

Classifying Insomnia in a Clinically Useful Way

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Insomnia is a prevalent complaint that may arise from myriad causes. Therefore, patients who present for insomnia evaluation and treatment represent a rather heterogeneous group that merits a reliable and valid diagnostic system. This review article considers the general purposes of diagnostic classification per se and highlights the factors that influence the development of diagnostic nosologies. Various past and current insomnia nosologies are described, and data supporting the reliability, validity, and general utility of these systems are presented. In addition, the limitations of existing nosologies are discussed, and factors that will lead to improved insomnia nosologies in the future are considered. The panel discussion that follows this review highlights the limitations of current nosologies and notes barriers that must be overcome to improve upon the currently available classification systems.

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Over the past 30 years, considerable clinical and research experience has shown that chronic insomnia arises from varied causes including primary sleep disorders, medical diseases, psychiatric illnesses, medication/substance abuse, and a host of behavioral and environmental factors.^{1–10} This realization, in turn, has spawned several nosologies for the diagnostic classification of insomnia patients. All of these nosologies serve the common functions of systematizing descriptions of patients, facilitating communication among practitioners, guiding treatment decision making, predicting clinical course, organizing administrative coding/billing operations, and standardizing insomnia research.¹¹ However, both the manner in which insomnia diagnoses are organized and the number of insomnia diagnoses described differ markedly across nosologies. The existence of such incongruent nosologies creates costly variability in the assessment and clinical management of insomnia patients as well as needless disunity among insomnia researchers who employ these alternate systems to anchor their empirical studies. The literature includes spirited debates between supporters of the various nosologies, yet empirical support for each of these classification schemes has been disappointingly sparse.

This brief review will trace the evolution of existing insomnia classification systems and examine the degree to which they are supported by the empirical literature. In

addition, this article considers the utility of these systems in standardizing diagnostic practice and guiding the clinical management of distinctive insomnia phenotypes. Finally, strengths and weaknesses of the extant classification schemes are discussed, and suggestions for future insomnia classification efforts are offered.

PROCESS OF DEVELOPING AN INSOMNIA NOSOLOGY

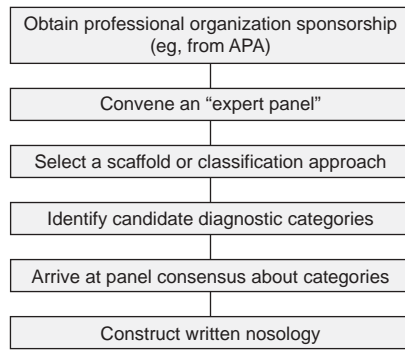
Ideally, the classification system for any set of related medical disorders is based on clearly defined etiologies. In the absence of unambiguous pathologies, however (as is the case for sleep disorders), classification must rely on less compelling factors such as symptomatic presentation, physiological measurements, clinical utility, expert opinion/experience, and consensus.¹¹ The insomnia classification systems in use today initially emerged when basic sleep research led to the identification of heterogeneous populations of insomnia sufferers. Subsequently, through the empirical study of varying insomnia phenotypes and the evolving practice of clinical sleep medicine, the heterogeneity of insomnia sufferers became increasingly obvious. Such research and clinical experience also led to the realization that insomnia often may be a disorder in its own right, as opposed to one of many symptoms characterizing an overarching illness or condition. Such realizations, in turn, spawned formal insomnia classification schemes within broader sleep disorders nosologies to facilitate research, diagnosis, and treatment.

The steps involved in the development of a nosology are depicted in Figure 1. A number of factors will shape a classification system's ultimate structure. Some of these are inherent to the development process itself. For instance, regardless of intent, the personalities and dynamics of the consensus panel will influence the final outcome.

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Figure 1. Steps Involved in Developing an Insomnia Nosology^a

^aUnder the auspices of a professional organization, such as the American Psychiatric Association (APA), a panel of sleep medicine specialists first shapes the basic structure of the insomnia classification system by selecting the major diagnostic groupings, then identifies potential subgroupings, or specific diagnoses, within each major category. When a consensus has been reached, the written nosology itself will be constructed.

Other influences, such as the consideration of coding and reimbursement issues, reflect the circumstances in which medicine is currently practiced. Not uncommonly, diagnostic systems developed previously for other disorders may be used as models for insomnia classification, and the strengths and weaknesses of the chosen model may be carried through into the new system. Finally, the quality of the research regarding insomnia phenotypes, clinical experience, and case histories is an important contributor to nosology development.

Along with these considerations and influences, the primary function of the diagnostic criteria is in shaping the classification system developed. For instance, in developing research diagnostic criteria, a fairly rigorous design that is likely to minimize the costly inclusion of false-positives is desirable. The inclusion of false-positives into study populations introduces variants and thus limits the interpretation and generalizability of a study's results. On the other hand, clinical criteria are generally more lenient and inclusive. False-positives in a clinical setting do not pose the same problems as they do in a research setting, because the main goal in the clinic is to treat symptoms. The *missed* diagnosis is the more dangerous outcome in the clinical setting. For example, untreated insomnia has been associated with an increased risk for developing medical and mood disorders, with some studies suggesting that insomnia may be an important predictor of poor physical and emotional health.¹² (The relationship between sleep disturbance and conditions such as depression and chronic pain is further explored in another article¹³ in this supplement.) Therefore, we can see that research and clinical needs are, to some extent, at cross-purposes, yet a classification system is usually designed to meet the needs of both groups.

PAST AND PRESENT INSOMNIA NOSOLOGIES

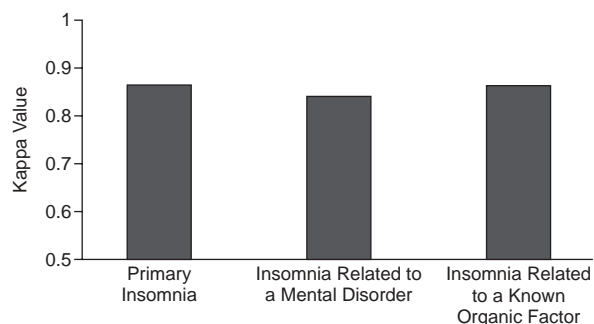
The first formal sleep disorder nosology, the Diagnostic Classification of Sleep and Arousal Disorders, was published in 1979 by the Association of Sleep Disorders Centers (ASDC).¹⁴ The category of disorders of initiating and maintaining sleep (DIMS) included subtypes for psychophysiological insomnia and for insomnia associated with psychiatric disorders, drugs or alcohol, sleep-induced respiratory impairment, or other medical, toxic, or environmental causes. Other diagnoses included were childhood-onset DIMS, other DIMS conditions, and no DIMS abnormality. Disorders of sleep/wake schedule, which often present as insomnia, were also categorized in the ASDC scheme.

In the 1980s, the Clinical Modification of the World Health Organization's *International Classification of Diseases, Ninth Revision (ICD-9-CM)*,¹⁵ outlined a limited number of sleep disorder diagnoses; the ICD-10 (published in 1992)¹⁶ further refined these diagnoses. The ICD system is more global in application than the ASDC nosology, and it uses a different scaffold, in which the primary distinction is between insomnia of nonorganic origin and insomnia of organic origin (i.e., "true" sleep disturbances). The nonorganic disorders include divisions based on chronicity of the complaint (transient versus persistent), as well as insomnia due to phase-shift disruption of the sleep-wake cycle, as associated with shift work or jet lag.

Also in the 1980s, the *Diagnostic and Statistical Manual of Mental Disorders* was revised (DSM-III-R)¹⁷ and introduced another fairly global insomnia classification system. The DSM-III-R, and the subsequent DSM-IV (published in 1994),¹⁸ made an essential distinction between the dyssomnias (disorders intrinsic to the mechanisms of sleep) and the parasomnias (unusual behaviors or events that occur during sleep: sleep terrors, nocturnal seizures, nightmares, and sleepwalking). Within the dyssomnias, the DSM relies primarily on the presumed etiology of the sleep disturbance to make major diagnostic distinctions (primary versus secondary to another condition). Primary dyssomnia diagnoses include primary insomnia, breathing-related sleep disorder, circadian rhythm disorder, and dyssomnia not otherwise specified. Secondary insomnias include insomnia related to another mental disorder, insomnia due to a general medical condition, and substance-induced insomnia.

In 1990, the American Sleep Disorders Association (ASDA) published the *International Classification of Sleep Disorders (ICSD)*,¹⁹ which was then revised in 1997.²⁰ The ICSD offers a highly specific classification scheme, with over 40 possible diagnoses related to insomnia. Diagnoses are organized according to the presumed pathophysiology underlying the sleep disturbance. The dyssomnias include intrinsic, extrinsic, and circadian rhythm sleep disorders. Other categories are insomnias

Figure 2. Test-Retest Reliability of DSM-III-R Insomnia Diagnoses: Interrater Reliability With a Structured Interview^a



^aData from Schramm et al.²¹ Two clinicians interviewed each patient with sleep disturbance (N = 68) using a structured clinical interview for the DSM-III-R, and diagnostic agreement between the interviewers was assessed. In the subclassification for insomnia, kappa values were consistently high, with values of 0.86 for primary insomnia, 0.84 for insomnia related to a mental disorder, and 0.86 for insomnia related to a known organic factor.

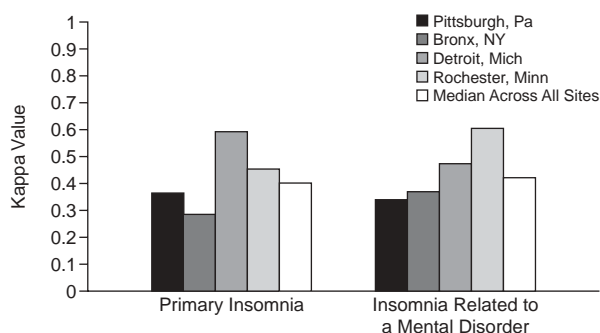
associated with a mental disorder, neurologic disorder, or other medical disorder.

Currently, not much is known about the reliability of the ASDC, ICD, and ICSD insomnia nosologies as there is virtually no research on these systems. In contrast, 2 studies have evaluated the reliability of the DSM-III and DSM-IV criteria. In the first of these, Schramm et al.²¹ compared DSM-III-R insomnia diagnoses assigned by independent clinicians who assessed a series of 68 patients using a structured clinical interview. Results of this study showed good agreement between interviewers, with a kappa value of 0.91 for all insomnias. Moreover, agreement rates between interviewers for the insomnia subcategories of primary insomnia, insomnia related to a mental disorder, and insomnia related to an organic cause were 97%, 91%, and 93%, respectively. Figure 2 shows the correspondingly respectable high kappa values found for each of these diagnoses. Overall, these findings suggest that DSM-III-R insomnia diagnoses derived via a structured interview diagnosis are reliable across clinicians.

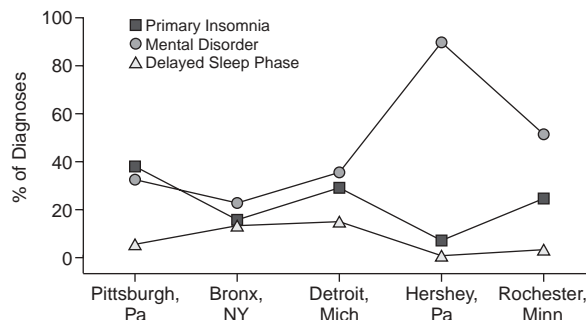
However, a subsequent study suggested that insomnia diagnoses may be less reliable when standard assessment procedures are used. In this second study,²² paired sleep specialists and nonspecialists at each of 5 sleep centers were asked to use standard clinical interviews to ascertain insomnia diagnoses in the series of patients they each interviewed. This diagnostic field trial for the DSM-IV showed relatively modest kappa values between specialists and nonspecialists for the various insomnia diagnoses ascertained. The study found that within-site agreement rates between sleep specialists and nonspecialists (including psychologists, psychiatrists, and neurologists) for diagnoses of primary insomnia and insomnia related to a mental disorder resulted in kappa values ranging from

Figure 3. DSM-IV Field Trial Results^a

A. Within-Site Agreement^b



B. Inter-Site Agreement: Sleep Specialists' Diagnosis^c



^aData from Buysse et al.²²

^bWithin each site, agreement (kappa value) between sleep specialists and nonspecialists ranged from poor to moderate. Hershey, Pa., site was excluded due to insufficient data.

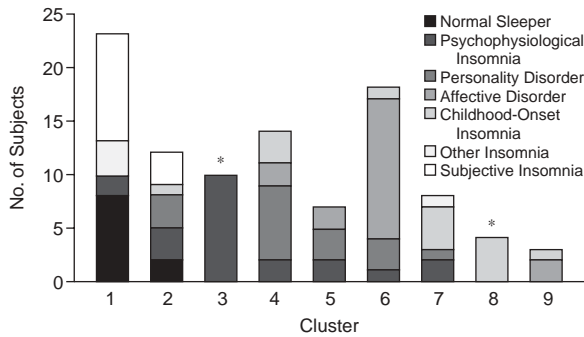
^cSite was found to have a significant effect on the prevalence of sleep disorder diagnoses; there was significant site bias in sleep specialists' assignment of primary diagnosis. The effect of site on diagnostic prevalence was tested with logistic regression analysis.

0.28 to 0.60 (Figure 3A). There was also a strong degree of site bias when diagnoses across sites were compared (Figure 3B), as well as a significant effect of site (data not shown) on clinicians' ratings of diagnostic fit, their confidence in the diagnosis assigned, and their ratings of how easy the classification system was to use ($p < .001$ for each). Sleep specialists tended to give higher ratings for utility and ease of use of the DSM-IV diagnoses than did nonspecialists. Thus, results of this field trial raise questions about the reliability and utility of even the fairly global DSM insomnia classification scheme, particularly when employed in traditional, nonspecialty settings.

**EMPIRICAL VALIDATION:
CLUSTER ANALYTIC STUDIES**

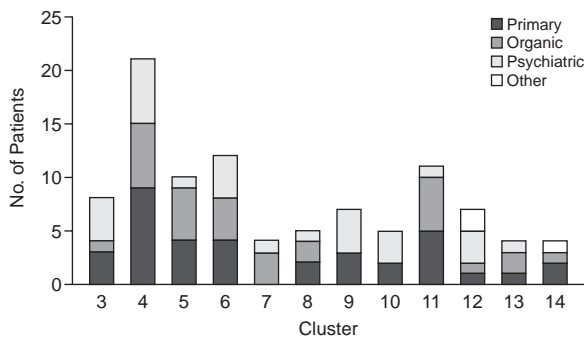
When evaluating the validity of classification systems, it is useful to ask whether clinical classification resulting from application of the diagnostic system in question actually subdivides heterogeneous groups of patients into naturally occurring homogeneous subgroups. Some stud-

Figure 4. Cluster Analysis of ASDC Diagnoses^a



^aData from Hauri.²³ *Only 2 of 9 empirical clusters consisted of patients with a single Association of Sleep Disorders Centers (ASDC) diagnosis: cluster 3 (persistent psychophysiological insomnia) and cluster 8 (childhood-onset insomnia). Cluster 3 contained 10 patients, and cluster 8 contained 4 patients. Not all patients with those ASDC diagnoses were captured within one cluster: childhood-onset insomnia was further differentiated into 2 levels of severity, and persistent psychophysiological insomnia was more narrowly defined than within the ASDC nosology.

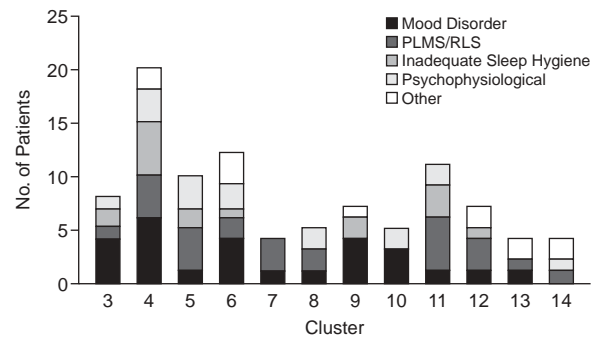
Figure 5. Cluster Analysis of DSM-III-R Diagnoses^a



^aData from Edinger et al.²⁴ Of 113 patients with insomnia, 98 were grouped into 14 empirical clusters (12 of which are depicted). No cluster was “pure” (i.e., was composed of patients with a single DSM-III-R diagnosis).

ies designed to address this question have compared classification results derived from usual clinical means with those derived from cluster analysis, an empirical procedure designed to group individuals on the basis of common clinical features. The typical methodology used by such studies entails having clinicians first assign diagnoses to each patient in a large cohort using data derived from clinical interview, chart review, or other source of pertinent information. Subsequently, empirically identified subgroups in the cohort are identified by applying a statistical cluster analysis program to a set of variables thought to be relevant to the type of clinical diagnoses of interest. In the case of insomnia, for example, data concerning nature, duration, and frequency of sleep complaint; daytime symptoms; medical history; psychiatric

Figure 6. Distribution of ICSD Insomnia Subtypes Across Empirical Clusters^a

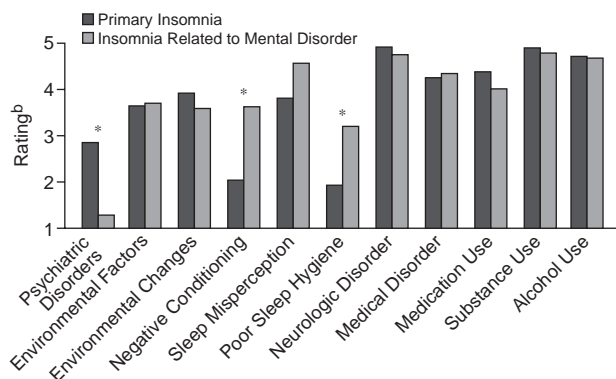


^aData from Edinger et al.²⁴ Of 113 patients with insomnia, 98 were grouped into 14 empirical clusters (12 of which are depicted). No cluster was composed of patients with a single ICSD diagnosis. Abbreviations: ICSD = International Classification of Sleep Disorders, PLMS = periodic limb movements in sleep, RLS = restless legs syndrome.

history; age; gender, etc., might all be employed in the cluster analysis to identify naturally occurring homogeneous subgroups. Once the cluster analysis is completed, the results of the clinical and the empirical classifications can then be compared for overlap. Ideally, each cluster will be composed mainly of patients sharing a single clinically assigned diagnosis. When this is the case, the validity of the nosology is supported since the empirical and clinical classification results are congruent. However, when the clinical and empirical results are not concordant, questions about the validity of the nosology remain.

To date, 2 cluster analyses have been performed on insomnia nosologies; one study tested the ASDC classification system,²³ whereas a second study tested the DSM-III-R and the ICSD systems.²⁴ In the first of these studies, Hauri²³ assessed a cohort of 99 subjects (89 patients with insomnia and 10 good sleepers) and empirically identified 9 groups on the basis of cluster analysis. Only 2 of these clusters were “pure” (i.e., consisted of only patients with a single ASDC diagnosis), and these clusters were composed of patients with clinically assigned diagnoses of psychophysiological insomnia and childhood-onset insomnia (Figure 4). Edinger and colleagues²⁴ assessed 98 insomnia patients and found 14 clusters. Comparisons of clinical and empirical classification showed that none of the empirically derived subgroups (clusters) were composed of only 1 clinically labeled insomnia subtype. However, there were 3 clusters composed of only 2 clinically identified diagnostic subgroups (Figure 5). Comparisons of the cluster analysis against the clinically assigned ICSD diagnoses yielded even less promising results, with only 2 clusters composed of 2 clinically identified diagnostic subgroups (Figure 6). These findings suggest that current diagnostic categories

Figure 7. What Leads to Overlap of Insomnia Diagnoses?^a



^aData from Nowell et al.²⁵ Sleep disorder specialists rated the degree of contribution of 20 factors (not all of which are shown) in the diagnosis of primary insomnia versus insomnia related to a mental disorder. Only a psychiatric disorder, negative conditioning, and poor sleep hygiene differed significantly in importance between the 2 diagnoses. Negative conditioning and poor sleep hygiene were rated as more important in making a diagnosis of primary insomnia than of insomnia related to mental disorders; a psychiatric disorder was rated as more important in making a diagnosis of insomnia related to mental disorders than of primary insomnia.

^b1 = Very important, 5 = not at all important.

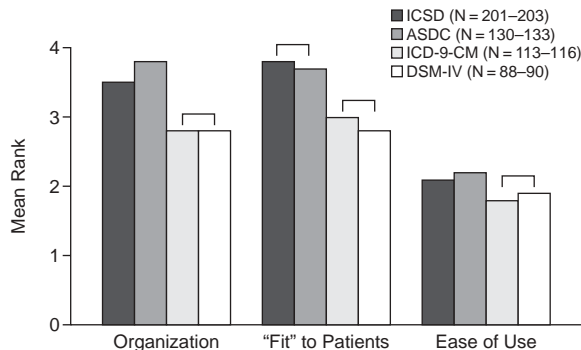
*Indicates a significant difference in importance between the 2 diagnoses.

do not faithfully reflect clinically observed characteristics of insomnia sufferers and may therefore be of questionable validity in a clinical setting.

CLINICAL UTILITY AND CONCORDANCE OF NOSOLOGIES

To illuminate those factors that physicians find most clinically important in defining a diagnosis, Nowell et al.²⁵ asked 5 sleep specialists to rate the importance of clinical factors used in assigning DSM-IV diagnoses of primary insomnia and insomnia associated with a mental disorder. Only 3 out of a list of 20 factors made a significantly different contribution ($p < .001$) in distinguishing between these 2 diagnoses. These 3 factors were (1) the presence of psychiatric disorders; (2) a history of negative conditioning; and (3) reports of poor sleep hygiene (Figure 7). All other factors showed strong overlap between primary and secondary insomnia. This high degree of symptom overlap may interfere with the clinician's ability to differentiate between primary insomnia and insomnia due to a mental disorder. Adding to the difficulty in making this differential diagnosis is the fact that DSM-IV includes neither poor sleep hygiene nor negative conditioning (2 of the 3 key factors) in its diagnostic criteria. Such omissions, as well as marked symptom overlap for the various DSM-IV subtypes, quite likely undermine the reliability of the DSM-IV.

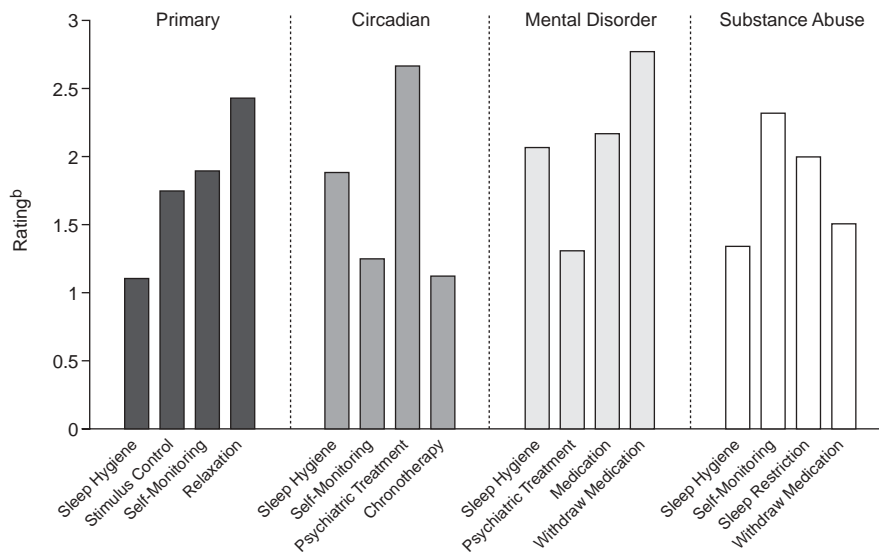
Figure 8. Direct Comparisons of Nosologies^a



^aReprinted with permission from Buysse et al.¹¹ Clinicians answered the following questions about 4 sleep disorders classification systems: "How would you rate the organization of sleep disorder categories and diagnoses?"; "How well do the diagnoses 'fit' your patients?"; and "How easy is the system to use?" The nosologies were rated on a scale of 1 (very poor) to 5 (excellent) for the first 2 questions and 1 (very difficult) to 4 (very easy) for the third question. Answers of "Don't know" were excluded. Brackets indicate classification systems that were not significantly different from each other in post hoc analysis. For significant differences, $p < .001$. Abbreviations: ASDC = Association of Sleep Disorders Centers; DSM-IV = *Diagnostic and Statistical Manual of Mental Disorders*, Fourth Edition; ICD-9-CM = *International Classification of Diseases*, Ninth Revision, Clinical Modification; ICSD = *International Classification of Sleep Disorders*.

Since there are clearly marked differences between the various insomnia classification schemes, a direct comparison of clinicians' use of the ICSD, the ASDC, the ICD-9-CM, and the DSM-IV was recently undertaken.¹¹ This survey study was specifically designed to investigate a number of questions such as how the systems are perceived by clinicians, each system's role in clinical practice, and the relative merits of each system's particular attributes. Findings showed that of the 206 surveyed clinicians practicing at sleep centers around the United States, 91.7% used the ICSD for clinical decision-making. Both the ICSD and the ASDC systems were rated more highly than the DSM-IV and the ICD-9-CM (which received similar scores) on organization, "fit" to patients, and ease of use (Figure 8). Thus, the most commonly used diagnostic tool in the psychiatrist's office, the DSM-IV, is unfortunately considered by sleep specialists to be less useful than other diagnostic systems for evaluating sleep disorders.

An additional research method used to compare the various insomnia nosologies entails ascertaining the concordance between 2 or more diagnostic systems when they are applied to the same group of patients. In one study using this methodology, Buysse et al.²² compared the diagnoses assigned to 216 patients with insomnia by sleep specialists using the DSM-IV, the ICSD, and the ICD-10. Results showed that the group of 52 patients given a diagnosis of DSM-IV primary insomnia was separated into 5 different ICSD diagnoses, with 60% of patients receiv-

Figure 9. Impact of DSM-IV Diagnoses on Treatment Decisions^a

^aData from Buysse et al.²⁷ Differing DSM-IV insomnia diagnoses were found to result in differing treatment modalities. For primary insomnia (N = 48), circadian rhythm disturbance (N = 16), and substance-induced sleep disorder (N = 6), the most strongly preferred interventions were usually nonmedicinal, while for insomnia related to a mental disorder (N = 99), pharmaceutical interventions were among the most strongly recommended. Adequate sleep hygiene was an important component in all cases.

^b1 = Strongly indicated, 5 = not indicated.

ing a diagnosis of psychophysiological insomnia. There was a slightly higher degree of concordance between the DSM-IV and the ICD-10 diagnoses, with 4 different diagnoses, 85% of which were for nonorganic insomnia.

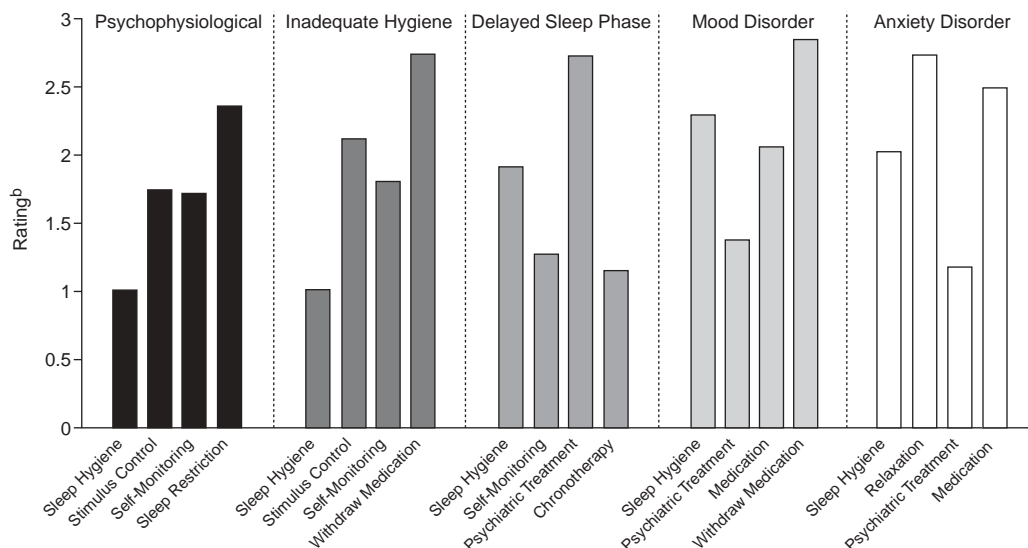
In another study,²⁶ 794 adolescents, aged 15 to 18 years, and 1447 young adults, aged 19 to 24 years, were interviewed via telephone and were assigned ICD-10 and DSM-IV diagnoses using a computer-driven structured interview called the Sleep-EVAL expert system. Of the subjects who received a DSM-IV diagnosis, 73.2% also received an ICD-10 diagnosis. In contrast, only 39.8% of subjects who were assigned an ICD-10 diagnosis also had a DSM-IV diagnosis. The finding that the DSM-IV criteria yielded a lower prevalence for sleep disorders than did the ICD-10 criteria underscores the differing emphases each nosology places on the insomnia complaint itself. The more stringent criteria of the DSM-IV require that the complaint be severe enough to warrant treatment in its own right. Also, the DSM-IV does not readily allow for dual diagnoses of dyssomnias (e.g., if a patient has a breathing-related sleep disorder, he or she cannot also be considered to have primary insomnia), whereas the ICD-10 does not impose such a restriction.

These 2 studies raise serious questions about the validities of one or all of these diagnostic systems. If the various nosologies are valid, then a group considered diagnostically homogeneous by one nosology should also be homogeneous based on the criteria of another. As can be seen

by these studies, such results are not obtained when applying 2 or more of the extant insomnia nosologies to the same patients. Not only do the nosologies disagree as to how finely they discriminate among insomnia patients, but they also differ markedly with regard to the decision as to when a separate insomnia diagnosis should be assigned in the first place.

THE IMPACT OF NOSOLOGY ON TREATMENT

In addition to the issues considered thus far, it is of great practical importance to determine if and how well diagnostic systems guide treatment decisions.^{26,27} In one study conducted to assess this question, Buysse et al.²⁷ asked sleep specialists to consider a standard list of treatment recommendations for each patient to whom they had assigned a DSM-IV and ICD-10 diagnosis. The specialists rated each treatment on a 4-point scale as “first-order treatment recommendation” (a rating of 1) through “not recommended” (a rating of 4). Analyses of treatment choices showed that the clinicians’ treatment decisions were guided by diagnostic decisions. The top 4 treatment recommendations for some of the most common diagnoses are shown in Figure 9. In the case of DSM-IV primary insomnia, for instance, all of the most strongly indicated interventions were nonpharmaceutical in nature, including improving sleep hygiene, stimulus control therapy, self-monitoring, and relaxation training. In con-

Figure 10. Impact of ICSD Diagnoses on Treatment Decisions^a

^aData from Buysse et al.²⁷ Differing International Classification of Sleep Disorders (ICSD) diagnoses were found to result in differing treatment modalities. For psychophysiological insomnia (N = 30), delayed sleep phase syndrome (N = 16), and cases of inadequate sleep hygiene (N = 13), the most strongly preferred interventions were usually nonmedicinal, while for insomnia related to a mood disorder (N = 69) or anxiety disorder (N = 13), pharmaceutical interventions were among the most strongly preferred. As for DSM-IV diagnoses, proper sleep hygiene was an important component of treatment recommendations.

^b1 = Strongly indicated, 5 = not indicated.

trast, the most strongly recommended interventions for insomnia related to a mental disorder included withdrawing or prescribing medications and psychiatric treatment. Behavioral interventions, such as improving sleep hygiene, were strongly indicated for all diagnoses. A similar pattern was seen for ICSD insomnia diagnoses (Figure 10). Psychophysiological insomnia was not associated with recommendations for pharmaceutical treatments, and all of the most strongly indicated interventions, including improved sleep hygiene, stimulus control, self-monitoring, and sleep restriction, were behavioral. These results imply that insomnia treatment decisions are strongly guided by diagnostic assignments regardless of the particular insomnia nosology used for assigning insomnia diagnoses. Hence, such results underscore the importance of developing a classification system that will accurately categorize insomnia subtypes.

CONCLUSIONS

While sleep medicine has made important advances in the decades since insomnia was first formally recognized, further research and refinement of nosological systems are required. Collecting more empirical data regarding a diagnostic scheme's reliability, validity, and ability to predict patient outcomes will be one of the most important contributions to further evolution of insomnia classification. The relative merits among classification systems should

also be empirically compared, and features such as the degree of diagnostic convergence or discrimination among nosologies, the relative validity of current and lifetime diagnostic capabilities, and the degree of accuracy in predicting course of illness and differential treatment response should be explored.

Another important goal for the further development of insomnia classification systems is that of maximizing diagnostic reliability. To do so, it is important to minimize the amount of clinician or investigator interpretation required to make a diagnosis, so that 2 different clinicians will independently assign the same diagnosis to the same patient. This can be accomplished by improving the specificity of diagnostic criteria. In a research setting, an increase in the use of structured interviews, and potentially the development of Research Diagnostic Criteria for insomnia, should be considered. Longitudinal diagnostic consistency is needed as well. Field validation of diagnostic criteria, through both long-term observation and treatment response, will contribute to achieving this goal.

It is important to keep in mind that any disease classification scheme is a representation of clinical reality and should not be substituted for actuality. Nevertheless, despite the imperfections inherent in a reliance on a model system, such systems are useful in that they provide a framework within which both our knowledge and our gaps in knowledge can be considered.²⁶ Arriving at the ideal insomnia classification system will be facilitated by the de-

velopment of an accurate, reliable, and empirically diagnostic schema. Deriving such a system is not just an academic goal but an imperative since our treatment decisions based on our insomnia diagnoses directly impact patient well-being.

REFERENCES

- Arriaga F, Paiva T. Clinical and EEG sleep changes in primary dysthymia and generalized anxiety: a comparison with normal controls. *Neuropsychobiology* 1990;24:109-114
- McCall WV, Reynolds D. Psychiatric disorders and insomnia. In: Kryger MH, Roth T, Dement WC, eds. *Principles and Practice of Sleep Medicine*. 3rd ed. Philadelphia, Pa: WB Saunders Co; 2000:640-646
- Gillin JC, Drummond SPA. Medication and substance abuse. In: Kryger MH, Roth T, Dement WC, eds. *Principles and Practice of Sleep Medicine*. 3rd ed. Philadelphia, Pa: WB Saunders Co; 2000:1176-1196
- Morin CM, Gibson D, Wade J. Self-reported sleep and mood disturbance in chronic pain patients. *Clin J Pain* 1998;14:311-314
- Moldofsky H. Sleep influences on regional and diffuse pain syndromes associated with osteoarthritis. *Semin Arthritis Rheum* 1989;18:18-21
- Hirsch M, Carlander B, Verge M, et al. Objective and subjective sleep disturbances in patients with rheumatoid arthritis: a reappraisal. *Arthritis Rheum* 1994;37:41-49
- White DP. Central sleep apnea. In: Kryger MH, Roth T, Dement WC, eds. *Principles and Practice of Sleep Medicine*. 3rd ed. Philadelphia, Pa: WB Saunders Co; 2000:827-839
- Walters AS. Toward a better definition of the restless legs syndrome: the International Restless Legs Syndrome Study Group. *Mov Disord* 1995;10:634-642
- Coleman RM, Pollak CP, Weitzman ED. Periodic movements in sleep (nocturnal myoclonus): relation to sleep disorders. *Ann Neurol* 1980;8:416-421
- Morin CM, Hauri PJ, Espie CA, et al. Nonpharmacologic treatment of chronic insomnia: an American Academy of Sleep Medicine review. *Sleep* 1999;22:1134-1156
- Buyse DJ, Young T, Edinger JD, et al. Clinicians' use of the International Classification of Sleep Disorders: results of a national survey. *Sleep* 2003;26:48-51
- Benca RM. Consequences of insomnia and its therapies. *J Clin Psychiatry* 2001;62(suppl 10):33-38
- Benca RM, Ancoli-Israel S, Moldofsky H. Special considerations in insomnia diagnosis and management: depressed, elderly, and chronic pain populations. *J Clin Psychiatry* 2004;65(suppl 8):26-35
- Association of Sleep Disorders Centers and the Association for the Psychophysiological Study of Sleep. *Diagnostic Classification of Sleep and Arousal Disorders*, 1st ed. *Sleep* 1979;2:1-154
- World Health Organization. *ICD-9-CM: Manual of the International Classification of Diseases, Ninth Revision, Clinical Modification*. Geneva, Switzerland: World Health Organization; 1998
- World Health Organization. *International Statistical Classification of Diseases and Related Health Problems, Tenth Revision (ICD-10)*, 1. Geneva, Switzerland: World Health Organization; 1992
- American Psychiatric Association. *Diagnostic and Statistical Manual of Mental Disorders, Third Edition, Revised*. Washington, DC: American Psychiatric Association; 1987
- American Psychiatric Association. *Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition*. Washington, DC: American Psychiatric Association; 1994
- Diagnostic Classification Steering Committee. *International Classification of Sleep Disorders (ICSD): Diagnostic and Coding Manual*. Rochester, Minn: American Sleep Disorders Association; 1990
- Diagnostic Classification Steering Committee. *International Classification of Sleep Disorders (ICSD-R): Diagnostic and Coding Manual*. Rev ed. Rochester, Minn: American Sleep Disorders Association; 1997
- Schramm E, Hohagen F, Grasshoff U, et al. Test-retest reliability and validity of the Structured Interview for Sleep Disorders according to DSM-III-R. *Am J Psychiatry* 1993;150:867-872
- Buyse DJ, Reynolds CF III, Kupfer DJ, et al. Clinical diagnoses in 216 insomnia patients using the International Classification of Sleep Disorders (ICSD), DSM-IV and ICD-10 categories: a report from the APA/NIMH DSM-IV field trial. *Sleep* 1994;17:630-637
- Hauri PJ. A cluster analysis of insomnia. *Sleep* 1983;6:326-338
- Edinger JD, Fins AI, Goeke JM, et al. The empirical identification of insomnia subtypes: a cluster analytic approach. *Sleep* 1996;19:398-411
- Nowell PD, Buyse DJ, Reynolds CF III, et al. Clinical factors contributing to the differential diagnosis of primary insomnia and insomnia related to mental disorders. *Am J Psychiatry* 1997;154:1412-1416
- Ohayon MM, Roberts RE. Comparability of sleep disorders diagnoses using DSM-IV and ICSD classifications with adolescents. *Sleep* 2001;24:920-925
- Buyse DJ, Reynolds CF III, Kupfer DJ, et al. Effects of diagnosis on treatment recommendations in chronic insomnia: a report from the APA/NIMH DSM-IV field trial. *Sleep* 1997;20:542-552