Prevalence of insomnia and use of sleep medicines in urban communities of Karachi, Pakistan

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Abstract

Objective: To assess the prevalence of insomnia, its associated factors and the use of sleep medicines.

Methods: The cross-sectional survey of 1488 adults from five urban and semi urban communities of Karachi, Pakistan, was conducted from August 2007 to July 2008. All face-to-face interviews were conducted in Urdu and data was entirely based on self-reported information by the respondents. Data was analysed using STATA 10.1.

Results: Of the total, 466 (31.3%) respondents reported insomnia out of which 141 (30.2%) reported using sleep medicines. These medicines were most frequently prescribed by some family physician (114/141; 80.8%). The odds of having insomnia were three times as likely if someone scored positive for psychological distress (OR 3.09; CI 2.30 - 4.15) and two times as likely if he/she was troubled by health related issues (OR = 2.40; CI 1.84 - 3.13) or had been exposed to adverse events (OR = 2.02; CI 1.18 - 3.45). Those who experienced financial problems were 59% more likely to report sleep problems (OR = 1.59; CI 1.20 - 2.12). Gender, age, income or occupational status were not found to be associated with insomnia, but married persons tended to enjoy better sleep.

Conclusion: Every third respondent reported insomnia and one-third of these were taking a sleeping pill prescribed by a family physician. Married people enjoyed better sleep. Gender, age or income was not associated with sleep difficulties.

Keywords: Insomnia, Prevalence, Sleep medicines, Karachi, Pakistan. (JPMA 63: 1358; 2013)

Introduction

Insomnia is defined as "difficulty initiating or maintaining sleep, or non-restorative sleep, for at least one month"; the sleep problem should be accompanied by significant distress and functional impairment.[1] Reported prevalence rates for insomnia vary from 11.8% in Nigeria[2] to 27% in the United States and 37% in France and Italy.[3] Insomnia has been associated with concurrent physical[4] and psychiatric problems[5] and may be a risk factor for the onset of depressive or anxiety related illnesses.[6] People who are affected by insomnia tend to use health services more often and report greater absenteeism from work,[7] may experience greater functional impairment in their daily and work-related tasks,[2,8] and may report poorer quality of life.[9] In Pakistan, rampant use of benzodiazepines[10,11] and other psychoactive drugs[12] is an additional factor that may be related to insomnia and which may have additional health implications. Despite the health and behavioural implications of insomnia, there are no studies on its prevalence in Pakistan. The present study was planned as a first step towards ascertaining the prevalence of insomnia in semi-urban communities of Karachi, Pakistan. The primary objective

of this study were to assess prevalence of insomnia among adults residing in the five mid-low to low income communities of Karachi; to ascertain the association of insomnia with demographic factors, psychological distress, reported health and financial problems and with exposure to adverse events; to ascertain the prevalence of the use of sleep medicines among those reporting insomnia; and to ascertain sources that had referred or recommended the use of sleep aids. No prior hypothesis was stated since there was no pre-existing information on this topic in Pakistan.

Subjects and Methods

The descriptive, cross-sectional study consisted of a house-to-house survey of insomnia among community dwelling adults from five urban and semi-urban localities of Karachi: Colony, Essa Nagri, Malir, Orangi Town and New Karachi. The study was nested in a larger study on the prevalence of psychological distress which was conducted between August 2007 and July 2008. Data was collected consecutively in the five communities; the duration of data collection in Hazara Colony was from August to October 2007; from November 2007 to mid-January 2008 in Essa Nagri; from mid of January to March 2008 in Malir; from April to May 2008 in Orangi Town; and from June to July 2008 in North Karachi.

Multistage sampling procedure was used where the first stage comprised selection of one community from each

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of the five districts of Karachi; districts South, East, North/Malir, Central and West. In the second stage, households were selected using systematic sampling. A pilot study had been conducted earlier using systematic sampling without any refusals. The number of houses to be approached in each community was determined by using the formula for sampling size on SPSS version 11.0. In the first community the sampling frame consisted of 2500 households and the target sample size was 300, so 2500/300 = 8.33, i.e., every 8th household was approached. However, there were frequent refusals in this particular community so that at times it was the 10th or 12th house that was included. To offset this problem, sample selection in the remaining four communities was conducted using the method of sim ple random sampling. In order to do this, the team first visited all households in the targeted community and allotted a number to each household. Households were then selected using the table of random numbers. In case of a refusal a new household was randomly selected using the same table. Once a household was selected, the family was approached and if the family agreed to participate, the research officer briefed them about the study, read out and explained the consent form, obtained a signature or thumb print and proceeded with the interview. A household member was included if he/she was 18 years or older, could understand and speak Urdu and consented to participate in the study. Those who were younger than 18 years or could not speak or understand Urdu were excluded.

All stages of the research were in concordance with ethical guidelines outlined in the 2000/fifth revision of the Helsinki Declaration of 1975. All efforts were made to interview the respondents in a private space and all answers were kept confidential.

The face-to-face interviews were conducted verbally in Urdu. All data was based on self-reported information from the respondents in response to a survey package which was compiled for the study. It included questions regarding insomnia and use of sleep medicines. Presence of insomnia was measured by the question "Do you or someone in your household have the problem of not being able to sleep?" Any individual who replied 'Yes' to this question was considered positive for insomnia. Hence in this study, insomnia was defined as self-reported difficulties with being able to sleep. If the answer was affirmative, the respondent was asked if he/she was taking a sleep medicine and, if so, the name of the substance and who had recommended that substance. Hence, all respondents were asked about sleep problems but only those who replied 'Yes' were inquired about the

use of sleep aids and the prescribing source. Since the information given on behalf of a family member could not be verified, for the present study only those responses were taken into account which pertained to respondent's own experience of insomnia and use of sleep medicines.

General Health Questionnaire (GHQ)-12 is a screening measure of psychological distress and potential for psychiatric morbidity.[13] Research has shown good evidence of GHQ's reliability and validity for populations from different countries and cultures.[14] We used the Urdu version of GHQ-12 which was validated for use with Pakistani population with reported specificity of 93% and sensitivity 88%.[15] The actual cutoff score for caseness on GHQ tends to vary from country to country and it is suggested that the mean score for a given sample be used to derive the cut-off score.[16] The overall mean score on GHQ-12 for our sample was 1.5 which was rounded off to 2 and, based upon this the mean score of 3 or more was considered positive for psychological distress.

The demographic questionnaire was a structured questionnaire about age, gender, education, income and marital status.

The last section of the survey related to the presence of health and financial problems and exposure to adverse events. This section comprised four questions. The first two questions were, "Are you currently facing health problems?" and "Are you currently facing financial problems?" The next two questions were "Have you experienced violence such as kidnapping, domestic violence or political violence?" and "Have you experienced a dacoity or burglary?" These last two questions were combined to form a single variable which was called exposure to adverse events.

Reported insomnia and reported use of sleep medicines were treated as dependant variables. Independent variables comprised age, gender, marital status, income, presence or absence of health or financial problems, exposure to adverse events and the total score on GHQ-12. Income was treated as an ordinal variable where the first category was Rs.6000 or less per month and each subsequent category was based on intervals of Rs. 6000. For regression analysis, income was treated as a continuous variable since each category was based on equal intervals. The GHQ-12 score was treated as a dichotomous variable where a score of 0-2 was coded 0 and a score of 3 or above was coded 1 and was considered positive for psychological distress. Reported financial and health problems and exposure to adverse events were all dichotomous variables with 0 = No and 1 = Yes response.

Data was analysed using STATA version Special Edition

10.1. Initial descriptive statistics were run to look at distributions and missingness. Prevalence of insomnia based on all the independent variables was analysed next before running t-test and chi-square tests to measure differences where a p value of less than 0.05 was considered significant. Next, odds ratios were derived by regressing insomnia on all the predictor variables. Finally, number of persons using sleep aids and the prescribing source were computed.

Results

Out of the 1876 houses selected and approached for the interview, 377 (20%) refused to participate. The resulting sample was 1499 out of which 2 persons were excluded because they were younger than 18 years, one respondent was excluded because he was 98-year-old, and 8 respondents were excluded due to significant missing information. The final total sample was 1488 (79.31%) with 300 (20.16%) respondents from Hazara Colony, District South; 321 (21.57%) respondents from Essa Nagri, District East; 287 (19.28%) respondents from Malir, District North; 225 (15.12%) respondents from Orangi Town, District West; and 355 (23.85%) respondents from New Karachi, District Central.

Table-1: Demographic characteristics of sample (N=1488).

Variable	f	%
Gender		
Male	513	35.5
Females	975	64.5
Age (Years)		
18-25	394	26.4
26-45	806	54.1
46-65	247	16.6
66-80	41	2.7
Marital Status		
Single	315	21.1
Married	1071	71.9
Div/Sep/Wid	102	6.8
Education		
Illiterate	387	26
Primary	202	13.5
Secondary	200	13.4
Matriculate	343	23
Intermediate	220	14.7
Graduate	135	9
Missing information	1	<1
Monthly income		
Rs. 6000 or less	435	32.2
Rs. 6001-12000	545	40.4
Rs. 12001-18000	220	16.3
Rs. 18001-24000	69	5.1
Rs. 24000 or up	79	5.8
Missing data	140	9.4

Table-2: Frequency of reported sleep problems among community dwelling adults from urban and semi urban centres in Karachi.

Variables	Insomnia N (%)	No Insomnia N (%)	χ^2#	P
Reported insomnia for overall sample	466 (31.3%)	1022 (68.6%)		
Males	147 (28.6%)	366 (71.3%)	2.57	0.108
Females	319 (32.7%)	656 (67.2%)		
Marital status				
Single	103 (32.7%)	212 (67.3%)	12.24	0.002*
Married	316 (29.5%)	755 (70.4%)		
Div/Sep/Widowed	47 (46%)	55 (53.9%)		
Psychological distress				
Positive for distress	192 (57.8%)	140 (42.1%)	139.67	0.000++
Negative for distress	274 (23.7%)	882 (76.3%)		
Health problems				
Yes	282 (46.3%)	696 (79%)	108.46	0.000++
No	184 (20.9%)	326 (53.6%)		
Financial problems				
Yes	313 (39.8%)	549 (78.2%)	56.02	0.000++
No	153 (21.7%)	473 (60.1%)		
Adverse events			19.67	
Yes	40 (54.7%)	33 (45.2%)		0.001+
No	426 (30.1%)	989 (68.8%)		

*p <0.05, +p<0.01, ++p 0.001.
#Chi-2 tests used to assess significance at .05 or less.

Overall, there were 975 (64.5%) females (Table-1). The average age of the respondents was 35±13.2 years with a range of 18-80 years; 1071 (79.1%) were married; 387 (26%) had no formal education and only 35 (9%) had a college degree; 435 (32.2%) reported income levels equal to the minimum wage or less, while 79 (5.8%) earned more than Rs. 24,000 monthly.

With regard to the exposure variables, 332 (22.3%) scored positive for psychological distress; 786 (52.8%) reported having finance-related problems; 608 (41%) reported having health-related problems; and 73 (4.9%) reported having experienced adverse events.

A total of 466 (31.3%) respondents reported having insomnia (Table-2). Slightly more females complained of insomnia (n=319; 32.7%) compared to the males (n=147; 28.6%), but the difference was not statistically significant (p<0.108). Single respondents had slightly higher prevalence of insomnia (n=103; 32.7%) and those who were divorced, separated or widowed had much higher prevalence of insomnia (n=47; 46%) compared to the married respondents (316/1071; 29.5%; p< 0.002). There were no significant differences in the prevalence of insomnia by age, education or income. There was no significant difference between the mean age of the group that reported insomnia (36.3±13.8) and those who did not

Table-3: Logistic regression analysis of risk factors for poor sleep.

Predictors	Odds Ratio	95% CI	P
Ref# - Male	1		
Females	0.77	0.53 – 1.12	0.184
Ref - 18-25 years	1		
26-45 years	1.19	0.80 – 1.79	0.377
46-65 years	1.12	0.66 – 1.89	0.658
66-80 years	1.59	0.65 – 3.91	0.306
Ref - Employed	1		
Unemployed	1.04	0.70 – 1.55	0.831
Homemaker	1.28	0.85 – 1.91	0.224
Income	1.09	0.96 – 1.24	0.146
Ref - Single	1		
Married	0.56	0.34 - .90	0.019*
Sep/Div/Widowed	0.91	0.44 – 1.88	0.806
Ref - No distress	1		
Positive for distress	3.09	2.30 – 4.15	0.000++
Ref - No health problems	1		
Positive for health problems	2.4	1.84 – 3.13	0.000++
Ref - No finance problems	1		
Positive for financial problems	1.59	1.20 – 2.12	0.001+
Ref - No adverse events	1		
Positive for adverse events	2.02	1.18 – 3.45	0.010+

*p<0.05, +p<0.01, ++p<0.001.
Ref# = Reference group.
CI: Confidence Interval.

have such problems (34.9±12.9, t=1.84, p<0.065).

Respondents who were positive for psychological distress were significantly more likely to report insomnia (n=192/332; 57.8%) than those who were not distressed (n=274/1156; 23.7%, p<0.000). Twice the number of respondents who reported current health problems were poor sleepers (n=282/608; 46.3%) compared to those who did not have such problems (n=184/880; 20.9%; p<0.001). Similarly, 313/786 (39.8%) of those who reported financial problems were more likely to report insomnia compared to those who did not have financial problems (n=153/702; 21.7%; p<0.001). People who had been exposed to adverse events were more likely to have insomnia (n=40/73; 54.7%) than the group without such exposure (n=426/1415; 30.1%, p<0.001).

Multiple logistic regression analysis showed that the odds of having insomnia were three times as likely if someone scored positive for psychological distress (OR 3.09; CI 2.30 - 4.15) and two times as likely if s/he was troubled by health-related issues (OR = 2.40; CI 1.84 - 3.13) or had been exposed to adverse events (OR = 2.02; CI 1.18 - 3.45) (Table-3). Those who experienced financial problems were 59% more likely to report insomnia (OR = 1.59; CI 1.20 - 2.12). Controlling for the stress factor and nature of problems, respondents who were married were 44% less likely to

report sleep problems (OR = 0.56; CI = 0.34 - 0.90). Other than marital status, none of the demographic variables were associated with reported insomnia in our sample.

Out of the 466 respondents who reported insomnia, 141 (30.2%) reported using sleep medicines. Almost half of the users of sleep aids (n= 69/141; 48.9%) were using benzodiazepines or hypnotics who either named the specific drug or showed it to the research officer; another 55/141 (39%) were using allopathic medicines which they stated were specifically given to them for sleep, but they did not know the name of the drug. Eight (5.6%) individuals were using allopathic medicines which were prescribed to them for a medical condition, such as for hypertension or for thyroid condition, but which the respondent stated helped with sleep. Another 8 (5.6%) individuals reported taking some pills for sleep, but were not aware of the nature or name of the substance. One (0.7%) person reported using injections to go to sleep.

The majority of the users of sleep aids (114/141; 80.8%) reported that the drug was prescribed to them by a family physician; 8/141 (5.6%) had been prescribed the medicine by a psychiatrist; 8 (5.6%) had bought the medicine themselves; a pharmacist or shopkeeper had suggested the medicine to 6 (4.2%) persons; 3 (2.1%) were given the suggestion by a friend, relative or neighbour; and 3 (2.1%) were given the suggestion by an alternative healer.

Discussion

The current study was a first attempt to ascertain the prevalence of insomnia and associated factors and use of sleep medicines by community dwelling adults in urban and semi-urban areas of Karachi, Pakistan. To the best of our knowledge, there is no data on insomnia in general population of Pakistan. One-third of our sample reported having problems with sleep at the time of the survey. This prevalence rate was similar to the prevalence rates reported from other Asian countries. For example, prevalence of overall insomnia or other sleep-related complaints was 29.4% in a sample from Turkey[17] and 20% to 34% in a sample from South India.[18] The prevalence rate for our sample was lower than rates of 39.4% from Hong Kong[19] and 44.8% from Japan.[20] The variation in prevalence rates, other than pertaining to cultural and national differences, may also be due to the different ways in which insomnia has been conceptualised and measured in different studies. For example, in a study from India, responses to specific questions about difficulty initiating or maintaining sleep and early morning awakening showed that 20% of the sample reported sleep-related problems but the sample's overall score on Pittsburg Sleep Quality Index, a standardised measure of sleep quality,

yielded a prevalence rate of 34%.[18]

In terms of factors associated with insomnia, several studies have reported that female gender, increasing age and poor physical and mental health are associated with insomnia.[2,17,19-21] For our sample, the only demographic factor that was a significant correlate was marital status where married people tended to enjoy better sleep than single, divorced, separated or widowed individuals. The strongest predictor of insomnia was psychological distress followed by health problems, exposure to adverse events and financial problems, in that order of effect. Among those who reported insomnia, one out of every three persons was taking a sleep aid and the majority was taking benzodiazepines which were typically prescribed by a family physician. While a higher percentage of females had sleep problems than males did, 35.3% males reported using sleep aids as compared to 27.9% females. However, these differences did not reach statistical significance. Evidence shows that use of benzodiazepines and other psychoactive substances is common in Pakistan, ranging from 14% in the general population[10] to 25.4% in people seeking medical consultation at a tertiary care hospital[22] and 40% among people seeking consultation at an outpatient mental health setting.[23] In at least one of these studies, 85% of the users reported they were taking the substance for insomnia and 40% were using the substances without a doctor's advice.[11]

Whether insomnia is related to physical health issues or to psychosocial issues was seen in our sample. Family physicians are usually the first point of contact when people seek help for ailments. However, at least in Western samples, few patients voluntarily bring up sleep issues.[3] On the other hand, physicians may underestimate the impact of sleep problems on daily functioning of their patients.[21] For example, in one study from the United States, 7% of the sample reported sleep problems, daytime sleepiness and problems of daytime sleepiness interfering with daytime activities, but only 1% had been formally diagnosed with a sleep-related problem by a physician.[24] Family physicians would do well to inquire about insomnia and to address the root causes. Advice and followup on sleep hygiene and investigating and addressing etiological factors may be more effective strategies for ameliorating sleep problems than prescription of sleep aids which have the potential for abuse and dependency, especially given the unregulated and easy availability of hypnotics and benzodiazepines in Pakistan.

The current study had several limitations; the major one being that insomnia was assessed by a single, broad question without using the criteria for different types of insomnia as outlines in the International Classification of Diseases (ICD-10). It is possible that if the question had been based on a stringent criteria of insomnia or if a standardised self-report measure of sleep quality had been used, the results may have been different. Another limitation of the study was that it was a cross-sectional analysis and, hence, the variables may best be understood as correlates rather than causal factors. There is a need for longitudinal analysis to understand the extent and impact of insomnia on health and daily functioning of Pakistanis and to understand causative factors associated with it. Yet another limitation of the study was that a number of factors that could be possible confounders were not addressed. For example, factors such as the use of substances, past or current physical or mental illnesses, work schedule, noise level or physical environment of sleep setting,, or other sleep-related conditions such as sleep apnoea or sleep walking, could be possible contributors to the presence of insomnia. Finally, the study sample did not include respondents from upper or middle income groups. Additionally, while our sample was ethnically diverse, it did not represent the entire gamut of ethnic or religious groups that inhabit Karachi. Hence, the generalisability of our findings would probably be limited to certain ethnic groups and to mid-low to low income groups residing in Karachi. Future studies on this phenomenon could improve on our findings by using a standardised measure of insomnia based on the ICD-10 criteria, using a more representative sample, and including other possible confounders that could contribute to disturbed sleep.

Conclusion

One in every three respondents reported insomnia and one-third of those reporting insomnia were taking a sleep aid, generally prescribed by a family physician. Gender or age were not associated with insomnia, but married respondents enjoyed better sleep than those who were single, divorced, widowed or separated. The findings suggest some important links to the issue of insomnia among the general population in urban and semi-urban centres in Pakistan and there is a need for more systematic investigations on this subject. Addressing insomnia has public health implications as it may not only be indicative of psychological distress or a current physical, psychiatric or neurological condition, but may be a risk factor for future psychiatric disorders.

Acknowledgements

References

1. American Psychiatric Association. DSM-IV-TR Diagnostic and Statistical Manual for Mental Disorders. 4th ed. (text revision). Washington, DC: American Psychiatric Association; 2000.
2. Gureje O, Makanjuola VA, Kola L. Insomnia and role impairment in the community: results from the Nigerian survey of mental health and wellbeing. Soc Psychiatry Psychiatr Epidemiol 2007; 42: 495-501.
3. Leger D, Poursain B. An international survey of insomnia: under-recognition and under-treatment of a polysymptomatic condition. Curr Med Res Opin 2005; 21: 1786-92.
4. Sivertsen B, Krokstad S, Overland S, Mykletun A. The epidemiology of insomnia: associations with physical and mental health. The HUNT-2 study. J Psychosom Res 2009; 67: 109-16.
5. Jansson M, Linton SJ. The role of anxiety and depression in the development of insomnia: cross sectional and prospective analyses. Psychol Health 2006; 21: 383-97.
6. Ford DE, Kamerow MD. Epidemiologic study of sleep disturbances and psychiatric disorders. An opportunity for prevention? JAMA 1989; 262: 1479-84.
7. Linton SJ, Bryngelsson I-L. Insomnia and its relationship to work and health in a working-age population. J Occup Rehabil 2000; 10: 169-83.
8. Bolge SC, Doan JF, Kannan H, Baran RW. Association of insomnia with quality of life, work productivity and activity impairment. Qual Life Res 2009; 18: 415-422. doi:10.1007/s11136-009-9462-6.
9. Zeitlhofer J, Schmeiser-Rieder A, Tribl G, Rosenberger A, Bolitschek J, Kapfhammer G, et al. Sleep and quality of life in the Austrian population. Acta Neurol Scand 2000; 102: 249-57.
10. Iqbal SP, Ahmer S, Farooq S, Parpio Y, Tharani A, Khan RAM, et al. Benzodiazepine use among adults residing in the urban settlements of Karachi, Pakistan: a cross sectional study. Subst Abuse Treat Prev Policy 2011; 6:19. doi: 10.1186/1747-597X-6-19.
11. Naqvi H, Hussain S, Dossa F. Benzodiazepine: slow sand of addiction. J Pak Med Assoc 2009; 59: 415-7.
12. Ali NS, Khuwaja AK, Zafar AM. Characteristics of patients using psychoactive drugs in Karachi, Pakistan. Pharm World Sci 2009; 31: 369-72.
13. Goldberg D, William P. A User's Guide to the General Health Questionnaire. Basingstoke: NFER-Nelson; 1988.
14. Goldberg DP, Gater R, Sartorious N, Ustun TB, Piccinelli M, Gureje O, et al. The validity of two versions of the GHQ in the WHO study of mental illness in general health care. Psychol Med 1997; 27: 191-7.
15. Minhas FA, Mubbashar MH. Validation of General Health Questionnaire in a primary care setting of Pakistan. J Coll Physicians Surg Pak 1996; 6: 133-6.
16. Goldberg DP, Oldehinkel T, Ormel J. Why GHQ threshold varies from one place to another. Psychol Med 1998; 28: 915-21.
17. Aslan S, Gulcat Z, Albayarak FS, Maral I, Yetkin S, Sutcigil L, et al. Prevalence of insomnia symptoms: results from an urban district in Ankara, Turkey. Int J Psychiatry Clin Pract 2006; 10: 52-8.
18. Panda S, Taly AB, Sinha S, Gururaj G, Girish N, Nagaraja D. Sleep-related disorders among a healthy population in South India. Neurology India 2012; 60:68-74. doi :10.4103/0028-3886.93601.
19. Wong WS, Fielding R. Prevalence of insomnia among Chinese adults in Hong Kong: a population-based study. J Sleep Res 2011; 20: 117-26.
20. Asai T, Kaneita Y, Uchiyama M, Takemura S, Asai S, Yokoyama E, et al. Epidemiological study of the relationship between sleep disturbances and somatic and psychological complaints among the Japanese general population. Sleep Biol Rhythms 2006; 4: 55-62.
21. Allaert F-A, Urbinelli R. Sociodemographic profile of insomniac patients across national surveys. CNS Drugs 2004; 18: 3-7.
22. Khuwaja AK, Ali NS, Zafar AM. Use of psychoactive drugs among patients visiting outpatient clinics in Karachi, Pakistan. Singapore Med J 2007; 48: 509-13.
23. Ahmer S, Salamat S, Khan RMM, Iqbal P, Haider II, Shabaz Khan, et al. Pattern of benzodiazepine use in psychiatric outpatients in Pakistan: a cross sectional survey. Clin Pract Epidemiol Ment Health 2008; 5: 9. doi: 10.1186/1745-0179-5-9.
24. Ram S, Seirawan H, Kumar SKS, Clark GT. Prevalence and impact of sleep disorders and sleep habits in the United States. Sleep Breath 2010; 14: 63-70.