

Commercially-available wearable provides valid estimate of sleep stages

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Objective:

The purpose of this study was to determine accuracy of a commercially available device to estimate sleep stages.

Background: Although many wearables purport to accurately distinguish between light and deep sleep, little information on the validity of using wearables in this manner is available.

Design/Methods: Overnight recordings were made on 55 individuals wearing a Garmin wearable device (vivosmart 3) on the nondominant wrist. EEG data was simultaneously collected using a take home device (Sleep Profiler) that recorded three channel EEG for sleep staging. EEG data was scored by a Registered Polysomnographic Technologist using AASM guidelines. An automated algorithm to distinguish sleep stages (wake, light (N1 and N2), deep, and REM) was developed using a neural network approach.

Results:

Of the 55 participants, 31% (17) were female and 69% were (38) male. (Age 35.5 +/- 8.7 years old; BMI 26.3 +/- 6.4) Per epoch [accuracy of 69.7% was achieved](#), with a [Cohen's kappa of 0.54 +/- 0.12](#). A sleep sensitivity of 95.8% and a wake specificity of 73.4% was obtained.

Conclusions: This study demonstrates that a wearable device employing optical PPG and accelerometry signals is a valid method to estimate sleep stages in a cohort of young adults.