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Personality Disorder Features and Insomnia Status amongst Hypnotic-Dependent Adults

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Abstract

Objective—To determine the prevalence of personality disorders and their relation to insomnia parameters among persons with chronic insomnia with hypnotic dependence.

Methods—Eighty-four adults with chronic insomnia with hypnotic dependence completed the SCID-II personality questionnaire, two-weeks of sleep diaries, polysomnography, and measures of insomnia severity, impact, fatigue severity, depression, anxiety, and quality of life. Frequencies, between-subjects t-tests and hierarchical regression models were conducted.

Results—Cluster C personality disorders were most prevalent (50%). Obsessive-compulsive personality disorder (OCPD) was most common (n=39). These individuals compared to participants with no personality disorders did not differ in objective and subjective sleep parameters. Yet, they had poorer insomnia-related daytime functioning. OCPD and Avoidant personality disorders features were associated with poorer daytime functioning. OCPD features were related to greater fatigue severity, and overestimation of time awake was trending. Schizotypal and Schizoid features were positively associated with insomnia severity. Dependent personality disorder features were related to underestimating time awake.

Conclusions—Cluster C personality disorders were highly prevalent in patients with chronic insomnia with hypnotic dependence. Features of Cluster C and A personality disorders were variously associated with poorer insomnia-related daytime functioning, fatigue, and estimation of nightly wake-time. Future interventions may need to address these personality features.

Keywords

insomnia; hypnotic-dependence; personality disorders; Cluster C personality disorders; sleep-wake perception; daytime functioning

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Conflicts of interest: None

Introduction

Chronic insomnia is a highly prevalent public health problem affecting approximately 10% of the general population [1]. Chronic insomnia is associated with lower health status, lower quality of life, and negative social and professional consequences [2]. Hypnotic medications are the most common method of treatment for chronic insomnia [3], yet these medications can result in dependence and increased risk of accidents and injuries [4–6]. Frequent use of hypnotic medication is estimated to range between 4.2–6.9% of the general population [7,8], and it has been associated with continued sleep disturbance [9], increased mortality[10], and other negative consequences [11,12].

While multiple factors that perpetuate chronic insomnia and hypnotic medication dependence have been hypothesized and identified [13], little evidence is available for predisposing factors that may increase risk of developing chronic insomnia with hypnotic dependence. Probable risk factors for chronic insomnia with hypnotic dependence that have been identified are being older, female, having poor health, greater psychological distress and anxiety, and severe insomnia [14–16], but less is known about personality traits and disorders. Links between personality traits and chronic insomnia without hypnotic dependence have been described such as neuroticism, depression, rumination, internalization of emotions, and perfectionism [17–22]. Personality disorders [23] are also prevalent in patients with chronic insomnia without hypnotic dependence [24–26]. Studies specifically examining personality disorders and chronic insomnia reveal Cluster C personality disorders (i.e., Avoidant, Dependent, and Obsessive-Compulsive personality disorders) and sub-threshold features of these disorders co-occur with chronic insomnia and poor sleep quality more than other personality disorder clusters [26–28]. Though some evidence suggests poorer sleep quality amongst persons with Cluster A personality disorders [29]. Few studies have examined personality disorders within a hypnotic dependent population. One study suggests Cluster C personality disorders are more prevalent amongst benzodiazepine-dependent patients than other personality disorder clusters [30]. Personality disorders and characteristic features of these disorders may represent a promising avenue of investigation into the development of chronic insomnia with hypnotic dependence.

To better understand the relation between personality disorder features and chronic insomnia with hypnotic dependence we identified a cross-sectional cohort of patients with chronic insomnia with hypnotic dependence and assessed the presence of personality disorder features as well as their self-reported and objective sleep and insomnia status. It was predicted that Cluster C personality disorders would be more prevalent than other personality disorders in this cohort, and that features of these disorders would be related to poorer perceived insomnia status as measured by self-reported sleep, insomnia severity ratings, impact of insomnia on daytime functioning, fatigue severity, and discrimination between sleep and wake states. The value of identifying these personality features could be the development of preventive sleep education and coping methods for individuals flagged to be vulnerable, or adapting standard treatments for these difficult to treat patients.

Methods

Study Context and Sample Selection

Data from this study were acquired from a larger randomized clinical trial offering treatment for patients with chronic insomnia with hypnotic dependence interested in reducing reliance on their hypnotic medication and improving their sleep. The study took place in Tuscaloosa and Birmingham, Alabama, USA. Participants were recruited from the local community via advertisements and clinical referrals. Eligibility criteria for inclusion into the study can be

found in Table 1. Along with meeting quantitative sleep criteria as outlined by Lichstein and colleagues [31], all participants must have met ICSD-II criteria for an insomnia disorder [32], which includes a) a complaint of difficulty sleeping (i.e., falling asleep, staying asleep, early morning awakenings, and non-restorative sleep), b) experiencing difficulty sleeping despite adequate opportunity to sleep, and c) experiencing daytime impairment due to the sleep difficulty. The present study used baseline data from qualifying participants prior to treatment. The study was approved by The University of Alabama Institutional Review Board and all participants gave written consent. Participants were treated in accordance with the principles expressed in the Declaration of Helsinki.

Participants and Procedure

Eighty-four participants met inclusion criteria for the study. The mean age of the participants was 52.6 years (SD = 11.4, Range = 21–69) and 76.2% were women (n = 64). Thirteen participants did not self-report their race. Of those 71 participants that did respond, 83% identified themselves as Caucasian and 17% identified themselves as Black. The sample was well-educated, with an average of 15.6 years of education (SD = 2.2).

Participants responded to community advertisements and clinical referrals to the study by completing a 30 to 60-minute telephone screening interview. Participants that appeared to qualify for the study were then mailed two weeks' worth of sleep diaries and daytime functioning questionnaires. The purpose of this assessment was to verify self-reported insomnia and hypnotic use. Once verified, participants were scheduled for a face-to-face screening visit comprised of a diagnostic psychiatric and medical screening interview at one of the two participating sleep centers, the Sleep Disorders Center of Alabama, Birmingham, Alabama or the Druid City Hospital Sleep Center, Northport, Alabama. Trained research staff administered the clinical interviews and completed a comprehensive sleep history. After completing this phase of screening the participants were then scheduled for a three-night sleep study with standard polysomnography (PSG) at one of the participating sleep centers to rule out other sleep disorders, mainly sleep apnea and periodic limb movement disorder. Participants were instructed to take their hypnotic medications as they normally would during these studies. Participants arrived about two hours prior to their normal bedtime on a weekday night for an adaptation study. Sleep recording was repeated on the two nights following. Lights out and rising time were chosen by the participants. On each morning, participants also completed sleep diaries for each study night. Data in the present study are derived from the DSM-IV personality questionnaire, two weeks of sleep diaries, sleep and daytime functioning questionnaires, overnight PSG sleep parameters, and sleep diary data from the PSG study nights.

Predictor Measures

Structured Clinical Interview for DSM-IV, Clinical Version Axis II, Personality Questionnaire—The Structured Clinical Interview for DSM-IV, Clinical Version Axis II [SCID-II-PQ; 33] is a screening tool for the assessment of DSM-IV-TR Axis II personality disorders [26]. The SCID-II-PQ comprises 119 yes-or-no questions designed to screen for each of the eleven DSM-IV-TR personality disorders. The SCID-II-PQ has shown good sensitivity, specificity, and internal consistency [34–37]. The SCID-II-PQ also has clinical cut-off scores for each personality disorder that demonstrate good agreement with diagnoses from the full SCID-II interview [35]. For the number of items and cut-off scores for each personality disorder please review the SCID-II-PQ or Ekselius and colleagues [35]. Clinical cut-off scores and the frequency of endorsing features from each personality disorder were the predictor variables in this study. Only the nine personality disorders verified in the DSM-IV-TR were examined.

Outcome Measures

Sleep monitoring—Respironics' Alice 3 Infant and Adult computerized polysomnographic system and the Grass-Telefactor polysomnographic system were used for overnight sleep recording (PSG). Two electroencephalography measures, two electro-oculography measure, and chin electromyography (EMG) were applied according to standard placements [38] to score sleep stages and sleep-wake measures. To screen for other sleep disorders particularly periodic limb movement disorder and sleep apnea, supplementary channels were used, including oxygen saturation level, bilateral anterior tibialis EMG, heart rate, thoracic strain gauge, and a nasal/oral thermistor. Registered PSG technicians manually scored PSG records in 30-second epochs according to the new American Academy of Sleep Medicine standard [39]. The recordings produced sleep stage percentages (stages 1, 2, 3, and REM) and absolute values for initial sleep latency (SOL), total sleep time (TST, actual time slept), wake time after sleep-onset (WASO), and sleep efficiency percent (SE; the ratio of TST to total time in bed × 100). The mean of nights two and three for each sleep parameter were used for data analysis.

Two weeks of sleep diaries were also obtained. The outcome measures from the sleep diaries were average two-week SOL, WASO, TST, and SE. These same self-reported sleep-wake measures were also collected on the mornings of the second and third nights of PSG recordings. These parameters were averaged over the two nights and subtracted from the mean of the PSG-derived sleep-wake measures. Then, the average of the mean differences between PSG-derived and self-reported SOL, WASO, TST, and SE from the PSG nights was computed. The mean differences of these sleep-wake measures represented how well the participants were able to discriminate between sleep and wake states. Negative mean differences indicated a self-reported overestimation of the sleep-wake measure in question.

Insomnia impact scale (IIS)—The IIS [40] is an index of the impact of insomnia on daytime functioning. The questionnaire consists of 40 negative statements assessing five areas of impairment: physical, cognitive, emotional, social, and occupational. Participants rate each item on a five-point scale to record their degree of agreement, and scores range from 40 to 200. The IIS is able to successfully discriminate between people with insomnia and people without insomnia, demonstrating good construct validity [40]. The average score was used as one of the main outcome variables.

Insomnia severity index (ISI)—The ISI [41] was used as an outcome measure of insomnia severity. The ISI quantifies perceived sleep difficulties and insomnia severity. It is a seven-item instrument with ratings on a zero to four point scale. A total composite score is computed by summing up the seven items, with higher scores indicating greater severity of insomnia. The ISI has demonstrated good internal consistency, test-retest reliability, construct validity, and temporal stability [42–45]. The average score was used as one of the main outcome variables.

Fatigue severity scale (FSS)—The FSS is composed of nine items, each asserting the intrusion of fatigue in different aspects of living [46]. Each item is rated from 1 = strongly disagree to 7 = strongly agree, and the test score is the average rating. The scale differentiates amongst patients and normal groups and has high internal consistency. The average score was used as one of the main outcome variables.

Other Psychiatric and Quality of Life Measures

State-trait anxiety inventory, trait-state, form Y (STAI)—The STAI consists of 20 self-descriptive statements designed to measure trait anxiety. Items are rated on a four-point scale, indicating how often the statement is true [47]. Scores range from 20 to 80. The STAI

shows test-retest reliability exceeding .7 and reliably distinguishes patients and normal groups.

Beck Depression Inventory (BDI)—The BDI is a 21-item survey that measures negative cognitions, affect, and behaviors that are characteristic of depression. Higher scores indicate greater depression. Beck and colleagues [48] have provided extensive reliability and validity data.

Medical Outcomes Study Short-Form Health Survey (SF-36)—The SF-36 is a 36-item questionnaire measuring general health and quality of life [49]. The SF-36 assesses eight health concepts: 1) physical functioning, 2) limitations imposed by physical health, 3) pain, 4) social functioning, 5) mental health, 6) limitations imposed by emotional problems, 7) vitality, and 8) general health. The scales range from zero to 100, with higher scores indicating better quality of life. The SF-36 distinguishes patients with varied medical and psychiatric conditions [50] and exhibits high item-discriminant validity and internal-consistency reliability [51].

Statistical Analysis

Data were analyzed with IBM SPSS 19.0 software. Before computing the main analyses, we calculated the frequencies of participants meeting and exceeding clinical threshold cut-off scores for each personality disorder as determined by Ekselius and colleagues [35]. Then, the proportion of features endorsed for each personality disorder was calculated. This was completed by dividing the number of items endorsed per personality disorder by the total number of items that assess each personality disorder. The proportion of features endorsed for each personality disorder was then averaged across the sample. The mean proportions represent how much the features of each personality disorder were endorsed in the sample.

Independent between-subjects *t* tests were used to compare objective and self-reported sleep parameters, insomnia indices, and other daytime functioning and quality of life outcomes across participants with and without personality disorders. The Sidak correction method for multiple comparisons was used to correct for type I error inflation [52]. Stepwise regression analyses were used to determine which personality disorders were most predictive of the study outcomes (self-reported sleep-wake measures, ISI, IIS, FSS, and discrepancies between PSG and self-reported sleep-wake measures). Once these personality disorders were identified, hierarchical regression analyses were computed to ascertain if these personality disorders still independently predicted study outcomes after controlling for relevant confounders. The confounders used in these analyses were age, gender, and perceived health status as measured by the SF-36 general health domain. Each of these constructs is known to influence various sleep and insomnia indices [53–56].

Results

Descriptive Information

Descriptive sleep and quality of life characteristics are reported in Table 2. Sleep diary values indicated the participants met quantitative criteria for insomnia and underestimated their sleep ability compared to their PSG-recorded values. Of the 84 participants, 69.1% (n = 52) met criteria for hypnotic dependence to one hypnotic medication, 31.0% (n = 26) to two hypnotic medications, 6.0% (n = 5) to three hypnotic medications, and 1.2% (n = 1) to four hypnotic medications. Of the medications consumed, the most common drug class was non-benzodiazepines (61.0%) followed by benzodiazepines (22.8%), anti-depressants (13.8%), anticonvulsants (.8%), melatonin agonists (.8%), and antipsychotics (.8%).

Personality disorder features' information for the sample can be found in Table 3. About 45.2% (n =38) of the sample did not meet clinical cut-off scores for a personality disorder, 26.2% met criteria for one personality disorder, and 28.6% met criteria for two or more personality disorders. Using SCID-PQ clinical cut-off scores, 16.7% of our sample met cut-off scores for at least one Cluster A personality disorder, 21.0% for at least one Cluster B personality disorder, and 50% for at least one Cluster C personality disorder. Obsessive Compulsive personality disorder (OCPD) was the most prevalent, with 46.4% (n = 39) of the whole sample meeting the clinical cut-off score. The proportion of OCPD questionnaire items endorsed was also the highest amongst this sample followed by Avoidant, Schizoid, Dependent, and Paranoid personality disorder features. As a whole, the sample most often meets clinical criteria for Cluster C personality disorders and highly endorses Cluster A personality disorder features at subclinical levels.

Are personality disorder features associated with self-reported sleep values?

For all the following regression analyses, see Table 4 for bivariate correlations between the outcome variables, covariates, and the personality disorders found to be significant in the subsequent analyses. A series of stepwise regression analyses were conducted to assess if personality disorder features were significantly associated with mean sleep diary values of SOL, WASO, TST, and SE. These analyses revealed no personality disorder features were significantly related to these parameters.

Are personality disorder features associated with the impact of insomnia?

A stepwise regression was conducted to determine what personality disorder features were most associated with the self-reported impact of insomnia on daytime functioning. IIS scores were regressed on to each proportion of personality disorder features. Only features of Avoidant Personality Disorder (β = .34, p = .001) and OCPD (β = .35, p = .001) were significantly associated with greater insomnia impact on daytime functioning, $F(2,80)$ = 16.1, p <.001. After age, gender, and perceived health status (SF-36) were controlled for in a hierarchical regression model, Avoidant Personality Disorder features (β = .28, p = .007) and OCPD features (β = .29, p = .005) remained significantly related to insomnia impact on daytime functioning, R^2 = .30, $F(5, 77)$ = 7.93, p <.001, ΔR^2 = .16, $\Delta F(2, 77)$ = 9.06, p < .001.

Are personality disorder features associated with the severity of insomnia?

Stepwise regression was conducted again except the ISI was regressed on to each proportion of personality disorder features. Only features of Schizotypal (β = .32, p = .002) and Schizoid Personality Disorders (β = .36, p = .001) were associated with increased ISI scores, $F(2, 77)$ = 14.05, p <.001. After age, gender, and perceived health status (SF-36) were controlled for in a hierarchical regression model, both remained significantly related to insomnia severity, R^2= .27, $F(5, 74)$ = 6.94, p <.001. Schizotypal and Schizoid personality disorder features explained an additional 24.5% of the variance in insomnia severity, $\Delta F(2, 74)$ = 13.33, p < .001, with Schizoid features recording a higher beta value, β = .39, p < .001, than Schizotypal features, β = .28, p = .006.

Are personality disorder features associated with fatigue severity?

A stepwise regression was conducted to determine what personality disorder features were most associated with self-reported fatigue severity. The FSS was regressed on to each proportion of personality disorder features. Both features of Avoidant Personality Disorder (β = .21, p = .048) and OCPD (β = .32, p = .003) were significantly associated with greater fatigue severity, $F(2,77)$ = 8.29, p =.001. After age, gender, and perceived health status (SF-36) were controlled for in a hierarchical regression model, only OCPD features (β = .23,

$p = .036$) remained significantly related to fatigue severity, $R^2 = .24$, $F(5, 74) = 6.0$, $p < .001$, $\Delta R^2 = .07$, $\Delta F(2, 74) = 3.47$, $p = .036$.

Are personality disorder features associated with estimation of sleep/wake time?

Stepwise regression was used to regress the discrepancy between subjective and objective sleep-wake measures (discrepancy between PSG and self-reported SOL, WASO, TST, and SE) on to each personality disorder features' proportion. Only features of Dependent Personality Disorder ($\beta = -.39$, $p = .002$) and OCPD ($\beta = .28$, $p = .019$) were associated with discrepancies in the perception of WASO, $F(2, 72) = 6.23$, $p = .003$. After age, gender, and perceived health status (SF-36) were controlled for in a hierarchical regression model, only Dependent Personality Disorder features ($\beta = -.44$, $p < .001$) remained significantly associated with discrepancies in the perception of WASO, $R^2 = .19$, $F(5, 69) = 4.42$, $p = .002$, $\Delta R^2 = .17$, $\Delta F(2, 69) = 7.56$, $p = .001$. Dependent Personality Disorder features were related to underestimating time spent awake. There was a trend toward overestimating time spent awake in participants who endorsed a high proportion of OCPD features ($\beta = .24$, $p = .05$).

OCPD-featured participants

Considering the high frequency of participants meeting clinical cut-off scores for OCPD, exploratory between-subjects t-tests were calculated, with Sidak's adjustment to correct for alpha inflation [52], to compare participants meeting SCID-PQ clinical cutoff criteria for OCPD to participants with no personality disorders. No comparisons were made to participants with personality disorders, but no OCPD because only 7 participants qualified under this categorization. Participants with OCPD compared to participants with no personality disorders did not significantly differ in sex, education, insomnia severity, subjective or objective SOL, WASO, or SE, or any sleep stages. However, OCPD participants had greater IIS scores, greater trait anxiety, and reported poorer mental health-related quality of life. There were trends toward younger age, greater objective TST, fatigue severity, depressive symptoms, and poorer physical functioning, vitality, and perceived health. Although not statistically significant, these differences may still be clinically meaningful. For specific values see Table 5.

Discussion

As predicted, Cluster C personality disorders were most prevalent in this cohort of participants with chronic insomnia with hypnotic dependence. OCPD was the most prevalent personality disorder as it was present in nearly half of the sample. Features of Cluster C personality disorders, and in particular OCPD and Avoidant personality disorder features were more prevalent than other features of personality disorders in this cohort. Participants with clinically significant levels of OCPD features perceived their insomnia as more disruptive despite no significant differences in subjective and objective sleep-wake measures and architecture. OCPD and Avoidant personality disorder features were associated with greater impact of insomnia on daytime functioning than other personality disorder features. OCPD personality disorder features were also significantly associated with greater fatigue severity and trended toward significance in overestimating time awake at night. Although a few studies have found an association between personality traits common to Cluster A personality disorders such as social introversion and those of insomnia [17,57,58] and poor sleep quality [29], we predicted that Cluster C personality disorders would be related to insomnia severity since the aforementioned relationships had not been found among insomnia patients with hypnotic dependence. Contrary to these original predictions, Schizoid and Schizotypal personality disorder features were significantly associated with insomnia severity such that more endorsement of features from both

disorders was associated with worse insomnia severity scores. Lastly, Dependent personality disorder features were significantly related to discrepancies in the perception of WASO such that patients with more Dependent personality disorder features underestimated their time awake during their awakenings at night.

The high prevalence of Cluster C personality disorders and features are in concordance with other studies examining personality disorders among patients with chronic insomnia and substance use disorders [26], and those with hypnotic dependence specifically [30]. Cluster C personality disorders, in general, are characterized by high levels of anxious arousability, neuroticism, and fearful thinking likely to interfere with sleep. Descriptive traits of Cluster C personality disorder such as neuroticism, perfectionism, and lack of self-confidence, have all been found to be significantly elevated in studies comparing persons with insomnia to controls on personality tests [17,18,59–61]. These traits may make the sleep state a particularly vulnerable arena for anxiety-ridden thoughts and behaviors amongst these individuals. Since sleep is a state of consciousness often difficult to control in the same ways as most daytime tasks, patients with OCPD features may find obtaining sleep particularly frustrating and demanding of cognitive fixation. However, one study suggests that the trait of perfectionism, common to OCPD, is only weakly related to developing chronic insomnia [62]. It may be the case that traits of cognitive-emotional hyperarousal, similar to Cluster C features, may be more significantly predictive of vulnerability to transient insomnia, as one study suggests [63]. This anxious hyperarousability as a hallmark of Cluster C personality disorder features, particularly OCPD and Avoidant features, is a sensitive risk marker for chronic insomnia, but lacks specificity. Indeed, OCPD and Avoidant personality disorder features and diagnoses happen to also be highly comorbid with chronic fatigue syndrome [64], restricting anorexia nervosa [65], and fibromyalgia [66]. Therefore, Cluster C personality disorder features may predispose one to a whole cluster of conditions, including chronic insomnia with hypnotic medication dependence.

What also continues to be unknown is if these same personality features also make a subset of patients more treatment-resistant or less treatment responsive. The results from the current study suggest these patients may be more difficult to treat judging by their excessive report of fatigue and the impact of insomnia on their daytime functioning and quality of life despite no difference in subjective and objective illness severity compared to patients without these personality features. In a previous study, cognitive-behavioral treatment for insomnia was administered to patients with chronic insomnia and hypnotic-dependence [15]. Patients with low levels of trait anxiety were more likely to reduce their hypnotic medication usage. These results may imply that patients with higher levels of trait anxiety (i.e., patients with high levels of Cluster C features) may have a poorer treatment response. However, Edinger and colleagues found that patients with insomnia and a “neurotic” personality profile benefited the most from behavioral treatment compared to other patients with insomnia without this personality profile [19]. Further research is needed to ascertain whether or not Cluster C personality features may signify a more difficult insomnia treatment course.

Why might persons with Schizoid and Schizotypal features report higher ISI scores? One possible explanation might be that individuals with Schizoid and Schizotypal features tend to have low levels of social interactions and extraversion, whether due to discomfort or a lack of desire to be social. A recent study revealed that individuals with chronic insomnia were more likely to have lower levels of extraversion [67]. It can be hypothesized that less extroverted persons may be more prone to developing insomnia because they may lack a stable social environment which can make a person more prone to illness and other factors that might foster the development of insomnia. The lack of social interaction may also reduce the likelihood of seeking treatment early, thus allowing the insomnia to become more

severe or chronic. Another explanation stems from the work of Kales and colleagues that suggest persons who tend to internalize emotions, such as Schizoid and Schizotypal subtypes, may develop chronic emotional arousal that manifests into physiological hyperarousal, then insomnia [68]. This mechanistic-based hypothesis is similar to the mechanism proposed to explain the relationship between Cluster C personality disorder features and vulnerability to insomnia with the exception that it focuses on different personality traits as the instigators of the emotional arousal [63]. Indeed previous research and the present study do note strong associations between insomnia and disorders characterized by internalization, and weaker relationships with externalizing disorders and traits (e.g., Antisocial and Borderline personality disorders) [17,26]. More research needs to be done on how Cluster A features may affect the severity of insomnia that appropriate interventions can be developed, perhaps to improve social functioning and emotional expression, or to identify persons earlier before chronic insomnia develops.

There are several limitations in this study that ought to be remedied in future research. This study did not examine patients with full structured interview and clinician-verified personality disorder diagnoses; however, the consistency between SCID-II-PQ scores and the full SCID-II interview diagnoses is generally good. The study was cross-sectional in design so it does not afford conclusions about causality or the direction of the effects; therefore, future studies should examine a population cohort prospectively to determine if personality disorders precede chronic insomnia with hypnotic dependence. The study sample also consisted of mostly well-educated Caucasian American women and might not generalize to men or other ethnicities. Studies recruiting diverse demographic groups should be conducted in the future. Furthermore, this study recruited participants who were treatment-seeking and may not represent all patients with chronic insomnia with hypnotic dependence. These participants may have had incentive to bias their responses to the reported measures to make themselves more desirable candidates for the study. However, they likely represent the patient group mostly likely to present themselves at a medical or sleep clinic.

Our study was exploratory; therefore, the results need to be replicated to substantiate these findings. Nonetheless, these results are important given that this is the first study to examine insomnia status in relation to personality disorder features amongst patients with hypnotic-dependence. The results allow a greater understanding of this patient population and suggest future directions on how to treat these patients. For example, patients with high endorsement of OCPD and Avoidant personality disorder features may benefit from insomnia prevention and treatment interventions designed to target these personality characteristics and any maladaptive coping strategies typically associated with them. Though the data were trending on greater objective total sleep time and overestimation of wake time at night in patients with high OCPD features, another example could be to encourage these patients to engage in behavioral experiments to remedy misperceptions of sleep and wake time as described by Tang and Harvey [69] and by Geyer and colleagues [70] for patients with paradoxical insomnia. Patients with paradoxical insomnia have shown some improvements in sleep estimation and distress from these behavioral experiments. In previous studies patients with paradoxical insomnia also appear to have more “neurotic” personality profiles [58,71]. Thus, these types of interventions may also be helpful for chronic insomnia patients with hypnotic dependence and OCPD features.

Some personality traits, particularly Cluster C personality disorder features, may serve as premorbid risk factors for the development of persistent insomnia and the seeking and subsequent dependence on hypnotic medications. However, these personality disorder features may also be simply a result of the chronicity and severity of insomnia and related sequelae. It is possible that feeling unwell due to the experiences of insomnia itself alters

how questions about personality constructs are answered. To disentangle this conundrum, prospective and longitudinal studies are needed. Whether or not these personality features do represent premorbid risk factors, they are present during the course of the actual insomnia syndrome. It would be important to assess if these personality features interfere with non-pharmacological insomnia treatment outcomes, and, if so, how these treatments can be adapted for these patients.

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Table 1

Inclusion and Exclusion Criteria

Inclusion criteria	Exclusion criteria
Ages: 21–69 years old	History of seizures
Met ICSD-II criteria for insomnia	High levels of caffeine, nicotine, or alcohol
Insomnia duration ≥ 6 months	Using other drugs with sleep-active properties
Sleep onset or awake time > 30 minutes	Apnea/hypopnea index > 10 per hour
Insomnia present ≥ 3 nights per week	Myocolonus arousals > 10 per hour
Report mood, cognitive, or socio-occupational impairment	
Prescribed hypnotic use ≥ 4 nights per week	
Prescribed hypnotic use ≥ 6 months in duration	
Desire to quit hypnotic use but inability to do so	

Note. ICSD-II refers to the International Classification of Sleep Disorders, 2nd edition [31]; quantitative sleep criteria for insomnia derived from Lichstein and colleagues [30].

Table 2

Sample characteristics for sleep and daytime functioning.

Clinical History	***M***	***SD***
Insomnia Duration (in years)	10.6	11.8
Insomnia Nights Per Week	5.0	1.6
Self-reported Sleep		
TST (in minutes)	375.6	73.5
SE (%)	74.6	9.9
SOL (in minutes)	46.0	28.3
WASO (in minutes)	47.6	26.7
PSG-derived Sleep		
TST (in minutes)	397.4	49.5
SE (%)	86.5	6.9
SOL (in minutes)	18.1	18.0
WASO (in minutes)	36.7	23.3
Stage 1 (%)	11.0	9.5
Stage 2 (%)	65.5	11.0
Stage 3 (%)	4.2	7.5
REM (%)	19.4	6.1
Daytime Functioning		
Insomnia Severity Index	16.5	4.7
Insomnia Impact Score	118.2	22.7
Beck Depression Inventory	7.0	5.5
Spielberger State-Trait Anxiety Inventory -Y2	36.8	10.0
Fatigue Severity Scale	3.9	1.3
SF-36 Physical Functioning	84.1	18.2
SF-36 Limitations due to Physical Health	77.7	32.7
SF-36 Pain	70.1	21.6
SF-36 Social Functioning	80.3	23.2
SF-36 Mental Health	74.5	16.7
SF-36 Emotional Problems Limitations	83.7	29.5
SF-36 Vitality	51.5	21.1
SF-36 General Health	68.9	20.5

Note. *M* refers to mean; *SD* refers to standard deviation; TST refers to Total Sleep Time; PSG refers to Polysomnography; SE refers to Sleep Efficiency; SOL refers to Sleep-Onset Latency; WASO refers to Wake After Sleep Onset; REM refers to rapid eye movement; SF-36 refers to the Medical Outcomes Study Short-Form Survey.

Table 3

Prevalence of SCID-II-PQ clinical thresholds and proportions of personality disorder features.

Cluster	n (%)	Personality Disorder	No. Meeting Clinical Threshold	Mean Proportion of Endorsed Features	Standard Deviation
No PD	38 (45.2)	-	-	-	-
A	14 (16.7)	Paranoid	9	.15	.21
		Schizotypal	1	.10	.12
		Schizoid	6	.20	.22
B	18 (21.0)	Histrionic	1	.13	.16
		Narcissistic	9	.11	.12
		Borderline	9	.11	.14
		Antisocial	1	.008	.03
C	42 (50)	Avoidant	10	.20	.25
		Dependent	1	.15	.16
		Obsessive-Compulsive	39	.43	.21

Note. Percentages may not sum to 100% due to multiple participants meeting criteria for more than one personality disorder; PD refers to personality disorder; SCID-II-PQ refers to Structured Clinical Interview for the Diagnostic and Statistical Manual of Mental Disorders-IV, Clinical Version Axis II, Personality Questionnaire.

Table 4

Correlations between demographic, personality disorder features, and insomnia indices.

Variable	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
1. Age	-																		
2. Sex	−.16	-																	
3. Health	.03	−.18	-																
4. AvPD	−.23†	.09	−.29*	-															
5. OCPD	−.15	−.03	−.32*	.22†	-														
6. DPD	−.03	.05	−.30*	.56†	.37*	-													
7. SchtypPD	−.14	.07	−.25†	.45*	.20	.36*	-												
8. SchPD	.11	.04	−.19	.30*	.28†	.47*	.16	-											
9. ISI	−.22*	.02	−.16	.32*	.27†	.26†	.38*	.41*	-										
10. IIS	−.19	.16	−.39*	.42*	.42*	.29*	.27†	.29*	.51*	-									
11. FSS	−.11	.16	−.46*	.28*	.37*	.31*	.24*	.21	.43*	.66*	-								
12. TST-D	−.17	.14	.16	.13	−.13	.19	.04	.07	.09	.02	.05	-							
13. SE-D	−.24†	.15	.13	.14	−.11	.21	.08	.02	.06	.03	.12	.96*	-						
14. SOL-D	.28†	−.23†	−.03	−.09	.08	−.07	−.19	.06	−.11	−.05	−.18	−.64*	−.71*	-					
15. WASO-D	.15	−.13	−.18	−.16	.14	−.28†	−.03	−.14	.01	−.01	−.07	−.81*	−.84*	.43*	-				
16. TST-s	.02	−.03	−.04	.17	−.05	.06	.04	−.01	.09	.09	−.12	.04	.03	.04	.08	-			
17. SE-s	.11	.02	−.06	.13	.02	.06	.03	.03	.11	.13	−.05	.02	−.01	.15	−.03	.79*	-		
18. SOL-s	.03	.02	.09	−.09	−.06	−.06	−.15	−.07	−.19	−.06	−.06	−.06	−.09	.02	.09	−.14	−.51*	-	
19. WASO-s	−.11	−.01	.04	.01	−.10	.05	.04	.03	.12	.03	.16	.18	.24†	−.29†	−.19	−.50*	−.65*	.04	-

Note. Health refers to general health status as measured by the SF-36; AvPD refers to avoidant personality disorder; OCPD refers to obsessive compulsive personality disorder; DPD refers to dependent personality disorder; SchtypPD refers to schizotypal personality disorder; SchPD refers to schizoid personality disorder; ISI refers to insomnia severity index; IIS refers to insomnia impact scale; FSS refers to fatigue severity scale; TST refers to total sleep time; SE refers to sleep efficiency; SOL refers to sleep-onset latency; WASO refers to wake after sleep onset; -D refers the discrepancy between polysomnography and self-reported wake after sleep onset; -s refers to self-reported from two-week sleep diaries.

† $p < .05$,

* $p < .01$

Table 5

The insomnia experience of participants with clinically significant OCPD features.

Demographic Information	OCPD (*n* = 39)	No PD (*n* = 38)
Age†	49.7(13.2)	56.0(9.1)
Sex (female, %)	76.9	78.9
Education	15.3(2.3)	15.7(2.0)
Self-reported Sleep		
TST (in minutes)	374.5(65.4)	362.2(74.0)
SE %	75.4(8.6)	72.3(11.0)
SOL (in minutes)	41.0(20.5)	52.8(34.7)
WASO (in minutes)	45.4(25.2)	51.9(29.1)
PSG-derived Sleep		
TST (in minutes) †	408.2(53.1)	383.1(43.8)
SE %	87.5(7.3)	85.9(6.7)
SOL (in minutes)	16.6(18.9)	18.7(16.0)
WASO (in minutes)	32.8(19.9)	38.7(26.6)
Stage 1 %	10.4(9.6)	11.0(9.7)
Stage 2 %	65.2(12.6)	66.4(9.8)
Stage 3 %	4.8(8.4)	3.7(7.0)
REM %	19.6(6.7)	19.0(5.9)
Daytime Functioning		
Insomnia Severity Index	17.1(4.3)	15.1(4.7)
Insomnia Impact Scale*	126.3(17.3)	107.2(23.9)
Fatigue Severity Scale†	4.7(2.2)	3.4(1.4)
STAI*	40.3(9.1)	31.9(7.4)
Beck Depression Inventory†	8.1(5.3)	5.1(4.1)
SF-36 General Health†	63.2(20.9)	75.9(15.3)
SF-36 Vitality†	44.1(20.7)	59.5(20.5)
SF-36 Mental Health*	69.0(16.3)	82.7(10.9)
SF-36 Physical Functioning†	80.0(20.5)	88.7(13.6)

Note. Data presented as *M*(*SD*); See Table 1 for descriptions of abbreviations for sleep parameters. OCPD refers to Obsessive-Compulsive Personality Disorder; No PD refers to no personality disorder; STAI refers to Spielberger State-Trait Anxiety Inventory Y-2;. SF-36 refers to the Medical Outcomes Study Short-Form Survey.

† $.01 < p < .05$.

* $p \leq .001$.