

Epidemiology of Insomnia

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Abstract

Insomnia is a prevalent complaint and often encountered by health care practitioners. It is costly and can cause significant morbidity if not addressed appropriately. Women and the elderly tend to suffer from insomnia more than other groups of the population. Other risk factors include psychosocial stressors, psychiatric and medical problems, low income, unemployment, excessive environmental noise, not having a life partner, and job-related stressors among others.

Keywords: Prevalence of insomnia, Hypnotic use, Economic impact, Socio-demographic determinants

Sleep accounts for one third of human life and insomnia is the most common sleep-related complaint and the second most common overall complaint (after pain) reported in primary care settings [1].

Estimates of the prevalence of insomnia are variable owing, in part, to inconsistencies in definitions and diagnostic criteria for insomnia. These issues also make it difficult to define other dimensions of the condition, such as incidence and remission rates, as a uniform characterization of episode lengths is lacking; a positive finding of insomnia at baseline and at 1-year follow-up may reflect unremitting chronic insomnia or two episodes of transient insomnia [2, 3]. Currently, there are three distinct diagnostic nosologic systems for insomnia: The Diagnostic and Statistical Manual of Mental Disorders [4], The International Classification of Sleep Disorders [5], and The ICD-10 Classification of Mental and Behavioral Disorders [6].

Mellinger et al. presented data from one of the first attempts to quantify the prevalence of the disorder. Their 1979 US survey, utilizing a nationally representative sample of 3,161 people whose ages ranged from 18 to 79, found that insomnia affected 35% of the general adult population in 1 year [7]. About half of these people experienced the problem as severe [7], yet only 15% were

treated with hypnotic medications [7]. In 1996, another study by Ohayon in Montreal examined the prevalence of insomnia in a representative sample of 5,622 French subjects of 15 years of age or older. 20.1% of the participants stated that they were unsatisfied with their sleep or taking medication for sleeping difficulties [8]. A 2000 study by Leger and colleagues, in France, noted that the prevalence of frequent insomnia was 29% in a representative sample of the population that included 12,778 individuals [9]. Twenty-four percent of the Canadian English-speaking population aged 15 and above reported insomnia according to a 2001 study by Sutton et al. [10]. In a representative selection of German citizens who were older than 13 years of age, 1,997 were asked about their sleep complaints. Twenty-five percent of people suffered at least sometimes from difficulties in falling asleep and/or staying asleep, which was not due to external factors, and 7% frequently or always [11]. A similar survey in Japan, conducted in a group of 6,277 new outpatients from 11 hospitals, revealed a prevalence of 20.3% with 11.7% of the people suffering from insomnia for over a month. Only 37% were treated with hypnotics [12]. A second study in Japan, done in a representative sample ($n=3,030$) of the general population, reported almost identical results: 21.4% during the month preceding the survey [13]. A representative adult sample (18 years and above) of the Norwegian population, comprising 2,001 subjects, participated in telephone interviews, focusing on the 1-month point prevalence of insomnia and use of prescribed hypnotics. Employment of DSM-IV inclusion criteria of insomnia yielded a prevalence rate of 11.7% [14]. A prior Norwegian study had queried 14,667 subjects and reported 41.7% of the women and 29.9% of the men complaining of occasional insomnia [15].

Another study in Austria in a sample of 1,000 revealed a prevalence of 26% with 21% of them being severe and chronic with duration of 1 year or more [16]. In a representative sample of the South Korean general population composed of 3,719 noninstitutionalized individuals aged 15 years or older, the prevalence of insomnia symptoms occurring at least three nights per week was reported to be 17.0% [17]. In Mexico, the prevalence of insomnia in a group of a 1,000 subjects, aged 18–84, was found to be 36% with 16% reporting severe insomnia [18]. In Finland, an early study reported a severe insomnia (daily of several times a week) prevalence of 5–14%, depending on age group, in subjects between ages of 15 and 64. In Singapore, the prevalence of persistent insomnia for over a year was 15.3% in subjects between the ages of 15 and 55 [19]. Hyypä and Kronholm reported a male/female prevalence of 9.6/12.8% of frequent or nightly insomnia and 57.6–62.7% of occasional insomnia in a group of 1,099 subjects representative of the Finnish population [20].

There are fewer studies in the pediatric population yet they reveal, in general, similar prevalence rates. In preadolescent children, one of the earliest studies noted that 14% of an outpatient US pediatric population between the ages of 6–12 had insomnia with a mean duration of 5 years [21]. Archbold et al. at Ann Arbor surveyed parents of 1,038 unselected children (554 boys) aged 2.0–13.9 years. Forty one percent of the children had at least one symptom of insomnia and 18% had two or more symptoms [22]. The prevalence of frequent insomnia in 1,413 schoolchildren aged 6.2–10.9 years in Sweden was reported to be 13% [23].

In adolescent groups, the prevalence of insomnia appears to be similar to that of younger children. In a Chinese study, a total of 1,365 adolescents

between the ages of 12 and 18 years were surveyed and 16.9% reported insomnia [24]. A multinational study in Europe, in a representative sample of 1,125 adolescents aged 15–18 years, from four countries (France, Great Britain, Germany, and Italy) reported insomnia symptoms in approximately 25% and DSM-IV insomnia disorder in approximately 4% [25]. Previous studies had reported prevalence rates of 4–5% for persistent insomnia in a group of 574 (aged 7–17) [26], 10.8–33.2% for frequent insomnia (at least twice a week) in a group of 40,202 children aged 11–16 [27], 11–12.6% for frequent insomnia [28–30], 23–38% for occasional insomnia, and 1–2% for persistent insomnia [31]. In summary, various from different countries suggest that insomnia is a universal complaint, and that it is commonly expressed, making it a major health issue.

In a recent review by Ohayon [32], an attempt was made to determine the prevalence of insomnia based on four categories; (1) Insomnia symptoms of difficulty in initiating and maintaining sleep or nonrestorative sleep; (2) Insomnia symptoms accompanied by daytime consequences; (3) Dissatisfaction with sleep quality or quantity; (4) Insomnia diagnosis based on definitions established by DSM-IV or ICSD. The first category based on insomnia symptoms alone revealed a prevalence of 30–48%. This dropped to 16–12% when frequency modifiers were added to symptoms such as presence of symptoms to at least three nights a week or “often” or “always.” When severity criteria were added to insomnia symptoms the prevalence of insomnia ranged from 10 to 28%. The prevalence of insomnia based on insomnia symptoms with daytime consequences (category 2) was around 10%. The prevalence of insomnia based on dissatisfaction with sleep quality and quantity (category 3) was 8–18% with a higher prevalence being consistently reported in females. The prevalence of insomnia based on DSM-IV classification varied from 4.4 to 6.4%. Primary insomnia was the most frequent diagnosis, its prevalence ranging between 2 and 4%.

Sociodemographic Determinants

Most epidemiological studies indicate that women, the elderly, and people with coexisting health problems are more likely to suffer from insomnia [33].

Gender

All of the available epidemiological studies that compare the prevalence of insomnia between the genders report a higher prevalence in women [8]. The female to male ratio is roughly 1.5/1 [33]. This is especially true when comparing peri- or postmenopausal women with age-matched men. One of the most common perimenopausal symptoms in women ranging in age from 35 to 55 is insomnia [34, 35].

There are, however, other studies that report an increased prevalence of insomnia in younger women, and even in adolescent girls, when compared with age-matched male counterparts. When studying a group of children and adolescents between ages of 3 and 14 ($n=452$), Camhi et al. found that the complaints of insomnia were much higher in adolescent girls (aged 11–14) than in the rest of the group (30.4–16.8%) [36]. This suggests that insomnia or the processes that produce it are operant in women as early as adolescence.

The increased prevalence of insomnia in adult women of all ages when compared with men seems to be a universal phenomenon. Studies from Hong Kong [37, 38], Germany [39], Canada [8, 13], the USA [2, 40], Norway [15], Scotland [41], and other countries [42, 43] have all reported increased prevalence in adult women when compared with age-matched male counterparts.

Age

Advancing age is thought to be a risk factor for developing insomnia. The odds ratio was noted to be 1.3 in one study [33]. Despite other reports of increased prevalence of insomnia with aging [13, 14], a few studies that involve elderly populations exclusively have failed to demonstrate this effect [42, 44, 45]. In 2001, Ohayon et al. surveyed 13,057 subjects, whose ages were above 15 years, from three different countries (United Kingdom, Germany, and Italy). Insomnia symptoms were reported by more than one-third of the population aged 65 and older. Multivariate models showed that age was not a predictive factor for insomnia symptoms when controlling for activity status and social life satisfaction. The authors concluded that the aging process per se is not responsible for the increase of insomnia often reported in older people. Instead, inactivity, dissatisfaction with social life, and the presence of organic diseases and mental disorders were the best predictors of insomnia, with the contribution of age being insignificant. In this study, the prevalence of insomnia symptoms in healthy seniors was similar to that observed in younger individuals [46].

Ethnocultural Factors

The few studies that have looked at the impact of ethnocultural variables on insomnia have shown that, among the elderly, European Americans more frequently complained of insomnia than African Americans [47, 48] and had a greater reliance on sleep medications [48].

Shift Work

Several studies have demonstrated that rotating daytime shift workers report sleep onset insomnia more frequently than the fixed daytime schedule workers (20.1% vs. 12.0%) [49], with the complaints of insomnia increasing in proportion to the number of shifts worked. Insomnia and other sleep complaints are significantly more common in three-shift workers than in two-shift workers. By the same token two-shift workers complain more of insomnia than straight-day shift workers [50]. Working the night or third shift may not only acutely cause insomnia but may have persistent deleterious effects on sleep quality, when adhered to for prolonged periods of amount of time, even after reversion to day or evening shifts [51].

Other Factors

Occupation, socioeconomic status, marital status, mental and physical health also impact the prevalence of insomnia. A few studies have reported a direct relationship between unemployed status [8, 13, 38, 52], lower socioeconomic status [33, 38] and lower educational level [38], and increased prevalence of insomnia. Higher prevalence of complaints of insomnia has also been reported

among single, widowed, or divorced adults as compared with ones who were in a marital relationship [8, 12, 52]. Noisy environments are associated with increased reports of poor sleep particularly in women [38, 53]. Psychosocial stressors appear to be a risk factor for insomnia as well [24]. Poor physical health is also associated with a higher prevalence of insomnia [12, 24, 33, 37, 43–45] as is poor mental health [12, 43–45]. Medical problems associated with insomnia include depressive disorders [44, 54], anxiety disorders [54, 55], substance abuse [55], schizophrenia [54], congestive heart failure, obstructive airway disease and other respiratory illnesses [56], back and hip problems, and prostate problems [57].

Seasonal differences have been reported in patients suffering from chronic insomnia. In Norway, a survey of a representative sample of 14,667 adults living in the municipality of Tromsø, north of the Arctic Circle, revealed increased incidence of complaints of insomnia during the dark period of the year than during any other time [15].

Psychiatric Disorders

In 1989, Ford and Kamerow utilized standardized questionnaires in 7,954 subjects at baseline and a year later. Of this community 10.2% had insomnia at baseline. The risk of developing new major depression following the course of 1 year was much higher in those who had insomnia at baseline, and in those in whom insomnia had not resolved by the time of the second visit [58].

In 1997, Chang et al. published a landmark paper on the subject of insomnia and its relation to the development of depression. A total of 1,053 men provided information on sleep habits during medical school at The Johns Hopkins University (classes of 1948–1964) and were followed since graduation. During a median follow-up period of 34 years (range 1–45), 101 men developed clinical depression (12.2%) and 13 committed suicide. A Cox proportional hazards analysis adjusted for age at graduation, class year, parental history of clinical depression, coffee drinking, and measures of temperament revealed that the relative risk of subsequent clinical depression was greater in those who reported insomnia in medical school [59]. In the same year, Weissman et al. published a study that reported data from a survey of over 10,000 adults living in three US communities. Psychiatric disorders were assessed utilizing a structured diagnostic interview, and the prevalence of insomnia, not due to medical conditions, medication, drug or alcohol abuse, during the subsequent 1-year of follow-up was assessed. The results revealed that 8% of subjects who had primary insomnia had sought psychiatric help at the end of that year for different psychiatric problems vs. 2.5% of the normal controls. Uncomplicated or primary insomnia was also associated with an increase in risk for first onset of major depression, panic disorder, and alcohol abuse over the following year [54]. These and similar studies have suggested that insomnia is a risk factor for the development of major depression and other psychiatric disorders [60].

Morbidity and Mortality

A number of studies have demonstrated a decreased quality of life as a direct consequence of the insomnia. Chevalier et al., using the SF-36, demonstrated that the degree of impairment in quality of life was directly proportional to

the severity of insomnia. They also demonstrated that individuals with severe insomnia showed a higher level of healthcare utilization [42]. Hajak and the SINE group (Study of Insomnia in Europe) in Germany and Leger and colleagues in France reported very similar results regarding quality of life and health care utilization [39, 61]. Zammit et al. and Hatoum et al., independently, reported similar results in the USA [62, 63]. Cognitive deficits identified on objective testing have been associated with chronic, persistent, insomnia as well [64, 65].

The limited numbers of studies that have examined the association between insomnia, its treatment, and mortality have been inconsistent. Kripke et al. followed 1.1 million subjects for 6 years. Insomnia alone was not associated with increased mortality [66]. However, another study showed that mortality risk over a 6-year follow-up period was significantly elevated in older adults who used medications other than traditional hypnotics for improved sleep [67]. There is an association between difficulties falling asleep and mortality due to coronary artery disease in men [68].

Epidemiology of Hypnotic Use

The use of hypnotics increases with age, particularly among middle aged and elderly women [69, 70]. Sleeping pill use varies with occupation. According to one study, the rate of frequent or habitual hypnotic use among male gardeners, female social office workers, and male construction workers was higher than the rate in other surveyed occupations [71]. Alcohol is the most commonly used hypnotic among insomniacs (roughly 15% have reported using alcohol for insomnia) [55, 72]. Between 1987 and 1996 there was a dramatic shift, in the USA, toward the use of antidepressants instead of hypnotics for the symptomatic treatment of insomnia, despite a paucity of data regarding their efficacy, and despite the potential for serious side effects [73]. Antidepressants and over-the-counter sleep aids remain the most commonly recommended and prescribed treatments for insomnia complaints [73]. Despite the safety profile of benzodiazepine receptor agonists they remain less utilized in the USA, possibly owing to concerns regarding their potential for dependence and abuse and their DEA status as “scheduled” agents [74].

Economic Impact of Insomnia

Insomnia costs the American public \$92.5 to \$107.5 billion annually, in both direct and indirect expenses, due to medical procedures and medications, accidents, and reduced productivity associated with absenteeism and decreased work efficiency [75]. Insomnia sufferers place a significant burden on both the health care system and their employers [76]. Weissman et al. noted that insomnia sufferers were more prone to access medical and psychiatric care providers during a 1-year follow-up period [54]. In 1995, Walsh and Engelhardt reported a total direct cost of \$13.9 billion in the USA [77].

Conclusion

Insomnia is a prevalent complaint and often encountered by health care practitioners. It is costly and can cause significant morbidity if not addressed appropriately. Women and the elderly tend to suffer from insomnia more than other groups of the population. Other risk factors include psychosocial stressors, psychiatric and medical problems, low income, unemployment, excessive environmental noise, not having a life partner, and job-related stressors among others.

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