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**Assessment of newly graduated nurses' stress and fatigue using heart rate variability spectral analysis: A prospective cohort pilot study**Yuki Yamagami<sup>1,2</sup>, Yuka Omura<sup>1</sup>, Kohei Tomita<sup>3</sup>, Tomomi Tsujimoto<sup>1</sup>, Iida Megumi<sup>1,3</sup> and Tomoko Inoue<sup>1</sup><sup>1</sup>Osaka University, Japan<sup>2</sup>Japan Society for Promotion of Science, Japan<sup>3</sup>Kyoto University Hospital, Japan

**Aim:** The aim of this study is to evaluate newly graduated nurses' stress and fatigue using Heart Rate Variability (HRV) spectral analysis.

**Methods:** This prospective cohort pilot study was conducted in Japan. Four undergraduate participants, aged 22 years, were enrolled from a National University, in February 2016. Outcomes of each participant were assessed during two periods, before and after 3 months of work as a registered nurse. After 5-minute rest, HRV measurements were continuously monitored for 5 minutes, in the supine position, using a portable electrocardiograph (RF-ECG, GMS, Japan). HRV spectral analysis was performed for 5 min using the HRV software (Bonaly Light, GMS, Japan) on the basis of a maximum entropy method. The HF and LF components were obtained by the integration of power spectra at respective ranges of 0.15-0.40 Hz and 0.04-0.15 Hz. Primary outcomes of the analysis were HF (a sympathetic nerve activity index) and LF/HF (a parasympathetic nerve activity index). Because these indexes were not normally distributed, natural logarithms of HRV index (InHF and InLF/HF) were calculated. Paired t-test was used to compare the outcomes between both time periods and  $P < 0.05$  was considered statistically significant. All analyses were performed using R 3.4.0 (R Development Core Team 2017) for Windows. This study was approved by the ethics committee at the Graduate School of Medicine, Osaka University, Japan.

**Results:** Among all the participants, InHF after 3 months of work as registered nurses significantly decreased than that before 3 months of work (mean difference = -0.8;  $P < 0.01$ ). Furthermore, InLF/HF after 3 months of work as registered nurses significantly increased than that before 3 months of work (mean difference = 0.8;  $P = 0.048$ ).

**Conclusion & Significance:** Despite a small sample size, InHF and InLF/HF significantly varied after 3 months of work as a registered nurse compared with that before 3 months of work. Our findings suggest that newly graduated nurses' stress and fatigue might be assessed using HRV spectral analysis, leading to the early detection and treatment of excessive stress and fatigue.

**Biography**

Yuki Yamagami has completed her Master of Science degree in Nursing from Osaka University, Japan. Currently, she is a Doctoral student at Osaka University. She has conducted several clinical trials to establish a nursing practice. Her research interests include evidence-based practice, such as vascular access and nursing stress and fatigue.

yuu-toki@sahs.med.osaka-u.ac.jp

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