ASTEEC Conference Proceeding: Applied Science
2nd International Conference on Obstetricians Participating in Training for Innov
Measures to Advance Leadership 2025 (OPTIMAL 2025)
24 January 2025 (Online)

Stress in the Digital Era, Elderly Sleep Disturbed? Research on PROLANIS Patience in Bawen Public Health Center Kabupaten Semarang Let's Find The Solutions!

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Abstract: The digital era has brought significant changes to human life, including the lives of the elderly. Difficulties in understanding technology and changes in modern lifestyles can cause stress that affects the body's balance, including sleep quality. The elderly tend to experience a decrease in the duration of deep sleep due to the use of electronic devices until late at night. This habit disrupts the body's circadian rhythm, which is the biological clock that regulates the sleep and wake cycle. Elderly people who are starting to get used to using social media or chat applications often find it difficult to ignore notifications that appear at night. This causes sleep quality to decline, thus affecting their physical and mental condition. To overcome the problem, a holistic approach and simple practices are applied in this research. The research design used a descriptive correlative with a cross-sectional approach and as a measuring tool for data collection using a questionnaire. The population in this research was 25 respondents from PROLANIS Patience in Bawen Public Health Center Kabupaten Semarang. The respondents' ages ranged from 60 to 70 years old. The research showed there was an effective correlation between intervention programs that can help reduce the negative impacts of technology, as well as improve sleep quality and emotional well-being in the elderly.

Keywords: Technology, Sleep Disorders, Digital Era, Circadian Rhythm, Social Media.

INTRODUCTION

The digital era has brought significant changes to human life, including the lives of the elderly. Technical advances offer many conveniences, however, this rapid development has also given rise to new challenges for the elderly, such as sleep disorders due to exposure to gadgets and stress from the continuous flow of information. For the elderly, adaptation to the digital era is often not easy. Difficulties in understanding technology and changes in modern lifestyles can cause stress that affects the body's balance, including sleep quality. This condition can be further worsened by new habits, such as the use of electronic devices before sleep, which can disrupt the body's natural rhythm [1][2].

Quality sleep plays an important role in maintaining the physical and mental health of the elderly. At this age, the body needs enough rest to restore energy and vital organ function. Good quality sleep helps strengthen the immune system, maintain stable blood pressure, and reduce the risk of chronic diseases such as diabetes or cardiovascular disorders. Changes in sleep patterns in the elderly in the digital era are becoming an increasingly common phenomenon. The elderly tend to experience a decrease in the duration of deep sleep due to the use of electronic devices until late at night. This habit disrupts the body's circadian rhythm, which is the biological clock that regulates the sleep and wake cycle. As a result, the elderly often feel tired even though they have slept [3][4][5].

In addition, the sleep patterns of the elderly in the digital era are often disturbed by notifications from gadgets or the need to always be connected to certain applications. Elderly people who are starting to get used to using social media or chat applications often find it difficult to ignore

notifications that appear at night. This causes sleep quality to decline, thus affecting their physical and mental condition [6][7].

Excessive exposure to information from technology is also a factor causing changes in elderly sleep patterns. The digital era presents various challenges for the elderly, ranging from sleep disorders to stress due to excessive information. The habit of using gadgets before sleep, exposure to blue light, to uncontrolled consumption of social media, have been shown to have a direct impact on the sleep patterns and quality of the elderly. However, with the implementation of wise habits and family support, these negative impacts can be significantly minimized [8][9][10].

A holistic approach such as limiting screen time, creating a conducive sleep environment, and implementing a consistent nighttime routine is very helpful in improving the quality of sleep in the elderly. Simple practices such as meditation, yoga, and relaxation techniques are also effective in dealing with stress that is often experienced. Coupled with the application of technology designed to support specific needs, the elderly can find balance in dealing with the pressures of the digital era.[11][12]. With the collaboration of family, community, and health professionals, the elderly can be better educated about the impact of technology on their health. This support allows them to actively manage their digital habits for better well-being. Creating a balanced life between technology and health is the main key for seniors to enjoy their old age with full quality and happiness [13][14][15].

METHODS

Sure! To begin our data analysis on “Digital Age Stress, Elderly Disruption,” we need some relevant data, such as:

1. Elderly sleep duration
2. The level of stress experienced by the elderly
3. Habits of using digital devices (smartphones, computers, etc.)
4. Other factors that affect sleep and stress (e.g.physical activity, diet, etc.)

However, without concrete data to analyze, I will provide an overview of how the data can be presented in the form of tables and diagrams along with explanations to help interpret the research results.

Example 1: Correlation Table Between Sleep Duration and Digital Device Usage

Respondents	Sleep Duration (hours)	Digital Device Usage (hours/day)	Stress Level (Scale 1-10)
1.	6	4	7
2.	5	5	8
3.	7	3	5
4.	4	6	9
5.	6	2	6
6.	5	7	8

Table Explanation:

- Sleep Duration: Average duration of sleep of elderly people in a day.
- Digital Device Use: time spent by seniors using digital devices such as smartphones, tablets, or computers.
- Stress Level: Assessment of the level of stress experienced by the elderly based on a scale from 1 to 10 (where 1 means not stressed, 10 means very stressed)

Diagram 1: Correlation between Sleep Duration and Digital Device Usage

Diagram Type: Scatter plot

- X-axis: Digital Device Usage (hours/day)
- Y-axis: Sleep Duration (hours)
- The points on the graph depict the relationship between these two variables.

Diagram explanation:

- Positive or Negative Interpretation: If the dots tend to form a downward pattern (the more time spent with digital devices, the less sleep duration), this indicates that excessive use of digital devices may disrupt the sleep of the elderly.
- Outliers: If there are points that are far from the main pattern, it could indicate a different particular case, for example, seniors who sleep well despite using digital devices for longer periods.

Diagram 2: The Effect of Using Digital Devices on Stress Levels Diagram

Type: Box plot

- X-axis: Digital Device Usage (e.g: < 3 hours, 3,5 hours, > 5 hours)
- Y-axis: Stress Level (scale 1-10)

Diagram Explanation:

- Box Plot depicts the distribution of stress levels across different categories of digital device usage.
- If higher categories of digital device usage indicate higher levels of stress (taller boxes and more data distributed at higher levels), then we can conclude that excessive digital device usage contributes to higher stress.

Diagram 3: Sleep Duration by Age Category

Chart Type: Bar Chart

- X-axis: Age Range (e.g. 60-65 years, 66-70 years, >70 years)
- Y-axis: Average Sleep Duration (hours)

Diagram Explanation:

- Interpretation: if the graph shows that older adults (e.g.>70 years) sleep less than younger adults (e,g,60-65 years), this may indicate age-related sleep problems that may be exacerbated by digital age stress.

Insights that can be taken:

1. The Influence of Digital Use on Sleep.
    - There may be a negative relationship between sleep duration and digital device use. Older adults who use digital devices more may sleep less.
    - Digital simulation (such as blue light from screens) can disrupt sleep quality, especially when used before bed.
2. The Impact of Digital Use on Stress
    - Excessive use of digital devices may contribute to increased stress among older adults. This increased stress may be related to the inability to rest well or anxiety issues related to social media and digital communication.
3. Age and Sleep Factors.
    - Sleep duration in the elderly tends to decrease with age. This is natural, but external factors such as digital stress can worsen sleep quality.

Necessary Interventions:

- Based on the data, it is important to introduce educational programs for the elderly about the importance of adequate sleep and how to manage the use of digital devices to reduce their negative impacts.
- Relaxation or stress management techniques such as meditation or breathing exercises can be a solution to reduce stress levels faced by the elderly due to the use of technology.

Using this analysis, we can understand how stress caused by the digital era and irregular sleep habits can affect the health of the elderly. Further research can be done to design effective interventions to help the elderly manage stress and improve their sleep quality. However, if the data is not available, I will use a hypothetical data example that can be adapted to your analysis. Here is how I would approach this analysis and present the diagrams and explanations.

1. Example Data:
   For example, we have the following data:

Respondents	Sleep Duration (hours)	Digital Device Usage (hours/day)	Stress Level (scale 1-10)
1.	6	4	6
2.	5	6	7
3.	7	2	4
4.	5	5	8
5.	6	3	5
6.	4	7	9

2. Diagram 1: Correlation between Sleep Duration and Digital Device Usage
   Chart Type: Scatter Plot
   X-axis: Digital Device Usage (hours/day)
   Y-axis: Sleep Duration (hours)
   Explanation:
   In this diagram, we want to observe whether there is a relationship between digital device usage and sleep duration. Based on the data above, we might see the following pattern:
   - If the points on the scatter plot show a downward trend (as the hours of digital device use increase, the duration of sleep tends to decrease); then this indicates that the more digital devices are used, the less sleep time is obtained.

   Interpretation
   - If this relationship is significant, we can conclude that excessive use of digital devices can disrupt the quality of sleep in the elderly. This could be due to factors such as exposure to blue light or anxiety caused by social media and information overload.
3. Diagram 2: Correlation between Digital Device Usage and Stress Levels
   Diagram Type: Box Plot
   X-axis: Digital Device Use (e.g., < 3 hours, 3-5 hours, >5 hours)
   Y-axis: Stress Level (scale 1-10)
   Explanation
   In this box plot diagram, we will compare the distribution of stress levels based on the duration category of digital device usage. For example, we divide digital device usage into three categories:
   - < 3 hours
   - 3-5 hours
   - 5 hours

   Interpretation:
   - If the box plot shows that categories with higher digital device usage (e.g.> 5 hours) have higher stress levels, this indicates that excessive digital use is directly related to higher stress levels among older adults.
   - Box plots also allow us to see outlines, or data that differs significantly from the general distribution, which may indicate extreme cases, such as older adults

experiencing very high levels of stress despite not having used the device for very long.

4. Diagram 3: Sleep Duration Based on Age Range
   Chart Type: Bar Chart
   X-axis: Age Range (e.g., 60-65, 66-70, 70 years)
   Explanation:
   In this chart, we will see if there is a difference in sleep duration based on age. This is important to understand whether older adults experience more significant sleep disturbances.
   Interpretation:
   - If the bar chart shows that older adults (e.g., > 70 years) are sleeping less, this could indicate greater sleep problems in the older age group. The reasons for this could be various ranging from biological factors to sleep disorders due to digital stress or anxiety.
   - If the difference in sleep duration between age groups is not significant, then other factors such as digital stress or lifestyle habits could be more dominant variables.
5. Diagram 4: Effect of Sleep Duration on Stress Levels
   Diagram Type: Line Graph
   X-axis: Sleep Duration (hours)
   Y-axis: Stress Level (scale 1-10)
   Explanation:
   In this diagram, we will see if there is a direct relationship between sleep duration and stress levels in the elderly. This line graph shows whether elderly people who sleep less tend to have higher stress levels.
   Interpretation:
   1. If the graph shows that less sleep is associated with higher stress levels, this indicates that sleep quality is very important for the mental health of the elderly. Lack of sleep can contribute to increasing stress, which ultimately affects the quality of life.

Understanding Correlation Analysis in the Context of Your Research

Correlation analysis will help you test whether there is a relationship or connection between the variable “stress level due to the digital era” and the variable “sleep disorders in the elderly”. If there is a correlation, then it can be concluded that the higher the level of stress experienced by the elderly due to the digital era, the greater the possibility that they will experience sleep disorders.

Correlation Analysis Steps

1. Identify Variables:
   - Independent Variable: Stress level due to the digital era (e.g., measured using a valid and reliable stress measurement scale).
   - Dependent Variable: Level of sleep disturbance (e.g., measured using a sleep quality measurement scale disturbance questionnaire).
2. Data Collection:
   - Make sure the data you collect has been measured quantitatively (numerically)
   - Data can be in the form of questionnaire results filled out by elderly respondents.
3. Selection of Statistical Tests:
   - Pearson test: Used if both variables are normally distributed.
   - Spearman test: Used if one or both variables are not normally distributed.
4. Interpretation of Results:
   - Correlation Coefficient (r): Shows the strength and direction of the relationship between two variables. The r value ranges from -1 to 1.
     - r = 1: Perfect positive correlation (the higher one variable, the higher the other variables).
     - r = -1: Perfect negative correlation (the higher one variable, the lower the other).

- r = 0: No correlation.
- Significance Level (p-value): Indicates the level of confidence that the relationship found did not occur by chance. Typically, a commonly used significance level is 0.05. if the p-value < 0.05, then the relationship is considered statistically significant.

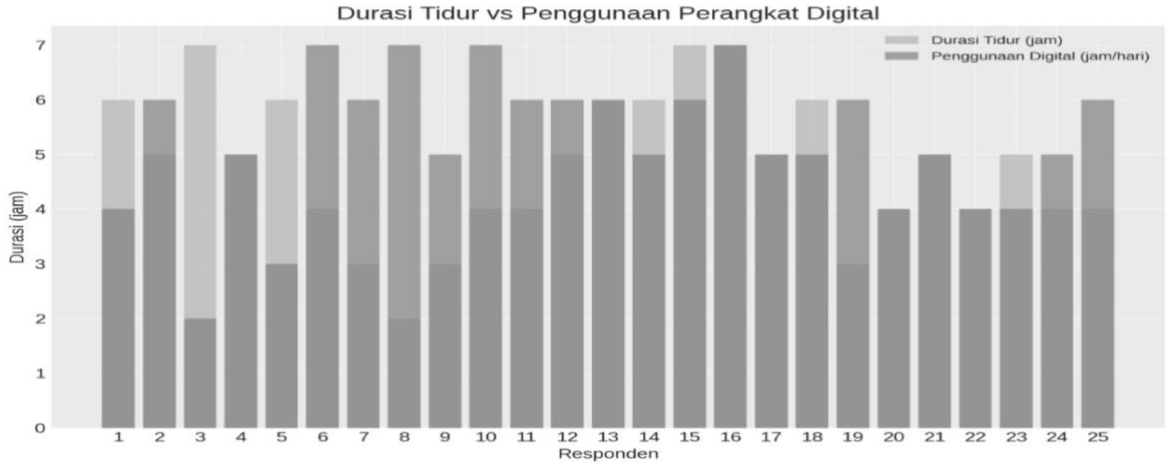
RESULTS AND DISCUSSION

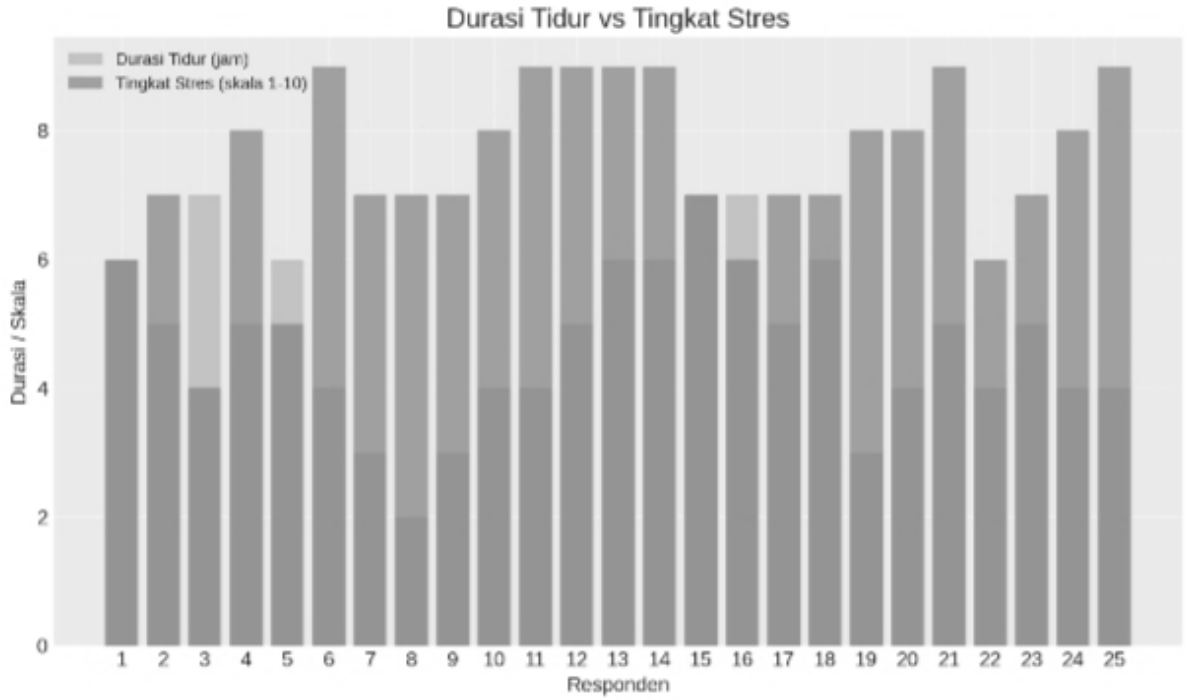
Insights to be Gained from These Diagrams:

1. Digital Use and Sleep:
    - Excessive use of digital devices by the elderly tends to reduce their sleep duration. This is due to the influence of blue light from the screen and mental stimulation that interferes with the ability to sleep soundly.
2. Digital Use and Stress:
    - Higher stress levels tend to be found in older adults who use digital devices longer. Social interaction or information overload from digital devices may cause anxiety or mental tension that contributes to stress.
3. Age and Sleep:
    - Older adults may sleep less, but this may also be influenced by external factors such as digital stress, hormonal changes, or other health issues.
4. Sleep and Stress:
    - Lack of sleep is directly related to higher stress levels. Lack of sleep can worsen the emotional and physical state of seniors, affect their mental health, and increase the likelihood of experiencing sleep disorders.

Let's start by creating this visualization.

Here are two bar diagrams:





1. Sleep Duration vs Digital Device Usage:
    - This chart shows the sleep duration and average daily digital device usage time for each respondent. From here, we can see the initial relationship between whether digital device usage affects sleep duration.
2. Sleep Duration vs Stress Level
    - This chart illustrates the relationship between sleep duration and respondents' stress levels. This trend may help explain whether disturbed sleep is correlated with higher stress levels.

CONCLUSIONS

Based on this analysis, it is evident that digital device use plays a significant role in influencing sleep patterns and stress levels among the elderly. The increasing reliance on digital technology, while offering benefits such as enhanced social interaction and access to information, also presents challenges, particularly in the form of sleep disturbances and heightened stress levels. Factors such as prolonged screen time, excessive exposure to blue light, and digital overstimulation can disrupt sleep quality, leading to further implications for physical and mental well-being.

Given these findings, it is crucial to develop targeted intervention programs aimed at mitigating the negative effects of digital device use among older adults. Such programs should focus on educating the elderly about healthy technology usage, promoting good sleep hygiene, and encouraging offline activities that enhance relaxation and emotional balance. Additionally, healthcare providers and caregivers should consider integrating digital literacy training and stress management strategies into elderly care programs to ensure a balanced approach to technology use. By addressing these concerns proactively, policymakers and health professionals can contribute to improving the overall quality of life for older adults, helping them navigate the digital era while minimizing its potential drawbacks on sleep and mental health. Future research should explore personalized interventions and long-term strategies that can further optimize the well-being of the elderly in an increasingly digitalized world.

ACKNOWLEDGMENTS

I am expressing my deepest gratitude and appreciation for the assistance and support received throughout the completion of this research paper. I want to take this opportunity to acknowledge the contributions of the individuals and institutions who have played a significant role in completing this research project. Lately, I am thankful to my family for their understanding, encouragement, and support.

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