from sources used in my final paper are for the WRDS 150B-701 course in Term 1 (2020-2021) ONLY. I will NOT use these tables, figures, images, or my research paper for any other purpose in the future.

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Whether it is for leisure or work, people have significantly increased their usage of devices in the past few years. However, researchers have questioned how screen time affects us (Stiglic & Viner, 2019). The aim of this paper is to discover the implementations on of screen time on adult physical health, mainly focusing on how caloric intake and physical activity is affected.

Though preventable, obesity is a major cause of death and impaired quality of life worldwide (Abdelaal et al., 2017). Furthermore, as the Coronavirus disease (COVID-19) continues, people are spending more time using their devices, as a means of work, communication, or entertainment. Therefore, the effect of screen time on health is a prevalent topic to discuss at the moment.

Literature Review

Physical health consists of multiple components, however in this paper, the factors focused on are physical activity, caloric intake, body mass index (BMI), metabolic health, adiposity, and diabetes. Adolescents with higher screen times reported having a higher waist circumference and BMI (Dumith et al., 2012). This change in body formation suggests more than just higher chances of adiposity. For children aged 8-10, a 1% increase in body fat decreased insulin sensitivity by 2.9% (Henderson et al., 2016). Thus, higher screen usage could lead to higher chances of type 2 diabetes in adolescents. However, what causes screen time to affect physical health in such negative ways?

For adolescents, an increase in device usage impacts physical activity and caloric intake. Physical activity can be inversely correlated to sedentary behaviour. Sedentary time is the amount of time people spend sitting down, thus the longer someone sits down, the lesser physical activity they are doing. It was established that the number of steps children took decreased as their

screen time increased (Meier et al., 2007). Similarly, adolescents' sedentary behaviour correlated with their screen utilization (Friedrich et al., 2014). The advertising of unhealthy food on devices was also shown to increase calorie consumption in adolescents (Russell et al., 2019).

Though this data shows screen time correlates to adiposity and diabetes (through lesser physical activity and higher caloric intake), it is only significant in adolescents. There was no significant evidence found on the effects of screen time on people above the age of fifteen. Thus, the research gap of this paper is the effect of screen time on the physical health of adults. This raises the questions:

How does an increase in screen time affect physical health for people older than fifteen? Additionally, how does this compare to the data found about adolescents?

Research Methodology

A systematic search was conducted on six databases (JSTOR, ProQuest, Biomedicalcentral (BMC), SpringerLink, National Center for Biotechnology Information (NCBI) and ClinicalKey). The articles were screened to be related to screen time, caloric intake, and physical activity in adults. The articles were further screened to ensure they were peer-reviewed to strengthen their significance.

Initially, a quantitative analysis of a graph and table was done to correlate screen usage and sedentary behaviour and find associations between sedentary behaviour and dietary behaviour. Next, a qualitative analysis of the articles was done to further find a correlation and causation between screen time and unhealthy metabolism, physical activity, and caloric intake. After this, with the equations provided in Rashad (2006), I found how caloric intake and physical activity affect BMI.

Equation 1: $Energy\ Balance\ at\ time\ t\ (E_t) =$

$$Caloric\ Intake\ (C_t) - Energy\ Expenditure\ or\ Activity\ (A_t)$$

Equation 2: $BMI = \sum_t E_t\ , variables\ that\ are\ specific\ to\ an\ indidiual\ (\varepsilon)$

From equation 1, I can imply that higher caloric intake and lower activity lead to an increased energy balance. With equation 2, it can then be suggested that an increase in energy balance would increase BMI.

Having multiple trusted databases and peer-reviewed articles allowed me to research a range of papers that were written by scholars with an interest in the same field as my research. This would allow me to make a more informed conclusion.

Results

Figure 1 (Harvey et al., 2013) (see Appendix) reports the prevalence of sedentary behaviour in older adults. The graph shows a high amount of TV viewing, correlated with a high amount of sitting (sedentary time). Furthermore, Nguyen et al. (2020) described that intervention measures taken to decrease sedentary behaviours saw the most effective changes in physical health. The study concluded that small changes in screen time allowed for a reduced sedentary time. Moreover, Panahi & Tremblay (2018) showed that an increase in screen time causes adults to have an increase in sedentary behaviour. The study also reports that sedentary behaviour also causes unfavourable metabolic health.

Figure 2 (Pearson & Biddle, 2011) (see Appendix) showed positive associations between sedentary behaviour and energy-dense snacks, fast foods, and energy-dense drinks. The table further shows inverse associations between sedentary behaviour and fruit, vegetables, and fibre. The study also concluded that sedentary behaviour, such as screen time and TV viewing, associate

with unhealthy behaviour in adults. The study further suggested a reduction in sedentary time to test its effects on a diet.

Discussion

Harvey et al. (2013) proved that a higher screen time leads to higher sedentary time, thus lower physical activity. The higher amount of sedentary behaviour shows lower metabolic health (Panahi & Tremblay, 2018). On top of this, Pearson & Biddle (2011) showed positive associations between unhealthy foods and sedentary behaviours. As people increase their unhealthy dietary intake, while decreasing their healthy dietary intake, they will have a larger caloric intake. Through the two equations provided by Rashad (2006), I can imply that adults would have a higher BMI.

Panahi & Tremblay (2018) showed that people would have an unhealthier metabolic health, as screen time increases. This leads to higher adiposity in adults. Biggs et al., (2010), proved that this adiposity can be associated with a chance of diabetes.

These outcomes prove that adolescents face similar consequences to adults in terms of their physical health when there is an increase in screen time.

Conclusion

The aim of this paper was to discover the implementations on of screen time on adult physical health, mainly focusing on how caloric intake and physical activity is affected.

An increase in screen time creates negative implications for overall physical health, through a larger caloric intake and a lower amount of physical activity. From the data discussed above, adults are likely to have lower physical health, due to increased TV viewing and screen time. It is also concluded that adults are likely to have an increase in BMI when their screen time

increases. Though BMI does not necessarily imply an unhealthier lifestyle, it is more likely to lead to adiposity. Adiposity and obesity are further factors that are associated with diabetes, as shown in Biggs et. (2010).

Adults and adolescents face an increase in caloric intake and decrease in physical activity, through the increase of screen/device usage. Moreover, both groups experience a higher risk of adiposity and diabetes. Thus, adults have similar consequences when compared to adolescents, with both of them having worsened physical health.

The sources used to find the correlation between adult health and screen time were relatively old, with only two articles in the past two years. It would help the significance of the article to include more recent research, as the data would be more up to date. Additionally, five research articles were used to find correlations between adults' physical health and screen time. It would be possible to search and review more articles to make a more informed and reinforced conclusion.

To lead this research further, I would conduct experiments or surveys to find primary data for this study. I would use different dependent variables, such as heart rate or blood cholesterol, with the independent variable remaining as screen time. This would allow me to further correlate between adult physical health and screen time.

Word Count: 1300

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Appendix: Figures from Secondary Data

Figure 1: Graph from Harvey et al. (2013)

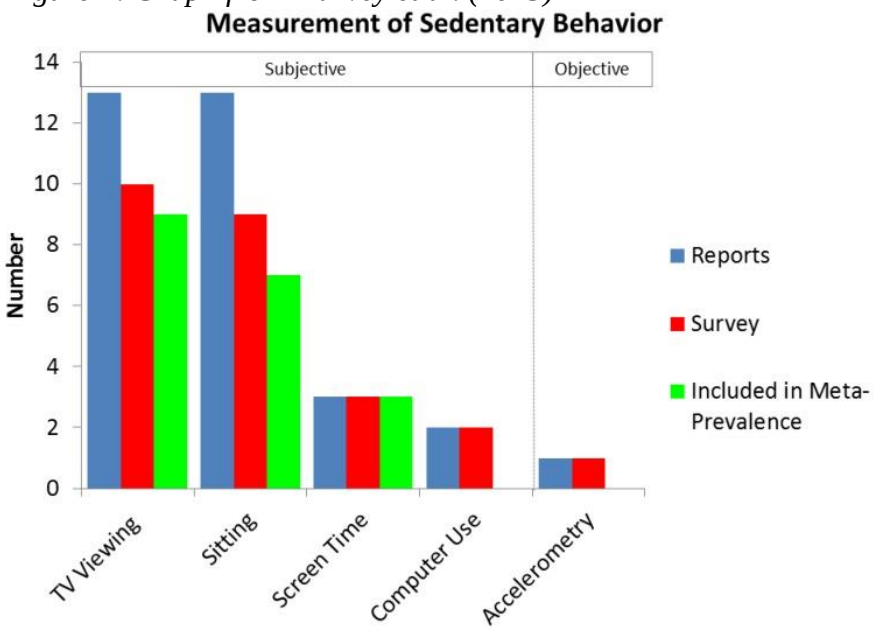

Figure 2: Table from Pearson & Biddle (2011)

Associations between sedentary behavior and diet in adults (aged >18 years)

Dietary behavior	No. of samples	Summary (*n* samples [references])		
		Positive association (+)	Inverse association (–)	No association (0)
Fruit	3	0	3 [11 G, 64 [a], 68 B]	0
Vegetables	3	0	3 [11 G, 64 [a], 68 B]	0
FV (composite measure of fruit and vegetables)	2	0	2 [65 B/G]	0
Energy-dense snacks	4	4 [11 G, 62 [b], 68 B, 69]	0	0
Fast foods	3	3 [11 G, 63 G, 68 B]	0	0
Energy-dense drinks	2	2 [62 [b], 71]	0	0
Total energy	7	5 [11 G, 62 [b], 66 II, 66 III, 68 B]	0	2 [66 I, 67 G]
Percentage energy from fat	4	1 [66 II]	0	3 [62 [b], 66 I, 66 III]
Total fat (g)	4	3 [11 G, 62 [b], 68 B]	0	1 [67 G]
Fiber	3	0	3 [11 G, 62 [b], 68 B]	0