FINAL REPORT LSC450: THE IMPACT OF COMPUTER & GAMING DEVICE USAGE ON SLEEP QUALITY IN ADULTS

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BACKGROUND

The increasing usage of computers and digital devices for both working and leisure has raised concerns about the potential health impacts of prolonged screen time. Among these impacts is poor sleep quality in adults who spend several hours a day in front of screens.

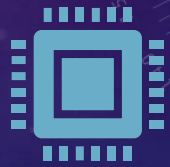
Studies by Nakshine et al. (2022), mentions adults exposed to screens for prolonged periods may experience increase stress, abnormal responsiveness to stimuli and an increased risk of sleep disturbances. These sleep issues can contribute to metabolic and cardiovascular problems making it important to understand how screen time affects sleep.

RESEARCH QUESTION AND MOTIVATION

Research Question: Is there a significant relationship between the number of hours adults spend using a computer/gaming device each day and their sleep?

Motivation: Growing concerns over screen time and its effects on health.

Null Hypothesis H_0: There is no significant relationship between the number of hours spent on a computer or gaming device per day (CompHrsDay) and sleep quality in adults.



Alternative Hypothesis H_a: Adults who spend more hours per day on a computer or gaming device (CompHrsDay) are more likely to experience poor sleep quality, which may correlate with shorter sleep duration (SleepHrsNight) or sleep disturbance (PoorSleep).

KEY VARIABLES FOR ANALYSIS

- Independent Variable :
  - CompHrsDay: Number of hours per day on average participant used a computer or gaming device over the past 30 days. Reported for participants 2 years or older. One of 0_hrs, 0_to_1hr, 1_hr, 2_hr, 3_hr, 4_hr, More_4_hr. Not available 2009-2010.
- Dependent Variable:
  - SleepHrsNight: Self-reported number of hours study participant usually gets at night on weekdays or workdays. Reported for participants aged 16 years and older.
- Controlled Variable:
  - SleepTrouble: Participant has told a doctor or other health professional that they had trouble sleeping. Reported for participants aged 16 years and older. Coded as Yes or No.

EXPLORATORY DATA ANALYSIS

```
 SleepHrsNight        CompHrsDay         Age          SleepTrouble
 Min.   : 2.000   0_hrs     : 824   Min.   :18.00   No :2704
 1st Qu.: 6.000   0_to_1_hr:1034   1st Qu.:31.00   Yes: 994
 Median : 7.000   1_hr      : 763   Median :46.00
 Mean   : 6.886   2_hr      : 456   Mean   :46.52
 3rd Qu.: 8.000   3_hr      : 255   3rd Qu.:59.00
 Max.   :12.000   4_hr      : 150   Max.   :80.00
                  More_4_hr: 216
[1] "Summary of Computer/Gaming Usage During Day"
    0_hrs 0_to_1_hr      1_hr      2_hr      3_hr      4_hr More_4_hr
      824      1034       763       456       255       150       216
[1] "Summary of Sleeping Hours During Night"
   Min. 1st Qu.  Median    Mean 3rd Qu.    Max.
  2.000   6.000   7.000   6.886   8.000  12.000
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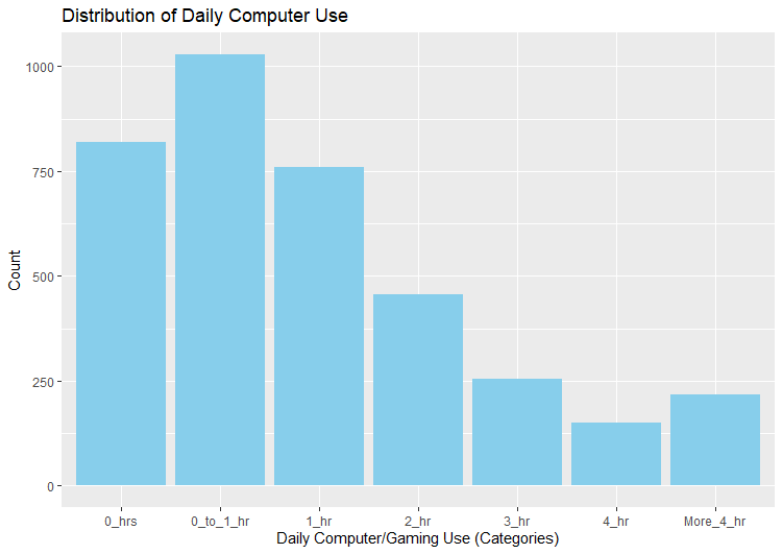

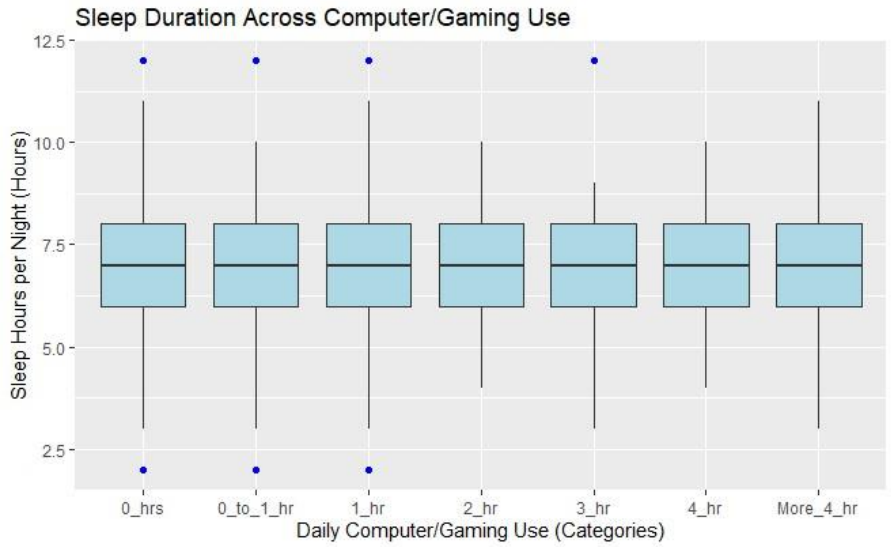

```
        Shapiro-Wilk normality test

data:  NHANES_clean$SleepHrsNight
W = 0.93852, p-value < 2.2e-16


        Shapiro-Wilk normality test

data:  residuals(anova_result)
W = 0.95195, p-value < 2.2e-16

[1] "ANOVA table"
             Df Sum Sq Mean Sq F value Pr(>F)
CompHrsDay    6     16   2.718    1.56  0.155
Residuals  3691   6430   1.742
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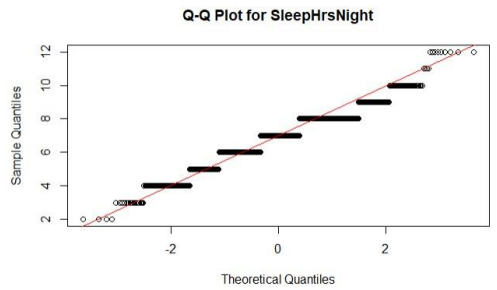

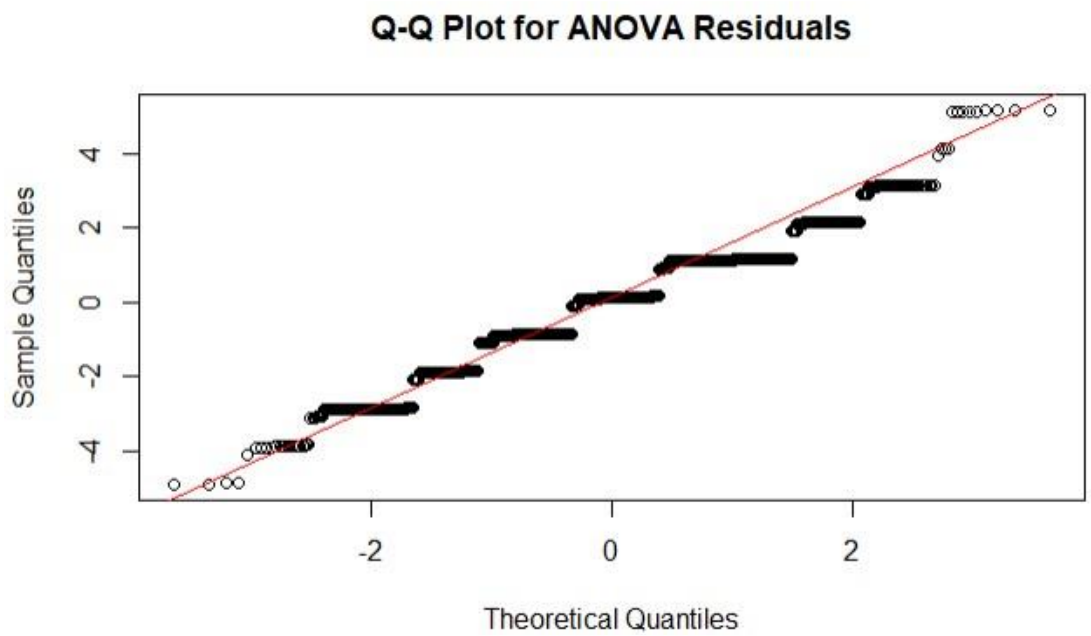

STATISTICAL METHODS USED

- Q-Q Plot: Visual check for normality in the sleep hours data.
- Shapiro-Wilk Normality Test: Formal test for normality
- ANOVA: Used to check if there is a significant difference in sleep duration across computer usage groups.

INTERESTING FINDS

- Shapiro-Wilk Test showed a significant violation of normality in sleep hours data
- ANOVA Results: While some computer usage categories showed differences in sleep, overall relationship was not strong enough to be significant (p-value = 0.155)
- Q-Q Plot: Confirmed the non-normality of residuals, especially in extreme categories.

FAIL TO REJECT THE NULL HYPOTHESIS

```
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- Based on the ANOVA result (p-value = 0.155) which is greater than 0.05, we fail to reject the null hypothesis.
  - The analysis did not find strong evidence of a significant relationship between computer usage and sleep quality.

CONCLUSION

- Small effect on sleep
- Data distribution for sleep duration (SleepHrsNight)
- Further Research
  - Lifestyle, stress, or work habits

REFERENCE

- Nakshine, V. S., Thute, P., Khatib, M. N., & Sarkar, B. (2022). Increased screen time as a cause of declining physical, psychological health, and sleep patterns: A literary review. Cureus, 14(10), e30051. https://doi.org/10.7759/cureus.30051

THANK YOU!