

Executive Summary

In this product validation study, we tested if the Nightingale Smart Home Sleep System would improve sleep in a sample of 25 S+ by ResMed users whose objective sleep data indicated difficulty falling asleep.

Across participants, there were 459 total nights (18 nights per person on average) during which participants tracked their sleep with the S+ by ResMed *before* using Nightingale, and 398 nights (16 nights per person on average) during which participants tracked their sleep *while* using Nightingale.

Self-report data collected before and after use of the product revealed that using Nightingale led to significant improvements in perceived sleep quality (26% higher) and sleep duration (16-minute increase). Also, participants reported fewer awakenings *due to noise* as a result of using Nightingale but no change in their total number of perceived awakenings.

Self-report data collected each morning following Nightingale use showed significant improvement across nights in participants' perceptions of how fast they fell asleep the previous night and how much they liked using Nightingale.

Looking at the objective sleep data, using S+ by ResMed, we confirmed the self-report result in improved sleep quality: There was significant improvement in participants' SleepScore (a measure of overall sleep quality) while using Nightingale compared to the time before using Nightingale. In addition, as a secondary analysis, we examined the subgroup of participants who had not previously been using sounds to help with sleep. In this subgroup, using Nightingale also led to significant improvement in SleepScore, along with improvements in Mind Score (a measure reflecting REM sleep), sleep efficiency, sleep maintenance, and proportion of time awake after sleep onset.

On the user experience side, the participants had mostly positive opinions about Nightingale. Nearly all the participants reported that the app was easy to use. Over three-quarters felt that Nightingale helped them relax and was useful for blocking indoor and outdoor noises. When asked if Nightingale improved their sleep, 76% of participants replied yes. Over 70% of users were pleased with Nightingale's sound quality, but over half wished that more sound options were available. Nonetheless, our study found that 80% of users would recommend Nightingale to their close friends and family, and 88% planned to continue to use Nightingale after completion of the study.

In sum, this study found that Nightingale can improve sleep, and this was found using both self-report data and objective sleep data using SleepScore technology by ResMed. Most participants reported that Nightingale improved their sleep. In addition, objective sleep data revealed that Nightingale use resulted in a higher SleepScore overall and several additional sleep improvements among people who were not previously using sounds to help with sleep.