

Reliability of consumer sleep trackers in patients suffering from obstructive sleep apnea syndrome

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Statistical methods

Different stages characterized the statistical analysis: 1) comparisons between several measurement methods (PSG vs. U vs. SWA vs. W), and 2) validity analysis for TST, TIB, SE, SL, light sleep, deep sleep A, deep sleep B, WASO, and awakenings. The statistical analysis included descriptive statistics with mean and standard deviation (SD) to describe all methods. The Wilcoxon signed rank test for paired samples was applied for comparisons between PSG, U, SWA, and W methods. A threshold value of $p < 0.05$ was adopted for ruling out non-significant differences.

We calculated the intra-class correlation coefficient (ICC) and used the Bland and Altman limits of agreement (LOA) method to assess agreement between the methods. A graphic plot was produced to highlight differences between each pair of measurements in relation to the mean of each pair. LOA 95% (mean difference \pm 2 SD) values are superimposed on this plot. For the TST parameter, the 30 minutes clinical acceptance range between commercial tracker and PSG previously described by Meltzer was also added to the Bland and Altman plot.

This allows good visual representation of the validity between two methods of observation for each parameter. An ICC greater than 0.75 was considered “good validity”, an ICC between 0.50 and 0.75 indicated “moderate validity, and less than 0.50 indicated “poor validity”.

All data were analyzed with Statistica (v.10. Statsoft) or R software (Version 3.1.1) with the ICC package (Facilitating Estimation of the Intraclass Correlation Coefficient 2.3.0. Matthew Wollak, URL address: <https://cran.r-project.org/web/packages/ICC/index.html>).