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Sleep Related Disorders among the adult population in an urban area of Manipur

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Abstract:
Background: *Sleep related disorders (SRDs) not only impair quality of life but also pose several health-related problems and have been considered an unmet public health problem. Objectives: To determine the prevalence of sleep related disorders among adult population in an urban community of Imphal East District, Manipur and assess the association between sleep related disorders and selected socio-demographic variables of interest such as age, gender, marital status etc.*
Materials and methods: *A cross sectional study was conducted in an urban area of Imphal east district of Manipur from May to June, 2017. Sample size calculated was 675 and three communities were chosen by convenience sampling. Data were collected using a structured questionnaire which included 4 sections, namely- Socio-demographic characteristics, Personal habits, Pittsburgh sleep quality index (PSQI) and Epworth Sleepiness scale (ESS). Descriptive statistics such as percentage, mean and standard deviation were used. Chi-square test was used to determine the association between PSQI score and sociodemographic variables. Independent t test was used to test the difference between mean component scores of PSQI and ESS scores by gender. Probability value of <0.05 was considered as statistically significant.*
Results: *Of the 681 respondents, those aged 21-35 years constituted the largest proportion. The mean age of respondents was 32.19 ± 7.36 years. 37.3% of the respondents have poor sleep quality (global PSQI score > 5). Pittsburgh mean score for components 1 and 5 were higher among females as compared to males (p value<0.05). Female respondents have significant poor sleep quality as compared to male and around three-fourths who were ever married have higher score as compared to unmarried. Those currently on medication for chronic diseases were having significantly higher score as compared to those who were not taking medications (P<0.05).*
Conclusion: *Prevalence of sleep related disorder as assessed by using Pittsburgh sleep quality index and Epworth sleepiness scale was found to be 37.3 % and 24.5% respectively. Female had significantly higher PSQI score as compared to male signifying poor sleep quality. Overall, 5.4% rated their own sleeping quality as very bad sleep.*

Key words: *Sleep, Pittsburgh sleep quality index (PSQI), Epworth sleepiness scale (ESS)*

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I. Introduction

Sleep is one of the basic physiological needs for human survival and is critical to physical and mental health. The International Classification of Sleep Disorders (ICSD-2) includes over 80 specific sleep disorders[1]. Sleep related disorders (SRDs) not only impair quality of life but also pose several health-related problems and have been considered "an unmet public health problem". The cumulative long-term effects of sleep loss and sleep disorders have been associated with a wide range of deleterious health consequences, including an increased risk of hypertension, diabetes, obesity, heart attack and stroke[2]. Sleep loss is associated with adverse effects on mood and behavior leading to increase in mental distress, anxiety and depressive symptoms. Recognition and treatment of these disorders may help to prevent cardiovascular diseases, psychological disturbances and accidents and also improve individual performance[2,3]. Sleep disorder is a common complaint among the general populations of western countries, with rates of self-reported insomnia ranging between 10% and 48%[4]. The prevalence of SRDs in India was reported to be 34.2% (South India)[5] and 55% (North India)[6] with a higher rate reported among elderly (59%)[7]. Sleep disorder has a significantly negative impact on morbidity and mortality. Sleep loss and sleep disorders are among the most common yet frequently overlooked

and readily treatable health problems[2]. There is scarce literature available on sleep disorders among the general population in India especially in the north-eastern part of the country. This study was conducted to determine the prevalence of sleep related disorder among the adult population in urban communities and assess the factors associated with sleep related disorders.

II. Material And Methods

A cross-sectional study was conducted in an urban area of Imphal East district, Manipur, among the adult population of 21-45 years from May to June 2017.

Study Design: Cross-sectional study

Study Location: Conducted in an urban area of Imphal East district of Manipur. Imphal East district has a population of 4.56 lakhs with four subdivisions and total urban population of 1.83 lakhs. The district has total literacy rate of 81.9% which is comparatively higher than state average of 76.9% (Census of India 2011)[8].

Study Duration: From May to June, 2017

Sample size: 675 adults

Sample size calculation: Sample size estimated using the formula $4PQ/l^2$ was 675, based on a prevalence of 34.2% for sleep related disorders[5] and an absolute error (l) of 4% at 95% confidence level and adjusting for non-response rate of 20%.

Subjects and selection method: Three urban communities were selected by convenience sampling. A maximum of two persons were interviewed, if there were more than one eligible individual in a household. If there were more than two eligible individuals of the same sex, lottery method was used. If there are >2 eligible individuals of opposite sex, one male and one female was interviewed provided they were not husband and wife and if both the husband and wife were eligible, either one of them was interviewed. The individual was reassured about his/her anonymity. The importance of honest answer at the time of interview was emphasized and privacy was maintained by interviewing the eligible individual alone.

Inclusion criteria:

1. All adults from 21-45 years of age were included in the study
2. Either sex

Exclusion criteria:

1. Seriously ill individuals
2. Refusal to participate
3. Those who were not available on the day of visit

Procedure methodology:

Data collection was done by interviewing those eligible adults after explaining the purpose of the survey. Data were collected using a pretested structured questionnaire which included 4 sections, namely- Socio-demographic characteristics, Personal habits, Pittsburgh sleep quality index (PSQI)[9] and Epworth Sleepiness scale (ESS)[10]. PSQI & ESS are validated scales for measuring sleep related disorder. Ethical approval of the study was obtained from the Research Ethics Board, Regional Institute of Medical Sciences, Imphal. Informed verbal consent was obtained from the participants before data collection. Data collected were kept secured and password protected, accessible only to the investigators. Any personal identifiers like name and address were not collected to maintain confidentiality. Collective data and findings were reported.

Sociodemographic characteristics and personal habits

Sociodemographic data on gender, age, marital status, employment status, socioeconomic status and type of family were collected. Socio-economic status was divided into 5 classes- I (upper), II (upper middle), III (middle), IV (lower middle) and V (lower) based on the revised BG Prasad's Socio-economic classification[11] for the year 2016. Questions pertaining to personal habits include tea/coffee consumption, smoking, alcohol consumption and currently on medication other than vitamins/nutritional supplements. Smoking: Ever smokers - those who have ever smoked in their lifetime and Current smokers - those who smoke during the past one year. Alcohol consumption: Alcohol ever user - those who consumed alcohol in their lifetime and current alcohol user - those who consumed alcohol currently during the past one year.

Sleep related disorder

Pittsburgh Sleep Quality Index (PSQI): PSQI evaluates multiple dimensions of sleep over a one-month period. Nineteen individual items generate seven component scores: subjective sleep quality, sleep latency, sleep duration, habitual sleep efficiency, sleep disturbances, use of sleeping medication, daytime dysfunction. The seven component scores are summed for one global PSQI score ranging from 0-21. These seven component scores are weighted equally on a 0-3 scale, in which three reflects the negative extremity of the Likert-type

scale. A global score > 5 provides a sensitive measure of poor sleep quality. Epworth Sleepiness Scale (ESS) is a subjective measure of a person's sleepiness. The test consists of eight statements for rating tendency to become sleepy on a scale of 0 (no chance of dozing) to 3 (high chance of dozing) and total score ranges from 0-24. Score ranging from 10-24 indicates very sleepy and should consider seeking medical advice.

Statistical analyses

Statistical analyses were performed using SPSS (IBM Corp., Armonk, USA) version 21.0. Descriptive statistics such as percentages to describe the background characteristics and mean and standard deviation for PSQI and ESS scores were used. Chi-square and independent t test were used for testing the significance and probability value of <0.05 was considered as statistically significant.

III. Result

Table no. 1 shows the background characteristics of the study participants. Of the 681 respondents, every two out of three were between the age 21-35 years. The mean age of the respondents was 32.19 ± 7.36 years. Three-fifth (60%) of the sample were women. More than two-thirds were married and a little less than half of the respondents were employed: self-employed (22.2%), private-employed (16.4%) and government-employed (9.6 percent). Around three-fifths of the respondents belong to socioeconomic status class I and II. Majority of the respondents took tea or coffee, out of which one fifth of them consumed more than two times a day. Only 80 respondents were ever smokers and four-fifth of them were current smokers. Only 91 respondents were ever alcohol drinker and more than four-fifth of them were current drinkers. Around one-fifth of the respondents were taking some form of medication other than vitamins and nutritional supplements (Table 1).

Table1. Background characteristics of the study participants (N=681)

Characteristic	Number	Percentage
A. Socio-demographic		
Gender		
Male	273	40.1
Female	408	59.9
Age group (mean year±SD)	32.19±7.36	
21-25	156	22.9
26-30	149	21.9
31-35	144	21.1
36-40	115	16.9
41-45	117	17.2
Marital status		
Married	446	65.5
Unmarried	226	33.2
Separated	5	0.7
Widow	4	0.6
Occupation		
Government	65	9.5
Private	112	16.4
Self	151	22.2
Unemployed	150	22.0
Housewife	203	29.8
Socio-economic status		
Class I (Upper)	201	29.5
Class II (Upper middle)	196	28.8
Class III (Middle)	106	15.6
Class IV (Lower middle)	130	19.1
Class V (Lower)	48	7.0
B. Personal habits		
Do you take tea or coffee?		
Yes	616	90.5
No	65	9.5
If yes, how many times a day?		
1-2	469	68.9
3-4	129	18.9
≥5	18	2.2
Do you take tea or coffee before going to bed?		
Yes	36	5.7
No	580	94.3
Have you ever smoked?		
Yes	80	11.7

No	601	88.3
If yes, are you a current smoker?		
Yes	67	83.8
No	13	16.2
Have you ever consumed alcohol?		
Yes	91	13.4
No	590	86.6
If yes, are you a current drinker?		
Yes	82	90.1
No	9	9.9
Currently taking any medicine other than vitamins or nutritional supplements?		
Yes	121	17.8
No	560	82.2

Table 2 reports the seven components of sleep disturbances assessed by the PSQI of the present sample. Female respondents scored significantly higher on components 1 (subjective sleep quality) and 5 (sleep disturbances) than their male counterparts (P<0.05).

Table 2. Mean Pittsburgh Sleep Quality Index component score by gender

Components	Mean score ± SD		P-value*
	Male	Female	
1. Subjective sleep quality	0.95±0.74	1.17±0.79	<0.001
2. Sleep latency	1.10±1.09	1.19±1.10	0.28
3. Sleep duration	0.81±0.90	0.92±0.95	0.13
4. Habitual sleep efficiency	0.57±0.93	0.48±0.91	0.24
5. Sleep disturbances	0.89±0.42	0.99±0.44	0.02
6. Use of sleeping Medication	0.04±0.31	0.06±0.35	0.45
7. Daytime dysfunction	0.76±0.73	0.79±0.74	0.61

*Independent t test

Table no. 3 shows that there was no association between gender and mean Epworth Sleepiness score.

Table 3. Mean Epworth Sleepiness score by gender

Activity	Mean score ± SD		P-value*
	Male	Female	
Sitting and reading	0.85±0.93	0.88±0.99	0.61
Watching TV	0.88±1.01	0.91±1.08	0.77
Sitting inactive in a public place	0.46±0.75	0.54±0.86	0.24
As a passenger in a car for an hour without a break	0.89±1.05	0.82±1.06	0.41
Lying down to rest on the afternoon when circumstances permit	1.45±1.04	1.50±1.02	0.58
Sitting and talking to someone	0.09±0.32	0.15±0.47	0.07
Sitting quietly after lunch without alcohol	1.07±0.73	1.13±0.93	0.38
In a car while stopped for a while for a few minutes in the traffic	0.05±0.26	0.09±0.40	0.22

In this study, 37.3% of participants were assessed as poor sleeper by global PSQI scoring more than 5 and 24.5% of participants had excessive daytime sleepiness as assessed by ESS score (Table 4).

Table 4. Distribution of respondents according to PSQI and ESS score

PSQI -Global score	Number	Percentage
0-5	427	62.7
6-21	254	37.3
ESS -Global score		
0-6	403	59.2
7-9	111	16.3
≥10	167	24.5

Table no. 5 shows the association between sleep quality and socio-demographic characteristics of the participants. The prevalence of poor sleeper in females was 40.7%, which was significantly higher than that in

males. The PSQI score was significantly higher among individuals who were ever married and who never drink alcohol. Housewife have significantly higher score than other form of occupation and study participants who were taking medicines (other than vitamins and nutritional supplements) suffered more from sleep disturbance (P<0.05).

Table 5. Association between sleep quality using PSQI score and participants' background characteristics

Characteristic	PSQI score		P-value
	0-5 n(%)	6-21 n(%)	
A.Socio-demographic			
Gender			
Male	185(67.8)	88(32.2)	
Female	242(59.3)	166(40.7)	0.02
Marital status			
Ever married	270(59.3)	185(40.7)	0.01
Unmarried	157(69.5)	69(30.5)	
Occupation			
Govt employed	46(10.8)	19(7.5)	
Private	72(16.8)	40(15.7)	
Self	91(21.3)	60(23.6)	0.04
Unemployed	102(23.9)	48(18.9)	
Housewife	116(27.2)	87(34.3)	
B. Personal habits			
Ever alcoholic			
Yes	68(74.7)	25(25.3)	
No	359(60.8)	231(39.2)	0.01
Medications*			
Yes	53(43.8)	68(56.2)	<0.001
No	374(66.8)	186(33.2)	

*other than vitamins and nutritional supplements

Table 6 shows an association between daytime dysfunction (component 7) of PSQI scale with ESS score. Those having higher score of daytime dysfunction (component 7) of PSQI scale was also having higher score of ESS (≥10) which indicates excessive daytime sleepiness and it was found to be statistically significant (P<0.05).

Table 6. Association of ESS score with Component 7 (daytime dysfunction) of PQSI scale

PSQI Component 7 Daytime dysfunction	ESS score			P-value
	0-6	7-9	≥10	
Yes	225(57.3)	73(72.3)	99(64.7)	0.01
No	168(42.7)	28(27.7)	54(35.3)	

IV. Discussion

In the present study we found that the overall prevalence of sleep related disorders as assessed by Pittsburgh sleep quality index (PSQI) was 37.3%. This finding was found to be within the range (34.32% - 55%)[5,6] reported by other studies from different parts of the country. The variation in prevalence rates of sleep related disorder can be due to cultural and regional differences. Moreover, different instruments to measure sleep related disorders used in different studies limit direct comparison. In the present study females appeared to have poorer sleep and it is consistent with several other studies conducted at different places viz. South India,[5] Japan,[12] China,[13] France,[14] USA[15]. There was a significant association seen between housewives and sleep related disorder. Such an association may be mediated by psychological distress. Similar to the study conducted by Xiang YT[13], ever married had higher score in PSQI score than the unmarried in the present study. Responsibility, social stress and marriage-related problems may have contributed to the higher likelihood of sleep related disorders among the married. These issues need to be investigated further. In this study, ever alcohol drinkers are found to be less likely to have sleep related problems which is similar to the findings reported by a study in China[13]. However, alcohol is known to compromise sleep when used excessively[16]. Laboratory studies of the effectiveness of alcohol as a hypnotic show that tolerance to the effects of alcohol develops rapidly[17]. The amount, frequency and duration of alcohol intake was not taken into account in our study. The impact of drinking on sleep related problem needs to be further explored. The prevalence of excessive daytime sleepiness was high (24.5%) in this urban adult population which is much higher than that

reported by a Norwegian study[18]. There has been no attempt to assess the relation between the sleep related disorder with BMI, neck size, medical co-morbidities etc which are found to affect sleep quality and identified as some of the major causes of sleep disturbance.

V. Conclusion

Prevalence of sleep related disorder (SRD) as assessed by Pittsburgh sleep quality index was found to be high with one in three respondents reporting SRD. Female had significantly higher PSQI score as compared to male signifying poor sleep quality. Overall, 5.4% rated their own sleeping quality as very bad. One in four respondents reported subjective excessive daytime sleepiness. Awareness programmes in communities can be taken up to make people aware of poor sleep quality being associated with personal habits and other co-morbid conditions so as to enable them to recognize the problem in time and seek help. Further follow-up studies are needed to investigate the factors leading to sleep related problems.

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