

Primary sleep disorders seen at a Neurology service-based sleep clinic in India: Patterns over an 8-year period

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Abstract

There is an increasing awareness for recognition of sleep disorders in India; however, there is still a huge gap in the number of people suffering from various sleep disorders, in the community versus those visiting hospital clinics for the same. Ours is a neurology services-based sleep disorders clinic, which has evolved successfully over the last decade. In this study, we aimed to evaluate the changes in referral patterns and distribution of various sleep disorders in the patients presenting to the clinic. **Materials and Methods:** This is a retrospective chart review-based study on all patients seen over an 8-year period, divided into 2 groups comprising of patients seen during the first 4 years versus those seen over the next 4 years. Only those patients who had the sleep disorder as their presenting manifestation and those who had been formally interviewed with a pre-structured questionnaire detailing about the main features of the common sleep disorders according to the ICSD-R were included. Patients, in whom the sleep disorder could be clearly attributable to another neurological or systemic disorder, were excluded. Statistical analysis was carried out to identify the differences between the two groups as regards the distribution of various sleep disorders and other clinical data. **Results:** Among 710 patients registered in the clinic, 469 were included for analysis and 222 patients formed group 1 while 247 formed group 2. The main differences observed were in the form of a clear increase in the percentage of patients with sleep-related breathing disorders, sleep-related movement disorder, and the hypersomnias on comparison of distribution over the first 4 years versus the last 4 years; while a clear decline was seen in the number of patients with insomnia and parasomnias. A 3-fold increase was observed in the number of patients in whom polysomnography was obtained. **Conclusion:** The distribution of various sleep disorders as seen in a neurology service-based sleep clinic is demonstrated in this study. Increasing referrals for sleep-disordered breathing, restless legs syndrome, and fewer referrals for insomnia and parasomnias might reflect on changing physician and patient awareness in our community.

Key Words

Clinic, neurology, referral patterns, sleep disorder

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Introduction

A sleep disorder is an alteration in the sleep pattern, which interferes with normal physical, mental, and/or emotional functioning of a person. Given the fact that sleep disorders for the most part still remain under-diagnosed, the actual prevalence of sleep disorders is not known. Some studies have estimated the prevalence in the general population to be around 10% to 15%.^[1] Approximately 35% to 40% of American adults have problems falling asleep or experience daytime sleepiness.^[2] Certain population groups in which the prevalence

is observed to be higher are females,^[3] people who are separated, divorced or living alone,^[4] the elderly, Caucasians,^[5] and the ones with co-morbid medical or psychiatric illness.^[6] Sleep disturbances are perceived as mild or moderate by the majority of sufferers and often escape clinical evaluation. Several illnesses or conditions have alteration of sleep as a co-morbidity. The more common of these include psychiatric illness like depression, post-traumatic stress disorder, anxiety disorders, and neurological diseases like chronic headache, Parkinson's disease, fibromyalgia etc. Daily sleepiness results in long-term impairment of work capacity and increased risk of accidents. A number of studies have also found that sleep abnormalities are associated with depression, anxiety, substance use, suicide, immune dysfunction,^[7] hypertension,^[8] and abnormal glucose metabolism.^[9] Studies have shown that people with less than 6 hours of sleep daily have double the risk of myocardial infarction when compared to other persons of their age.^[10] Excessive daytime sleepiness, greater nighttime wakefulness, severe sleep apnea, and greater nocturnal hypoxemia are independently associated with an increased risk of mortality.^[11]

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Despite their high frequency and well-established detrimental effects on overall health, sleep disorders remain poorly identified. Even though a comprehensive and universal diagnostic manual called the International Classification of Sleep Disorders has been proposed by the American Academy of Sleep Medicine, which lists more than 80 different sleep disorder diagnoses, less than 20% of individuals with sleep disorders are correctly diagnosed and treated. There is very little literature from India about the clinico-epidemiological profile of sleep disorders in the region. Similarly, there is next to no information about referral patterns at sleep clinics; in fact, a majority of patients does not get referred to such clinics. This is due to a lack of awareness about the importance of good sleep hygiene among the general population as well as lack of information and poor sensitization to sleep problems among medical practitioners. All India Institute of Medical Sciences (AIIMS), being the apex medical institution in India, has a specialized sleep disorder clinic run by the department of neurology, which has been functioning actively for the past 12 years. With referrals ranging from within the department itself, from other departments of the AIIMS hospital and other hospitals from Delhi and surrounding areas to the whole of North India, it is one of the largest centers of its kind in the region. This study evaluates the changes in referral patterns and distribution of various sleep disorders in the patients presenting to the clinic.

Materials and Methods

This is a retrospective chart review study. All patients who presented to the sleep disorders clinic, run by the neurology department of AIIMS, were formally interrogated using a pre-structured sleep disorders questionnaire. Information collected from the questionnaire was subsequently tabulated and studied. Details recorded included demographic information, detailed history for each primary sleep disorder, the frequency and duration of symptoms, co-existing neurological, psychiatric, or medical illness, personal history mainly pertaining to sleep hygiene and addictions, a detailed drug history; as well as general physical and neurological examination. Results of all previous and current investigations were also recorded. Treatment details and follow-up data including the final diagnosis were entered, whenever available. The diagnosis were made according to the International Classification of Sleep Disorders 2nd edition (ICSD-2), which is a primary diagnostic, epidemiological, and coding resource given by the American Academy of Sleep Medicine and is a universally accepted system of classifying sleep-related illnesses.^[12] Patients registered with the sleep disorders clinic, deptt of neurology, AIIMS over a period of 8 years beginning from 2003-2008 formed the study population. Only those patients who were formally interrogated using the structured questionnaire by a neurologist were included in the study. All the patients whose records were incomplete or in whom a sleep-related problem was not the primary complaint for presentation were excluded from the study. Patients in whom the sleep disorder was clearly attributable to another illness were excluded from this analysis as well; examples include sleep apnea among patients with temporo-mandibular joint ankylosis or muco-polysaccharidoses, restless legs syndrome secondary to chronic kidney disease, drug-induced REM sleep behavior disorder, and insomnia secondary to depression. The International Classification of Sleep Disorders-2nd edition

published by the American Academy of Sleep Medicine was used to classify the various patients according to their symptoms, and cases in which a conclusive diagnosis could not be reached were further excluded. Statistical analysis was performed using Stata 10.0 software. Descriptive analyzes were carried out, and the Student's 't' test as well as chi square test were used to identify levels of significance in differences between the two groups.

Results

Of the total 710 patients who presented to the sleep disorders clinic between 2003 and 2010, 469 fulfilled the inclusion criteria and were included for analysis. Of these, 222 patients who presented in the initial 4-year period (2003 to 2006) were termed as group 1 and the 247 presenting in the later 4 years (2007-2010) formed group 2. In group 1, mean age at presentation was 43.1 ± 17.6 years and the sex ratio was 2.48:1 while the same for group 2 were 41.7 ± 15.0 years and 2.1:1, respectively. The mean body mass index (BMI) was 26.56 ± 6.34 for group 1 and 28.24 ± 7.12 for group 2. Looking at the occupation-profile of these patients, in the first group, 18.64% of the patients were homemakers, 9.09% were students, 12.73% were retired from service, and the rest were salaried employees or self-employed. In group 2, 12.05% were housewives, 3.61% were students, 12.05% retired from service, and the rest were either salaried employees or self-employed.

In group 1, 15.34% of patients presented with difficulty in falling asleep as the chief complaint, 22.73% with frequent awakenings after falling asleep, 18.75% with restless leg syndrome (RLS) symptoms, 31.82% with increased sleepiness, and 11.36% had abnormal behavior in sleep as the main symptom for seeking medical advice. On the other hand, in group 2, 13.6% had difficulty falling asleep as the chief complaint, 31.4% had frequent awakenings, 32.2% had RLS symptoms, 18.2% had increased sleepiness, 2.4% had abnormal behavior in sleep, and 2.2% complained of altered sleep cycle as the chief reason for their visit. In group 1, 15.74% of the patients were suffering from depression while this figure decreased to 13.16% in group 2. Similarly, a slight decrease from 25.52% to 23.37% in the number of patients who had a co-existing neurological illness at the time of presentation was observed between the two groups. Co-morbid illnesses were present in 20.5% of the patients in the first group, and these were known at the time of evaluation in 19.92% of the patients in the second group. [Table 1]. There was a significant ($P < 0.005$) increase in the percentage of patients presenting with and diagnosed with sleep-related breathing disorders (mainly obstructive sleep apnea), sleep-related movement disorder (mainly restless legs syndrome), and the hypersomnias; while the number of patients with insomnia and the parasomnias saw a decline over the last 4 years [Table 2, Figure 1]. Polysomnography was obtained in 47 (21.1%) patients in group 1 as a part of further investigations. Polysomnography in our practice has become more popular as an integral part of diagnostic work-up for sleep disorders, which was reflected in the fact that it was ordered for 162 (65.5%) patients in group 2.

Discussion

In this study, we have presented the referral and distribution

Table 1: Demographic details of patients seen in sleep disorders clinic over an 8-year period

	Group 1	Group 2
Total no of patients studied	222	247
Mean age at presentation	43.1±17.6 years	41.7±15.0 years
Male: Female ratio	2.48:1	2.1:1
BMI	26.56	28.24
Occupation		
housewives	18.64%	12.05%
students	9.09%	3.61%
retired from service	12.73%	12.05%
under government employment	22.27%	39.76%
working in private enterprise/ self employed	33.64%	32.53%

Table 2: Distribution of sleep disorders seen over the first 4 years versus the next 4 years

ICSD-R category of sleep disorder	Group 1	Group 2	P value
Insomnias	38	29	0.000
Sleep-related breathing disorders	67	117	0.000
Hypersomnias	28	43	0.012
Circadian rhythm sleep disorder	5	4	0.776
Parasomnias	44	28	0.011
Sleep-related movement disorder	69	86	0.000
Isolated symptom, unresolved	6	3	-

patterns of 491 patients suffering from various primary sleep disorders, seen by a single neurologist over a period of 8 years, comparing these patterns over the first 4 years versus those over the last 4 years.

A clear-cut epidemiological data on sleep disorders and their referral patterns in India is lacking. A population-based cross-sectional study done in south India (CURES-67) found the overall prevalence of snoring and daytime sleepiness to be 40% and 59%, respectively.^[13] Given that this data is from an urban area and reporting from rural and semi-urban areas is significantly lower, the actual prevalence could be even higher. In our study, we have presented the referral and distribution patterns of 491 patients suffering from various primary sleep disorders, evaluated at our referral sleep clinic over a period of 8 years.

Given that more than half of the population suffers from some sleep disturbance or the other at some point in life, the expected numbers of referrals to specialty sleep clinics would be expected to be very high indeed. Surprisingly, we enrolled only a little over 700 patients to our clinic in 8 years. The main reason for this difference in expected and observed numbers could possibly be a lack of awareness, both among patients as well as among their primary treating physicians. General practitioners and family physicians are at an ideal position to perform surveillance over sleep problems, but in India, patients rarely present with a sleep disorder as the chief complaint. Often, sleep disorders are picked up as concomitant illnesses with other diseases, especially those affecting respiratory, neurological, or psychiatric health; as a result, a majority of the sleep disorders are ultimately evaluated and treated by pulmonologists, neurologists, and psychiatrists.

When we compare the diagnosis of sleep disorders made in the first 4 years with those of patients presenting in the latter half of the 8-year period under study, we observe that there is a clear-cut change in the spectrum of diagnosis made between the two periods. While a decline is observed in the number of patients diagnosed with insomnia, parasomnia, and REM behavior disorder, a distinct rise is seen in the patients who got a final diagnosis of sleep apnea and sleep-associated movement disorders.

In a study by The National Sleep Foundation, USA, one-third of the 1000 Americans who were interviewed on telephone reported some type of sleep problem, 1 in 4 reported occasional insomnia.^[14] Another telephone survey conducted in 2011 in Canada revealed that 40.2% of population reported at least one symptom of insomnia i.e. trouble falling or staying asleep or early morning awakening for a minimum of 3 nights per week in the previous month and almost a fifth were dissatisfied with their sleep.^[15] The American Insomnia Survey estimated that insomnia alone costs the US government somewhere between \$15 billion and \$92 billion in lost productivity and that is without taking into account the other sleep disorders, which still remain to a large extent grossly under-diagnosed.^[16] Recent data from the same survey also suggests that insomnia is significantly associated with workplace and non-workplace injuries.^[17]

An increase in the awareness about the management of insomnia could have led to a decrease in the number of final diagnosis of insomnia in our practice. This is owing to a decrease in referrals as more patients could be getting the appropriate treatment from their primary treating physicians and psychiatrists. There is increased consensus among physicians and psychiatrists about the greater efficiency and decreased incidence of treatment-related problems like dependence, tolerance, and adverse drug reactions with non-benzodiazepine hypnotics. Newer medications like ramelteon and eszopiclone have been shown to be quite effective in improving sleep parameters in Indian patients with a better safety profile, which has led to them being increasingly prescribed for treatment of insomnia in Indians.^[18,19] Given that the economic burden of untreated insomnia is much higher than that of treating insomnia, there is a need for better screening and medical management of this condition.^[20]

Parasomnias are characterized as undesirable physical or behavioral phenomena occurring during the sleep period. Although these conditions can be distressing and, in some cases, hazardous to the sleeper and his or her bed partner, it is important to recognize that parasomnias are diagnosable and treatable in the vast majority of patients.^[21] Several parasomnias like somnambulism, sleep terror, confusional arousals, sleep enuresis, and RBD can be mistaken for complex partial seizures or nocturnal frontal lobe epilepsy.^[22] A complete video-polysomnographic study is of utmost importance in patients with nocturnal motor attacks in order to provide a correct diagnosis and to delineate the real clinical impact of parasomnias.^[23] In our study, we found that increased general awareness among physicians about parasomnias as a common differential for epilepsy, anxiety disorders, and other neurological / psychiatric illnesses appears to have led to a decline in the number of referrals both from outside and within

the hospital. Due to easy availability and usage of video EEG as a tool to differentiate it from the other disorders at not only referral centers like ours but also at smaller centers and with private practitioners has better equipped treating general physicians, pediatricians and neurologists with ability to differentiate and manage these cases. Also, the treatment of parasomnia is relatively simpler with small dose benzodiazepine therapy with a significant and prompt improvement, which has contributed to its better management. All these factors may have resulted in decrease in the number of referrals for parasomnia.

In our practice, REM sleep behavior disorders are more often diagnosed in the elderly, with the most common cause of acute presentation being side effects due to anti-depressant usage with Serotonin reuptake inhibitors in particular. RBD has been described in various neurological disorders ranging from immunologically-mediated diseases, such as Guillain-Barré syndrome and multiple sclerosis to neurodevelopmental disorders such as autism, Tourette's syndrome, and group A xeroderma pigmentosum.^[24] REM sleep behavior disorders are associated with neurodegenerative disorders, particularly synucleinopathies such as Parkinson disease (PD), multiple system atrophy (MSA), pure autonomic failure (PAF), and Dementia with Lewy body disease (DLB). The importance of recognition of REM behavior disorder has gained significant amount of awareness, in recent years, with reports that RBD often antedates the development of a neurodegenerative disorder and that close follow-up of patients with idiopathic RBD could enable an early detection of neurodegenerative diseases.^[25] Since the confirmation of diagnosis of RBD requires sophisticated testing with a video polysomnography, along with the history, there could have been a rise in referrals for RBD to our clinic.

Sleep apnea has been shown to be an independent risk factor for all-cause mortality.^[26] Estimates of obstructive sleep apnea prevalence are in the range of 3% to 7%, with certain subgroups of the population bearing higher risk. Factors that increase vulnerability for the disorder include age, male sex, obesity, family history, menopause, craniofacial abnormalities, and certain health behaviors such as cigarette smoking and alcohol use.^[27] The reported prevalence of obstructive sleep apnea in India is 9.3% and OSA syndromes is 2.8%.^[28] A study conducted by Udawadia *et al.* in middle-aged urban Indian men estimated the prevalence of SDB (apnea-hypopnea index of 5 or more) as 19.5% and that of OSAHS (SDB with daytime hypersomnolence) as 7.5%.^[29] Moreover, Asians are at risk for a more severe form of OSA for lesser degrees of obesity than their Caucasian and African counterparts owing to their craniofacial structure.^[30] A recent study from South India found that while sleep-related breathing disorders were common in the community, the prevalence of OSA was quite low.^[31] This only demonstrates the differences in evaluation in screening methodologies and makes the need for a uniform screening and diagnosis guideline for SDB, evident, for our country. There appears to be a collective rise in concern about sleep-related breathing disorders among patients and physicians from various specialties alike. A number of sleep awareness programs for public have been conducted over the course of last few years, which also focused on increasing awareness about sleep apneas, as these are one of the commonest treatable sleep disorders in the community. The fact that a conclusive diagnosis of sleep apnea cannot be made without a polysomnogram

probably attracted an increased number of self-referrals and referrals by general physicians.

Epidemiological studies report the prevalence rate of RLS to be somewhere between 5-15% in the general population, with 2.5% of adults having symptoms severe enough to require medical intervention.^[32] The prevalence in India has been reported to be nearly 2%.^[33] Some of the risk factors for RLS include female gender, pregnancy, low iron levels, lower socio-economic status, poor health, elderly age, co-morbidity with Parkinson's disease, positive family history of RLS, and co-morbidity with psychiatric disorders. We developed a dedicated questionnaire for diagnosis of restless leg syndrome, particularly relevant to the Indian population, which we have been utilizing for diagnosis of this condition since 2006, and its validation study is underway. This has certainly increased the sensitivity of the diagnostic tools available for RLS. Prior to this more limited questioning of patients confined to IRLSSG diagnostic criterion was used. Hence, there is a distinct possibility that a number of patients were missed, and underreporting of this condition was done prior to 2006 in our clinic.

There is dearth of literature on referral and distribution patterns of various sleep disorders. Most studies, which elaborate on the distribution of sleep disorders in different communities, are community-based epidemiological studies (Ref). However, it is important to recognize which type of sleep disorders are more often seen in sleep clinics, since, this will aid in planning future strategies for development of awareness programs for both patients and physicians. This could further help in better planning for optimal resource utilization, which is of utmost importance in our part of the world.

Our study is the first of its kind, reflecting on the distribution of various sleep disorders seen in a neurology service-based sleep disorders clinic. The main limitations are the biases introduced mainly because of changing referral patterns, since ours is a tertiary care referral center. Nevertheless, once these biases are identified, this analysis will help in improvement of dissemination of knowledge about common sleep disorders, especially to referring physicians.

Conclusion

The distribution of various sleep disorders as seen in a neurology service-based sleep clinic is demonstrated in this

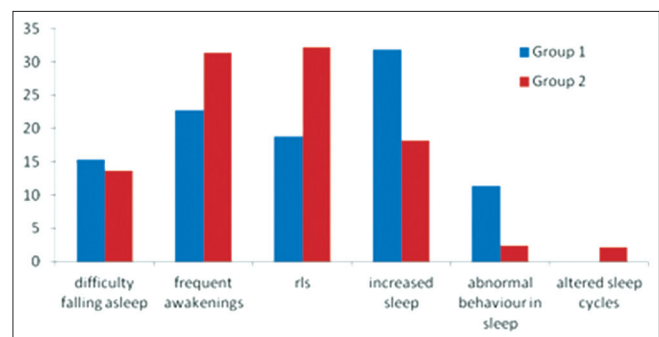


Figure 1 : Comparison of the presenting sleep complaints among patients seen over the 8 year study period

study. Increasing referrals for sleep-disordered breathing, restless legs syndrome, and fewer referrals for insomnia and parasomnias might reflect on changing physician and patient awareness in our community.

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