Interpersonal distress is associated with sleep and arousal in insomnia and good sleepers ☆,☆☆

Heather E. Gunn [a], Wendy M. Troxel [a,b], Martica H. Hall [a], Daniel J. Buysse [a,*]

[a] Department of Psychiatry, School of Medicine, University of Pittsburgh, Pittsburgh, PA, USA
[b] RAND Corporation, Pittsburgh, PA, USA

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ABSTRACT

Objective: The interpersonal environment is strongly linked to sleep. However, little is known about interpersonal distress and its association with sleep. We examined the associations among interpersonal distress, objective and subjective sleep in people with and without insomnia.
Methods: Participants in this cross-sectional observational study included men and women with insomnia (n = 28) and good sleeper controls (n = 38). Interpersonal distress was measured with the Inventory of Interpersonal Problems. Sleep parameters included insomnia severity, self-reported presleep arousal, and sleep quality; and polysomnographically-assessed sleep latency (SL), total sleep time (TST), wake after sleep onset (WASO), percent delta (stage 3 + 4 NREM), percent REM, and EEG beta power. Hierarchical linear regression was used to assess the relationship between distress from interpersonal problems and sleep and the extent to which relationships differed among insomnia patients and controls.
Results: More interpersonal distress was associated with more self-reported arousal and higher percentage of REM. More interpersonal distress was associated with greater insomnia severity and more cognitive presleep arousal for individuals with insomnia, but not for controls. Contrary to expectations, interpersonal distress was associated with shorter sleep latency in the insomnia group. Results were attenuated, but still significant, after adjusting for depression symptoms.
Conclusion: Distress from interpersonal problems is associated with greater self-reported arousal and higher percent REM. Individuals with insomnia who report more distress from interpersonal problems have greater insomnia severity and cognitive presleep arousal, perhaps due to rumination. These findings extend our knowledge of the association between interpersonal stressors and sleep. Assessment and consideration of interpersonal distress could provide a novel target for insomnia treatment.

Introduction

The sense of safety and security that is necessary for good sleep originates from the interpersonal environment [1,2]. Distress within the interpersonal environment, therefore, may signal that it is not "safe" to sleep [1,2] via increased psychological and physiological arousal at bedtime and throughout the night. That is, rumination and somatic arousal at bedtime can interfere with sleep onset, whereas underlying arousal can interfere with sleep quality. Indeed, a lack of interpersonal security is associated with worse sleep. For example, individuals who are more anxious about the emotional availability of their partner or are fearful that the relationship is not enduring also have less stage 3 + 4 NREM sleep [3] and worse subjective sleep quality than individuals who feel secure in their relationship with others [4–6]. On the other hand, individuals who are satisfied with their romantic relationship [7] or trust that others are available if needed have better sleep [8], perhaps due to feelings of interpersonal safety and security.

Other interpersonal circumstances and behaviors may be more distressing because they impede connectedness with others, which also can influence sleep. For instance, people who tend to overvalue autonomy (i.e., separateness from others) at the expense of close relationships have more subjective sleep disturbances following a conflict with a romantic partner [6]. Moreover, whereas social support is linked to better self-reported sleep quality [9], social isolation and loneliness are associated with greater sleep fragmentation, an index of sleep-related arousal [10]. Despite emerging evidence that the general interpersonal environment is associated with sleep, less is known about interpersonal behaviors themselves and how they relate to sleep.

Insomnia, the most common sleep disorder, affects 10–15% of the population and is associated with increased risk of adverse physical [11] and mental health outcomes [12,13]. Given that insomnia is often considered a disorder of arousal [14], poor sleepers may have more

interpersonal distress than good sleepers. Evidence also suggests that women are more sensitive to both negative and positive aspects of the interpersonal environment than men [15]. Further, women have higher rates of insomnia than men [16]. Therefore, a more detailed understanding about the types of interpersonal distress that are associated with poor sleep quality and how this differs between men and women, may inform targeted interventions that address interpersonal distress and sleep simultaneously.

An important next step in understanding the interpersonal environment and its association with insomnia is to identify specific and modifiable interpersonal behaviors that are associated with sleep disturbances. To date, most of the literature is focused on general constructs (i.e., social support, relationship styles) of the interpersonal environment and their association with sleep quality. Further, with the exception of one study on social support in insomnia [9], little is known about *how* the interpersonal environment is associated with insomnia. Specific interpersonal behaviors may interfere with the development and maintenance of interpersonal security relevant to sleep disturbances in insomnia. The lack of interpersonal security may be a signal that it is not safe to sleep, which increases psychological and physiological arousal. Arousal is counterproductive for sleep [17], and could interfere with sleep onset and/or sleep duration (i.e., increased sleep onset latency and shorter/fragmented sleep times). Indeed, arousal is also one of the defining factors of insomnia [14]. However, we know very little about specific interpersonal behaviors and their relation to sleep-related arousal.

The purpose of the current study was to examine an index of interpersonal distress that includes specific interpersonal behaviors and its association with sleep in individuals with and without insomnia. Specifically, we examined distress from problematic interpersonal behaviors and its association with self-reported and polysomnographically-measured sleep. Conceptually, we propose that distress arising from problematic interpersonal behavior heightens presleep arousal and interferes with sleep. As such, we expected interpersonal distress to be associated with greater self-reported arousal and we expected this association to be stronger for individuals with insomnia. We also examined objective sleep measures (PSG) that have been previously linked to psychosocial stressors [3,18–20] and are indicators of hyperarousal. We expected that more distress would be associated with less stage 3 + 4 sleep and more REM, longer sleep latency (SL), more wake after sleep onset (WASO) and less time spent asleep (TST). We also tested whether interpersonal distress was associated with greater EEG beta power during NREM sleep, which has been linked to psychological stress, hyperarousal and insomnia [21–23]. Lastly, given that women are more likely to have insomnia than men and are more sensitive to the interpersonal environment than men, we examined whether the effects of interpersonal distress on sleep parameters were stronger in women than men.

Methods

Study design and participants

The current study is a secondary analysis of data collected as part of a larger study testing a neurobiological model of insomnia. The University of Pittsburgh Biomedical Institutional Review Board approved this study. After written informed consent, participants completed an in-person Structured Clinical Interview for Diagnostic and Statistical Manual of Mental Disorders, 4th Edition [DSM-IV; [24]] with a study clinician to assess for psychiatric and medical conditions. Insomnia participants met criteria for insomnia disorder according the DSM-IV, with duration of insomnia greater than six months. Average WASO had to be greater than or equal to 30 min and sleep efficiency (SE) had to be less than 85% based on a two-week sleep diary. Control participants were screened for sleep problems and excluded if they met criteria for an insomnia disorder. Other exclusion criteria for both groups included: significant or unstable acute or chronic medical

conditions, current major psychiatric disorders, substance use disorders, and personality disorders; concurrent sleep disorders such as delayed sleep phase syndrome, narcolepsy, restless legs syndrome, clinically significant obstructive sleep apnea (as defined by apnea hypopnea index >15 during an overnight in-lab PSG study), substance or medication use that is known to affect sleep or wake function (e.g., hypnotics, benzodiazepines, antidepressants, anxiolytics, consumption of more than four cups of coffee per day). As part of the parent study, participants underwent positron emission tomography (PET) scans; therefore, individuals were excluded if they had an implanted device (e.g., pacemaker) or significant radiation exposure within the last year.

Sixty-six participants completed baseline subjective sleep measures and were scheduled for the in-laboratory portion of the study. Ten participants withdrew or were withdrawn prior to in-laboratory PSG due to schedule conflicts (n = 8) or previous exposure to radiation (n = 3). Therefore, a total of 55 participants have PSG data.

Measures

Interpersonal distress and demographic information were collected at screening, prior to the baseline clinical assessment and PSG. Other self-report measures were collected at the initial baseline assessment. PSG sleep measures were derived from the second and third nights in the sleep lab, to reduce well-documented "first-night" effects [25] and effects of screening for sleep apnea and periodic limb movements.

Interpersonal distress

Interpersonal distress was assessed with the 25-item *Inventory of Interpersonal Problems* [26,27]. This measure assesses different types of problematic interpersonal behaviors individuals may engage in, and the degree of distress associated with the behavior. It includes items that may be problematic when relating to others (e.g., "It is hard for me to be assertive without worrying about hurting the other person's feelings") and interpersonal behaviors that are excessive (e.g., "I am too sensitive to criticism"). Participants rate how distressing each statement is on a 5 point Likert scale from "not at all" to "extremely." Five subscales are derived from the measure: Interpersonal Aggression; Interpersonal Ambivalence; Interpersonal Sensitivity; Lack of Sociability; and Need for Social Approval.

The 25-item scale and scoring have been documented as a reliable and valid screening tool for personality disorders because personality disorders are frequently characterized by problematic interpersonal behaviors [26]. For the current study, internal reliability was excellent (α = .93) in the whole measure and was acceptable in the subscales (all α's > .76). Given the high internal validity of the measure, and to reduce multiple comparisons, we created a summary score that approximated a global measure of interpersonal distress in which higher scores represent more interpersonal distress as a result of problematic interpersonal behavior. Scores ranged from 0 to 29 (possible range: 0–125). Thus, the participants had a mild overall level of problematic interpersonal behavior. When we observed significant effects for the global score, we then explored the five subscales. Consistent with previous research, Interpersonal Sensitivity and Need for Social Approval had a higher base rate [26] and were normally distributed. Aggression, Lack of Sociability, and Interpersonal Ambivalence were not normally distributed (i.e., 43–48% of participants endorsed no distress from these behaviors) and were transformed as dichotomous predictors indicating presence or absence. Scores for all subscales ranged between 0 and 13 (possible range: 0–25).

Hyperarousal

The general tendency towards hyperarousal was measured by the Hyperarousal scale, a 26-item measure that describes behaviors that are found in primary insomnia patients [28,29]. Items assess a range of behaviors including: reactivity ("I get rattled when a lot happens at once"), rumination ("I think a lot about feelings,"), general arousal