

# A Study on Prevalence of Chronic Insomnia and its Association with Medical Co morbidities among Patients Attending General Out Patient Department (OPD) of a Tertiary Care Hospital of Kolkata, India

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## ABSTRACT

**Introduction:** Different studies revealed that between 10% to 30% of adults have insomnia at any given point in time and up to 50% -60% have insomnia in a given year. Study objectives were to find out the prevalence of chronic insomnia and related co-morbid medical conditions.

**Material and Methods:** An Institution based descriptive cross sectional study was conducted from 27.02.2017 to 26.03.2017 among 390 patients attended general OPD of a tertiary care teaching hospital of Kolkata using Athens Insomnia Scale by exit interview. Analysis: Epi-info version 6 software and Statistical Package for the Social Sciences SPSS Version 16.0.

**Results:** About 45.13% of the study population suffered from chronic insomnia as per AIS Score; this study found a significant association of chronic insomnia with hypertension, diabetes, high cholesterol, heart disease, kidney disease, thyroid disease, asthma and chronic pain and gastritis etc.

**Conclusion:** Every patient should be assessed for sleep pattern, screened for insomnia and should give adequate counselling for the same.

**Keywords:** Insomnia, Medical Co Morbidities, Athens Insomnia Scale

## INTRODUCTION

The word “insomnia” comes from Latin words “in”(no) and “Somnus”(sleep). Insomnia disorder is defined as a subjective perception of difficulty with sleep initiation, duration, consolidation, or quality, which occurs despite adequate opportunity for sleep, and which results in some form of daytime impairment, and is considered a major important public health problem.<sup>1-3</sup>

As per duration, insomnia is of three types- transient (symptoms lasts for less than one week), acute (inability to consistently sleep well for a period of one –four weeks/less than a month) and chronic (symptoms are present for at least 3 nights/week for at least 1 months, and not be linked to other sleep, medical, or mental disorders).<sup>4,5</sup>

Conditions that can result in insomnia include psychological stress, chronic pain, heart failure, hyperthyroidism, heartburn, restless leg syndrome, menopause, certain medications, and drugs such as caffeine, nicotine, and alcohol.<sup>6</sup>

Insomnia can be grouped into primary and secondary insomnia.<sup>1</sup> *Primary insomnia* includes the following clinical entities: (a) idiopathic insomnia,(b) psycho-physiologic insomnia,(c) paradoxical insomnia.

*Secondary insomnia* includes the following clinical entities: (a) adjustment insomnia,(b) inadequate sleep hygiene; (c) insomnia

due to a psychiatric disorder; (d) insomnia due to a medical condition; (e) insomnia due to a drug or substance.<sup>6</sup>

Worldwide epidemiological studies assessed the prevalence of insomnia without restrictive criteria as 33% in general population;<sup>7</sup> when frequency was used to determine the presence of insomnia around countries, it was 17%-34%;<sup>8,9</sup> using severity it was 18%<sup>10</sup> and symptoms with daytime consequence was around 16%.<sup>9</sup>

Thus overall globally different studies revealed that between 10% to 30% of adults have insomnia at any given point in time and up to 50% -60% have insomnia in a given year.<sup>11-13</sup>

Much of this variation in prevalence may be explained by the use of different definitions of insomnia in these studies.<sup>14</sup> Epidemiological studies on insomnia have been undertaken in different populations: primary care offices, out-patient clinics, cohorts and general populations.<sup>14</sup> Consistent risk factors for insomnia are increasing age(older than 60)<sup>13,15</sup>, female sex<sup>12,13</sup>, medical and mental comorbidity<sup>11,13</sup>, night shift work, emotional stress, unemployment and lower socioeconomic status.<sup>13</sup> The consequences of insomnia are depression, reduced work performance, work-related/motor vehicle accidents, and overall poor quality of life.<sup>16</sup>

Majority of studies about chronic insomnia were conducted abroad and there is sparse data available regarding the prevalence of insomnia in Indian patients. With this background this cross-sectional, epidemiological study, was conducted to find out the prevalence of chronic insomnia and related co-morbid medical conditions.

## MATERIAL AND METHODS

An Institution based observational descriptive study, cross-sectional in design was carried out from 27.02.2017 to 26.03.2017, a duration of 28 days (4 weeks) at General OPD of a tertiary care teaching hospital of Kolkata. Study population was patients attending the general OPD of a Tertiary care teaching hospital of Kolkata, West Bengal, India during the data

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collection period.

**Inclusion Criteria:** Age- 20 years and more, both sex, who gave informed written consent to participate in the study.

**Exclusion Criteria:** Patients with known psychiatric illness, seriously ill patients, pregnant women, and who didn't gave consent.

**Study Variables:** Age (in years), Sex (Male/Female), Residence (Urban/Rural), Type of family (Nuclear/Joint), Education (Illiterate, Primary School, Middle School, Secondary, Higher Secondary, Graduate and above), Occupation (Unskilled, Skilled, Service, Business, Student, Housewife, Unemployed), Per Capita Monthly Income (PCMI) (As per modified B. G. Prasad Scale May, 2016), Addiction (Yes/No; if yes types), Medical Co-morbidities, Eight questions of Athens Insomnia Scale (AIS).

**Study Tool:** A predesigned, structured, pretested proforma, Athens Insomnia Scale (AIS), Relevant records and reports. The proforma was designed by a research team; piloted among 30 randomly selected patients attended the same setting to assess its clarity, reliability and validity. After some minor modifications the proforma was re-evaluated by the same panel of experts. The proforma had two parts- the first part consisted of socio-demographic data (9 items -age, gender, residence, type of family, educational level, occupation, Per Capita Monthly Income/PCMI, addiction and medical co morbidities); the second part was concerned about assessment of participant's sleep pattern using 8 statements (AIS). The participants who were included in the pilot study were not included in the whole study sample.

**Sample Size:** Sample size was determined by applying the formula  $4pq/L^2$  where  $p$  is the proportion of study population having chronic insomnia,  $q$  is the proportion of study population not having chronic insomnia, and  $L$  is allowable error of 5%. Considering 33% had chronic insomnia,<sup>10</sup> with a type-1 error of 5% ( $\alpha = 0.05$ ) and 95% level of confidence, the sample size was calculated as  $4 \times 33 \times 67/(5)^2 = 354$ ; nonresponse rate was taken as 10%; hence, the target has been set to reach 390 participants to achieve the objectives of the study.<sup>10</sup>

**Sampling technique:** Selection of the study population was done by non-randomized purposive sampling technique among patients attending general OPD.

**Methods of data collection:** The purpose as well as nature of the study was explained to the study population. They were ensured about their anonymity and confidentiality.

They were told that their participation is voluntary and not compulsory. Patients who agreed to participate in the study were asked to sign a consent form/ or to give LTI and were provided with contacts of the investigators for any further inquiries. Then data collection was done by face-to-face exit interview method. At last, any questions they had were answered.

#### Operational definitions:

##### A. Residence:

1. Rural: Area under Panchayat
2. Urban: Area under Municipality/Corporation

##### B. Type of family:

1. Nuclear family: Consists of the married couple and their

dependent children

2. Joint family: Consists of a number of married couples and their children who live together in the same household, also include three generation family

##### C. Educational Qualification:

1. Illiterate: A person aged 7 years and above can't read and write with understanding in any language.
2. Primary Education: Class IV pass
3. Middle School Education: Class VIII pass
4. Secondary School Education: Class X pass
5. Higher Secondary Education: Class XII pass
6. Graduate and above

##### D. Occupation:

1. Service: who are engaged in specific job like engineers, legal professions, teachers, clerk etc.
2. Business: who are engaged in trade business, like shop owners etc.
3. Unskilled worker: who are casual workers and are engaged by others on wages on daily basis.
4. Skilled workers: who are engaged in occupation which requires training i.e. carpenter, electrician, driver etc.
5. Housewife: A married woman whose main occupation is caring for her family, managing household affairs, and doing housework.
6. Student: A person formally engaged in learning specially enrolled in a school or college.
7. Unemployed: a person without a paid job but available to work and searching for a employment.

##### E. Addiction:

1. Any substance/drug which is self-administered for nonmedical reasons, in quantities and frequencies which may impair an individual's ability to function effectively, and may result in social, physical or emotional harm.
2. Tobacco addiction is a strong craving for nicotine, a chemical in tobacco that makes it hard for people to quit tobacco despite many health risks.
3. Alcoholism: a physical dependence on alcohol.

##### F. Modified B.G.Prasad Scale, May 2016:<sup>17</sup>

##### G. Medical Co-morbidities:

1. Hypertension: As per JNC VIII criteria.<sup>18</sup>
2. Diabetes  
Fasting Plasma Glucose (FPG)  $\geq 126$ mg/dl  
or  
2 hr Plasma Glucose  $\geq 200$ mg/dl
3. High Cholesterol, Heart disease, Liver disease, Kidney disease, Thyroid disease Asthma: as per relevant records and reports.

##### H. Athens Insomnia Scale (AIS)<sup>19</sup>:

The AIS is a self-assessment psychometric instrument designed for quantifying sleep difficulty based on the ICD-10 criteria. It is measured by assessing 8 factors (provided that it occurred at least three times per week during the last month) amongst which the first 5 are related to nocturnal sleep, and the last 3 to the daytime dysfunction. These are rated from 0-3 scale and sleep is finally evaluated from the cumulative score of the factors. A cut-off score of  $\geq 6$  on the AIS is used to establish the diagnosis of insomnia.

### STATISTICAL ANALYSIS

Data were entered in Microsoft Office Excel 2010(Microsoft Corp, Redmond, WA, USA) and analysis was done using Epi-info version 6 software (Centres for Disease Control and Prevention, Atlanta, GA, USA, 2001)and Statistical Package for the Social Sciences SPSS Inc.Released 2007. SPSS for Windows, Version 16.0. Chicago. Results were expressed by tables (numbers and percentages) and by figures (pie chart and bar diagram). Association of some variables were studied using Chi square test. The odds ratios (OR) and 95% confidence intervals (CI) were also calculated. A p value of <0.05 was interpreted as significant.

### RESULTS

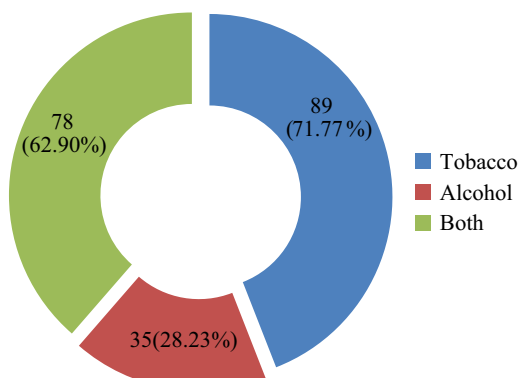
An observational descriptive cross-sectional study was conducted among 390 patients attending the general OPD of a tertiary care teaching hospital of Kolkata from 27.02.2017 to 26.03.2017 using a pre designed, structured pre tested proforma by face-to –face exit interview.

The following findings were observed:

Table 1 revealed socio demographic profile of the study population. About 39.50% of the participants belonged to the age group of 30-40 years; 68.72% were females while the rest 31.28% were males; almost 75% were from rural area; 63% belonged to nuclear family; 31.80% patients were illiterate and only 2.05% had an educational qualification of graduation and above; regarding occupation, more than half (57.44%) were housewives and 1.80% were unemployed; almost 37% of the study population belonged to social class V according to modified B. G. Prasad scale (May,2016).About 31.89% of the patients had some kind of addiction(tobacco/alcohol/both);among the addicted individuals, 94.35% were addicted to tobacco [Figure 1]. So far medical co morbidities were concerned; about 24.36% had high cholesterol,20% of had hypertension, 13.85% had Br. Asthma,11.79% had thyroid disease, 11.28% had Diabetes Mellitus,8.72% had heart disease and 31.79% had other diseases.

Figure 2 demonstrated that about 45.13% of the study population suffered from chronic insomnia as per Athens Insomnia Scale Score.

This study found a significant association of chronic insomnia with hypertension, diabetes, high cholesterol, heart disease, kidney disease, thyroid disease, asthma and chronic pain and gastritis etc.(p value<0.05) [Table 2].



**Figure-1:** Doughnut diagram showing types of addiction (N=124)\* Multiple response

### DISCUSSION

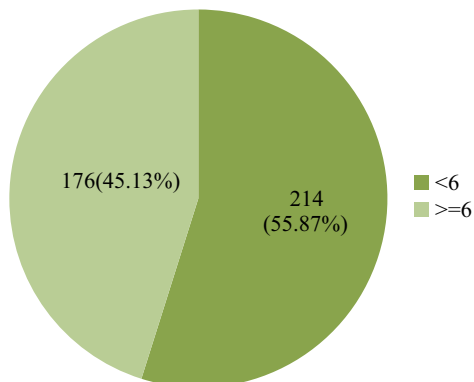
Our study findings confirmed that insomnia is common in adult Indian general population, with a prevalence of 45%; which can be compared with some previous studies conducted in India and abroad.<sup>16,20-28</sup>

Socio demographic variables	Number (n)	Percentage (%)
Age group(in years)		
20-30	83	21.28
30-40	154	39.50
40-50	83	21.28
50-60	46	11.79
60-70	24	06.15
Gender		
Male	122	31.28
Female	268	68.72
Residence		
Urban	98	25.13
Rural	292	74.87
Type of family		
Nuclear	246	63.08
Joint	144	36.92
Educational status		
Illiterate	124	31.80
Primary school	110	28.21
Middle school	85	21.79
Secondary	46	11.79
Higher secondary	17	04.36
Graduation and above	08	02.05
Occupation		
Unemployed	07	01.80
Housewife	224	57.44
Unskilled	56	14.36
Skilled	54	13.84
Student	22	05.64
Business	22	05.64
Service	05	01.28
Per capita monthly income(PCMI)		
I(>=6277)	08	02.05
II(3139-6276)	24	06.15
III(1883-3138)	73	18.72
IV(942-1882)	141	36.15
V(<942)	144	36.93
Addiction		
Present	124	31.79
Absent	266	68.21
Medical co morbidities* Multiple response		
Hypertension	78	20.00
Diabetes Mellitus	44	11.28
High cholesterol	95	24.36
Heart disease	34	08.72
Liver disease	27	06.92
Kidney disease	12	03.08
Thyroid disease	46	11.79
Asthma	54	13.85
Others (Arthritis, gout, chronic pain, migraine, gastritis etc.)	124	31.79
Total	390	100.00

**Table-1:** Distribution of the study population according to socio demographic variables (N=390)

Medical co-morbidities	Chronic Insomnia			Chi-square; p value	Odds ratio; 95%CI
	Present N=176(%)	Absent N=214(%)	Total N (%)		
<b>Hypertension</b>					
Present	49(62.82)	29(37.18)	78(20.00)	12.32;	2.46(1.47-4.10)
Absent	127(40.71)	185(59.29)	312(80.00)	0.00	
<b>Diabetes</b>					
Present	32(72.72)	12(27.28)	44(11.28)	15.25;	3.74(1.86-7.511)
Absent	144(41.62)	202(58.38)	346(88.72)	0.00	
<b>High cholesterol</b>					
Present	61(64.21)	34(35.79)	95(24.36)	18.46;	2.80(1.73-4.53)
Absent	115(38.98)	180(61.02)	295(75.64)	0.00	
<b>Heart disease</b>					
Present	24(70.59)	10(29.41)	34(8.72)	9.75;	3.22(1.49-6.93)
Absent	152(42.70)	204(57.30)	356(91.28)	0.00	
<b>Liver disease</b>					
Present	10(37.04)	17(62.96)	27(6.92)	0.76;	0.69(0.31-1.56)
Absent	166(45.73)	197(54.27)	363(93.08)	0.38	
<b>Kidney disease/Urinary problem</b>					
Present	09(75.00)	03(25.00)	12(3.08)	4.46;	3.79(1.01-14.22)
Absent	167(44.18)	211(55.82)	378(96.92)	0.03	
<b>Thyroid disease</b>					
Present	27(58.70)	19(41.30)	46(11.79)	3.87;	1.85(0.99-3.47)
Absent	149(43.31)	195(56.69)	344(88.21)	0.04	
<b>Bronchial Asthma/Breathing problem</b>					
Present	37(68.52)	17(31.48)	54(13.85)	13.84;	3.08(1.66-5.69)
Absent	139(41.37)	197(58.63)	336(86.15)	0.00	
<b>Others (Chronic pain, gastritis etc.)</b>					
Present	81(65.32)	43(34.68)	124(31.79)	29.94;0.00	3.39(2.16-5.30)
Absent	95(35.71)	171(64.29)	266(68.21)		

**Table-2:** Association of chronic insomnia with medical co morbidities (N=390)



**Figure-2:** Pie diagram showing distribution of study population as per Athens Insomnia Scale Score (N=390)

A study by Karnik et al<sup>20</sup> across 25 centres in India among hypertensive patients by means of Athens Insomnia Scale (AIS) revealed the prevalence of insomnia was 47.2%; which was corroborative with the result of the present study.

However it was quite higher than study by Roy et al<sup>21</sup> at West Bengal, India in urban population utilizing Insomnia Symptoms Questionnaire (ISQ) (15.4%); Panda et al<sup>22</sup> at South India among apparently healthy adults attending patients in a tertiary hospital using Epworth Sleepiness Scale (ESS) (18.6%); and Yardi et al<sup>23</sup> at 6 corporate offices of India among Indian corporate employees by ISQ (13.8%); moderately higher than study by Bhaskar et al<sup>16</sup> at Bengaluru in family medicine out patient clinic utilizing AIS (33%); Morphy et al<sup>24</sup> at U.K. among general population using 4 questions relating to sleep, based on work by Jenkins et

al (37%); Zailinawaton et al<sup>25</sup> in Malaysian patients attending primary care clinics using the Epworth Sleepiness Scale (ESS) (38.9%); and Kessler et al<sup>26</sup> among commercially insured health plan members in America Insomnia Survey by Brief Insomnia Questionnaire (BIQ) (23.6%). Wang et al<sup>27</sup> community adults, aged 60 years or older, who resided in four major cities in Hebei province 37.75%.

On the contrary a multinational study done by Blümel et al<sup>28</sup> in Latin American countries using Athens Insomnia Scale (AIS) among middle-aged females showed 56.6% of surveyed women suffered from either insomnia, poor sleep quality, or both.

These variations in prevalence of insomnia might be due to use of different definitions of insomnia in different studies; use of different insomnia scales (ISQ,AIS,ESS) and/or different study population.

Medical co morbidities and insomnia are often co exist.The present study also analysed the association of various medical comorbidities with chronic insomnia and described statistically significant correlation with patients having hypertension, diabetes mellitus, high cholesterol, heart disease, kidney disease, thyroid disease and bronchial asthma; which was in line with some previous studies.

In a similar study; Bhaskar et al<sup>16</sup> demonstrated that Diabetes patients suffered more from insomnia than non-diabetics (50% vs 27%). Yardi et al<sup>23</sup> showed that one of the common co-morbid conditions associated with insomnia was hypertension.

In another study, Taylor et al<sup>11</sup> among community based population at Memphis, Tennessee documented that people with chronic insomnia reported more of the following than did

people without insomnia: Heart disease (21.9% vs. 9.5%), high blood pressure (43.1% vs. 18.7%), breathing problems (24.8% vs. 5.7%), urinary problems (19.7% vs. 9.5%), chronic pain (50.4% vs. 18.2%), and gastrointestinal problems (33.6% vs. 9.2%). In contrast, people with the following medical problems reported more chronic insomnia than did those without those medical problems: Heart disease (44.1% vs. 22.8%), high blood pressure (44.0% vs. 19.3%), breathing problems (59.6% vs. 21.4%), urinary problems (41.5% vs. 23.3%), chronic pain (48.6% vs. 17.2%), and gastrointestinal problems (55.4% vs. 20.0%). When all medical problems were combined together, patients with high blood pressure, breathing problems, urinary problems, chronic pain, and gastrointestinal problems had statistically higher levels of insomnia.

Study by Kessler et al<sup>26</sup> observed that Insomnia was significantly associated with 17 comorbidities (like diabetes, cardiovascular disease, arthritis, chronic pain, gastritis, urinary problem, bronchitis etc.)

Earlier studies by Calhoun et al,<sup>29</sup> Phillips et al<sup>30</sup> and Lanfranchi et al<sup>31</sup> have revealed that there was an association between insomnia and hypertension.

Like other studies our study also had some limitations. These are: Patients may give false information; Institution based cross sectional study; Data from only one OPD was taken. Also, the prevalence of insomnia was high in this study because the study population were patients who reached out to physicians for management of their morbidities.

## CONCLUSION

Despite being the commonest sleep related problem, insomnia remains largely undiagnosed in the general population. The present study provided some idea about prevalence of insomnia among patients of Kolkata. In this study the overall prevalence of insomnia among patients who reached out to physicians for the management of their morbidities was higher (45%) than reported in general Indian population. This study also showed positive association between insomnia and some medical co morbidities like hypertension, diabetes, high cholesterol, heart disease, kidney disease, thyroid disease, bronchial asthma, chronic pain and gastritis. It may be mentioned that every patient should be assessed for sleep pattern, screened for insomnia and should give adequate counselling for the same.

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