Original Article

Prevalence and associated risk factors of insomnia among adults attending primary health care settings in the Kingdom of Bahrain

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Abstract

Background: Insomnia patients often visit their primary care physician, but their sleep disorders go undiagnosed and many sufferers do not receive adequate care. This study aims to detect insomnia among adults in Bahrain and its associated risk factors in order to provide a better quality of sleep for these individuals. **Methods:** A cross-sectional study was conducted in a primary health care center with 400 adult participants in Bahrain. The study participants completed a self-administered questionnaire containing two parts: a structured part for sociodemographic and lifestyle factors, and the AIS. **Results:** Among the participants, 59% had insomnia. The highest prevalence was among students (80%) ($P < 0.001$). Regarding risk factors, insomnia was more prevalent in females (64.5%) ($P = 0.017$), unmarried (66.9%) ($P = 0.037$), and those who practiced physical activity less than 30 minutes per day (53.9%) ($P = 0.032$). **Conclusion:** Insomnia is a prevalent problem among primary healthcare attendees that needs special attention. It is mostly associated, according to this study, with young age < 30 years, female sex, being a student, and physical inactivity.

Keywords: Athens insomnia scale (AIS), Bahrain, insomnia, prevalence, primary care, risk factors, sleep

Introduction

Insomnia is the most common sleep disorder, defined by WHO as taking longer than 30 minutes to fall asleep, a total of 30 minutes and more of wakefulness during the night, and less than 6.5 hours of total sleep.[1] A report of sleep disturbance should accompany distress or impairment of daytime functioning.[1] The difficulty sleeping should occur at least three times weekly for one month.[1]

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Globally, insomnia prevalence ranges from 10% to 60% across different populations,[2] Various criteria are used to define insomnia, explained by wide population characteristics.[1]

Insomnia is associated with several risk factors, with a higher prevalence among females, older adults, working shifts, and comorbid medical disorders.[1] Lifestyle habits have been reported to increase insomnia risk such as drinking caffeine, alcohol, smoking, exercising, napping, and bedtime.[2] Insomnia is associated with reduced quality of life, work-related accidents, impaired work, and social functioning,[3] and cardiovascular outcomes, mental disorders,[4] and suicide in severe cases.[2]

Multiple studies have been carried out about the Prevalence of Insomnia. In England, the prevalence was 29%,[5] while

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in Canada, 13.4% according to DSM IV criteria and ICD 10th edition, Insomnia was associated with female sex, older age, and poorer self-rated physical and mental health.[6]

In India, the prevalence of insomnia was 33% using the Athens insomnia scale and was associated with increasing age and diabetes.[7] While in Egypt, the prevalence of insomnia in the elderly was 33.6%, associated with unmarried status, smoking, and asthma.[3]

The prevalence of insomnia in China was 24.8%, associated with females, higher years of education, and chronic diseases. While protective factors were being married and older age.[8]

In Lebanon, insomnia prevalence was 47.1% using AIS. Higher prevalence was associated with drinking caffeine before sleep more than 2 days per week.[9]

In Saudi Arabia, several studies were conducted to investigate insomnia prevalence, with 51.1% in Jeddah,[10] 60.1% in Aseer,[11] and 77.7% in Riyadh.[12] In Jeddah, poor sleep quality was associated with female sex, young age <37, exercising more than four times per week, drinking coffee, and earning high income.[10] In Aseer, people aged 25–40, those over 40 years, with insufficient income, smokers, those underweight, and people with chronic diseases had a more prevalence of insomnia.Click or tap here to enter text.[11] While in Riyadh, insomnia was higher in females, elderly, widowed or divorced, housewives, low educated, and excessive tea drinkers.[12]

In Qatar, insomnia prevalence ranged from 3% (using DSM-V criteria) to 5.5% (using the Sleep condition indicator score). Insomnia is related to Arab ethnicity, young age, unemployment, married status, school education less than high school, poor health, depression, and anxiety.[13]

In Bahrain, there are only two studies about insomnia. The first is among doctors with on-call duties with a prevalence of 77.4%.[14] The second study was done by Arabian Gulf University students for nurses in tertiary-care hospitals.[15] Insomnia was most prevalent in young Bahraini nurses in the surgical and pediatrics departments, with a prevalence of 85.5% and 80%, respectively.[15]

Despite numerous studies demonstrating insomnia's prevalence in primary care settings and its potential consequences, data is limited in Bahrain. Insomnia patients often visit their primary care physician, but their sleep disorders go undiagnosed. Many sufferers receive sleep hygiene advice instead of proper cognitive behavioral therapy for insomnia and pharmacotherapy, which is not accessible in primary care settings.[12,16]

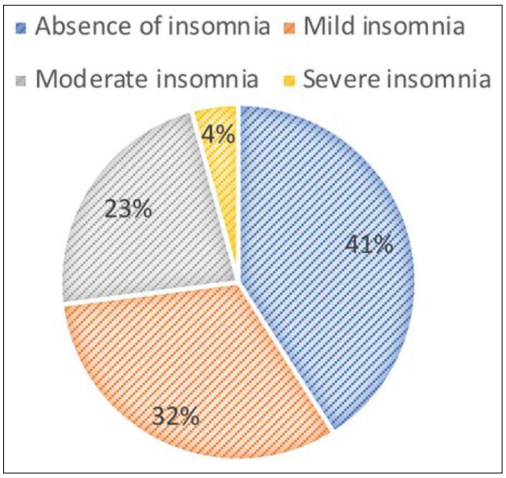

Figure 1: Participants insomnia severity according to athens insomnia scale (Total = 400)

Table 1: Sociodemographic characteristics and lifestyle activities of participants (Total=400)

	n (%)
Age	
<30 years	119 (29.8)
30–39 years	113 (28.3)
40–49 years	89 (22.3)
50–59 years	38 (9.5)
≥60 years	41 (10.3)
Mean±SD	38.4±14
Sex	
Male	186 (46.5)
Female	214 (53.5)
Marital status	
Single	104 (26)
Married	282 (70.5)
Widow	8 (2)
Divorced	6 (1.5)
Occupation	
Employed	219 (54.8)
Unemployed	84 (21)
Student	45 (11.3)
Retired	52 (13)
Working night shifts	
Yes	45 (20.5)
No	174 (79.5)
Physical activity (more than 30 minutes)	
None	194 (48.5)
1–3 times/week	145 (36.3)
≥4 times/week	61 (15.3)
Consume caffeine regularly	
Coffee	217 (54.3)
Tea	268 (67)
Energy drinks	51 (12.8)
No consumers	80 (20)
Smoking status	
Smoker	66 (16.5)
Non-smoker	313 (78.3)
Ex-smoker	21 (5.3)
Chronic Diseases	
None	287 (71.8)
Yes	113 (28.2)

Chronic diseases. 1. Hypertension, diabetes, Heart disease, respiratory disease, Anemia, Behçet's disease, Cancer, Dyslipidemia, Eczema, Gastritis, Gastroesophageal reflux disease, Hypothyroidism, Inflammatory bowel disease, Irritable bowel syndrome, Liver transplant, Obesity, Orthostatic hypotension, Osteoporosis, Rheumatoid arthritis, Sinusitis, Urticaria

Primary care physicians are the first medical encounter with the community thus screening for insomnia should be a part of the clinical consultations as it carries the burden on an individual's life, early detection of sleep disturbance may prevent long-term mental, social, financial, and physical burden.

Method

Study design and setting

This cross-sectional study was conducted in April–May 2023 in Primary healthcare centers in the Kingdom of Bahrain. There are 28 health centers distributed among five health regions. In each region, there is an average of five to six health centers. We selected two health centers from each region: region-one, BBK Hidd, and Halat Bu Maher Health Centers; region-two, Shaikh Sabah Alsalem and Jidhafs Health Centers; region-three, Yousif Engineer and Shaikh Jabber Alsabah Health Center; region-four; Hamad Kanoo and Aali health-center; and region-five, Kuwait and Mohamed Jassim Kanoo Health Center.

Table 2: Association between Sociodemographic characteristics and lifestyle activities with presence of insomnia

Characteristics	Present *n* (%)	Absent *n* (%)	*P*
Age			
<30 years	80 (67.2)[a]	39 (32.8)	0.044
30–39 years	67 (59.3)[a]	46 (40.7)	
40–49 years	52 (58.4)[a,b]	37 (41.6)	
50–59 years	15 (39.5)[b]	23 (60.5)	
≥60 years	22 (53.7)[a,b]	19 (46.3)	
Sex			
Male	98 (52.7)	88 (47.3)	0.017
Female	138 (64.5)	76 (35.5)	
Marital status			
Married	157 (55.7)	125 (44.3)	0.037
Unmarried	79 (66.9)	39 (33.1)	
Occupation			
Employed	123 (56.2)[a]	96 (43.8)	<0.001
Unemployed	58 (69)[b]	26 (31)	
Student	36 (80)[b]	9 (20)	
Retired	19 (36.5)[c]	33 (63.5)	
Working night shifts			
Yes	29 (64.4)	16 (35.6)	0.209
No	94 (54)	80 (46)	
Physical activity (more than 30 minutes)			
Yes	111 (53.9)	95 (46.1)	0.032
No	125 (64.4)	69 (35.6)	
Consume coffee regularly			
Yes	131 (60.4)	86 (39.6)	0.544
No	105 (57.4)	78 (42.6)	
Consume tea regularly			
Yes	158 (59)	110 (41)	0.979
No	78 (59.1)	54 (40.9)	
Consume energy drinks regularly			
Yes	32 (62.7)	19 (37.3)	0.560
No	204 (58.5)	145 (41.5)	
Smoking status			
Smoker	39 (59.1)	27 (40.9)	0.984
Non-smoker	185 (59.1)	128 (40.9)	
Ex-smoker	12 (57.1)	9 (42.9)	

Note: The overall prevalence of insomnia is 59%; Each subscript letter denotes a subset of age or occupation categories whose proportions do not differ significantly from each other at 0.05 level

Study population

Study participants include all adults ≥18 years old, Bahraini, both sexes, and Arabic and/or English speaking attending Primary Care for any reason in Bahrain. Exclusion criteria were individuals with a language barrier, severely ill, and who were uncooperative.

Sample size calculation and technique

The sample size was calculated by an expert epidemiologist using the formula below

$$n = \frac{z^2 p(1-p)}{d^2}$$

Based on the formula the estimated sample size to be studied is 385 ≃ 400. Therefore, the required sample size is 400. (Z 1.9, P expected prevalence, D precision, CI 95% margin of error 5% power 80%)

Simple random sampling using the Excel Randomization tool, two health centers from each region were chosen, and ten primary health centers were selected, 40 participants from the selected health centers were approached equally from waiting areas in primary health centers to fill out the questionnaire by convenient sampling. The process took place during the morning and evening shifts.

Study tools and data collection

A self-administered questionnaire was given to participants in either Arabic or English. It was composed of two parts: a structured part for Socio-demographics and lifestyle factors[2,6,8] and the AIS (valid Arabic version).[17]

Validation of Arabic versions of study tool

Athens Insomnia Scale is a self-assessment psychometric instrument designed for quantifying sleep difficulty based on the ICD-10 criteria. It assesses night symptoms and daytime symptoms. Night symptoms include difficulty commencing sleep, difficulty maintaining sleep (awakening during the night), early morning awakening, total sleep duration, and overall quality of sleep problems. Daytime symptoms include overall functioning (physical and mental) during the day, sleepiness during the day, and a sense of well-being during the day. Items of the AIS were rated from zero to 3, with 0 corresponding to no problem at all and 3 to a very serious problem.[18] The interpretation will be as follows: absence of insomnia (0–5), mild insomnia (6–9), moderate insomnia (10–15), and severe insomnia (16–24).[18]

AIS was translated, examined, and validated in a previously published Arabic research.[19]

A pilot study was done and distributed to 20 candidates. The purpose was to test the questions for any ambiguity and assess the practicability and feasibility of using the structured questionnaire. It also helped to determine the time needed for finishing the questionnaire. The candidate needed about 5–7 min to finish the questionnaire, and they did not experience any difficulties. The pilot study is not included in the sample size.

Data analysis

Data entry and analysis were carried out using SPSS 26 software. Frequencies and percentages were computed for categorical variables, while means and standard deviations were computed for quantitative variables. Independent samples *t*-test was used to determine whether there was a significant difference in mean scores between two groups, while ANOVA was used to determine whether there was a significant difference in mean scores between more than two groups. Finally, binary logistic regression was carried out to explore the risk factors that have an impact on insomnia. A *P* value of less than 0.05 was considered statistically significant.

Ethical approval

Written consent was obtained from all participants. The questionnaire was anonymous and confidentiality was ensured. Approval from the Primary Care Research Committee was taken to conduct the research and data collection from the selected health centers.

Result

The study included 400 participants as shown in Table 1. The mean age was 38.4 (SD = 14). Females were 214 (53.5%). Married were 282 (70.5%). Of the total population surveyed 219 (54.8%) of the participants were employed. Of those who were employed, 45 (20.5%) were working night shifts. Regarding physical activity, 194 (48.5%) participants were not engaged in physical activity. Out of the studied population, caffeine consumers were 217 (54.3%). According to the smoking status, 313 (78.3%) were nonsmokers.

Insomnia severity was assessed according to the AIS as in Figure 1. A total of 164 (41%; 95% CI = 36.2%–45.8%) people had no insomnia and 128 (32%; 95% CI = 27.4%–36.6%) had mild insomnia. Moreover, those who had moderate insomnia were 91 (22.8%; 95% CI = 18.6%–26.9%), and those with severe insomnia were 17 (4.3%; 95% CI = 2.5%–6.7%). The mean score of AIS is 7.1 (SD = 4.2) out of a total score of 24.

Table 2 shows the association between sociodemographic characteristics and lifestyle activities with the presence of insomnia was studied. In comparison to other age groups, sleep quality was mostly affected in the age group less than 30 (80 (67.2%)) and least affected in the age group between 50 to 59 years (15 (39.5%)) (P = 0.044). According to sex and marital status, it was more prevalent in females (138 (64.5%)) (P = 0.017). Among occupation categories, students had the highest prevalence of insomnia (36 (80%)) and retirees the lowest (19 (36.5%)) (P < 0.001). It was found that 29 (64.4%) of employers who work night shifts suffer from insomnia (P = 0.209). In addition, insomnia was present more in those who did not do any kind of physical activity (P = 0.032).

According to the post-hoc test, there is a significant difference in the prevalence of insomnia between less than 30 years participants (80 (67.2%)) and 50–59 years participants (15 (39.5%)), besides the group between 30 and 39 years participants (67 (59.3%)) and 50 and 59 years participants (15 (39.5%)). Moreover, there is a significant difference in the prevalence of Insomnia between employed participants (123 (56.2%)) and each of the unemployed (58 (69%)), students (36 (80%)), and retired (19 (36.5%)). In addition, there is a significant difference in the prevalence of Insomnia between retired (19 (36.5%)) and both unemployed (58 (69%)) and students (36 (80%)).

As shown in Table 3 independent sample *t*-test was performed for the independent variables to compare the mean score for the AIS for sex, marital status, working night shifts, physical activity >30 minutes, coffee, tea, energy drinks consumption, smoking status, and chronic diseases. No significant difference in the mean score was found for working night shifts, physical activity, coffee, tea, and energy consumption, smoking, and chronic diseases (P > 0.05). A significant difference in the mean score was found for sex, male (M = 6.4, SD = 4.1) and female (M = 7.6, SD = 4.2; t (398) = −2.8, P < 0.005. The magnitude of the differences in the means (MD = −1.2, P 95% CI: −2.002 to − 0.35) was very small (eta squared = 0.02). Furthermore, there was a significant difference in the mean score for married (M = 6.8, SD = 4.10 and unmarried (M = 7.76, SD = 4.4; t (398) = −2.17, P = <0.03. The size of the difference in the means (MD = −0.997, 95% CI: −1.902 to −092 was small (eta squared = 0.01)

A one-way between-groups ANOVA was conducted to explore the impact of age and occupation on the AIS, for age, participants were divided into three groups 1: <30 years; 2: 30–49 years; and 3: >50 years. There was a statistically significant difference at P < 0.05 level in the Athens Insomnia score for the three age groups: F (2,397) =3.8, P = 0.022. Despite reaching significance, the actual difference in mean scores between the groups was quite small. The effect size calculated using eta squared was 0.02. Post-hoc comparisons using the Tukey HSD test indicated the mean score for group 1 (M = 7.82, SD = 4.3) and group 3 (M = 6.15, SD4.2) (P < 0.018). For occupations, participants were divided into four groups, group 1: employed, 2: unemployed, 3: students, and 4: retired. One-way between-groups ANOVA was conducted to explore the Impact of occupation on the AIS. There was a significant difference at the P = 0.5 level in the Athens insomnia score for the four groups F (3, 396) = 8.084, P = 0.0. Although significant, the actual difference in mean scores between the groups was moderate, (eta squared = 0.06). Post-hoc comparisons between the groups indicated that the mean scores for the groups were significantly

different from each other. There is a significant difference in mean Insomnia score between employed participants (M = 6.7, SD = 4) and unemployed participants (M = 8.1, SD = 4.4), between employed participants (M = 6.7, SD = 4) and students (M = 8.8, SD+ 4.1), between unemployed participants (M = 8.1. SD = 4.4) and retired participants (M = 5.3, SD = 4), and between students (M = 8.8, SD = 4.1) and retired participants (M = 5.3, SD = 4); $P < 0.036$ to $P < 0.01$.

According to Table 4: Direct logistic regression was performed to assess the impact of several factors on the likelihood that respondents would report that they had a problem with their sleep. The model contained five independent variables (age, sex, marital status, occupation, and physical activity. The full model containing all predictors was significant χ^2 (5, N = 400) = 43.4 $P < 0.00$, indicating that the model was able to distinguish between respondents who reported and did not report sleep problems on the AIS. The model as a whole explained between 10.3% and 13.9% of the variance in sleep status and correctly classified 64.1% of cases. Only three of the independent variables that made a unique statistically significant contribution to the model were unemployed, students, and lack of physical activity. The strongest predictor of reporting a sleep problem was students, recording an OR of 5.9 (95% CI = 1.6 to 18.9, $P < 0.003$).

Table 3: Difference in the mean score of insomnia according to sociodemographic characteristics

	Athens Insomnia Score Mean (SD)	*P*
Age		
1.<30 years	7.8 (4.3)	0.022
2. 30–49 years	7 (4.1)	
3. ≥50 years	6.2 (4.2)	
Sex		
Male	6.4 (4.1)	0.005
Female	7.6 (4.2)	
Marital status		
Married	6.8 (4.1)	0.031
Unmarried	7.8 (4.4)	
Occupation		
1. Employed	6.7 (4)	<0.001
2. Unemployed	8.1 (4.4)	
3. Student	8.8 (4.1)	
4. Retired	5.3 (4)	
Working night shifts		
Yes	7.4 (4)	0.190
No	6.5 (4)	
Physical activities (more than 30 mins)		
Yes	6.8 (4.3)	0.304
No	7.3 (4.1)	
Consume coffee regularly		
Yes	7.1 (4.1)	0.704
No	7 (4.4)	
Consume tea regularly		
Yes	7.2 (4.3)	0.467
No	6.8 (4.1)	
Consume energy drinks regularly		
Yes	7.8 (5.1)	0.202
No	7 (4.1)	
Smoking status		
Smoker	7.1 (4.2)	0.999
Non-smoker	7.1 (4.2)	
Chronic disease		
Yes	6.81 (4.3)	0.465
No	7.16 (4.2)	

Discussion

The study investigates insomnia among Bahraini adults attending local health centers in the Kingdom of Bahrain. The prevalence of insomnia was 59%. It is almost similar to the prevalence of insomnia among primary care attendees in previous studies conducted in various cities in Saudi Arabia: Aseer (60.1%),[11] Riyadh city (57.1%),[12] and Jeddah (51.1%)[10] However, our prevalence was higher than Qatar's, which ranged from 3% to 5.5% using DSM V criteria for insomnia[13] and Canada according to DSM IV and ICD 10th, which was 13.4%. 4 Three more studies using the AIS resulted in a lower prevalence rate: Egypt (33.6%), India (33%)[7], and Lebanon (47.1%).[9] Differences may be attributed to various socioeconomic characteristics of our population.

The univariate analysis of this study showed that the presence of insomnia differs significantly according to age groups, with higher prevalence among the age group less than 30 years old. Previous studies reported a significant association between age and insomnia. Some found that younger age participants have more sleep problems than older ones, like the study conducted in China,[8] Qatar,[13] and Jeddah.[10] While a study in Riyadh city found contralateral results; participants aged more than 40 have

Table 4: Binary logistic regression of risk factors on insomnia

	Odd Ratio	95% CI for Odd Ratio	*P*
Age			
<30 years	1.253	(0.584–2.687)	0.562
30–49 years	1.500	(0.776–2.898)	0.228
≥50 years (Reference)			
Gender			
Female	1.198	(0.763–1.881)	0.432
Male (Reference)			
Marital status			
Unmarried	1.158	(0.676–1.987)	0.593
Married (Reference)			
Occupation			
Employed	1.702	(0.796–3.638)	0.170
Unemployed	2.995	(1.339–6.698)	0.008
Students	5.906	(1.850–18.850)	0.003
Retired (Reference)			
Physical activity (>30 minutes)			
No	1.695	(1.105–2.603)	0.016
Yes (Reference)			

poor sleep quality[12] attributed to the specific characteristics of the early adulthood stage of life.

In our study, the female sex is strongly associated with a high prevalence; this correlates with the results of the studies conducted in Canada,[6] China,[8] Jeddah,[10] and Riyadh.[12] Findings can be attributed to the hormonal changes in females: during the menstrual cycle, pregnancy, postpartum, and peri-menopausal period. Locally, mothers are the primary caregivers, especially in the early years of their child's life; thus their sleeping cycle is affected by the child's awakenings and sicknesses.

The presence of insomnia was significantly affected by marital status; the highest prevalence was seen among unmarried participants, which is similar to the study done in Egypt[3] and China[8] whereas in Riyadh city, insomnia was prevalent among widowed and divorced individuals.[12] On the contrary, the prevalence in Qatar is higher among married participants.[13] Lower prevalence among married participants reflects the positive impact of marriage and family support on mental health and overall well-being.

A significant relationship between insomnia and unemployment is seen as inconsistent with the Qatar study.[13] The relationship between unemployment and insomnia is reasonable, as unemployed participants are at higher risk of anxiety and financial stress. The highest prevalence was seen among student participants; this could be attributed to time spent on college tasks. No correlation is found with shift employment, attributed to a small percentage of shift workers in our sample, similar to the Jeddah study.[10] Lower prevalence was reported among physically active participants; in contrast to the Jeddah study.[10] It is well known that regular exercise improves the quality of sleep.[20]

No significant relation is noted with consuming caffeinated drinks, contrary to Jeddah and Aseer's studies.[10,11] This result can be explained by the chronic consumption of caffeine-containing drinks in our culture, which may lead to tolerance. Unfortunately, this study did not address the amount of caffeine consumed by participants; this also can explain the negative correlation.

Chronic diseases are not observed as a risk factor, in oppose to Aseer.[11] This may be attributed to the small percentage of people aged 50–59 (9.5%) and above 60 (10.3%), as they are at increased risk of having chronic diseases.

Limitations

The study design is cross-sectional which is not sturdy in providing information on the causality of the associations. The use of a self-administered questionnaire increased the possibility of participant bias. However, employing a valid assessment instrument could reduce the probability of bias. Moreover, the study was conducted in the month of Ramadan, this may have affected the participant's sleep schedule.

Recommendation

We recommend the use of insomnia screening and diagnostic tools as part of clinical assessment for high-risk individuals. We suggest that family physicians offer CBT-I to their patients.[21,22] Moreover, we recommend more health promotion campaigns, which will increase the awareness of sleep hygiene in such high-risk groups. We encourage future longitudinal studies to assess the impact of social crisis and mental health on insomnia.

Conclusion

Our study demonstrated that 59% of the population has insomnia, and that there is an association with young age < 30 years, female sex, being a student, and not doing physical activity. Thus, special attention is needed to these risk factors while screening individuals for insomnia.

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Conflicts of interest

There are no conflicts of interest.

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