Assessing Sleep Disorders in the Asian Client

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Introduction

Sleep disorders are highly prevalent, affecting approximately one-third of the population based on epidemiology studies (Partinen & Hublin, 2011). Sleep disorders are commonly seen in various health-care settings, such as primary care, sleep clinics, and mental health facilities. Proper diagnosis of sleep disorders can help guide clinical care, especially as effective treatments for sleep disorders become more widely available. Additionally, considering that sleep disorders are often comorbid with other physical and mental disorders, implementing adjunctive sleep treatment may enhance treatment for a comorbid physical or psychiatric illness.

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The most widely studied sleep disorders that are comorbid with psychiatric disorders include insomnia, obstructive sleep apnea (OSA), and narcolepsy. While Asian-Americans are one of the fastest-growing minority groups in the USA, there have been very few studies examining sleep disorders specifically in Asian-American populations. Thus, the main objective of this chapter is to provide a comprehensive overview of various sleep disorders, provide prevalence rates in Asian-Americans if available, introduce subjective and objective assessment tools in diagnosing sleep disorders, and discuss cultural considerations associated with Asian-Americans for various sleep disorders.

Among the different sleep disorders, the current chapter focuses primarily on insomnia, OSA, and narcolepsy. Because very few studies have investigated sleep disorders with Asian-American populations, studies that have been conducted in the countries of origin are also discussed to provide a wider framework of understanding.

Insomnia

Description and Prevalence

Insomnia is the most common sleep disorder that psychologists encounter and diagnose. Insomnia is characterized by a combination of nocturnal and diurnal symptoms and is recognized as an independent disorder in all diagnostic classification systems. The two most widely used diagnostic classification systems are the

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International Classification of Sleep Disorders, 2nd edition (ICSD) and Diagnostic and Statistical Manual for Mental Disorders, 4th edition (DSM-IV). Both classification systems include diagnostic criteria of insomnia as having both nocturnal symptoms (i.e., difficulty initiating or maintaining sleep, early morning awakenings, or nonrestorative sleep) and diurnal symptoms characterized by impairment of daytime functioning (i.e., difficulties with memory or concentration that are related to sleep difficulty) as well as marked distress due to sleep disturbance.

The Diagnostic and Statistical Manual for Mental Disorders, 5th edition (DSM-5) is scheduled to be published in 2012, and the DSM-5 sleep advisory committee on sleep nosology has proposed changing primary insomnia disorder to a single diagnosis of insomnia disorder with use of specifiers for clinical comorbidities (see Table 21.1). This moves away from more established notions of "secondary" versus "primary" insomnia and also moves away from causal attribution. The proposed diagnosis of insomnia disorder based on the new DSM-5 criteria also includes the presence of sleep disturbance for at least 3 nights a week, for at least 3 months

Epidemiologic studies indicate that the prevalence of insomnia disorder in the USA is between 6 and 10 % (Ford & Kamerow, 1989; Ohayon, 2002) and based on population surveys, approximately 30 % of Americans report experiencing at least one insomnia symptom (Ancoli-Israel & Roth, 1999). In Asian countries, insomnia symptoms have been shown to be present in approximately 17 % of the Korean population, with 5 % meeting criteria for insomnia disorder, which is comparable with Western countries (Ohayon & Hong, 2002).

Table 21.1 Proposed changes for diagnosing insomnia in DSM-5

(A)	The predominant complaint is dissatisfaction with sleep quantity or quality. In children or the elderly, the complaint may be made by a caregiver or family member.
(B)	Report of one or more of the following symptoms:
	1. Difficulty initiating sleep. In children, this may be manifested as difficulty initiating sleep without caregiver intervention.
	2. Difficulty maintaining sleep, characterized by frequent awakenings or problems returning to sleep after awakenings. In children this may be manifested as difficulty returning to sleep without caregiver intervention.
	3. Early-morning awakening with inability to return to sleep.
	4. Non-restorative sleep.
	5. In children, prolonged resistance to going to bed and/or bedtime struggles.
(C)	The sleep complaint is accompanied by significant distress or impairment in daytime functioning as indicated by the report of at least one of the following:
	1. Fatigue or low energy.
	2. Cognitive impairment (e.g., attention, concentration, memory).
	3. Mood disturbance (e.g., irritability, dysphoria).
	4. Behavioral problems (e.g., hyperactivity, impulsivity, aggression).
	5. Impaired occupational or academic functioning.
	6. Impaired interpersonal/social functioning.
	7. Negative impact on caregiver or family functioning (e.g., fatigue, sleepiness)
(D)	The sleep difficulty occurs at least 3 nights per week.
(E)	The sleep difficulty is present for at least 3 months.
(F)	The sleep difficulty occurs despite adequate opportunity for sleep.

Risk Factors and Psychiatric Comorbidity

Risk factors for insomnia can be divided into static risk factors and modifiable risk factors. Static risk factors include gender, age, ethnicity, and genetics. Women are far more likely to be diagnosed with insomnia than men. This has been attributed to fluctuating hormone levels that may predispose women to have a higher prevalence of mental disorders than men (Seeman, 1997). Additionally, women report higher incidence during certain junctures in life, especially during pregnancy and when entering menopause (Kravitz et al., 2008; Mindell & Jacobson, 2000; NIH, 2005; Seron-Ferre, Ducsay, & Valenzuela, 1993; Steiger, 2007). Other psychological factors, such as difference in coping styles, higher likelihood of rumination, and more frequent exposure to stressful events may predispose or perpetuate insomnia in women.

Age has also been shown to be a significant risk factor for insomnia. One meta-analysis (Lichstein, Durrence, Ridel, & Bush, 2004; Lichstein, Taylor, McCrae, & Ruiter, 2011) indicated that over 60 % of studies found heightened risk of insomnia with older age. However, other studies have found that after controlling for comorbid factors such as physical illness, age no longer remains a significant risk. Both ethnicity and genetics have been indicated to be a risk factor for insomnia. There has been scarce research on genetics, but heritability estimates range from 20 to 40 % based on twin studies (Lichstein et al., 2011).

Modifiable risk factors for insomnia include hyperarousal, stress and life events, medical comorbidities, and psychiatric comorbidities. Many of the modifiable risk factors are targets for behavioral treatment of insomnia. Insomnia has long been considered to be associated with hyperarousal states, and studies have suggested that activation of the hypothalamic–pituitary–adrenal axis may contribute to the development of insomnia (Richardson, 2007). Additionally, the combination of having a predisposition towards hyperarousal (i.e., anxiety) and stressful life events increases the likelihood of developing a sleep disturbance after a stressful event.

Both medical and psychiatric illnesses increase risk of developing insomnia. Medical conditions such as chronic pain, cancer, and HIV status have a twofold to threefold risk of subsequently developing insomnia (Blazer, Hays, & Foley, 1995). Among psychiatric disorders, depression has been shown to be a stable risk factor for insomnia, with odds ratios ranging from 1.4 to 8.6 (Foley, Monjan, Izmirlian, Hays, & Blazer, 1999; Foley, Monjan, Simonsick, Wallace, & Blazer, 1999). While there have not been many longitudinal studies investigating the bidirectional relationship between insomnia and other psychiatric disorders, considering that insomnia is a symptom of most psychiatric disorders, it raises the possibility that these disorders may also be risk factors for developing insomnia.

Assessment Tools

1. The Clinical Interview

The first step to diagnosing insomnia usually starts with a clinical interview. The clinical interview should provide comprehensive information about nighttime symptoms (e.g., current sleep patterns, difficulty initiating or maintaining sleep), daytime symptoms (i.e., impact of sleep disturbance on daytime functioning), and etiological or comorbid conditions that contribute to the sleep disturbance. A clinical interview typically covers three broad domains: (a) the patient's current sleep patterns and daytime functioning, (b) history and developmental course, and (c) comorbid psychiatric or medical conditions.

Current sleep patterns and daytime functioning: A review of the patient's current sleep patterns typically involves the patient recalling his/her sleep schedule for the past 1–2 weeks. Completing sleep diaries prior to the initial clinical interview may help the clinician analyze the patient's current sleep patterns and derive sleep indices (i.e., average total sleep time, sleep onset latency) that are frequent targets for behavioral treatments for insomnia. At the minimum, the clinician should inquire about average total sleep time, time spent in bed, sleep onset latency, time spent awake in the middle of the night, and early morning awakenings. Additionally, some patients will report night-to-night variability in insomnia symptoms, as well as weekday–weekend variability in sleep schedules, so it is important to obtain at a minimum 1 week of sleep schedule data.

In addition to sleep patterns, the impact of sleep disturbance on daytime functioning should also be assessed. This can include irritability, changes in mood, difficulties with attention or concentration, reduction in social or physical activities, and preoccupation with sleep-related cognitions. Other compensatory behaviors, such as taking sleep medication, excessive caffeine intake, or taking prolonged daytime naps should also be assessed.

History and developmental course: Obtaining a history of insomnia can be helpful in understanding etiological features, as well as the presence of comorbid conditions, and making differential diagnosis. The 3-P model introduced by Spielman and Glovinsky (1991) provides a diathesis-stress framework for understanding the insomnia patient's history. This model proposes that predisposing, precipitating, and perpetuating factors are involved in the development and maintenance of insomnia disorder.

Predisposing factors include familial vulnerability to insomnia, or proneness to anxiety that increase one's risk of developing insomnia. A predisposing factor that is often overlooked in the assessment of insomnia is the patient's chronotype. A person's chronotype is determined by the patient's circadian rhythm, defined by oscillations of some indicator (such as core body temperature or blood pressure), with one complete oscillation occurring approximately every 24 h. A person's chronotype determines when a person's sleep propensity is the strongest. The terms *morningness* and *eveningness* are used to distinguish people who endorse extreme diurnal preferences. *Morningness* refers to those who show preferences for daytime activity. Individuals with strong morningness tendencies report peak performance and alertness in the early-morning hours. The opposite is true for those who show *eveningness,* or preferences for nighttime activities. Those with strong eveningness tendency report heightened alertness and peak performance during the evening hours.

Chronotype varies for each individual, and it is common for individuals with strong morning or evening tendency to develop insomnia, due to a misalignment in their circadian rhythm and imposed sleep–wake schedule due to social restraints. A patient's chronotype can be determined by asking a patient about their preferred sleep–wake schedules on an unrestrained schedule without work or social obligations.

Predisposing factors alone do not cause insomnia, and precipitating factors such as stressful life events (e.g., losing a job or death in the family) may cause acute insomnia. The sleep disturbance in acute insomnia is usually a normal response to a stressor. In response to acute insomnia, perpetuating factors may contribute to the maintenance of insomnia. These include cognitive and behavioral reactions to the sleep disturbance, such as preoccupation with the need for sleep, increasing time spent in bed, rumination about the consequences of poor sleep, using alcohol as a sleep aid, and misuse of sleep medication.

Comorbid sleep, psychiatric or medical conditions: An assessment of comorbid conditions is necessary in understanding the relationship between insomnia and the comorbid disorder. Comorbid sleep disorders, or other psychiatric and/or medical illnesses, may contribute to the development and severity of insomnia. Common comorbid sleep disorders with insomnia include OSA, restless leg syndrome, periodic limb movement disorder, and narcolepsy. It is also important to review the presence of medical disorders and medications that the patient is currently taking. Common medical disorders that are associated with insomnia include chronic pain, hyperthyroidism, cancer, and HIV. Medications such as steroids, stimulants, and beta-agonist drugs may also contribute to insomnia.

Assessment of psychiatric disorders is also important, considering that insomnia is a symptom of many psychiatric disorders including unipolar depression, bipolar disorder, generalized anxiety disorder, and post-traumatic stress disorder (PTSD). Among all the psychiatric disorders, depression has been shown to be the most strongly associated with insomnia, with early morning awakenings frequently being a sign of the onset of depression. Sleep disturbance has also been found to be associated with suicidal ideation, and thus, a thorough suicide risk assessment is necessary if a patient is severely depressed and reporting suicidal ideation (Bernert, Joiner, Cukrowicz, Schmidt, & Krakow, 2005; Bjorngaard, Bjerkeset, Romundstad, & Gunnell, 2011; Singareddy & Balon, 2001).

2. Self-report Questionnaires

The most commonly used measures for diagnosing insomnia include the Insomnia Severity Index (ISI; Bastien, Vallieres, & Morin, 2001) and

the Pittsburgh Sleep Quality Index (PSQI; Buysse, Reynolds, Monk, Berman, & Kupfer, 1989). The ISI consists of seven items that assesses the degree of subjective symptoms of insomnia during the past 2 weeks on a five-point Likert scale, with scores ranging from 0 to 28. A higher score reflects greater insomnia severity. Guidelines for interpreting the total scores are as follows: Scores 0–7 reflect no significant insomnia, scores 8–14 reflect subthreshold insomnia, scores 15–21 reflect moderate insomnia, and scores 22–28 reflect severe insomnia. Scores higher than 14 are consistent with insomnia disorder. The ISI is used widely in both research and clinical settings, and is brief and easy to administer.

The PSQI is a self-report questionnaire assessing sleep quality and disturbances over the past month. The scale yields a total score that ranges from 0 to 21, with higher scores indicating more difficulties with sleep. The scale has good diagnostic sensitivity and specificity, and a score greater than 5 has been established as an optimal cutoff point to differentiate poor sleepers from good sleepers (Backhaus, Junghanns, Broocks, Riemann, & Hohagen, 2002). The questionnaire also has seven subscales including subjective sleep quality, sleep latency, sleep duration, habitual sleep efficiency, sleep disturbances, use of sleeping medications, and daytime dysfunction.

Other supplementary questionnaires are frequently used to assess features of insomnia, such as levels of hyperarousal, maladaptive beliefs about sleep, circadian preference, and sleep hygiene. Hyperarousal is common in insomnia patients, defined as heightened or conditioned arousal state in association with sleep (i.e., worrying about sleep, having intrusive thoughts at bedtime). The most frequently used questionnaires to assess for hyperarousal levels is the Hyperarousal Scale (HS; Pavlova et al., 2001) and Presleep arousal scale (PSAS; Nicassio, Mendlowitz, Fussell, & Petras, 1985). The HS consists of 26 items that assess the level of hyperarousal in individuals. The HAS can identify those with high levels of hyperarousal using an extreme score (number of items checked "extremely") and an introspective score (sum of six scores measuring introspectiveness) and a react score (sum of three items measuring reactivity). The PSAS consists of 16 items assessing both cognitive ("worrying about falling asleep") and somatic ("heart racing") arousal of insomnia patients. Patients are asked to rate symptoms reflecting hyperarousal during the time prior to sleeping on a five-point Likert scale. It is common to use the PSAS daily with a sleep diary to monitor hyperarousal states. There are currently no known cutoff scores for identifying pathological levels of hyperarousal in insomnia patients.

Another common feature of insomnia patients are maladaptive beliefs about sleep. The Dysfunctional Beliefs and Attitudes Scale (DBAS; Morin, Stone, Trinkle, Mercer, & Remsberg, 1993) consists of 30 items reflecting common dysfunctional beliefs about sleep. Higher scores on this scale reflect higher levels of maladaptive beliefs about sleep, and are later targeted during cognitive therapy to treat insomnia. The original version of the questionnaire consists of five subscales: (1) dysfunctional beliefs about the consequences of insomnia; (2) beliefs that sleep is unpredictable and uncontrollable; (3) unrealistic sleep expectations; (4) misconceptions about the causes of insomnia; and (5) erroneous beliefs about sleep-promoting habits. Recently, there have been two abbreviated versions with 10 items (DBAS-10) and 16 items (DBAS-16), and both have been reported to have adequate psychometric properties (Edinger & Wohlgemuth, 2001; Espie, Inglis, Harvey, & Tessier, 2000).

Chronotypes or circadian rhythms influence an individual's sleep schedule, and often a misalignment of work schedules and natural circadian rhythms may be an etiological feature of insomnia. The Horne–Östberg Morningness–Eveningness Questionnaire (MEQ; Horne & Ostberg, 1976) consists of 19 items reflecting questions about circadian preference, including daytime and nighttime activities, sleep exercise, mental activity, and alertness. The MEQ produces scores on a morningness–eveningness continuum (scores ranging from 16 to 86). Individuals can be classified into morning types (M-type; scores 59–86), neither type (N-type; scores

42–58), and evening types (E-type; scores 16–41). The MEQ demonstrates high correlations with physiological measurements of circadian rhythms (Kerkhof & Van Dongen, 1996; Lack & Bailey, 1994).

3. Polysomnography

An overnight polysomnography (PSG) is not necessary in the diagnosis of insomnia, but is often used to rule out other sleep disorders, especially sleep-disordered breathing (Kushida et al., 2005). Traditionally, diagnostic PSG is conducted in a sleep laboratory, but studies have found night-to-night variability of sleep recordings and first-night effects that produce sleep disturbance may interfere with obtaining an accurate recording of the patient's sleep. Recently, portable home monitoring PSG has been developed to avoid the first-night effect (Edinger et al., 1997).

A subgroup of insomnia patients have a tendency towards sleep misperception, which is often called paradoxical insomnia. Specifically, these patients have a discrepancy between their subjectively perceived sleep and objective sleep (typically measured by PSG). Past studies have indicated that many insomnia patients have the propensity to underestimate the amount of sleep they got, and research has also linked this to neurobiological dysfunction, including elevated levels of global cerebral metabolism during sleep, cortical arousal, and cerebral response to increasing task demands (Drummond, Meloy, Yanagi, Orff, & Brown, 2005; Nofzinger et al., 2004; Perlis, Giles, Mendelson, Bootzin, & Wyatt, 1997). If a patient consistently reports very little sleep each night without accompanied daytime impairment, it may be useful for the patient to undergo PSG to assess for sleep misperception.

4. Sleep Diaries

Sleep diaries are the essential self-reporting tool for diagnosing insomnia, and are considered the gold standard for the subjective assessment of insomnia (Carney et al., 2012). It is recommended that at least 2 weeks of sleep diary information is obtained for a baseline assessment of insomnia. The content of the sleep diaries should include the following sleep parameters: sleep onset latency (SOL), amount of time spent awake after sleep onset (WASO), total time actual spent in bed (TIB), early morning awakenings, lights on/off, and total amount of actual sleep (TST). Sleep efficiency (SE), often used as a treatment outcome indicator, can be calculated as $\text{TST/TIB} \times 100$. Information on the type and timing of sleep medication can also be included in the sleep diary, in addition to subjective ratings of sleep quality, and daytime sleepiness and fatigue levels. There is also often a section for notes and comments that can be used to elaborate on unusual circumstances that affected the patient's sleep schedule.

Information derived from the sleep diary can also be helpful in identifying night-to-night variability in a patient's sleep patterns, such as weekday–weekend variability. Some patients may exaggerate the severity of sleep disturbance across the week based on a few nights of poor sleep. Sleep diaries can also help guide treatment by challenging the patient's beliefs about sleep in thinking that a bad night of sleep will directly affect the patient's daytime consequences.

5. Actigraphy

Actigraphy is a wristwatch size device that contains an accelerometer which monitors the degree of motion to differentiate between wakefulness and sleep. Compared to PSG, which is based on multiple channels of information (EEG, EMG, EOG), actigraphy determines sleep and wakefulness states solely based on the occurrence and degree of motion. Research has indicated that there is acceptable agreement between actigraphy-derived estimates of sleep parameters and PSG (Tryon, 2004). Actigraphy is also frequently used to detect change in sleep for a patient who is in treatment. The main advantage of actigraphy-based measures is that it allows recording of sleep–wake data for long periods of time in the patient's natural sleep environment. While actigraphy is not recommended for diagnosing insomnia, it is often useful for evaluating specific aspects of insomnia, and also used along with sleep diaries for accurate sleep schedule information.

Cultural Considerations

A common feature in Asian cultures, especially Korean and Chinese, is the somatization of

emotional distress. In many Asian cultures, negative emotions such as anxiety, depression, or other psychological problems are rarely expressed, and mental illness is usually stigmatized (Kim & Rhi, 1976). This is rooted in traditional Chinese medicine, which is characterized by an "unwillingness to differentiate between psychological and physiologic functions" (Lin, 1980). Thus, it is common for a patient who is suffering from emotional distress to express his/her difficulties through physical complaints. It has been suggested that people from Asian cultures who conceptualize their health based on solely their physical health are less likely to express their psychological states and have very poor skills in communicating their emotional states (Kleinman, 1980).

Several culture-bound syndromes that are indicated in the DSM-IV-TR highlight this issue, and sleep disturbance or insomnia is a frequent physical complaint of these conditions. One example is *hwa-byung*, a culture-bound syndrome found specifically in the Korean culture, especially in Korean women who are brought up to suppress their emotions and be submissive based on traditional Confucian values. The direct translation of *hwa-byung* is "fire-illness" or "anger syndrome" and it is associated with suppressed anger manifesting in psychosomatic symptoms. Insomnia is known to be one of the main symptoms of *hwa-byung* and also provides a way of conceptualizing and resolving emotional distress through somatic complaints in Korean elderly immigrant women (Pang, 1990). It is common for Koreans to have physical complaints rather than psychological or mental complaints when they are expressing emotional distress (Kleinman, 1980; Lock, 1980).

Another culture-bound syndrome that is frequently seen in China is called *shenjing shuairuo* ("neurasthenia" or "weakness of nerves"). *Shenjing shuairuo* is characterized by various somatic and psychological complaints including fatigue or weakness, poor concentration, memory loss, irritability, and sleep disturbance. Studies on *shenjing shuairuo* and its similarities to diagnoses in the ICD-10 highlight that it is most similar to both somatoform and anxiety disorders. Similarly, *Shen-k'uei* (Taiwan) or *Shenkui* (China) is also a culture-bound syndrome that is characterized by somatic complaints such as dizziness, fatigue, general weakness, and insomnia, for which no physical cause can be found. *Shen-k'uei* is usually accompanied by marked anxiety or panic symptoms, and patients with this syndrome attribute their symptoms to excessive semen loss, which is feared to drain one of their vital essence and is perceived as being life-threatening.

Thus, when seeing an Asian-American patient who is complaining of insomnia,, especially from Korean or Chinese cultures, it may be important to assess for deeper underlying issues of emotional distress and suppressed anger, and thus, a more thorough evaluation of comorbid psychological illnesses is important.

Another issue relevant to Asian-Americans in the assessment of insomnia is comorbid PTSD, especially in Southeast Asian refugees who have immigrated to the USA to escape political turmoil. The impact of traumatic events tend to be lifelong in these refugees, and it puts them at high risk for a wide variety of mental illnesses, especially PTSD. For example, research has shown that over 90 % of Cambodian refugees who immigrated to the USA who experienced traumatic events during the 4 years of Pol Pot's regime prior to coming to America were found to meet criteria for PTSD (Rhee, 2009). It is important to assess for comorbid PTSD among Southeast Asian immigrants who were refugees prior to coming to the USA, as sleep disturbance is a common symptom of PTSD and is often characterized by vivid nightmares in PTSD patients. Implementing adjunctive psychological treatment with treatment for insomnia or nightmares (imagery rehearsal therapy) may increase the effectiveness in the treatment of the underlying illness.

Obstructive Sleep Apnea

Description and Prevalence

OSA is a disorder characterized by repeated episodes of partial or complete upper airway obstruction during sleep. Individuals diagnosed

Table 21.2 Characteristics of obstructive sleep apnea (OSA)

1. Overnight polysomnography (PSG) (Recommended by the AASM guideline[a])
   (A) Apnea severity is observed by the *apnea–hypopnea index (AHI)*, the count of apneas and hypopneas per hour of sleep
      - *Apnea*: complete or near cessation of airflow for at least 10 s with or without the presence of associated oxygen desaturation or sleep fragmentation
      - *Hypopnea*: at least 30 % reduction in airflow reduction from the baseline that is accompanied by at least a 4 % drop in oxygen saturation (SaO2).
         – (Alternatively) at least 50 % reduction in oronasal airflow associated with a decreased oxyhemoglobin saturation or an EEG arousal.

   (B) Classification of OSA Severity:
      - AHI <5 ("No OSA"),
      - 5 ≤ AHI < 15 ("Mild OSA"),
      - 15 ≤ AHI < 30 ("Moderate OSA"),
      - AHI ≥ 30 ("Severe OSA")
2. Physical examination / symptoms:
   (A) Nighttime symptoms:
      - Prominent snoring
      - Witnessed apneas or gasping

   (B) Daytime symptoms:
      - Daytime sleepiness
      - Mood or affective disturbance

[a]American Academy of Sleep Medicine Task Force, 2007

with OSA often experience loud snoring, witnessed breathing interruptions, awakenings resulting from gasping or choking, and excessive daytime sleepiness (EDS). As part of sleep-disordered breathing (SDB), OSA is among the most common class of disorders diagnosed in the sleep centers all across the USA, and is known to account for about 70 % of all patients evaluated in sleep clinics (Punjabi et al., 2000) (Table 21.2).

OSA is known to be prevalent in 24 % of men and 9 % of women in the general population, when defined by the diagnostic criteria of an Apnea–Hypopnea Index (AHI) > 5. When distinguished further by accompanying symptoms, such as daytime sleepiness, 4 % of men and 2 % of women are presented with OSA (Cao & Kushida 2011). Only one previous study has looked at OSA prevalence in Asian-Americans, reporting that OSA was prevalent in 3.81 % of the Asian-American population, a rate lower compared to other races (Stein et al., 2011). However, the rate of snoring was found to be similar between Asian-Americans and Caucasians (O'Connor et al. 2003). On the other hand, large prevalence studies focused on the Asian countries (i.e., Hong Kong, Korea, and India) reported the prevalence of OSA is comparable to those of Caucasian studies using similar methodological designs and definitions (Bixler et al., 2001; Duran et al., 2001; Gislason et al., 1988; Ip et al., 2001; Kim et al., 2004; Udwadia et al., 2004).

Risk factors and Psychiatric Comorbidity: There are several well-known risk factors of OSA which may provide critical evidence for the presence of the disease. One of the strongest risk factors is old age (age 65 and older). The prevalence of OSA increases with age in Asian populations, similar to Western countries (Ong & Clerk, 1988). Male gender is also a well-known risk factor for OSA. The fact that android-type obesity (fat deposition mainly in the neck and abdomen) is more dominantly seen in men may explain this gender predominance for OSA. Women are at greater risk for OSA in presence of obesity during the postmenopausal state. Craniofacial structural factors are established risk factors for OSA, and it has been reported that Asians are predisposed to a higher severity of OSA due to craniofacial skeletal features that contribute to development of OSA (Li et al., 2000; Ong & Clerk, 1988). Abnormal cranial features may be good indicators for detecting OSA in nonobese Asian patients (Lam et al. 2007).

Body-mass index (BMI) is a good indicator for obesity, and also has good sensitivity and specificity for predicting OSA (Tsai et al., 2003). A positive correlation between BMI and OSA has been also reported in the population-based studies of Asian countries, but when comparing Asian patients to Caucasian patients, obesity is suggested to be a less significant risk factor for OSA in the Asian race. There seems to be a notable difference between the percentage of obesity in Asian and Caucasian OSA patients (Li et al., 2000), and BMI is significantly lower in this

group compared to Caucasian patients when age, sex, and disease severity were controlled (Genta et al., 2008; Li et al., 2000)

Psychiatric symptoms or disorders are commonly presented with OSA, and they may be controlled with treatment of OSA (Millman et al., 1989). Research has shown that more than half of OSA patients have comorbid psychiatric symptoms such as depression (21.8 %), anxiety (16.7 %), and bipolar disorder (3.3 %), and female patients had higher prevalence of psychiatric problems than male patients (DeZee et al., 2005; Dursunoglu et al., 2009; Uyar et al., 2011). This association may be explained by common neurobiological risk factors share by OSA and affective disorders, especially on the neurotransmitter level; for example, serotonin reuptake inhibitors (SSRI), commonly prescribed as a medication for depression, is suggested to improve OSA (Schroder & O'Hara, 2005). Sleep fragmentation and hypoxemia in OSA could also cause metabolic impairment and result in depressive symptoms (Kamba et al., 1997). The relationship between OSA and depression is complex, and thus, information on a patient's sleep schedule should be evaluated when assessing for depressive disorders.

Assessment Tools

1. Clinical Interview

While an overnight PSG study is required to confirm the diagnosis of OSA, it is typical for the clinician (physician or clinical psychologist) to conduct a clinical interview and physical examination to assess for risk factors and symptoms suspicious of OSA prior to the overnight sleep study. Patients are often not aware of their symptoms, and thus, it is important to obtain this information from someone who has observed the patient's sleep habits.

Nighttime Symptoms: A typical characteristic of OSA is loud snoring or brief gasps alternating with nocturnal snorting and gasping. Loud and disruptive snoring accompanied by apneic events or choking is commonly observed by bed partners of OSA patients (Guilleminault et al., 1976; Hoffstein & Szalai, 1993; Kales et al., 1985), but most OSA patients are unaware of their symptoms, and the absence of this symptom does not exclude the possibility of having the disorder. Dry mouth and thirst upon waking up in the morning are reported by a majority of patients with OSA (Kales et al., 1985).

Daytime Symptoms: Sleep fragmentation and poor sleep quality are well-known consequences of abnormal breathing events in OSA, and they are often presented as EDS and fatigue (Hoffstein & Szalai, 1993; Kales et al., 1985; Marin et al., 2005). Patients with OSA commonly report drowsiness or napping during the daytime, and these symptoms can result in catastrophic consequences such as motor vehicle accidents (George et al., 1987; Ip et al., 2001; Tufik et al., 2010). It is essential to inquire about the presence and level of sleepiness while driving a motor vehicle or operating machines if a clinician suspects a patient has OSA.

Research has shown that cognitive dysfunction is a common consequence of OSA, and many complaints of problems in concentration, attention, memory, or judgment (Redline et al., 1997). Specific neurocognitive tests that involve the prefrontal cortex have been shown to be impaired in OSA patients, which may be a result of sleepiness. Studies of the psychomotor vigilance task (PVT), a task sensitive to sleep loss and sleepiness, also revealed that OSA patients showed slower reaction time and more lapses as compared to individuals without OSA (Kim et al., 2007). Most patients appear to show improved performance with treatment (e.g., nasal continuous positive airway pressure (CPAP) treatment), but it has been suggested that there may be specific genetic susceptibilities (i.e., ApoE-e4 gene) that could contribute to persistent neurobehavioral deficits in OSA (O'Hara et al., 2005).

During the clinical interview, information on a decreased sex drive, change in mood, nocturnal heartburn, and a history of hypertension should also be noted, because these are symptoms commonly related with OSA. Craniofacial structures,

such as having a short, thick neck, a short lower jaw, or receding chin, and a large tongue, may also indicate that the patient is vulnerable to developing OSA (Cartwright, 2001).

2. Self-report Questionnaires

The Berlin questionnaire is a simple questionnaire that consists of three categories measuring the risk of having OSA (Netzer et al., 1999). The patient can be categorized into High Risk or Low Risk depending on their responses to questions related to (1) snoring behavior, (2) daytime sleepiness, and (3) obesity and hypertension, and positive responses to at least two categories indicate a high likelihood of exhibiting OSA. This questionnaire has been demonstrated to predict a RDI > 5 with sensitivity of 0.86 and specificity of 0.77 and is widely used in primary care settings (Heistand et al., 2006).

Another self-report questionnaire that is frequently used in detecting EDS is the Epworth Sleepiness Scale (ESS; see Narcolepsy section below for detailed description). In the OSA population, the ESS cutoff is greater than 10 for detecting EDS (Johns, 1991).

3. Polysomnography

According to the International Classification of Sleep Disorders (ICSD), a diagnosis of OSA requires evidence-based data from a PSG study (AASM). The scoring guidelines provided by the American Academy of Sleep Medicine (AASM) recommends scoring obstructive hypopneas based on the number of abnormal breathing events during nocturnal sleep, namely, an AHI, which reflects the count of apneas and hypopneas per hour of sleep. Clinically, OSA is defined by the presence of at least five obstructive respiratory events per hour of sleep (Cao et al., 2011). The severity of OSA is usually defined by AHI <5 (no OSA), $5 \leq$ AHI < 15 (mild OSA), $15 \leq$ AHI < 30 (moderate OSA), and AHI ≥ 30 (severe OSA), but respiratory disturbance index (RDI; the count of apneas and hypopneas) plus respiratory effort-related arousals (RERAs) per hour of sleep, can also be used interchangeably due to the variability of measurement outcome (Cao et al., 2011). AHI is also most commonly used to evaluate OSA in children, and OSA is defined as AHI >1, according to the criteria of the AASM (AASM, 2005).

Pediatric OSA

Diagnosis of OSA in children is made on the basis of a thorough evaluation of sleep history, physical examination, and PSG data (AASM, 2005). Parental complaint about their children's sleep is a critical factor of identifying OSA, and hyperactivity or attention deficits are also notable clinical features of OSA in children. Displays of EDS or frequent napping could also provide major evidence for detecting sleep problems in older children.

Cultural Considerations in OSA patients

In the Asian-American population, a higher level of acculturation is known to be associated with higher BMI and elevated rates of obesity (Frisbie et al., 2001), which reflects adoption of an American lifestyle such as physical inactivity and diet consisting of high-fat and calorie-dense food (Cho & Juon, 2006; Kandula & Lauderdale, 2005). This trend in obesity indicates the possibility of increased risk of OSA in Asians who were born in the USA or immigrants who resided in the USA for a long duration, although no previous study has focused on this particular topic.

Previously, OSA has been reported to be under-recognized in Asian-American communities, with low BMI being one factor that most strongly associated with low rate of recognition (Kapur et al., 2002). Considering that Asian patients have lower BMI compared to other ethnic groups, it is possible that OSA in Asian-Americans is largely under-recognized in comparison to other ethnicities; most patients presented in sleep clinics are obese, but this may be due to high rate of suspicion for having OSA. Likewise, one study reported that the risk of OSA related to high BMI is greatly under-recognized in Japanese descendants as compared with Caucasian descendants (Genta et al., 2008). The fact that sleep medicine is relatively underdeveloped in many Asian countries may also affect Asian-American immigrants' awareness of OSA (Lam et al., 2007).

Narcolepsy

Description and Prevalence

Narcolepsy is characterized by the following symptoms: (a) *EDS*: It is characterized by pathological or inappropriate somnolence, and has been defined in the International Classification of Sleep Disorders, 2nd Edition (ICSD-2) as "the inability to stay awake and alert during the major waking episodes of the day, resulting in unintended lapses into drowsiness and sleep (American Academy of Sleep Medicine). Daytime sleepiness is the most disabling and frequent cause for consultation (Dauvilliers et al., 2001; Guilleminault et al., 1974; Overeem et al., 2001; Scammell, 2003). These sleep attacks are typically short, but refreshing. However, a single sleep attack is not enough to eliminate sleepiness in these patients. (b) *Cataplexy*: It is characterized by a reversible sudden drop of muscle tone triggered by emotional factors, most often by positive emotions such as laughter, pleasant surprise, or anger, but almost never by stress, fear, or physical effort (Overeem et al., 2001; Scammell, 2003; Thorpy, 2006). Awareness is preserved throughout the attacks. Although the attacks are abrupt, they usually take several seconds to reach their maximum, and lasts from several seconds to several minutes. Cataplexy is pathognomonic of narcolepsy, and found in 60–70 % of narcoleptic patients (Bassetti et al., 2003; Poirier, Montplaisir, Decary, Momege, & Lebrun, 1986). (c) *Hypnagogic or Hypnopompic Hallucinations*: Both hypnagogic and hypnopompic hallucinations are vivid dreamlike experiences that occur during the transition between wakefulness and sleep. Some patients report difficulty in differentiating dreams from reality and are occasionally misdiagnosed as schizophrenic. (d) *Sleep paralysis*: Sleep paralysis is the inability to move during the onset of sleep or on awakening, while patients are subjectively awake and conscious. It is usually of short duration but can at times last several minutes. (e) *Disrupted nocturnal sleep*: Approximately one-third of narcolepsy patients indicate they have no difficulty initiating sleep, but have more difficulty maintaining sleep after sleep onset (Table 21.3).

Table 21.3 Diagnostic criteria for narcolepsy with and without cataplexy

Criteria for narcolepsy
1. Excessive daytime sleepiness (EDS) occurring almost daily for at least 3 months.
2a. [*For Narcolepsy with cataplexy*] Definite history of cataplexy, defined as sudden and transient (less than 2 min) episodes of loss of muscle tone, generally bilateral, triggered by emotions (usually laughing and joking).
2b. [*For Narcolepsy without cataplexy*] Typical cataplexy is not present, although doubtful or atypical cataplexy-like episodes may be reported.
3. Diagnosis should, whenever possible, be confirmed by nocturnal PSG (with a minimum of 6 h sleep) followed by a daytime MSLT:
(a) Mean daytime sleep latency 8 min or shorter, with two or more sleep onset in REM periods (the time from sleep onset to REM sleep should be less than 15 min in at least two naps).
(b) Alternatively, hypocretin-1 concentrations in the cerebrospinal fluid 110 ng/mL or lower, or a third of mean control values.
4. Hypersomnia is not better explained by another sleep disorder, medical or neurological disorders, mental disorder, medication use, or substance use disorder.

PSG polysomnography, *MSLT* multiple sleep latency test, *REM* rapid eye movement

The prevalence of narcolepsy is usually about 25–50 per 100,000 (Longstreth, Koepsell, Ton, Hendrickson, & van Belle, 2007). According to the previous general population studies, prevalence rates of narcolepsy were 0.02–0.05 % in the US (Longstreth et al., 2009; Silber, Krahn, Olson, & Pankratz, 2002). Currently, there are no studies investigating the prevalence of narcolepsy in Asian-Americans, but population-based prevalence studies consisting of racially diverse ethnic groups suggest that Asian-Americans have lower prevalence of narcolepsy compared to African-Americans or Caucasians (Longstreth et al., 2009). However, prevalence in certain racial or ethnic groups requires further research.

Risk Factors and Psychiatric Comorbidity: Pathophysiological studies have shown that narcolepsy is caused by the early loss of neurons in the hypothalamus that produce hypocretin, a

wakefulness-associated neurotransmitter present in cerebrospinal fluid (CSF). The cause of neural loss could be autoimmune in nature since most patients have the HLA DQB1*0602 allele that predisposes individuals to the disorder (Dauvilliers, Arnulf, & Mignot, 2007).

Narcolepsy is highly comorbid with psychiatric disorders, especially depression and anxiety. The prevalence of depression in narcolepsy has been reported to be as high as 20–37 %, which has been attributed to be caused by the reaction to the disorder and its effects (Kales et al., 1982; Krishnan, 1984; Mosko, 1989; Sours, 1963; Vandeputte, 2003) However, a recent study has found that narcolepsy does not increase frequency of diagnosable depressive disorders when overlapping symptoms of narcolepsy and depression (i.e., sleep, fatigue) are excluded (Vourdas et al., 2002). Another study reported there may be higher frequency of depressive symptoms such as depressed mood, pathological guilt, crying, and anhedonia (Fortuyn, 2010).

High levels of anxiety have also been reported in narcolepsy patients, with 35 % of patients meeting criteria for anxiety disorder, compared to 3 % in the general population (Fortuyn, 2010). Elevated anxiety symptoms can partially be explained by perceived loss of self-control associated with the narcolepsy symptoms and vivid memories of daytime hallucinations.

Narcolepsy patients are often misdiagnosed as having schizophrenia, usually due to experiencing hypnagogic and hypnopompic hallucinations, which are observed in 30 % of narcolepsy patients. However, hallucinations in schizophrenic patients are distinctly different from hypnagogic and hypnopompic hallucinations observed in narcolepsy patients. Schizophrenic hallucinations are typically auditory, while hallucinations in narcolepsy patients are usually a combination of visual, auditory, as well as tactile experiences (Dahmen, Kasten, Mittag, & Muller, 2002).

Assessment Tools

1. Clinical Interview

A diagnosis of narcolepsy is based primarily on clinical symptoms, which are usually obtained during a diagnostic interview. Narcolepsy with cataplexy is based on EDS occurring daily for at least 3 months, and a history of cataplexy. The diagnosis of narcolepsy without cataplexy has the same criteria without typical cataplexy, although doubtful or atypical cataplexy-like episodes may be reported (AASM, 2005).

The most common causes of EDS can be differentiated by the sleep related histories. It is important to enquire about the patient's general sleep hygiene and other lifestyle issues that may have irregular sleep patterns and sleep deprivation. A sleep diary can also be helpful in making differential diagnoses.

2. Self-report Questionnaires

The subjective severity of daytime sleepiness can be quantified using scales such as the ESS and Stanford Sleepiness Scale (SSS) (Hoddes & Zarcone, 1972; Johns, 1991). The ESS is an 8-item questionnaire that measures the degree of sleepiness during the daytime (Johns, 1991) and is commonly used to evaluate the level of daytime sleepiness in narcolepsy patients. The ESS questionnaire requires subjects to rate the likelihood that they might doze off or fall asleep in eight different everyday situations. The sleepiness is scored from 0 to 3 points, where 3 represents a high likelihood of dozing or falling asleep. ESS scores of $\geq$15 are common in untreated narcolepsy patients (Johns, 1991) (Table 21.4).

The SSS was developed to quantify the subjective sleepiness of patients throughout the day. It is a 1–7 rating scale, and the patients are asked to pick one that best represents how they are feeling. While the ESS has been validated for narcolepsy, the SSS is not specific for narcolepsy.

The Pediatric Daytime Sleepiness Scale (PDSS), a validated scale, is more appropriate for use in children and teenagers between ages of 11 and 15 years (Drake et al., 2003). This is useful when considering largest incidence of narcolepsy is around 15 years. It was created to determine the relationship between daytime sleepiness and school performance, and now used as sleepiness measures, and score of 16 or higher is likely to be associated with a negative impact on daily functioning.

The Ullanlinna Narcolepsy Scale (UNS) consists of 11 narcolepsy and cataplexy related

Table 21.4 Self-report questionnaires for sleep disorders

Assessment name	Disorder assessed	Recommendation(s) and/or relevant research findings	May be used with	Available in
Insomnia Severity Index	Insomnia	Scores 0–7: no insomnia Scores 8–14: subthreshold Scores 15–21: moderate Scores 22–28: severe Cutoff score >14 found to be optimum cutoff for insomnia as a clinical disorder	Adults, adolescents	Korean Chinese Japanese
Pittsburgh Sleep Quality Index	Insomnia	Score >5 represents clinical insomnia Includes seven subscales: sleep latency, subjective sleep quality, sleep duration, habitual sleep efficiency, sleep disturbances, use of sleeping medications, daytime dysfunction	Adults	Korean Chinese Japanese Taiwanese Hindi
Dysfunctional Beliefs and Attitudes Scale	Insomnia	Short versions with 10 items (DBAS-10) and 16 items (DBAS-16) available	Adults	Korean Chinese Malaysian
Hyperarousal Scale	Insomnia	No known cutoff scores	All	None validated in Asian languages
Presleep Arousal Scale	Insomnia	No known cutoff scores	Adults	None validated in Asian languages
Horne Östberg Morningness–Eveningness Questionnaire	Insomnia	Evening type (Scores 16–41) Neither type (Scores 42–58) Morning type (Scores 59–86)	Adults	Korean Chinese Japanese Hindi
Berlin Questionnaire	OSA	"Snoring" is present with ≥2 positive responses to Q's 2–6 "Daytime sleepiness" is present with ≥2 positive responses to Q's 7–9 "Hypertension and/or obesity" is determined with ≥1 positive responses and/or a BMI >30 Presence of two out of the three symptoms indicates a high likelihood of sleep disordered breathing	Adults	Korean Japanese Chinese Hindi Filipino
Ullanlinna Narcolepsy Scale (UNS)	Narcolepsy	Score >14 consistent with narcolepsy	All	Korean Chinese
Epworth Sleepiness Scale (ESS)	Daytime sleepiness in Insomnia, OSA and Narcolepsy	Scores >10 consistent with EDS in the general population and OSA patients; Scores ≥ 15 used for untreated narcolepsy patients.	All	Korean Chinese Japanese Filipino
Stanford Sleepiness Scale (SSS)	Daytime sleepiness in OSA and Narcolepsy	Cutoff scores not reported	All	Korean Japan
Pediatric Daytime Sleepiness Scale	Daytime sleepiness in adolescents with narcolepsy	Score ≥16 reflecting EDS	Adolescents ages 11–15	

questions. Each question is rated from 0 to 4 which indicate how frequently individuals experience those symptoms. Total scores range from 0 to 44, and cutoff scores of 14 or more have high sensitivity and specificity for narcolepsy (Hublin et al., 1994). This scale has been translated in Korean and Chinese (Shin et al., 2008; Wing et al., 2000).

3. Polysomnography

An overnight PSG is not essential in the diagnostic workup, yet it remains an important part of the evaluation process and usually done the night before the Multiple Sleep Latency Test (MSLT; see below). The main purpose of the PSG is to exclude other conditions related to daytime sleepiness, such as OSA, periodic limb movement disorder, or behaviorally induced voluntary sleep restriction. In a PSG study, a short sleep latency of less than 10 min and a sleep-onset REM (SOREM) sleep are frequent findings in narcolepsy patients. SOREM during nocturnal sleep is observed in 25–50 % of cases of narcolepsy with cataplexy and is a highly specific finding.

4. MSLT and MWT

The MSLT consists of five 30-min trial naps every 2 h (from 9 a.m. to 6 p.m.) in a dark room (Carskadon et al., 1986). The mean sleep latency (mean time to fall asleep) and number of sleep-onset REM sleep (SOREM: REM sleep appearing within 15 min after sleep onset) are documented. Mean daytime sleep latency of 8 min or shorter, with two or more SOREM, are needed for the diagnosis of narcolepsy.

The MWT is similar to MSLT. Patients remain awake in a comfortable sitting position in a dark room for five 20-min trials given at 10 a.m., noon, and 2, 4, and 6 p.m. (Mitler, Walsleben, Sangal, & Hirshkowitz, 1998). The purpose of the MWT is to test the patient's ability to stay awake. This measurement is not used for diagnosis, but rather to assess treatment effects of psychostimulant alertness, and risk of falling asleep associated with specific jobs or activities.

5. Hypocretin Concentration

Hypocretin is a deficient neurotransmitter in narcolepsy. CSF measurement of hypocretin-1 level is low in narcolepsy, and the absolute value for diagnosis is defined as CSF hypocretin-1 concentration lower than 110 ng/mL or lower, or a third of mean control values. Although deficient hypocretin is a genuine disease entity of narcolepsy cataplexy, the specificity is still to be determined (Mignot et al., 2002).

6. Genetic Testing

Narcolepsy occurs sporadically in 99 % of patients, but genetic factors may play a role in which environmental factors act on. Genetic testing has been used to aid the clinical diagnosis of narcolepsy. The HLA DQB1*0602 is the most specific genetic marker for narcolepsy across all ethnic groups, including Asians, and is found in 95 % of narcoleptic patients with cataplexy (Mignot, Hayduk, Black, Grumet, & Guilleminault, 1997).

Cultural Considerations in Narcolepsy Patients

One cultural aspect to consider in Asian-American populations, especially adolescents, is EDS following chronic sleep deprivation. Many Asian-American adolescents are under tremendous pressure and carry enormous social and psychological importance in academic success. This may lead many Asian-American students to stay awake late at night to complete their academic loads. As a result, insufficient sleep and irregular sleep patterns in Asian students can lead to EDS and may manifest as symptoms similar of narcolepsy. For example, the mean school night total sleep times for Korean high school students were 6.02 h, 5.62 h, and 4.86 h for 10th, 11th, and 12th graders, respectively, and amount of sleep deprivation correlated with daytime sleepiness (Yang, Kim, Patel, & Lee, 2005). The academic demands/stress and early school start time are the important contributing factors for sleep deprivation among Korean adolescents (Yang et al., 2005). Similarly, total sleep time in Japanese adolescents were 6–7 h, and 7.5 h in Chinese adolescents (Fukuda & Ishihara, 2001; Liu & Zhou, 2002). This is comparably shorter than American peers of 7–8 h (Wolfson & Carskadon, 1998).

In Asian-Americans, experiencing hypnagogic or hypnopompic hallucinations in narcoleptic patients may hold beliefs of being possessed by evil spirits. For instance, some Korean narcoleptic patients may be mistaken for *shin-byung* or "a culture-bound syndrome specific to Koreans, characterized by sleep disturbance and various psychosomatic symptoms, developing into waking-state hallucinations," before proper diagnosis.

Summary and Conclusions

1. The essential tools for the assessment of insomnia includes a clinical interview and sleep diaries. Self-report questionnaires such as the Insomnia Severity Index and the Pittsburgh Sleep Quality index, along with actigraphy, can be used as adjunctive measures to aid assessment. Polysomnography is not indicated, but can help rule out other sleep disorders.
2. When assessing for insomnia in Asian-Americans, it is common for individuals from Asian cultures to express their emotional distress through somatization, as mental illness is usually stigmatized, and thus, it is important to be sensitive to underlying emotional distress. Asian-Americans may be more likely to conceptualize their health based only on their physical health and may have poor skills in communicating their emotional distress. Complaining of insomnia may be one way to express underlying negative emotions, and thus, a more thorough evaluation of comorbid psychological disorders is important.
3. While an overnight PSG study is required to confirm the diagnosis of OSA, presence of snoring, daytime sleepiness, hypertension, or obesity may be used as strong indicators of OSA.
4. Considering that Asian OSA patients have lower BMI compared to Caucasian patients, it is possible that OSA is largely underrecognized in the Asian-American population. Nonetheless, adoption of the American lifestyle (e.g., high-calorie intake, physical inactivity) in Asian-Americans with high acculturation often leads to increase in BMI, which may result in increased risk of OSA in the Asian-American population.
5. Narcolepsy is characterized by EDS, cataplexy, hypnagogic or hypnopompic hallucinations, sleep paralysis, and disrupted nocturnal sleep. A diagnosis of narcolepsy is confirmed by nocturnal polysomnography followed by an MSLT. Questionnaires such as the ESS and SSS can indicate EDS, regardless of etiology of the symptom; such as OSA and narcolepsy. The Ullanlinna Narcolepsy Scale (UNS) is a questionnaire which includes symptoms of narcolepsy specific EDS and cataplexia. EDS, the most common presenting symptom of narcolepsy, should be considered with individual's sleep schedule in the assessment of insomnia.
6. Many Asian-American adolescents are under tremendous pressure to perform well in school. This may lead many Asian-American adolescents to be sleep deprived because of academic work during the night, which in turn may present as EDS symptoms, a symptom that is often mistaken for narcolepsy.
7. Symptoms of hypnagogic or hypnopompic hallucinations in narcolepsy can be misdiagnosed as schizophrenia, or cultural bound syndromes such as *"shin-byung"* in Korean-Americans.

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