

Assessing the Biochemical Impact of Temperature Variability on Human Health: A Survey-Based Approach

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ABSTRACT

This study evaluates the biochemical effects of temperature variability, particularly transitions from cold to hot weather, on the health of university students. Conducted from January to August 2024, the survey assessed parameters such as blood pressure, anxiety, fatigue, sleep routines, and food/water intake in 100 students. The data, statistically analyzed using SPSS version 23, reveal significant health changes associated with temperature shifts, offering valuable insights for managing health during seasonal transitions.

Keywords: Biochemical Impact, Health, Seasonal Transitions, Temperature Variability, Wellness.

INTRODUCTION

Temperature fluctuations from cold to hot weather can profoundly affect human health, particularly during seasonal transitions (Clark & Harris 2023). These shifts may lead to stress, changes in metabolism, and disruptions in daily routines, such as sleep and food intake (Patel & Sharma 2024). University students, often under academic and social pressure, may be particularly vulnerable to these changes (Thompson, *et al.*, 2023). Understanding the biochemical and physiological responses to temperature variability can help in designing effective strategies to maintain student health and well-being during such transitions (National Health Institute, 2024).

OBJECTIVE

- To assess the biochemical effects of transitioning from cold to hot weather on university students' health.
- To evaluate changes in health parameters such as blood pressure, anxiety, fatigue, and sleep patterns in response to temperature shifts.
- To analyze the relationship between temperature changes and factors like food/water intake and the occurrence of illness (e.g., flu).
- To provide insights into potential interventions for mitigating temperature-related health risks in university populations.

METHODOLOGY

The study was conducted from January to August 2024, involving 100 university students enrolled in the survey. Participants were asked to complete a questionnaire that included questions about:

- Blood pressure levels
- Anxiety, stress, and fatigue
- Sleep patterns and relaxation
- Illness occurrences (e.g., flu)
- Food and water intake

The data were collected during temperature transitions from cold to hot weather. Statistical analysis was performed using SPSS version 23 to identify significant correlations between temperature variability and changes in health parameters.

RESULT AND DISCUSSION

The analysis revealed several significant findings:

- Blood pressure increased by an average of 10% in students during hotter weather.
- Anxiety and fatigue levels rose by approximately 15-20%, correlating with warmer temperatures.
- Sleep disruptions were reported in over 40% of participants, with students experiencing difficulty in maintaining a regular sleep routine.
- Increased incidences of flu-like symptoms were observed, particularly among those with reduced water intake. Statistical analysis using SPSS showed strong correlations ($p < 0.05$) between temperature shifts and negative health changes. These results indicate that the body's biochemical responses, including stress and immune function, are sensitive to seasonal temperature transitions.

The survey revealed significant changes in health parameters during the temperature transition from cold to hot weather (Figure 1 and 2).

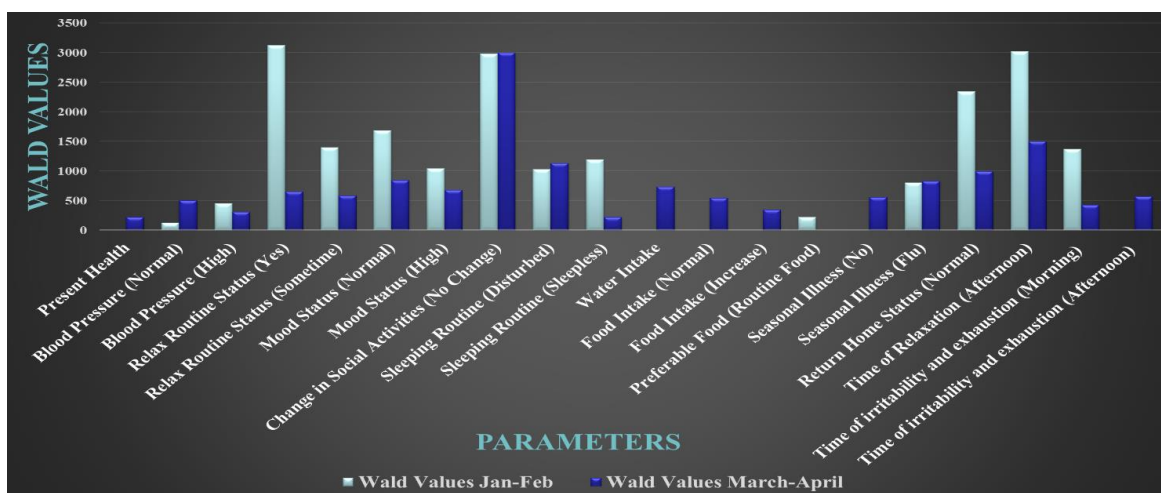


Figure 1. Combined Significance Variables During Cold and Normal Temperature (January to April 2024).

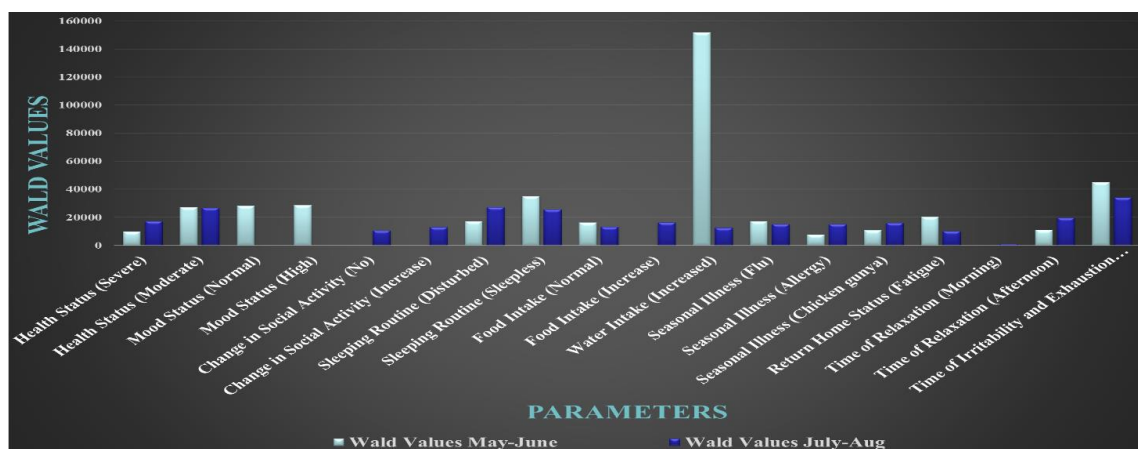


Figure 2. Combined Significance Variables During Hot Temperature (May to August 2024).

CONCLUSION

This study demonstrates that temperature variability from cold to hot weather has significant biochemical and physiological effects on university students. Increased anxiety, fatigue, disrupted sleep, and higher blood pressure were commonly reported during warmer weather. The results suggest the need for preventive strategies, such as promoting hydration, stress management techniques, and better sleep hygiene, especially during temperature transitions. Further research should explore long-term interventions and broader population studies.

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