

## ABSTRACT

**Objective:** The body's glucose concentration is influenced by carbohydrate intake, insulin-induced carbohydrate reduction, and hepatic glycogen breakdown induced by stress hormones. This study investigated the potential of employing glucose fluctuations as a measure of stress by examining the relationship between heart rate variability (HRV) data and glucose levels during sleep in healthy subjects.

**Methods:** In this cross-sectional study, a chest-worn electrocardiogram (ECG) and continuous glucose monitoring device (CGM) were respectively used to monitor the heart rate intervals and glucose fluctuations of five subjects (two males, three females) during sleep. A time-series correlation analysis was performed on the HRV data extracted from heart rate intervals and the corresponding glucose fluctuation data.

**Results:** The time-series analysis of ECG and CGM data collected from subjects during sleep ( $n = 25$  nights) revealed a moderate negative correlation between glucose levels and HRV, with a cross-correlation coefficient of  $r = -0.453$ .

**Conclusion:** Similar to HRV, changes in stress levels can be detected by observing glucose fluctuations, particularly during sleep when the impact of food intake can be eliminated. Our findings highlight a significant correlation between glucose levels and HRV, indicating that glucose fluctuations can be used as an indicator of autonomic nervous system activity in an exploratory study.