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Sleep-Wake Complaints and Their Relation to Sleep Disturbance

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This report is a comparison of patients presenting with 1) an insomnia complaint diagnosed as no objective findings, 2) insomnia diagnosed as being associated with a psychiatric disorder, and 3) daytime sleepiness diagnosed as no objective findings. The sleep of patients with insomnia diagnosed as no objective findings is comparable to that of patients with daytime sleepiness diagnosed as no objective findings and is significantly better than that of patients with insomnia associated with a psychiatric disorder. Significant differences were found in sleep induction, sleep maintenance, and overall sleep efficiency. No major differences were found among any of the groups in terms of sleep staging. All groups showed signs of psychological distress, but as expected this was significantly higher in the patients with insomnia associated with a psychiatric disorder. The fact that patients may present with sleep complaints (either insomnia or daytime somnolence) despite essentially normal sleep has clinical implications. Adequate evaluation of sleep complaints and symptomatic treatment plans are discussed. (Henry Ford Hosp Med J 1988;36:9-12)

Difficulty initiating and maintaining sleep is a frequent complaint in the general population and a common symptom of patients seen in medical and psychiatric clinics. As with any symptom, the underlying cause of an insomnia complaint must be identified. The accumulated experience of specialized sleep disorders centers over the last decade clearly shows that insomnia has a variety of causes. Consequently, our understanding of the differential diagnoses of insomnia has improved such that the underlying cause of most insomnia complaints can now be identified after a thorough evaluation (1).

The disorders associated with insomnia complaints can be psychiatric, behavioral, medical, or a primary sleep disorder (2). In 10% to 25% of cases, however, the sleep complaint itself cannot be verified. Although patients' nighttime sleep, when recorded, appears within normal limits with no evidence of abnormal physiological activity, these patients report that they have slept poorly or not at all. Therefore, a diagnostic category of subjective insomnia complaints with no objective findings has been established (previously "pseudoinomnia") (3). Some associate this insomnia diagnosis with a presently undetected physiological event, while others attribute it to psychological or behavioral factors. As yet, none of these suggestions have been supported by convincing data.

Typically, patients with insomnia complaints are prescribed symptomatic treatment in the form of sedative-hypnotics. The recognized clinical benefit of sedative-hypnotics is to increase sleep time while decreasing wakefulness before and during sleep. Since these patients do not show objective evidence of increased wakefulness, it is difficult to determine what benefit, if any, is achieved in patients complaining of insomnia with no objective findings. To develop a more rational and effective treatment for this type of insomnia, it is necessary to better char-

acterize patients who complain of chronic insomnia and have no definitive objective findings.

Previous attempts to identify this population of patients with insomnia but no objective findings have focused on comparisons to other insomnia populations where a specific diagnosis has been made (eg, insomnia associated with psychiatric disorders) (4). Although useful, this approach suffers from a circularity of reasoning; that is, the basis for diagnosis is also the basis of comparison. Patients are categorized as having insomnia with no objective findings based on polysomnographic results which are then used to compare the groups. In this report, we attempt to partially avoid this circularity by comparing two groups of patients who present with different symptoms, and more importantly the diagnosis of no objective findings is made based on evaluation of the specific complaint with the appropriate laboratory tests for the specific complaint. In other words, the basis for the diagnosis is not the basis for comparison in the comparison group. Thus, in the case of insomnia associated with no objective findings, patients present with insomnia and the diagnosis is made based on a normal all-night sleep recording. In the case of excessive daytime sleepiness associated with no objective findings, patients present with sleepiness and the diagnosis is based not on the results of the all-night sleep recording but on a standardized test of daytime sleepiness (ie, the Multiple Sleep

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Table 1
Means and Standard Deviations for Sleep and Wake Parameters
for Each Diagnostic Group

Diagnosis	Total Sleep Time (min)	Sleep Efficiency (%)	Wake Before Sleep (min)	Wake During Sleep (min)	Wake After Sleep (min)
Insomnia—Psychiatric	314.8 ± 103.8*	63.9 ± 20.4*	45.6 ± 35.2*	77.5 ± 61.4*	45.3 ± 65.0
Insomnia—No Objective Findings	421.3 ± 78.1	85.9 ± 11.6	22.0 ± 24.9	42.0 ± 48.5	11.5 ± 26.5
Daytime Sleepiness—No Objective Findings	463.5 ± 18.5*	86.3 ± 10.5	22.4 ± 26.4	44.9 ± 44.9	7.7 ± 16.3

*Significantly different from insomnia—no objective findings group ($P < 0.05$).

Sleep efficiency = total sleep time/time in bed, wake before sleep = minutes of wake before 10 minutes of persistent sleep, wake during sleep = minutes of wake after 10 minutes of persistent sleep and before final awakening, and wake after sleep = minutes of wake after end of sleep and before termination of recording.

Latency Test [MSLT]) (5). In addition to comparing the insomnia patients to daytime sleepiness patients, we have compared them to an insomnia group where a specific diagnosis was made. The diagnostic group selected was insomnia associated with a psychiatric disorder. We chose this group because it is the most common comparison group in previous studies and because insomnia associated with no objective findings is most frequently misdiagnosed as insomnia of psychiatric etiology.

Methods

Subjects included three groups of patients self-referred or physician-referred to the Sleep Disorders and Research Center at Henry Ford Hospital during a two-year period for the evaluation of their sleep-wake complaints. The first group, 14 men and 28 women with a mean age of 41.6 ± 14.4 years, had complaints of chronic difficulty in initiating and maintaining sleep and received a diagnosis of insomnia without any abnormal sleep findings. This diagnosis varies slightly from the diagnostic classification system of the Association of Sleep Disorders Centers (ASDC). While the ASDC classification reserves this diagnosis for individuals with normal sleep lacking apparent psychopathology, we use this diagnosis for patients who may or may not show psychopathology but who had normal sleep. The rationale for this diagnostic scheme is discussed in more detail later. The second group included 43 patients, 20 men and 23 women with a mean age of 46.1 ± 14.2 years, who complained of chronic insomnia and received a diagnosis of insomnia associated with a psychiatric disorder. These patients had Axis I, Diagnostic and Statistical Manual of Mental Disorders III (American Psychiatric Association), psychiatric diagnoses made by interview. The third group, 20 men and 23 women with a mean age of 38.6 ± 16.1 years, were evaluated for complaints of excessive daytime sleepiness and received a diagnosis of daytime sleepiness without any abnormal sleepiness. Before initial assessment, each patient completed a detailed sleep questionnaire and maintained a two-week sleep diary. At the first visit, each patient also completed the Cornell Medical Index and the Minnesota Multiphasic Personality Inventory (MMPI).

The clinical evaluation consisted of a review of the sleep history and general physical and brief mental status examinations. For the polysomnographic evaluation, in addition to the standard central (C3) and occipital (OZ) EEGs, electrooculogram,

and submental electromyogram, several other parameters were recorded continuously during sleep (6). Airflow was measured with oral and nasal thermistors, heart rate was recorded with a V5 ECG lead, and leg movements were detected by electrodes applied over the left and right anterior tibialis muscles. At least one night of polysomnography was obtained from each patient, and only the first night recordings were analyzed for this report. The sleep stages were scored according to the standard criteria reported by Rechtschaffen and Kales (6). Patients with the complaint of excessive daytime sleepiness were given the standard MSLT during the day following their nocturnal polysomnograms (5). The MSLT is a standard procedure which measures sleep latency repeatedly throughout the day and is a highly valid and reliable measure (5). Latency to the onset of sleep in minutes is determined for each test, and the latencies are summed and subtracted from 100 to yield a sleepiness index. Indexes of 50 or lower are considered normal, those between 50 and 75 as a diagnostic gray area, and those of 75 or higher as pathological. All nocturnal recordings and the MSLTs were reviewed by two clinical polysomnographers for a consensus diagnosis.

Based on the entire clinical evaluation of interviews, questionnaires, the MSLTs, and nocturnal polysomnography, each patient received a specific diagnosis from the diagnostic classification of sleep disorders from the ASDC (1).

Results

If no objective findings is a valid diagnostic category, patients receiving this diagnosis should have comparable sleep regardless of their sleep-wake complaint. To determine the validity of this category, we compared the sleep parameters of patients with the no objective findings diagnosis who presented with either an insomnia or daytime sleepiness complaint. The daytime sleepiness patients received the no objective findings diagnosis based on their MSLT, not on their nighttime recording. The sleepiness index for these patients was 32.8 ± 17.6 , which is consistent with normal populations (7). The results of the analyses (independent group *t* tests, $P < 0.05$), as well as the means for the two groups, are presented in Table 1. No significant differences were noted between the two groups on wake time before sleep, during the sleep period, after the sleep period before time-of-arising, or in sleep efficiency. The only difference found was that daytime sleepiness patients had more

Table 2
Means and Standard Deviations for Sleep Stage Parameters for
Each Diagnostic Group

Diagnosis	% Stage 1	% Stage 2	% Stage 3-4	% Stage REM
Insomnia—Psychiatric	20.9 ± 13.2*	59.6 ± 13.3	3.5 ± 5.6	16.3 ± 9.8
Insomnia—No Objective Findings	14.7 ± 7.2	59.0 ± 8.4	7.0 ± 7.5	19.0 ± 8.1
Daytime Sleepiness—No Objective Findings	12.9 ± 5.9	58.1 ± 9.5	8.9 ± 9.4	20.0 ± 6.6

*Significantly different from insomnia—no objective findings group ($P < 0.05$).
 REM = rapid eye movement.

total sleep time (463.5 minutes) compared to the insomnia patients (421.3 minutes). In the absence of any differences in sleep efficiency or wake time, the difference in total sleep time occurred because daytime sleepiness patients spend an extra 30 to 45 minutes asleep in bed. Finally, the groups showed no significant differences in terms of the amount of sleep time spent in the various sleep stages (Table 2).

Clearly, the two patient groups with the no objective findings diagnosis showed comparable sleep. However, the question remains as to whether this sleep is similar to or different from that of insomnia patients in whom a specific insomnia diagnosis has been made. To answer this question, we compared the patients presenting with insomnia but with no objective findings to those diagnosed as psychiatric (Table 2). The results showed significant differences on all sleep-wake parameters. The patients diagnosed as insomnia associated with psychiatric conditions showed significantly increased wake time before, during, and after sleep. They also showed significantly less total sleep time and a lower sleep efficiency. In terms of sleep stages, the only significant difference was in stage 1 sleep, with the psychiatric insomnia group showing a significant elevation. This significant difference in stage 1 sleep between the two insomnia groups further supports the notion that the insomnia psychiatric group shows more disturbed sleep than the no objective findings group.

Psychological parameters

In the group of 42 patients with insomnia and no objective findings, 26% reported current problems with anxiety or depression. The prevalence of these problems did not differ in the group of patients with complaints of daytime sleepiness with no objective findings, where 14% related current problems with anxiety or depression ($\chi^2 = 2.0$, $P > 0.05$). A total of 29 (69%) of the patients with insomnia complaints and no objective findings completed the MMPI and showed a mean of 2.4 ± 2.2 elevations. An elevation is defined as a T score of 70 or above on any clinical scale except for masculinity/femininity. This was not different from the mean number of elevations, 2.2 ± 2.1 , among the 34 (79%) patients with daytime sleepiness complaints and no objective findings who completed the MMPI.

The group of insomnia patients with no objective findings did differ from those with a psychiatric diagnosis for self-reported history of depression or anxiety. Compared to the prevalence of 26% in the no objective findings patients, 67% of psychiatric pa-

tients had a positive history ($\chi^2 = 14.6$, $P < 0.001$) of anxiety or depression. The no objective findings patients had fewer MMPI elevations (2.4 ± 2.2) than the 42 (97%) psychiatric patients (4.2 ± 2.8) who completed the MMPI ($t = 3.3$, $P < 0.01$).

Discussion

Insomnia and daytime sleepiness, like any other symptom in medicine, require a thorough evaluation before treatment. It is necessary to evaluate both the etiology and the severity of the symptom. With the methodologies available to evaluate nocturnal sleep as well as daytime sleep tendency, sleep-wake complaints can now be evaluated systematically and objectively. The results of the present study clearly show that there is a subpopulation of patients who complain of chronic sleep-wake problems but who do not show evidence of the sleep-wake problem on objective evaluation. The existence of these patients who complain of insomnia yet who on examination show "normal" sleep has been noted in the literature for a long time (3). These patients were originally referred to as having "pseudoinomnia" and more recently have been termed as having insomnia with no objective findings. Another subgroup includes patients complaining of daytime sleepiness who have a symptom that cannot be confirmed by objective measurement. What proportion of patients presenting with a chronic sleep-wake symptom belong to the no objective findings category is an important question that needs to be answered. To date, there are no systematic studies of the prevalence of the various diagnostic categories in an unbiased sample. In a national study of sleep centers, insomnia associated with no objective findings was present in 9.2% of patients presenting with an insomnia complaint (8). However, great variability occurred between the centers, with one center reporting zero prevalence and another reporting a prevalence of 28.7%. Even within a single center, a significant difference occurred in the prevalence of no objective findings as a function of age (9). Younger patients showed significantly more no objective findings than did older patients. In the absence of data from an unselected population of patients, the exact prevalence of this entity cannot be determined.

Insomnia with no objective findings is defined as a complaint of disturbed sleep (insomnia) in the presence of a normal polysomnographic recording. It does not imply that the patients have no positive psychiatric or medical findings. Although a significant difference was noted in psychological measures between the two insomnia groups in the present study, patients in both

groups exhibited some evidence of psychological distress. In the present diagnostic system, a patient with an evident psychiatric disorder with no sleep abnormality received a sleep diagnosis of no objective findings. The advantage of this system is twofold: 1) all patients with normal sleep, regardless of all other findings, received the same diagnosis; and 2) the description of no objective findings clearly indicates that the patient has no sleep problem, and treatment approaches to the patient's complaint should not be directed at improving sleep (ie, sedative-hypnotics) but at other aspects of the patient's functioning which may be related to the complaint.

Because both insomnia and daytime sleepiness are complaints, not disease entities, a thorough evaluation is critical. In the absence of a diagnostic evaluation, the clinician is left with symptomatic treatment. In the present series, 40% of patients with insomnia and no objective findings had been previously prescribed hypnotics and 24% of patients with daytime sleepiness and no objective findings had been prescribed stimulants. Given the similarity of the sleep and waking function in these patients, it is unlikely that they had objective benefits from these treatments. Patients who do show objective evidence of sleep disturbance usually benefit from treatment both subjectively and objectively. Because of the risks associated with long-term treatment with sedative-hypnotics or stimulants, these prescriptions should be avoided unless absolutely necessary.

Given the widespread complaint of insomnia, the question of what constitutes a thorough evaluation becomes important. Specifically, is a polysomnographic recording a necessary part of evaluating an insomnia complaint? We believe the evaluation of a persistent insomnia complaint does not require a polysomnographic recording in all cases. Nevertheless, if a patient has no evidence of a medical or psychiatric disorder that is likely to

give rise to the presenting complaint, a polysomnographic recording should be considered. Similarly, if there is a psychiatric or medical basis for the insomnia complaint but the complaint is refractory to the treatment of the underlying condition, a polysomnographic recording should be performed. Finally, a polysomnographic recording is particularly important in a patient who derives no benefit from symptomatic sedative treatment. In all of these cases, a search for the cause of the complaint should be reviewed rather than simply prescribing or continuing symptomatic treatment.

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