

Association between sleep quality and severity of menopausal symptoms

Gary Garcia-Molina^{1,2}, Vidhya Chellamuthu¹, Susan DeFranco³, Patrick Stark³, Mark Aloia ^{3,4}

¹ Sleep Number Labs, San Jose, CA, United States ; ² University of Wisconsin-Madison, Madison, WI, United Sates; ³ Sleep Number Corporation, Minneapolis, MN, United States ⁴ Department of Medicine, National Jewish Health, Denver, CO, United Sates

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OIntroduction

Women in the menopausal transition and post-menopausal women are more likely to report sleep difficulties compared to pre-menopausal women (see Fig. 1). The Study of Women's Health Across the Nation (SWAN) showed that sleep difficulties due to frequent awakenings increased as women transitioned through menopause and were the most common problem [1]. In a group of women in the menopausal transition, [2] found that hot flashes were responsible for about 27 percent of objective wake after sleep onset. the period between June 4 to June 18, 2024.

The survey included questions about demographic information, sleep behaviors, sleep disorders, menopause symptom severity, and menopause symptom onset date (month/year).

higher in the mild-symptom group compared to the other two groups (Fig. 5).

Although not statistically significantly, heart rate and respiratory rate are highest for the severe symptom group, and heart rate variability is lowest for the severe symptom group.



Figure 1: Sleep difficulties reported across the menopausal transition. This figure was adapted from [1]

Objective sleep data collected by the SN platform (see Fig. 2) included the following metrics: sleep duration, restful sleep, sleep latency, sleep quality, mean respiration rate, mean heart rate, and mean heart rate variability [3]. The sleep quality score (1-100) is a metric that considers sleep duration, level of movement during sleep, bed exit count, resting heart rate, and breathing rate. For respondents that reported menopause symptoms and the date of symptom onset, six months of objective sleep data starting from symptom onset were extracted from the secure SN cloud.



Figure 3: Analysis method to quantify the association between a sleep metric and menopause symptom severity.

The association between each objective sleep metric and the reported severity of menopause symptoms was quantified (see Fig. 3) and the corresponding statistical significance was evaluated using Kruskal-Wallis [4] and Mann-Whitney [5] tests. For the participants that reported treatment for the alleviation of menopause symptoms, the effects of the treatment on sleep met-





Figure 5: Sleep metrics versus menopause symptom severity.

Significant improvements in restful sleep duration and HRV associated with symptom alleviation treatment were found in the severe symptom group. Sleep quality trended to improve as a result of treatment in the severe symptom group (see Fig. 6).



OGoal

rics were also quantified.

To quantify the association between self-reported severity of menopause symptoms and objective sleep metrics, this research leverages objective sleep data collected by the Sleep Number bed platform and survey data which include demographic information, subjective reports on menopause symptoms, symptom severity, date of symptom onset, and symptom alleviation treatment.



O Results

Survey response analysis

Out of 10540 survey respondents, 730 women reported menopause symptom severity and symptom onset date. The objective sleep data of 311 respondents were available for the final analysis (see Fig. 4).

Severity was categorized into three levels, mild (120 respondents), moderate (140 respondents), and severe (51 respondents). A treatment to alleviate menopause symptoms was reported by 46, 88, and 37 respondents in the mild, moderate, and severe symptom categories respectively.



Figure 6: Treatment effect on sleep metrics.

O Conclusive remarks

The severity of menopause symptoms has a significant influence on sleep quality. While sleep duration is not significantly different across symptom severity groups, the sleep quality is significantly lower in women with severe and moderate symptoms compared to women with mild menopause symptoms. Symptom alleviation treatment has a positive effect in sleep quality for the severe symptom group with a notable increase in restful sleep duration of 20 minutes and an increase in HRV of 20 milliseconds.

Figure 2: Objective data collected by the SN platform.

Figure 4: Participant disposition.

O Methods

A survey approved by the Allendale Investigational Review Board was presented to a cohort of Sleep Number (SN) customers during

Sleep metric analysis

Sleep duration and restful sleep duration are not statistically significantly different across groups. Sleep quality is significantly

References

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