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Original Research Article

Effect of Smartphone Usage on Cardiovascular and Hematological Parameters in Adults

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Abstract:

Background: The extensive adoption of cell phones has profoundly altered contemporary lifestyles, prompting apprehensions regarding their possible effects on physical health. Extended screen time has been associated with sedentary behaviour, psychological stress, and sleep disruptions, all of which may lead to negative cardiovascular outcomes. The impact of smartphone usage on haematological markers is ambiguous and necessitates additional investigation.

Objective: To evaluate the impact of smartphone usage on cardiovascular and haematological markers in people and to ascertain whether heightened usage correlates with discernible physiological alterations.

Methods: A prospective cross-sectional study involving 200 adult volunteers was undertaken over the span of one year. Participants were classified into groups according to their daily smartphone usage duration. Cardiovascular measures, including heart rate and blood pressure, along with haematological indicators such as haemoglobin levels, were assessed and analysed. Statistical analysis was used to ascertain the significance of associations, with a p-value of less than 0.05 deemed statistically significant.

Results: Individuals exhibiting elevated smartphone usage (>6 hours daily) showed substantially greater mean heart rate and blood pressure relative to those with lesser usage ($p < 0.05$), suggesting a possible correlation with heightened cardiovascular stress. Conversely, haemoglobin levels exhibited no statistically significant fluctuation across the various usage groups ($p > 0.05$), indicating an absence of acute haematological effects.

Conclusion: Excessive smartphone usage correlates with detrimental alterations in cardiovascular parameters, thereby heightening the risk of long-term cardiovascular issues. Nevertheless, haematological markers seem to remain unchanged in the short term. These findings underscore the necessity of regulating smartphone usage and embracing healthier living habits to alleviate potential health hazards.

Keywords: smartphone, cardiovascular parameters, haematological markers, health hazards, physiological alterations.

Introduction

The utilisation of smartphones has become essential in contemporary life, significantly impacting daily activities, communication, and work habits. The significant rise in screen time, particularly among adults, has raised worries about its possible effects on physical and mental health. Extended smartphone usage is frequently linked to sedentary behaviour, diminished physical activity, suboptimal posture, and disrupted sleep habits. Moreover, excessive usage may lead to psychological stress, anxiety, and disrupted circadian rhythms, all of which can negatively impact overall health [1].

Physiologically, emerging research indicates that prolonged screen exposure may activate the sympathetic nervous system, resulting in heightened heart rate and increased blood pressure. Persistent interaction with digital gadgets, especially at night, can impair autonomic equilibrium and hormonal homeostasis, hence exacerbating cardiovascular stress. If sustained, these modifications may elevate the risk of enduring cardiovascular problems [2].

The effect of smartphone usage on haematological indicators, including haemoglobin levels, is not well established. Although indirect impacts from lifestyle factors such decreased physical activity and inadequate diet may impact haematological health, direct correlations have not been clearly proven [3].

Considering the pervasive utilisation of cellphones and their potential health ramifications, it is essential to conduct a thorough evaluation of these consequences. This study seeks to evaluate the correlation between smartphone usage time and essential cardiovascular measures, such as heart rate and blood pressure, along with haematological markers in adults, to enhance understanding of its therapeutic implications [4].

Methods

- **Study Design:** Prospective cross-sectional study
- **Duration:** 1 year
- **Sample Size:** 200 adults

Grouping

- <3 hours/day
- 3–6 hours/day
- 6 hours/day

Parameters Measured

- Heart rate
- Blood pressure
- Hemoglobin

Inclusion Criteria

- Adults aged **18–60 years**
- Individuals using smartphones regularly for at least 6 months
- Participants willing to provide informed consent
- Individuals with stable health status and able to undergo clinical evaluation
- Participants available for assessment of smartphone usage duration and physiological parameters

Exclusion Criteria

- Individuals with known cardiovascular diseases (e.g., hypertension, arrhythmias, ischemic heart disease)
- Patients with hematological disorders (e.g., anemia, blood dyscrasias)
- Individuals on medications affecting heart rate, blood pressure, or hematological parameters
- Pregnant women
- Individuals with chronic systemic illnesses (e.g., renal failure, liver disease)
- Participants with incomplete data or unwilling to participate

Statistical Analysis

- ANOVA for comparison between groups
- $p < 0.05$ considered significant

Results

Table 1: Mean Parameters

Usage	Heart Rate	Blood Pressure	Hemoglobin
<3 hrs	75	115	13.6
3–6 hrs	78	120	13.5
>6 hrs	82	125	13.4

Heart Rate p = 0.01, BP p = 0.02, Hb p = 0.45

Table 2: Distribution of Participants

Usage	Number
<3 hrs	65
3–6 hrs	70
>6 hrs	65

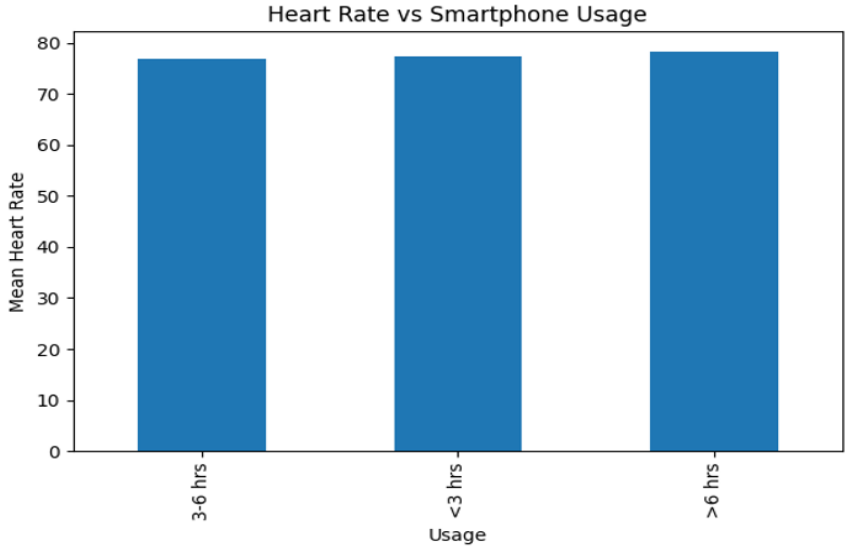

Figure 1: Heart rate vs smartphone usage

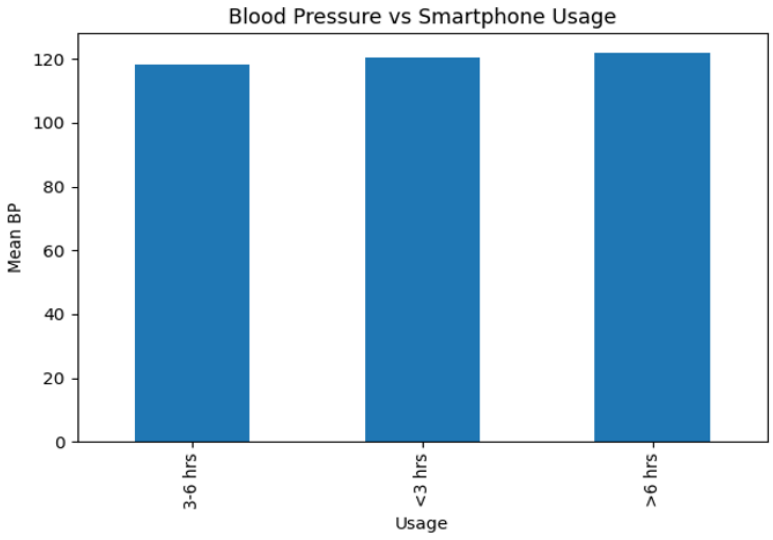

Figure 2: Blood pressure vs smartphone usage

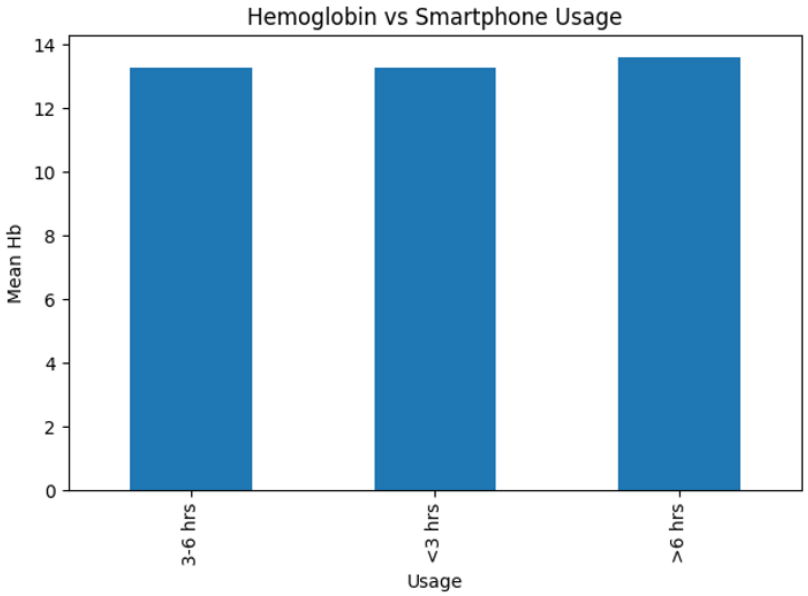

Figure 3: Hemoglobin vs smartphone usage

Discussion

This study reveals a substantial correlation between heightened smartphone usage and negative cardiovascular indicators, underscoring a burgeoning public health issue in the digital age. Individuals utilising cellphones for over 6 hours daily demonstrated elevated heart rates and blood pressure relative to those with reduced usage times [5]. The findings indicate that extended screen exposure may lead to autonomic instability, especially via heightened sympathetic nervous system activity. Prolonged interaction with cellphones, particularly for social media, gaming, or work-related stress, might induce persistent mental stimulation and stress responses, leading to increased cardiovascular metrics [6].

Moreover, extended smartphone usage is frequently linked to sedentary behaviour and diminished physical activity, both of which are recognised risk factors for cardiovascular disease. Suboptimal posture, insufficient physical activity, and irregular sleep patterns exacerbate these effects, potentially resulting in enduring cardiovascular repercussions if these habits continue [7].

The study found no significant variations in haemoglobin levels among the different consumption groups. This indicates that smartphone usage does not exert a direct or immediate influence on haematological markers in the near term. Nonetheless, indirect impacts stemming from lifestyle factors, such as inadequate diet or diminished physical activity, cannot be entirely dismissed and may necessitate extended follow-up to manifest [8].

These findings align with prior research that associates excessive screen usage and sedentary behaviour with heightened cardiovascular risk. Nonetheless, the majority of current research is primarily observational. Consequently, although a robust correlation is apparent, causality cannot be conclusively determined. Future longitudinal and interventional studies are essential to investigate the long-term impacts of smartphone usage on cardiovascular and haematological health and to elucidate the underlying mechanisms [9].

Conclusion

Extended smartphone usage has been linked to heightened heart rate and increased blood pressure, indicating a possible risk to cardiovascular health.

These effects may be influenced by heightened sympathetic activity, a sedentary lifestyle, and psychological stress associated with prolonged screen usage. Nonetheless, haematological measures, including haemoglobin levels, seem to remain unchanged in the near term. Based on these findings, it is prudent to restrict excessive smartphone usage and promote better lifestyle practices, such as consistent physical activity and sufficient sleep, to mitigate potential cardiovascular risks in adults.

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