

A COMPREHENSIVE STUDY ON THE EFFECTS OF ELECTRONIC GADGETS ON HEALTH AND SLEEP

Written by *Anurag Aryal** & *Karigya Joshi***

* *High School Senior, Tilottama Secondary School, Butwal, Nepal*

** *High School Senior, Valmiki Shiksha Sadan, Bharatpur, Nepal*

ABSTRACT

General Background and Our Motivation

As our world is digitalizing at a rapid rate in every sphere of life, it is indispensable for everyone using digital platforms and gadgets to be aware of their impact on physical health, mental health, and sleep. Before beginning to work on this research paper, we browsed extensively on the internet to see whether there was any case study associated with this topic on a multi-national spectrum. However, we were unable to locate any. As a result, we made the decision to work on this research.

With this research paper, we aspire to present the statistical data that demonstrates the consequences of electronic gadgets on people from all over the globe and to aware them by stating the extent to which gadgets affect different aspects of human life. We would vouch for our ardency in this case study by mentioning that over the last two months, we have worked for roughly 1-2 hours per day to make this proposal as effective and relevant to individuals all over the world as possible.

Our Data Collection Approach

Both primary and secondary data were used for global-scale relevance. We thought the best approach would be to include at least the countries with the highest screen time in each continent. So, we inculcated the statistics from different journals, federal institutions, surveys, and schools about the average screen time, sleep disorders, obesity, and engagement in physical activities from 7 different countries across 6 continents. Furthermore, we conducted our own personal survey. A binary logistic regression model was adapted using IBM SPSS software,

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considering average screen time as an independent variable and poor sleep, eye diseases and depression as dependent variables to assess our primary data.

INTRODUCTION

The unprecedented use of electronic gadgets is inevitable in today's digital world as they have many crucial applications in multiple domains. Many studies have shown that COVID-19 has promoted the usage of electronic gadgets, as online classes and remote online work have grown in popularity. Having said that, it is critical to recognize their role in encouraging a sedentary lifestyle, which puts us at risk for a variety of physical, mental, emotional, and social illnesses like myopia, obesity, and attention deficit hyperactivity disorder.

SECONDARY DATA

Sources:

- Greece (highest screen time in Europe)
- South Africa (highest screen time in Africa)
- Brazil (highest screen time in South America)
- Mexico (highest screen time in North America)
- Australia (highest screen time in Oceania)
- Nepal & Philippines (highest screen time in Asia)

Result and Conclusion:

According to data derived from a school-based health survey published in the Journal of Clinical Sleep Medicine, 42.5 percent of men and 37.3 percent of women in Greece experience poor sleep. 177091 people were surveyed between March 2015 to May 2015 from various age groups, gender, and areas of Greece who reported approximately 8.6 hours of screen time per week and 12.4 hours of physical activities per week. 20 % of surveyors reported obesity too.

On January 11th, 2021, an article was published which provided the details of a survey in which 2295 children from Soweto, Johannesburg, South Africa participated. The average screen time was more than 21 hours per week. However, only 18% acknowledged doing physical activities for around 3.1 hours per week. 35% of males and 65% of females reported sleeping for 8 hours or less during the school night. Consequently, it was discovered that 54 percent of those kids were obese.

Likely, the Federal Institute of the Triangulo Mineiro (IFTM) published reports of 185 randomly selected people in Minas Gerais, Brazil. It was done between March 2018 and September 2018. 67.17 % of the participants acknowledged poor sleeping experience and 22.75 hours of screen time every week. Similarly, only 12.82% claimed 21.91 hours of physical activities per week. A tiny fraction (1.08%) only followed the recommended viewing period of less than or equal to two hours. Accordingly, 22.2 percent of survey respondents were obese.

As far as Mexico is concerned, publicly available data from ENSANUT (Encuesta Nacional de Salud y Nutrición) states that the mean screen time was 27.58 hours per week. The data was collected from 6419 people in 2016. One half were from the rural area while the other half belonged to the urban area. Engagement in physical activities was mere 9.58 hours per week. As a result, 19% of respondents said they had a poor sleep disorder, and 37% said they were obese. 70% were either overweight or obese and only 21% had normal weight.

In 2020, 934 students were polled at a private Australian school with a bring-your-own-device policy. Only 11% of participants followed the screen time recommendation of fewer than 2 hours per day, indicating that 89 percent of participants spent more than 14 hours of screen time per week. A mere 21% of people said they exercised for an hour every day. As a result, 26 percent of respondents had trouble sleeping, and 21.25 percent were obese.

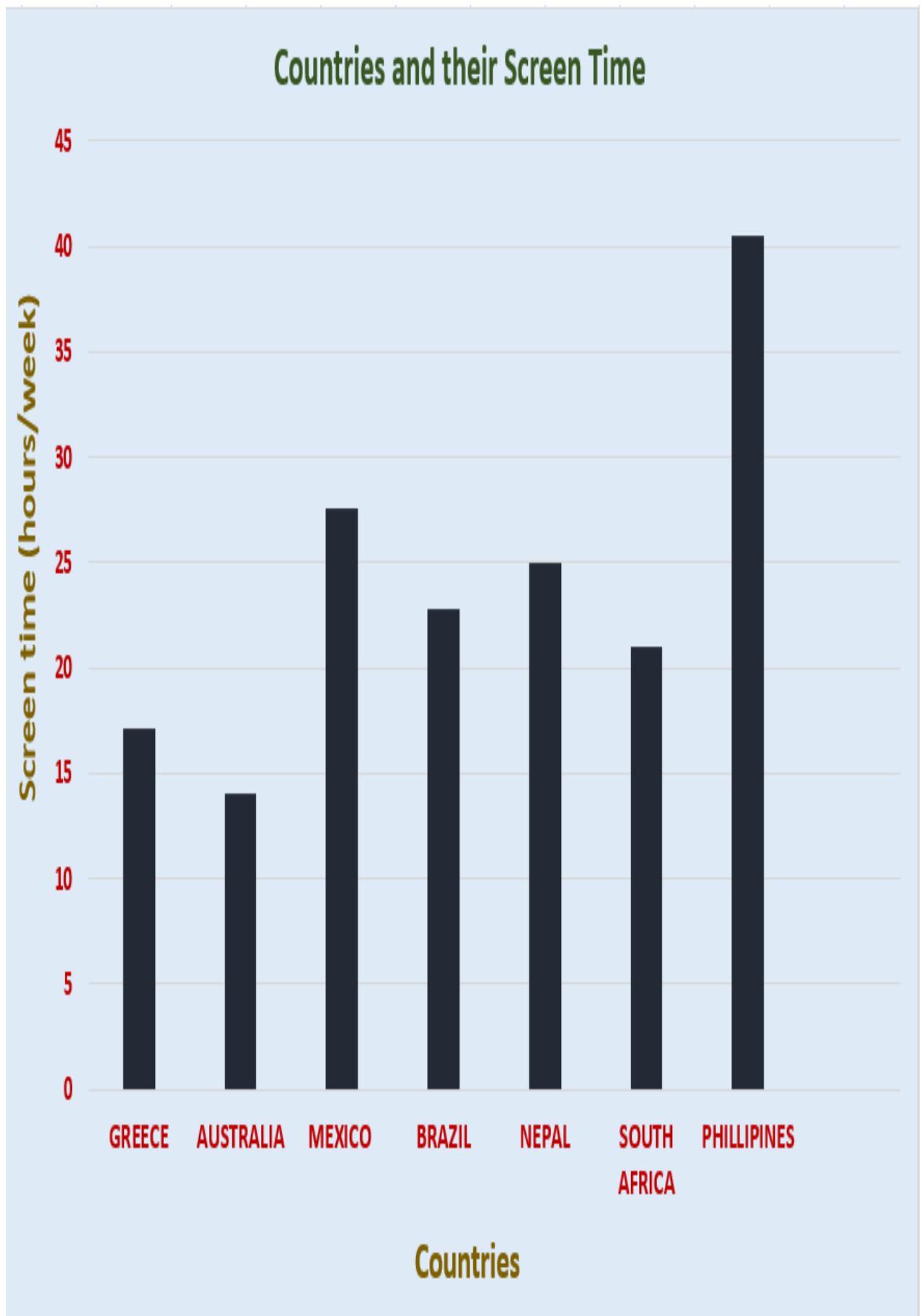
While in the Philippines, a whopping 40.5 hours per week of screen time was reported and half the proportion of the people was found to be physically inactive. Accordingly, 46% experienced poor sleep and obesity was prevalent in 36.6% of the population.

We also got secondary data on Nepal in Springer Link. Based on a survey done between May 2019 and September 2019 by randomly selecting students from 8 schools in Kathmandu valley,

approximately 42.5% of surveyors accounted for 21-28 hours of average screen time per week. Just 36.9% of 627 participants acknowledged doing physical activities. As a result, 24.4 percent experienced sleep problems and 23.7 percent were found to be obese.

It is explicitly clear that more screen time results in obesity and sleep problems. Moreover, a careful inspection of the data reveals that the more we spend time on electronic gadgets, the more we tend to have a sedentary lifestyle.

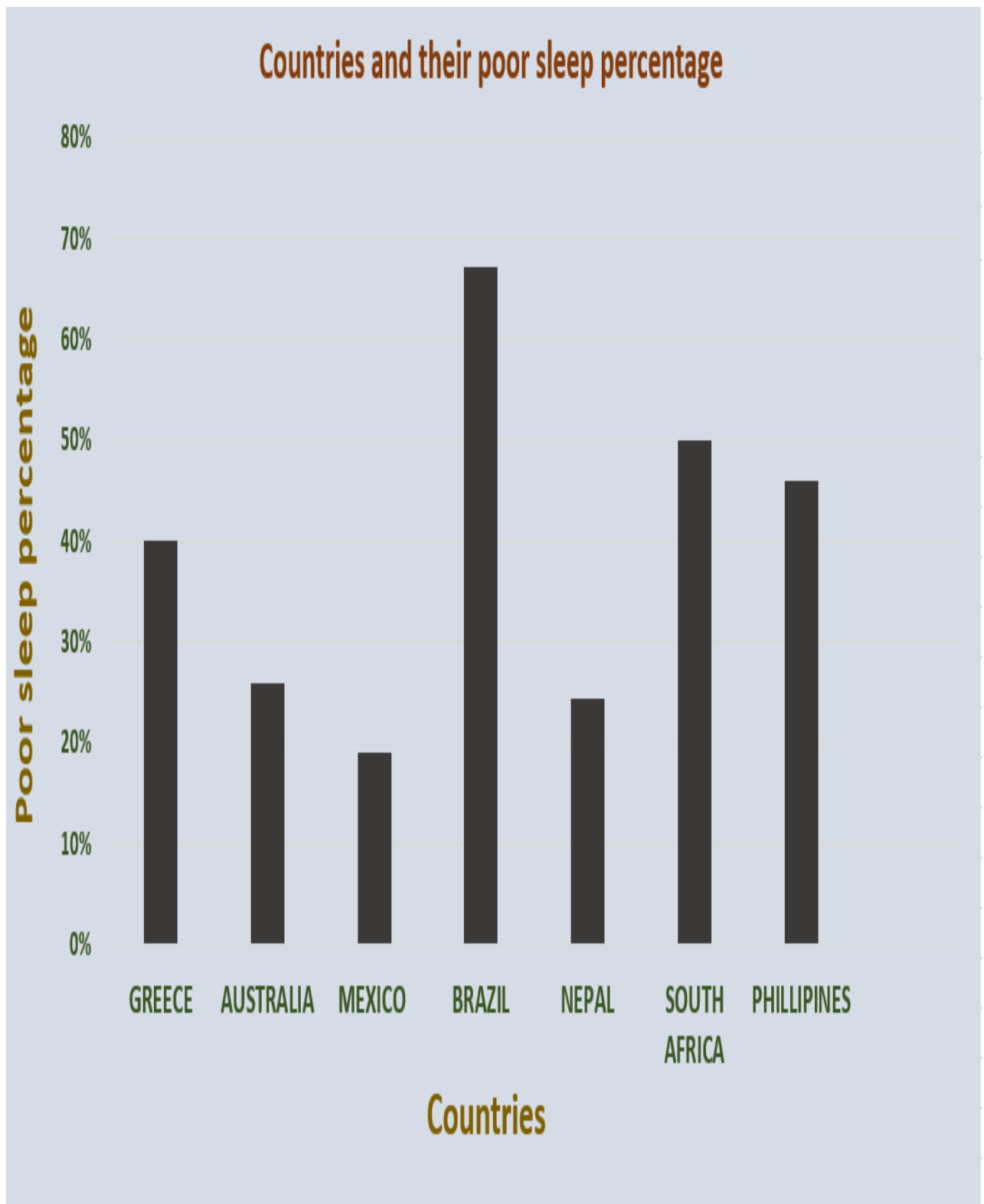


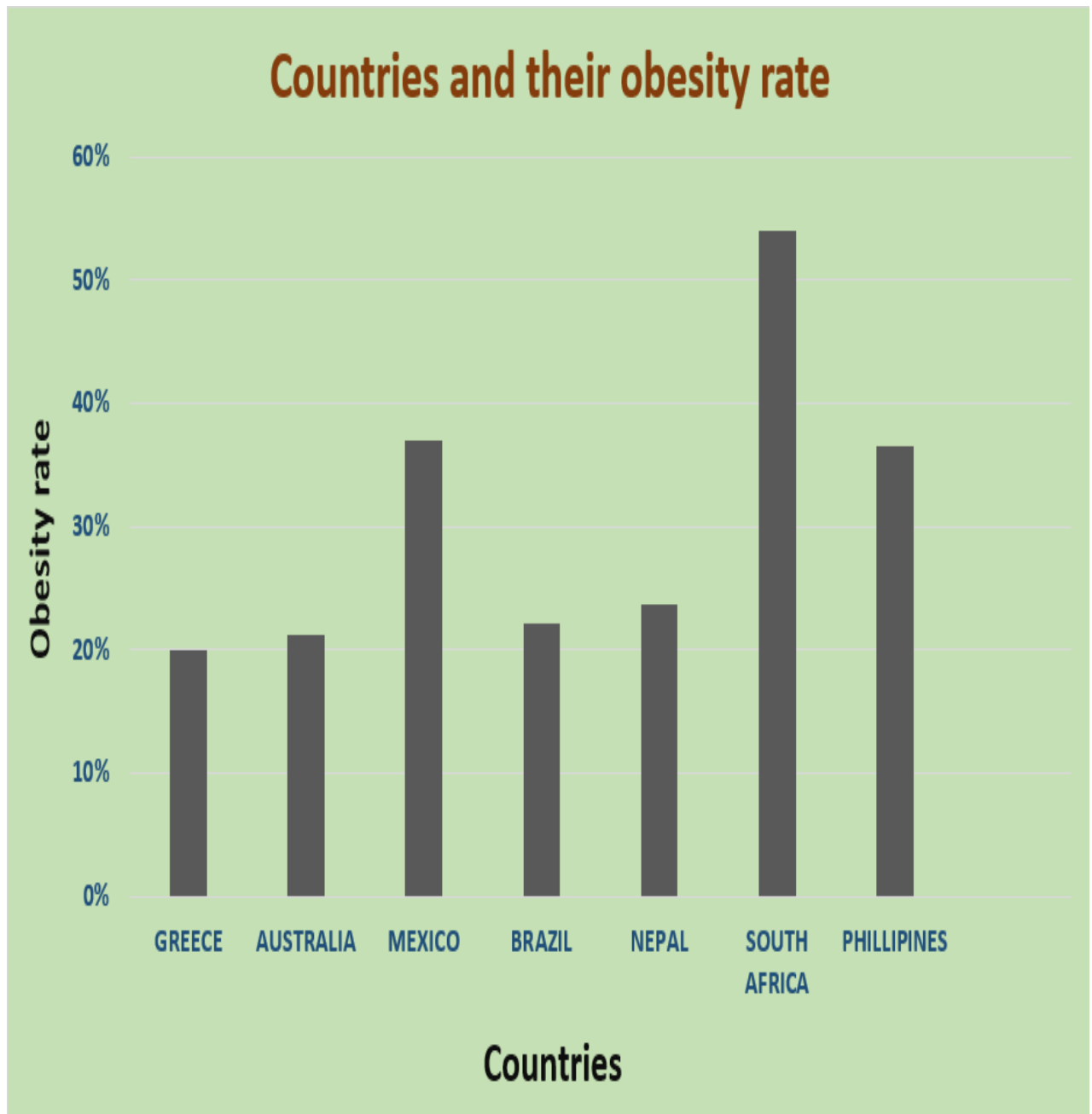


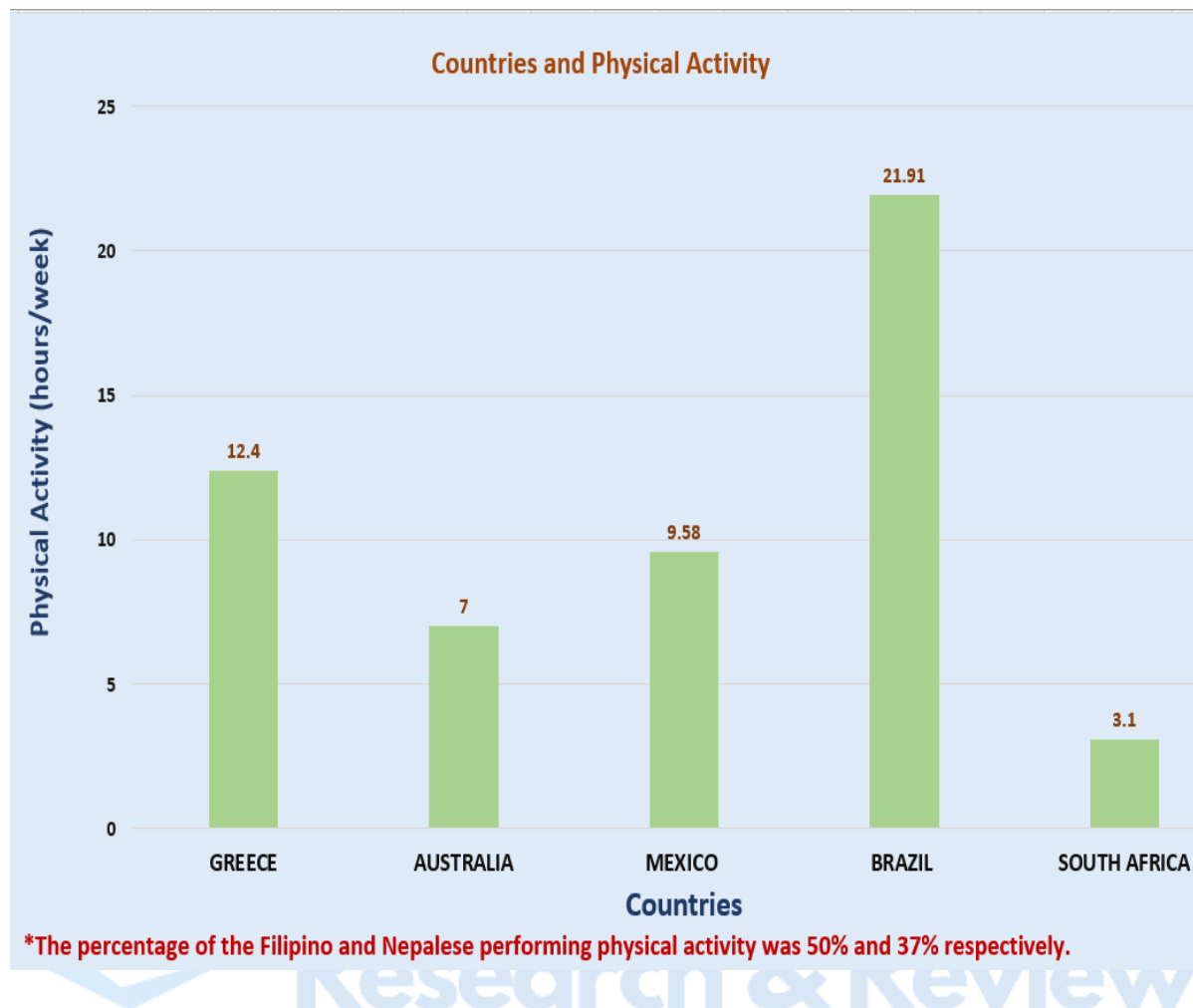
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PRIMARY DATA

Source:

600 randomly selected people from Butwal and Chitwan in Nepal were asked questions about their gadget use, place of residence, family's annual income, body weight, average screen time, the average number of hours allocated for physical activities on a daily basis, and whether they had poor sleep, myopia and other eye diseases, and depression. The consent of the participants was taken beforehand and the motive was also explained before surveying them.

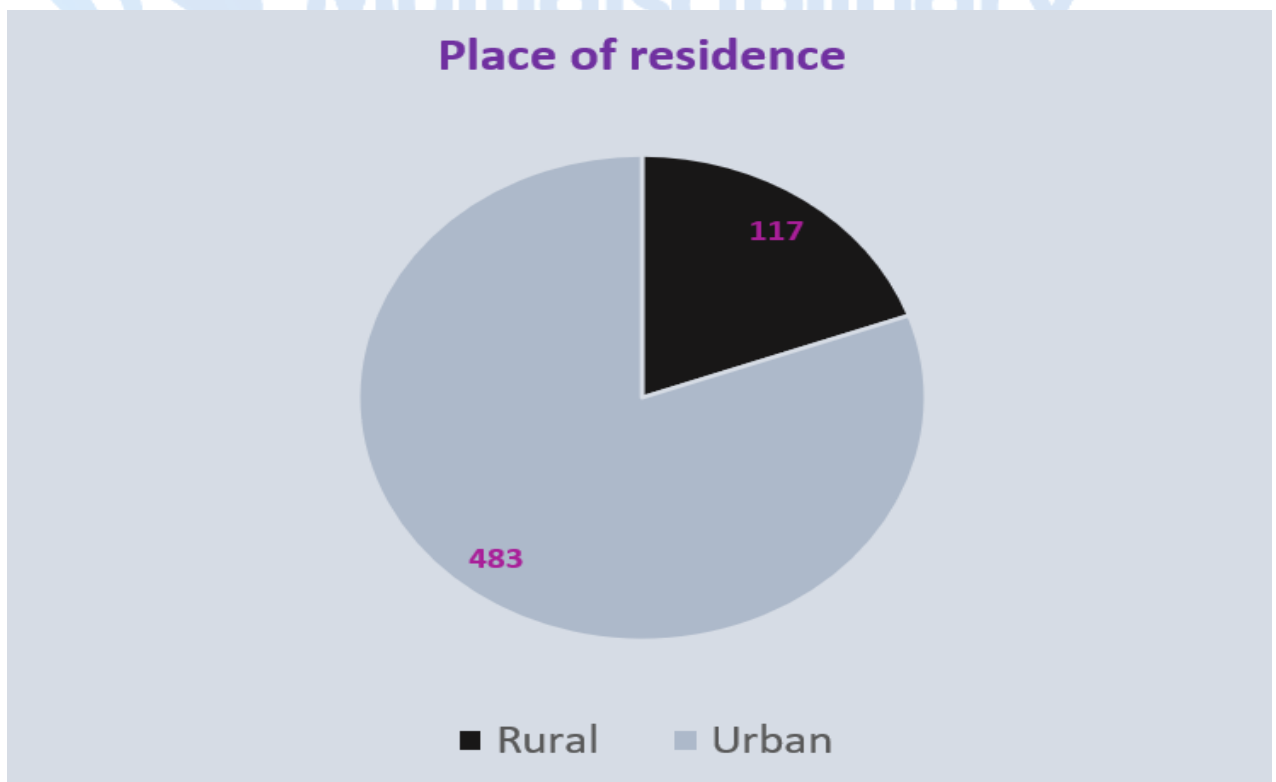
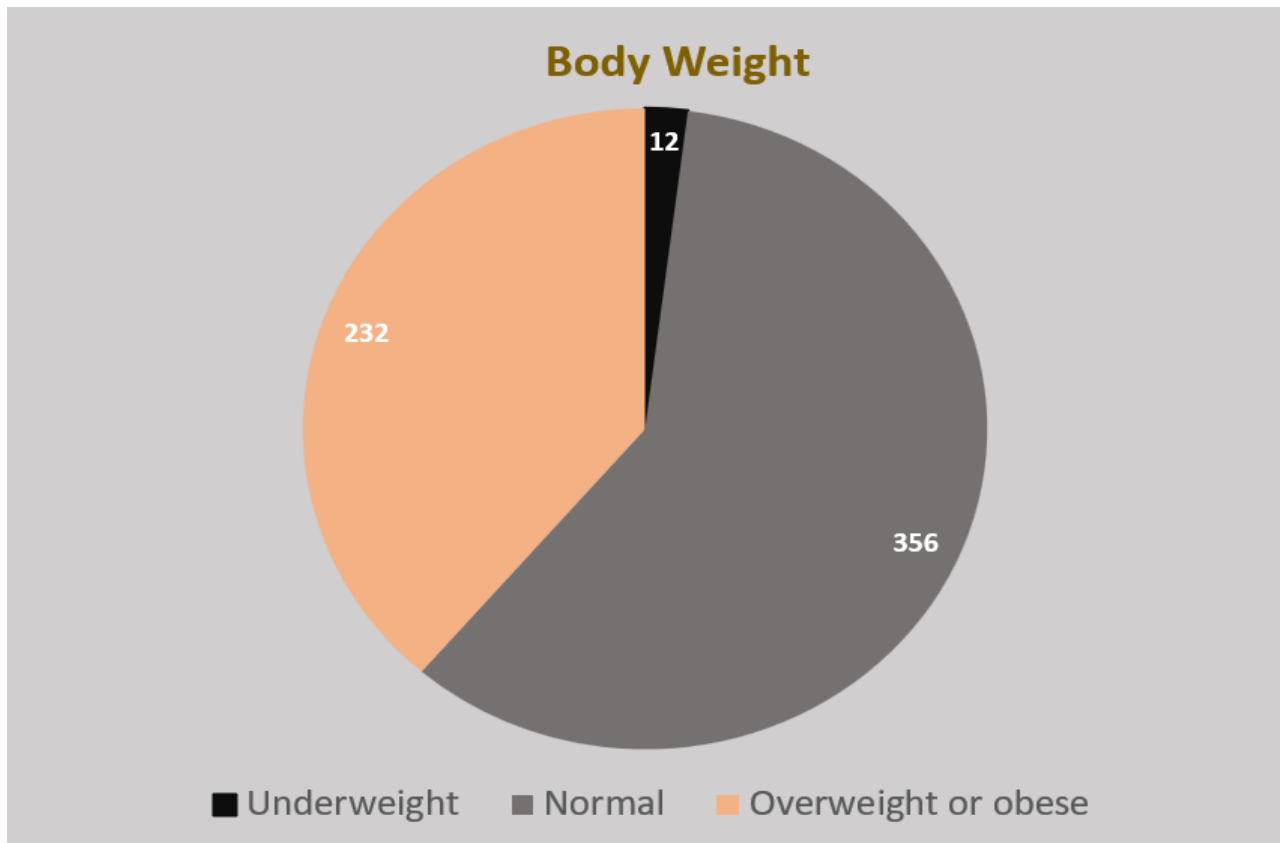
Data Analyses:

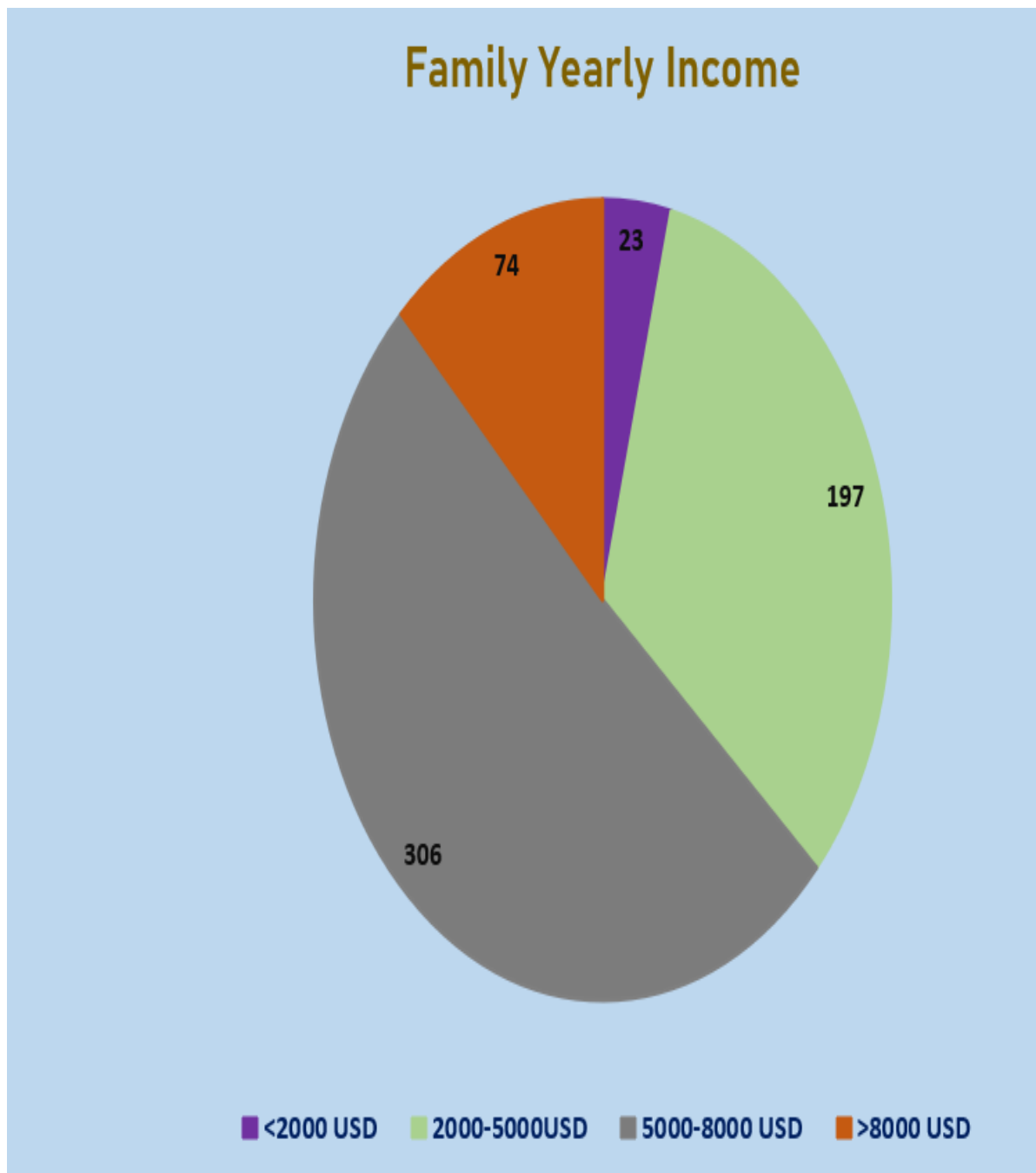
The obtained data were tabulated in the master sheet for further processing and analysis. The data collected through the interview was converted to a master table on the basis of dependent and independent variables which facilitated the tabulation of data in the desired form. The master chart data was inputted in IBM SPSS software for further calculation and assessment. A binary logistic regression model was considered to understand the relationship between different variables. Statistical analysis was done with a 5% level of significance. The p-value which determines the level of significance was also calculated.

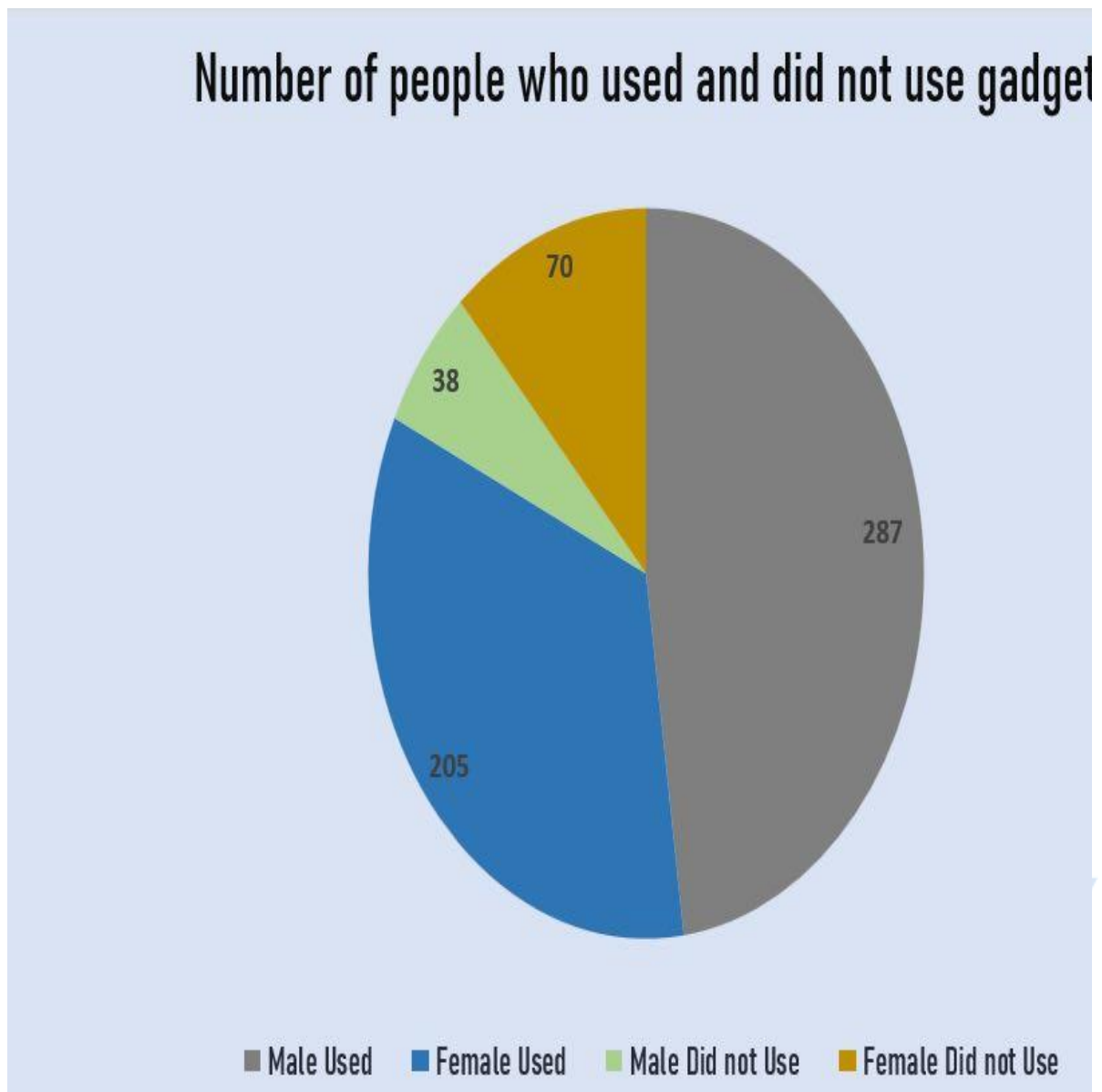
Result and Conclusion:

A total of 600 people participated in this study, 325 of whom were men and 275 of them were women. While 483 of the participants said they were from an urban area, 117 claimed to live in a rural area. 287 males and 205 females reported using electronic gadgets on a regular basis while 38 males and 70 females refused to use them at all, most of which were aged elderly people. As far as annual family income was concerned, the families of 23 surveyors earned less than 2000 dollars per annum, whereas 197 participants belonged to families whose yearly income was between 2000 and 5000 USD. Similarly, 74 people came from the family with more than 8000 USD annual income. But the majority of respondents (306) stated that their households made between \$5,000 and \$8,000 annually. In terms of their weights, 12 participants were underweight, 356 had normal weight and 232 of them were either overweight or obese as per WHO's standards for their age.

Furthermore, it was observed that most of the overweight and obese participants were from urban areas and settings and belonged to families that had an annual income of more than 5000 USD which clarifies that an urban lifestyle and an affluent background correlate with obesity.





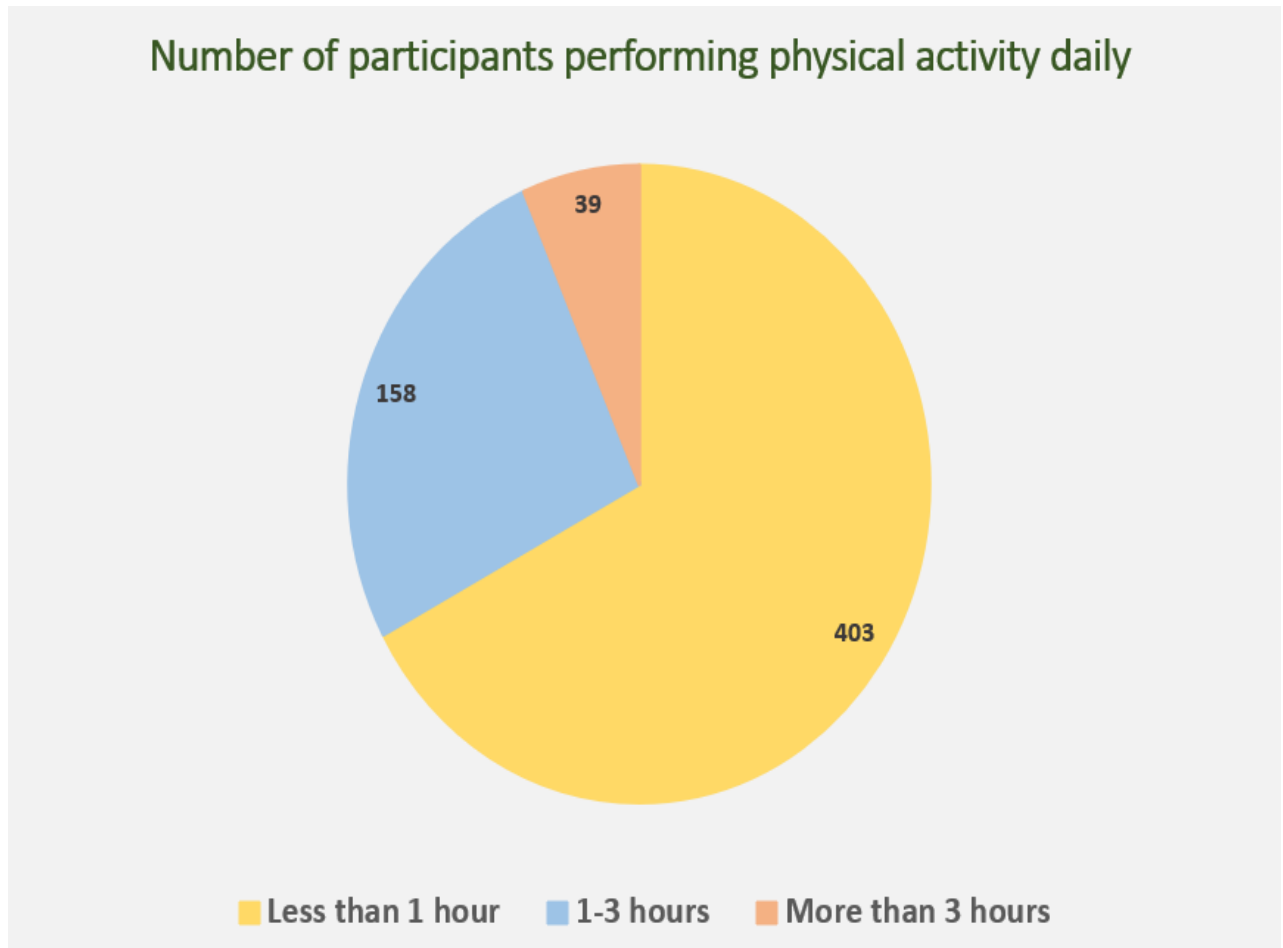


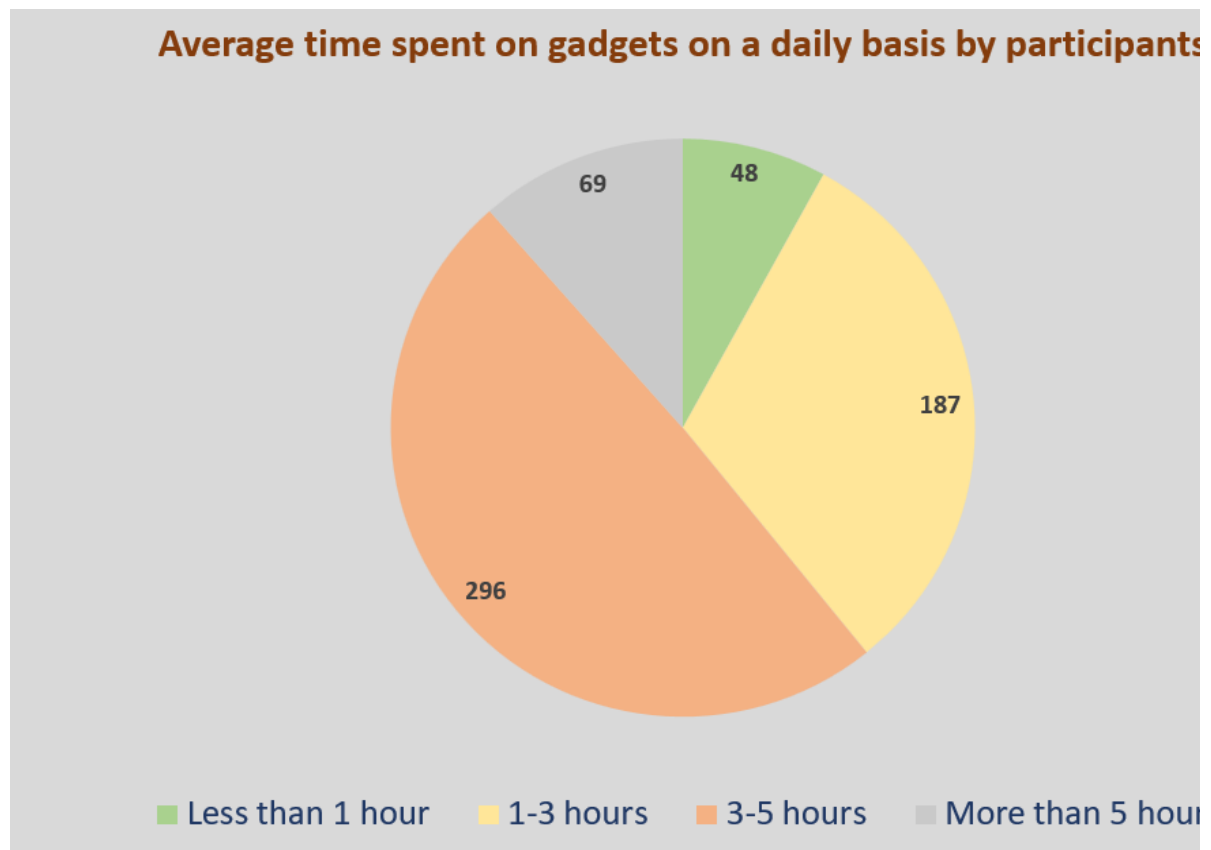
We also accumulated statistics about the average time spent on gadgets on a daily basis. Only 8% of the respondents claimed using electronic gadgets for less than 1 hour. 187 surveyors said that they used the gadgets for 1-3 hours daily. However, the largest proportion (49.33%) acknowledged using the gadgets for 3-5 hours and 69 participants even used them for more than 5 hours regularly.

Additionally, respondents were asked how many hours they typically allocated for daily physical activities. Approximately 67.2% of participants performed regular physical exercises

for less than 1 hour. Only 6.5 percent of those polled reported exercising for more than 3 hours, while 158 reported exercising for 1-3 hours.

Moreover, it was evident that the more time people spent on electronic gadgets, the less likely they were to engage in physical activities.





A binary logistic regression model was used to evaluate the impact of electronic gadgets on poor sleep, eye diseases, and depression. 2 participants with less than 1 hour of gadget time reported poor sleep; 8 surveyors with the same screen time were diagnosed with myopia and other eye diseases and 14 respondents with less than an hour of screen time claimed to be depressed. For participants with 1-5 hours of gadget time, 363 respondents said they have trouble sleeping; 281 reported eye diseases such as myopia, and 411 of them also claimed to be diagnosed with depression. Similarly, 57 respondents whose screen time was more than 5 hours said they experienced poor sleep; 48 participants with the same screen time were diagnosed with myopia and other eye diseases and 65 surveyors who used the gadgets for more than 5 hours reported depression.

Gadget time	Participants with poor sleep	Participants with myopia and other eye diseases	depression
< 1 hour	2	8	14
1-5 hours	363	281	411
More than 5 hours	57	48	65

The odds ratio, SE, and p-value (significant if it is less than 0.05) were also calculated. For the participants with an average screen time of less than 1 hour, the odds ratio for poor sleep, eye diseases, and depression were 299, 74, and 41.857 respectively. The SE on poor sleep, eye diseases, and depression for participants with the same gadget time were 0.708, 0.356, and 0.270, respectively.

When the mean screen time was between 1–5 hours, the odds ratio for poor sleep, eye diseases, and depression were 0.719, 1.308, and 0.609, respectively. The SE were 0.083, 0.082, and 0.084 for poor sleep, eye diseases, and depression, respectively.

For screen time of more than 5 hours, the odds ratio for poor sleep, eye diseases, and depression were 7, 10.321, and 7.571, respectively. The SE was 0.123, 0.144, and 0.127 for poor sleep, eye diseases, and depression, respectively.

The p-value was 0.000 in all scenarios except for myopia and other eye diseases when the time spent on gadget was between 1-5 hours.

Variable	Odds ratio	SE (Standard Error)	p-value
Poor sleep			
Time spent on gadgets			
< 1 hour	299	0.708	0.000
1-5 hours	0.719	0.083	0.000
More than 5 hours	7	0.123	0.000

Myopia & other eye diseases			
Time spent on gadgets			
< 1 hour	74	0.356	0.000
1-5 hours	1.308	0.082	0.001
More than 5 hours	10.321	0.144	0.000
Depression			
Time spent on gadgets			
< 1 hour	41.857	0.270	0.000
1-5 hours	0.609	0.084	0.000
More than 5 hours	7.571	0.127	0.000

Based on the calculation and assessment, we can contend that increased usage of electronic gadgets results in poorer sleep disorders, eye diseases, and depression too.

After manifesting both primary and secondary data, it is clear that electronic gadgets affect their users physically and mentally to a very great extent. The consequences have been seen in every nook and corner of the world. So, everyone should take measures to mitigate these effects.

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