Biological Rhythm Research

ISSN: 0929-1016 (Print) 1744-4179 (Online) Journal homepage: https://www.tandfonline.com/loi/nbrr20

Insomnia among primary care adult population in Aseer region of Saudi Arabia: gastroesophageal reflux disease and body mass index correlates

Nabil Joseph Awadalla & Hassan Mohammed Al-Musa

To cite this article: Nabil Joseph Awadalla & Hassan Mohammed Al-Musa (2019): Insomnia among primary care adult population in Aseer region of Saudi Arabia: gastroesophageal reflux disease and body mass index correlates, Biological Rhythm Research, DOI: 10.1080/09291016.2019.1656933

To link to this article: https://doi.org/10.1080/09291016.2019.1656933

Published online: 19 Aug 2019.

BIOLOGICAL RHYTHM RESEARCH
https://doi.org/10.1080/09291016.2019.1656933

Taylor & Francis
Taylor & Francis Group

ORIGINAL REPORT

OPEN ACCESS Check for updates

Insomnia among primary care adult population in Aseer region of Saudi Arabia: gastroesophageal reflux disease and body mass index correlates

Nabil Joseph Awadalla [a,b] and Hassan Mohammed Al-Musa [a]

[a]Department of Family and Community Medicine, College of Medicine, King Khalid University, Abha, Saudi Arabia; [b]Department of Community Medicine, Faculty of Medicine, Mansoura University, Mansoura, Egypt

ABSTRACT

Insomnia negatively impacts person's quality of life. Little is known about its relationship with gastroesophageal reflux disease (GERD) and body mass index (BMI). Objectives were to evaluate the prevalence of insomnia among primary care adult population; explore its associated factors; examine the relationship between insomnia and BMI categories, and GERD and to ascertain daytime impairments of patients with insomnia. In a survey, representative sample of primary care adult population was screened using questionnaire consists of the following parts: sociodemographic characteristics; habits; validated Arabic versions of Athens insomnia scale, Epworth sleepiness scale, fatigue severity scale and GerdQ questionnaire; participants' height and weight. Out of 3166 surveyed, 1903 suffered insomnia with a prevalence of 60.1%. Through multivariable analysis, insomnia was significantly higher among people having insufficient income (aOR = 1.95), smokers (aOR = 1.47), those drinking >3 coffee cups a day (aOR = 1.24), those having underweight (aOR = 2.06), and those suffering from; chronic disease (aOR = 1.25), fatigue (aOR = 2.10), daytime sleepiness (aOR = 1.57) and GERD (aOR = 1.65). In conclusion, insomnia is a prevalent problem among primary care population. Underweight, chronic diseases and GERD are associated factors. Daily impairment is a significant problem among insomnia patients.

ARTICLE HISTORY
Received 18 July 2019
Accepted 13 August 2019

KEYWORDS
Insomnia; prevalence; GERD; BMI; primary care population

1. Introduction

Healthy sleep is important for good health and well-being. Insomnia negatively impacts person's quality of life, safety, work productivity, physical and mental health (Metlaine et al. 2005; Itani et al. 2018; Melo et al. 2019). It is the most common sleep disorder, with a worldwide prevalence rate in general population of 10% to 33.3% (Kim et al. 2000; Roth and Roehrs 2003; Riemann et al. 2017). The prevalence is even higher among primary care population with an estimated rate of 50–74% (Smith et al. 2002; Zailinawati et al. 2008, 2012; Bjorvatn et al. 2016; Almeneessier et al. 2018). It is frequently comorbid with chronic medical and neuropsychiatric disorders of patients attending primary health care (Khurshid 2018). Despite the advancement of sleep knowledge in recent years, there is still poor awareness of

CONTACT Nabil Joseph Awadalla, njgirgis@yahoo.co.uk Department of Family and Community Medicine, College of Medicine, King Khalid University, Abha, Saudi Arabia

primary health-care providers making the problem of insomnia under-estimated and under-treated (Leger and Poursain 2005).

Association between insomnia and body mass index (BMI) has received a little attention in the literature and most of the results are nonconclusive (Sivertsen et al. 2014).

There is increasing evidence that Gastroesophageal Reflux Disease (GERD) is an associated factor for poor sleep quality, insomnia, variations in circadian preferences and increased sleepiness (Iwakura et al. 2016; Ballou et al. 2018; Ayappa et al. 2019). Furthermore, a previous study reported that about one-third of GERD patient are taking sleep medication at least once per week (Ballou et al. 2018). Relation of GERD with insomnia patients should be addressed to help primary health-care providers in managing these patients more effectively (Jung et al. 2010).

Although the potential risks of daytime impairments (sleepiness and fatigue) related to comorbid insomnia on patients' health and safety, there are limited data in this regard among primary health-care population (Zailinawati et al. 2012; Almeneessier et al. 2018).

The objectives of the current study were to evaluate the prevalence of insomnia and explore its associated factors among primary health-care adult population. Also, highlight the relationship between insomnia and BMI underweight and overweight/ obesity categories. In addition, to explore the prevalence of GERD and its relationship with insomnia in primary care population. Finally, to address the magnitude of daytime impairments (sleepiness and fatigue) associated with insomnia.

2. Methods

2.1. Study design and setting

A cross-sectional survey study was carried out in all primary health-care centers (PHCCs) in Abha city, Aseer region, southwestern Saudi Arabia. There are 11 PHCCs in Abha City provide primary health-care services for approximately 500,000 peoples.

2.2. Study population

All adults who visited PHCCs in Abha city for any reason during the study period were the target population. The study continued from September 2017 through June 2018. Exclusion criteria were subjects less than 18 years old, uncooperative and those with serious illness.

2.3. Sample size calculation and sampling technique

Epi info program version 7.2 was used to estimate sample size. Using a conservative anticipated prevalence of insomnia 60% (Zailinawati et al. 2012), an acceptable margin of error 2% and confidence level of 95%, the minimum recommended sample size of the survey was 2294 subjects. To account for possible non-response and incomplete responses a sample of 3110 subjects was proposed. From each of 11 PHCCs, 283 male and female participants were chosen by systematic random sampling.

2.4. Study tools and data collection

Arabic anonymous questionnaire was developed by the researchers. It covered the following sections: (1) sociodemographic attributes such as age, sex, education, marital status, occupation and family income; (2) Habits as smoking, caffeine intake; (3) Arabic Athens Insomnia scale (AIS); (4) Validated Arabic version of Epworth sleepiness scale (ESS); (5) validated Arabic version of fatigue severity scale (FSS); (6) Arabic version of GERD questionnaire (GerdQ); (7) participants' height and weight. The questionnaire was distributed among the participants in person by a group of medical students as a part of their training in the community medicine course. Data were collected by self-report. Trained students assisted illiterates and older participants in completing the questionnaire.

2.5. Validation of Arabic versions of study tools

(1) Arabic version of Athens Insomnia scale (AIS)

AIS is a survey tool used to detect insomnia among the adult population (Soldatos et al. 2000). It comprises eight questions related to insomnia symptoms. Each question score ranged from 0 to 4 depending on the extent of symptoms. The total AIS score ranged from 0 to 32. Presence of insomnia was considered when the total score has a value of 6 points or more (Soldatos et al. 2003). AIS was translated, examined and validated in a previously published Arabic research (Bakr et al. 2012). But up to our knowledge, there are no reports on the reliability of the Arabic version of AIS. The present study was therefore examined the internal consistency of the developed version. The calculated Cronbach's alpha was found acceptable (0.776).

(2) Arabic version of Epworth sleepiness scale (ESS)

The developed English version of ESS (Johns 1991) is validated throughout various countries and cultures. The Arabic version of ESS was developed, adjusted to accommodate culture in Arabic countries and validated. Its reliability was examined using test–retest intra-class correlation coefficient and was found substantially high (0.86) (Ahmed et al. 2014). ESS comprises eight self-reported questions. The total score ranged from 0 to 24. Participants with a total score of more than 10 were considered suffering excessive daytime sleepiness (EDS).

(3) Arabic version of fatigue severity scale (FSS)

FSS is a valid tool to measure impacts of fatigue on daily functions among general and specific populations. It contains nine self-reported items that assess the severity of participants' fatigue symptoms over the past week. Scoring of each item ranged from 1 to 7 based on the degree of agreement with each statement (1 = strong disagreement, 7 = strong agreement). Fatigue was considered when the total score has a value of 36 or more (Krupp et al. 1989). The Arabic version was developed and validated by an Arabic study (Al-Sobayel et al. 2016). According to the previous study, the reliability of the Arabic FSS was found adequate (Cronbach's alpha = 0.84).

(3) Arabic version of GERD questionnaire (GerdQ)

GerdQ is a valid survey tool used to evaluate the possibility of GERD. It is composed of six questions as follows: four positive questions related to GERD symptoms (heartburn, regurgitation, sleep disturbance due to the heartburn and regurgitation and medications use) and two negative questions (nausea and epigastric pain). Each question rated

from 0 to 3 depending on the frequency of symptoms over the previous week. GERD was considered with a total score value of 8 or more (Jones et al. 2009). The Arabic version of GerdQ was developed and validated for use among Arabic speakers (Altwigry et al. 2017; Alsuwat et al. 2018). No data are available for the reliability of Arabic GerdQ. Hence, the Cronbach's alpha was calculated in the present study and was found acceptable (0.826).

2.6. Data analysis

The gained data have been revised, double-checked and refined. Statistical analysis was done by IBM SPSS Statistics for Windows, Version 22.0. Armonk, NY: IBM Corp. Body mass index (BMI) was calculated and categorized as follows: <18.5 Kg/m^2 underweight, 18.5–24.9 Kg/m^2 normal, 25.0–29.9 Kg/m^2 overweight and ≥30 Kg/m^2 obese (Purnell 2018). Crude odds ratios (cOR) and adjusted odds ratios (aOR) were estimated by univariate and multivariable logistic regression analysis, respectively. Their 95% confidence intervals (95% CIs) were used to explore significant factors related to insomnia among participants. Cronbach's alpha was measured to confirm the reliability of Arabic versions of AIS and GerdQ.

2.7. Ethical approval

Prior data collection, all required approvals were taken from the authorities of the selected PHCCs to conduct the study in the setting. During data collection, the medical students (data collectors) presented themselves to the selected subjects in each PHCC, informed them about research objectives and assured their anonymity and confidentiality. Participation in the research was completely voluntary. The authors confirm that the study was conducted according to the ethical codes of the relevant national and institutional committees on human research and with the Helsinki Declaration of 1975, as revised in 2008.

3. Results

3.1. Description of the study population

The study included 3166 adults visited the studied primary health centers (PHCCs). Their age ranged from 18 to 90 years old, with an average age of 33.45 (SD 12.45) years. Most of them were in the age group 25–40 years (48.3%), female (54.8%), had secondary and above education (80.3%), married (60.1%), governmental employee (55.7%), had sufficient family income (88.4%), currently non-smokers (79.9%) and used to drink less than four coffee cups per day (71.8) (Table 1).

3.2. Insomnia prevalence

According to Table 1, a total of 1903 participants suffered insomnia with a prevalence rate of 60.1%.

Table 1. Univariate analysis for sociodemographic characteristics associated with insomnia.

Characteristics	Total N. (%)	No Insomnia N. (%)	Insomnia N. (%)	cOR. (95%CI)
Overall	3166 (100)	1263 (39.9)	1903 (60.1)	-
Age (years)				
18–25	881 (27.8)	387 (43.9)	494 (56.1)	Ref
25–40	1528 (48.3)	594 (38.9)	934 (61.1)	1.23 (1.04–1.46)
> 40	757 (23.9)	282 (37.3)	475 (62.7)	1.32 (1.08–1.61)
Sex				
Male	1432 (45.2)	581 (40.6)	851 (59.4)	Ref
Female	1734 (54.8)	682 (39.3)	1052 (60.7)	1.05 (0.91–1.21)
Education				
< Secondary	623 (19.7)	227 (36.4)	396 (63.6)	Ref
secondary and more	2543 (80.3)	1036 (40.7)	1507 (59.3)	1.20 (1.00–1.44)
Occupation				
Free work	82 (2.6)	37 (45.1)	45 (54.9)	Ref
Military	236 (7.5)	87 (36.9)	149 (63.1)	1.41(0.85–2.34)
Governmental Employee	1762 (55.7)	730 (41.4)	1032 (58.6)	1.16 (0.74–1.81)
Unemployed	1086 (34.3)	409 (37.7)	677 (62.3)	1.36 (0.87–2.14)
Marital status				
Married	1904 (60.1)	740 (38.9)	1164 (61.1)	Ref
Unmarried	1262 (39.9)	523 (41.4)	739 (58.6)	0.90 (0.78–1.04)
Family income				
Sufficient	2798 (88.4)	1158 (41.4)	1640(58.6)	Ref
Insufficient	368 (11.6)	105 (28.5)	263 (71.5)	1.77 (1.39–2.24)
Smoking status				
Non-smoker	2529 (79.9)	1050 (41.5)	1479 (58.5)	Ref
EX- smoker	349 (11.0)	121 (34.7)	228 (65.3)	1.51 (1.17–1.96)
Smoker	288 (9.1)	92 (31.9)	196 (68.1)	1.34 (1.06–1.69)
Coffee (cups)				
= <3	2272 (71.8)	960 (42.3)	1312 (57.7)	Ref
>3	894 (28.2)	303 (33.9)	591 (66.1)	1.43 (1.21–1.68)

cOR = Crude Odds Ratio, 95% CI = 95% Confidence Interval, Ref. = Reference group.

3.3. Univariate analysis for factors associated with insomnia

Univariate analysis revealed that insomnia was significantly higher among those in the age groups 25–40 years (cOR = 1.23, 95% CI:1.04–1.46) and more than 40 years (cOR = 1.08, 95% CI:1.08–1.61) compared to those in the group 18–25 years. Similarly, the following sociodemographic factors were found to be significantly associated with insomnia: insufficient income (cOR = 1.77, 95% CI:1.39–2.24), being ex-smoker (cOR = 1.51, 95% CI:1.17–1.96) or smoker (cOR = 1.34, 95% CI:1.06–1.69) and drinking more than three coffee cups a day (cOR = 1.43, 95% CI:1.21–1.68) (Table 1)

Table 2 reveals that insomnia was significantly higher among those having chronic diseases such as bronchial asthma, diabetes mellitus, hypertension, and ischemic heart disease (cOR = 1.60, 95% CI:1.38–1.86) compared to those who were free. In comparison with average weight participants, insomnia was significantly higher among underweight (cOR = 1.86, 95% CI:1.14–3.04), overweight (cOR = 1.31) and obese participants (cOR = 1.51). Subjects suffering from insomnia have higher prevalence rates of fatigue (72.5%), daytime sleepiness (69.8%) and GERD (70.3%) compared to insomnia free participants (27.5%, 30.2% and 29.7%, respectively). Moreover, insomnia was significantly associated with fatigue (cOR = 2.39, 95%CI:2.04–2.78), daytime sleepiness (cOR = 1.93, 95%CI: 1.65–2.25) and GERD symptoms (cOR = 2.03, 95%CI:1.75–2.37).

Table 2. Univariate analysis for body mass index (BMI) and health conditions associated with insomnia.

	Total N. (%)	No Insomnia N. (%)	Insomnia N. (%)	cOR (95%CI)
Presence of chronic disease	1249 (39.5)	414 (33.1)	835 (66.9)	1.60 (1.38–1.86)
BMI grouping				
Normal weight	1117 (35.3)	494 (44.3)	623 (55.7)	Ref
Underweight	116 (3.7)	36 (31.6)	80 (68.4)	1.86 (1.14–3.06)
Overweight	1155 (36.5)	443 (38.3)	712 (61.7)	1.31 (1.07–1.60)
Obesity	778 (24.6)	290 (37.3)	488 (62.7)	1.51 (1.20–1.90)
Fatigue	1204 (38.1)	331 (27.5)	873 (72.5)	2.83 (2.04–2.78)
Daytime sleepiness	1150 (36.2)	347 (30.2)	803 (69.8)	1.93 (1.65–2.25
GERD	1215 (38.4)	361 (29.7)	854 (70.3)	2.03 (1.75–2.37)

cOR = Crude Odds Ratio, 95% CI = 95% Confidence Interval, Ref. = Reference group, GERD = gastroesophageal reflux disease

3.4. Multivariable analysis for factors associated with insomnia

According to table 3, through multivariable regression analysis, the following variables continued significantly associated with insomnia: having insufficient income (aOR = 1.95, 95%CI:1.43–2.66), being smokers (aOR = 1.47:1.13–1.92) or ex-smokers (aOR = 1.37, 95% CI:1.02–1.84), drinking more than three coffee cups a day (aOR = 1.24, 95%CI:1.01–1.54), having underweight (aOR = 2.06, 95%CI:1.22–3.48), and suffering from chronic disease (aOR = 1.25, 95%CI:1.02–1.54), fatigue (aOR = 2.10, 95%CI: 1.72–2.56), daytime sleepiness (aOR = 1.57, 95%CI:1.29–1.91) and GERD (aOR = 1.65, 95%CI:1.36–2.01).

Table 3. Multivariable analysis for factors associated with insomnia.

Factors	β	S. E	aOR. (95%CI)
Age (years)	-	-	-
18–25	0.016	0.115	1.02 (0.81–1.27)
25–40	–0.134	0.148	0.87 (0.65–1.17)
> 40			
Income			
Sufficient	-	-	-
Insufficient	0.667	0.159	1.95 (1.43–2.66)
Smoking status			
Non-smoker	-	-	-
EX- smoker	0.316	0.150	1.37 (1.02–1.84)
Smoker	0.385	0.136	1.47 (1.13–1.92)
Caffeine (cups)			
=<3	-	-	-
>3	0.219	0.108	1.24 (1.01–1.54)
Presence of chronic disease	0.223	0.105	1.25 (1.02–1.54)
BMI grouping			
Normal weight	-	-	-
Underweight	0.724	0.267	2.06 (1.22–3.48)
Overweight	0.185	0.114	1.18 (0.94–1.47)
Obesity	0.165	0.147	1.23 (0.96–1.58)
Fatigue	0.947	0.096	2.10 (1.72–2.56)
Daytime sleepiness	0.453	0.100	1.57 (1.29–1.91)
GERD	0.502	0.100	1.65 (1.36–2.01)

β = Beta coefficient, S. E = standard error of estimate, aOR = Adjusted Odds Ratio, 95% CI = 95% Confidence Interval, Ref. = Reference group, GERD = gastroesophageal reflux disease

4. Discussion

The present study investigated the problem of insomnia among adult attendees of PHCCs in southwest Saudi Arabia. The prevalence of insomnia according to our study was 60.1%. This figure is close to the prevalence rate among primary health-care population in Malaysia (60%) (Zailinawati et al. 2012), Riyadh city, Saudi Arabia (74%) (Almeneessier et al. 2018), some European countries like Italy (64%) (Terzano et al. 2004) and Norway (more than 50%) (Bjorvatn et al. 2016) and in the United states (50%) (Smith et al. 2002). On the other hand, this figure is clearly higher than the prevalence rate of insomnia among general population worldwide including: Malaysia (33.8%) (Zailinawati et al. 2008), other Asian countries like Japan (21%) (Kim et al. 2000) and South Korea (17%)(Ohayon and Hong 2002), European countries (5.8–15.8%)(Riemann et al. 2017) and the United States (10%)(Roth and Roehrs 2003). The worldwide trend of higher prevalence of insomnia among primary health-care population compared to the general population is possibly due to the underlying comorbid conditions in primary health-care visitors (Almeneessier et al. 2018). This comorbid medical and neurological disorders can be also associated with insomnia (Khurshid 2018). This has been confirmed by the results of our study which revealed a significant positive association between the existence of comorbid conditions and insomnia among attendees of PHCCs. The high prevalence of insomnia among primary health-care visitors necessitates adequate awareness of insomnia among primary health-care providers. Unfortunately, recent studies indicated that awareness about sleep disorders among health-care givers in some countries still poor (Bhaskar et al. 2016; Saleem et al. 2017). Poor awareness of health-care givers together with a low reporting rate of the sufferer to physicians makes the problem of insomnia underestimated and undertreated (Leger and Poursain 2005).

Univariate analysis in the present study revealed that the probability of insomnia increased significantly with age. However, the multivariable model failed to show age as a predictive factor for insomnia. Similar findings were reported by other studies which showed that age was not a risk factor for insomnia after controlling health and life conditions (Ohayon et al. 2001). This may indicate that the factors associated with aging like increased prevalence of medical disorders, increased medications use, and social and lifestyle conditions are indirect predictive factors of insomnia with aging (Grewal and Doghramji 2017).

In the present study, the multivariable model showed low-income independent predictive factor of insomnia. This could be related to the increased psychological stress, anxieties and worries associated with their poor living conditions (Arber et al. 2009; Grewal and Doghramji 2017).

The multivariable model in our study indicated that smoking is an independent factor of insomnia. Other epidemiological studies reported a sleep disruptive effects of smoking (Irish et al. 2015). Nicotine induces arousal and difficult sleeping by stimulation of cholinergic receptors in the basal forebrain (Boutrel and Koob 2004). Interestingly, the present study also indicated that ex-smoking is an independent factor for insomnia. Epidemiological studies reported that in the early stages of smoking cessation, arousal is very common. On the other hand, the long-term effect of smoking cessation is not well documented (Boutrel and Koob 2004). Unfortunately, the present study did not take in consideration the duration of smoking cessation.

Also, the multivariable model showed the consumption of more than three coffee cups is an independent factor for insomnia. This result confirms a previous study which

reported that increasing caffeine intake is associated with a significant sleep disruption (Drake et al. 2013). This study recommended for appropriate sleep hygiene behaviors is to avoid caffeine intake 3 to 6 h before bedtime (Drake et al. 2013).

In the present, both univariate and multivariable analysis indicated a significant association between underweight and insomnia. Little is known about sleep problems in underweight individuals. Previous studies have found a significant relationship between underweight and short sleep duration (Krueger and Friedman 2009; Sivertsen et al. 2014). Underweight may arise from different conditions including dietary problems, uncontrolled physical and mental illnesses and drug abuse has been found to be associated with poor sleep (Uzogara 2016). It has been suggested that underweight caused be low-calorie diet intake could be associated with insomnia. Low-calorie intake may be related to lower levels of sleep-inducing agents and higher levels of wake agents (Lauer and Krieg 2004; Tomiyama et al. 2010).

The univariate analysis in the present study indicated that overweight/obesity increased the risk of insomnia. However, adjusting for other factors, including smoking, presence of chronic diseases, fatigue and GERD, disappeared the significance of this association. This result supports the finding of a previous study which suggested that patient with insomnia do not necessarily exhibit overweight. The study suggests that the relation between insomnia and body weight is possibly confounded by other factors (Crönlein et al. 2015). A meta-analysis study indicated daily sleepiness, napping, fatigability, physical activity and eating disorders may attenuate the associations between BMI and sleep (Chan et al. 2018).

Multivariable model in the present study indicates a significant positive association between GERD and insomnia. A similar result has been observed in previous studies (Jung et al. 2010; Iwakura et al. 2016; Ballou et al. 2018; Ayappa et al. 2019; Lei et al. 2019). The relation between GERD and insomnia could be bidirectional. GERD symptoms may induce conscious arousals and sleep disturbances. Also, sleep disturbances and medications use for treatment may provoke or aggravate GERD (Jung et al. 2010). Moreover, proper treatment of GERD could improve subjective sleep quality. The high prevalence of GERD among insomnia patients necessitates attention and care for a possible hidden GERD (Bollu and Kaur 2019).

The present study showed that fatigability and daytime sleepiness are important associations of insomnia. Similar daytime impairments have been reported in previous studies (Zailinawati et al. 2012; Shekleton et al. 2014). These symptoms could negatively impact the quality of life, accidents, work productivity, physical and mental health (Metlaine et al. 2005; Itani et al. 2018; Melo et al. 2019). Road traffic accidents (RTAs) are a serious problem globally and in Saudi Arabia. It accounts for 4.5% of all mortalities in Saudi Arabia. Daytime sleepiness and falling asleep while driving is one of the driver errors responsible for RTAs (Mansuri et al. 2015). Therefore, clinical identification and management of insomnia at the primary health-care level could help in improving patients' comorbid diseases, quality of life, productivity and safety (Grandner and Chakravorty 2017).

There many strengths of the present study. First, it includes a large and representative sample of the adult primary health-care population. Second, we may extend the existing literature by examining the relationship between GERD, and BMI and insomnia among these precious populations. Third, we use a multivariable model to adjust for the potential confounders.

There are some limitations that should be considered when inferring the findings of the present study. First, the findings are based on a cross-sectional design. Therefore, it

is difficult to identify the direction of certain relationships and to confirm the causal link. Second, the reliance on subjective assessments of study variables may increase the possibility of information bias. However, the use of valid assessment tools may minimize the likelihood of this happening.

5. Conclusion

Our findings suggest that the prevalence of insomnia is high among primary care population. So, continuous medical education of primary caregivers should focus on insomnia detection and management skills. Underweight and chronic diseases including diabetes mellitus, hypertension and bronchial asthma are significantly associated with insomnia. Therefore, patients suffering from these conditions should be screened for insomnia by primary health-care providers to avoid misdiagnosis. GERD is highly prevalent among insomnia patients. Hence, insomnia patients should be screened for GERD to get a better clinical outcome. Smoking and excess coffee intake are significantly associated factors with insomnia. We recommend awareness programs for appropriate sleep hygiene behaviors to avoid sleep-disrupting factors among primary care population with insomnia. Daily impairments in the form of daily sleepiness and fatigue are frequent among insomnia patients which may threaten person's health and safety. It is, therefore, necessary to implement insomnia early detection and management program at primary care level.

Acknowledgments

The authors wish to thank level 8th medical students in academic year 2017/2018, college of Medicine, King Khalid University for their efforts in data collection.

Disclosure statement

No potential conflict of interest was reported by the authors.

Funding

This research work did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors.

ORCID

Nabil Joseph Awadalla http://orcid.org/0000-0002-5687-6621

References

Ahmed AE, Fatani A, Al-Harbi A, Al-Shimemeri A, Ali YZ, Baharoon S, Al-Jahdali H. 2014. Validation of the Arabic version of the Epworth sleepiness scale. J Epidemiol Glob Health. 4:297–302.

Almeneessier AS, Alamri BN, Alzahrani FR, Sharif MM, Pandi-Perumal SR, BaHammam AS. 2018. Insomnia in primary care settings: Still overlooked and undertreated? J Nature Sci Med. 1:64.

Al-Sobayel HI, Al-Hugail HA, AlSaif RM, Albawardi NM, Alnahdi AH, Daif AM, Al-Arfaj HF. 2016. Validation of an Arabic version of fatigue severity scale. Saudi Med J. 37:73.

Alsuwat OB, Alzahrani AA, Alzhrani MA, Alkhathami AM, Mahfouz MEM. 2018. Prevalence of gastroesophageal reflux disease in Saudi Arabia. J Clin Med Res. 10:221.
Altwigry AM, Almutairi MS, Ahmed M. 2017. Gastroesophageal reflux disease prevalence among school teachers of Saudi Arabia and its impact on their daily life activities. Int J Health Sci. 11:59.
Arber S, Bote M, Meadows R. 2009. Gender and socio-economic patterning of self-reported sleep problems in Britain. Soc Sci Med. 68:281–289.
Ayappa I, Chen Y, Bagchi N, Sanders H, Black K, Twumasi A, Rapoport DM, Lu S-E, Sunderram J. 2019. The association between health conditions in world trade center responders and sleep-related quality of life and sleep complaints. Int J Environ Res Public Health. 16:1229.
Bakr IM, Elaziz KMA, Ezz NFAE, Fahim HI. 2012. Insomnia in institutionalized older people in Cairo, Egypt: Prevalence and risk factors associated. Eur Geriatr Med. 3:92–96.
Ballou S, Alhassan E, Hon E, Lembo C, Rangan V, Singh P, Hirsch W, Sommers T, Iturrino J, Nee J. 2018. Sleep disturbances are commonly reported among patients presenting to a gastroenterology clinic. Dig Dis Sci. 63:2983–2991.
Bhaskar S, Hemavathy D, Prasad S. 2016. Prevalence of chronic insomnia in adult patients and its correlation with medical comorbidities. J Family Med Primary Care. 5:780.
Bjorvatn B, Meland E, Flo E, Mildestvedt T. 2016. High prevalence of insomnia and hypnotic use in patients visiting their general practitioner. Family practice. 34:20-24. eng.
Bollu PC, Kaur H. 2019. Sleep medicine: Insomnia and sleep. Mo Med. 116:68.
Boutrel B, Koob GF. 2004. What keeps us awake: the neuropharmacology of stimulants and wakefulness promoting medications. Sleep. 27:1181–1194.
Chan WS, Levsen MP, McCrae CS. 2018. A meta-analysis of associations between obesity and insomnia diagnosis and symptoms. Sleep Med Rev. 40:170–182.
Crönlein T, Langguth B, Busch V, Rupprecht R, Wetter TC. 2015. Severe chronic insomnia is not associated with higher body mass index. J Sleep Res. 24:514–517.
Drake C, Roehrs T, Shambroom J, Roth T. 2013. Caffeine effects on sleep taken 0, 3, or 6 hours before going to bed. J Clin Sleep Med. 9:1195–1200.
Grandner MA, Chakravorty S. 2017. Insomnia in primary care: Misreported, mishandled, and just plain missed. J Clin Sleep Med. 13:937–939.
Grewal RG, Doghramji K. 2017. Epidemiology of insomnia. In: Attarian H. (eds)., Clinical handbook of insomnia. Current Clinical neurology. Springer, Cham. pp. 13–25.
Irish LA, Kline CE, Gunn HE, Buysse DJ, Hall MH. 2015. The role of sleep hygiene in promoting public health: A review of empirical evidence. Sleep Med Rev. 22:23–36.
Itani O, Kaneita Y, Jike M, Furuya M, Uezono C, Oda F, Agematsu R, Tokiya M, Otsuka Y, Ohida T. 2018. Sleep-related factors associated with industrial accidents among factory workers and sleep hygiene education intervention. Sleep Biol Rhythms. 16:239–251.
Iwakura N, Fujiwara Y, Shiba M, Ochi M, Fukuda T, Tanigawa T, Yamagami H, Tominaga K, Watanabe T, Arakawa T. 2016. Characteristics of sleep disturbances in patients with gastro-esophageal reflux disease. Internal Med. 55:1511–1517.
Johns MW. 1991. A new method for measuring daytime sleepiness: The Epworth sleepiness scale. Sleep. 14:540–545.
Jones R, Junghard O, Dent J, Vakil N, Halling K, Wernersson B, Lind T. 2009. Development of the GerdQ, a tool for the diagnosis and management of gastro-oesophageal reflux disease in primary care. Aliment Pharmacol Ther. 30:1030–1038.
Jung H-K, Choung RS, Talley NJ. 2010. Gastroesophageal reflux disease and sleep disorders: evidence for a causal link and therapeutic implications. J Neurogastroenterol Motil. 16:22.
Khurshid KA. 2018. Comorbid insomnia and psychiatric disorders: An update. Innov Clin Neurosci. 15:28.
Kim K, Uchiyama M, Okawa M, Liu X, Ogihara R. 2000. An epidemiological study of insomnia among the Japanese general population. Sleep. 23:41–47.
Krueger PM, Friedman EM. 2009. Sleep duration in the United States: a cross-sectional population-based study. Am J Epidemiol. 169:1052–1063.

Krupp LB, LaRocca NG, Muir-Nash J, Steinberg AD. 1989. The fatigue severity scale: application to patients with multiple sclerosis and systemic lupus erythematosus. Arch Neurol. 46:1121–1123.
Lauer CJ, Krieg J-C. 2004. Sleep in eating disorders. Sleep Med Rev. 8:109–118.
Leger D, Poursain B. 2005. An international survey of insomnia: under-recognition and under-treatment of a polysymptomatic condition. Curr Med Res Opin. 21:1785–1792.
Lei W-Y, Chang W-C, Wong M-W, Hung J-S, Wen S-H, Yi C-H, Liu -T-T, Chen J-H, Hsu C-S, Hsieh T-C. 2019. Sleep disturbance and its association with gastrointestinal symptoms/diseases and psychological comorbidity. Digestion. 99:205–212.
Mansuri FA, Al-Zalabani AH, Zalat MM, Qabshawi RI. 2015. Road safety and road traffic accidents in Saudi Arabia: a systematic review of existing evidence. Saudi Med J. 36:418.
Melo DLM, Carvalho LBC, Prado LBF, Prado GF. 2019. Biofeedback therapies for chronic insomnia: A systematic review. Applied Psychophysiol Biofeedback. May 23: 1–11.
Metlaine A, Leger D, Choudat D. 2005. Socioeconomic impact of insomnia in working populations. Ind Health. 43:11–19.
Ohayon MM, Hong S-C. 2002. Prevalence of insomnia and associated factors in South Korea. J Psychosom Res. 53:593–600.
Ohayon MM, Zulley J, Guilleminault C, Smirne S, Priest RG. 2001. How age and daytime activities are related to insomnia in the general population: consequences for older people. J Am Geriatr Soc. 49:360–366.
Purnell JQ. 2018. Definitions, classification, and epidemiology of obesity. In: Feingold KR, Anawalt B, Boyce A, et al., editors. Endotext [Internet]. South Dartmouth (MA): MDText. com, Inc.; 2000. Available from: https://WWW.ncbi.nlm.nih.gov/books/NBK279167/
Riemann D, Baglioni C, Bassetti C, Bjorvatn B, Dolenc Groselj L, Ellis JG, Espie CA, Garcia-Borreguero D, Gjerstad M, Gonçalves M. 2017. European guideline for the diagnosis and treatment of insomnia. J Sleep Res. 26:675–700.
Roth T, Roehrs T. 2003. Insomnia: epidemiology, characteristics, and consequences. Clin Cornerstone. 5:5–15.
Saleem AH, Al Rashed FA, Alkharboush GA, Almazyed OM, Olaish AH, Almeneessier AS, BaHammam AS. 2017. Primary care physicians' knowledge of sleep medicine and barriers to transfer of patients with sleep disorders: a cross-sectional study. Saudi Med J. 38:553.
Shekleton JA, Flynn-Evans EE, Miller B, Epstein LJ, Kirsch D, Brogna LA, Burke LM, Bremer E, Murray JM, Gehrman P. 2014. Neurobehavioral performance impairment in insomnia: relationships with self-reported sleep and daytime functioning. Sleep. 37:107–116.
Sivertsen B, Pallesen S, Sand L, Hysing M. 2014. Sleep and body mass index in adolescence: results from a large population-based study of Norwegian adolescents aged 16 to 19 years. BMC Pediatr. 14:204.
Smith MT, Perlis ML, Park A, Smith MS, Pennington J, Giles DE, Buysse DJ. 2002. Comparative meta-analysis of pharmacotherapy and behavior therapy for persistent insomnia. Am J Psychiatry. 159:5–11. eng.
Soldatos CR, Dikeos DG, Paparrigopoulos TJ. 2000. Athens Insomnia Scale: validation of an instrument based on ICD-10 criteria. J Psychosom Res. 48:555–560.
Soldatos CR, Dikeos DG, Paparrigopoulos TJ. 2003. The diagnostic validity of the Athens Insomnia Scale. J Psychosom Res. 55:263–267.
Terzano MG, Parrino L, Cirignotta F, Ferini-Strambi L, Gigli G, Rudelli G, Sommacal S. 2004. Studio Morfeo: insomnia in primary care, a survey conducted on the Italian population. Sleep Med. 5:67–75.
Tomiyama AJ, Mann T, Vinas D, Hunger JM, DeJager J, Taylor SE. 2010. Low calorie dieting increases cortisol. Psychosom Med. 72:357.
Uzogara SG. 2016. Underweight, the less discussed type of unhealthy weight and its implications: a review. Am J Food Sci Nutr Res. 3:126–142.
Zailinawati AH, Ariff K, Nurjahan M, Teng C. 2008. Epidemiology of insomnia in Malaysian adults: a community-based survey in 4 urban areas. Asia Pacific J Public Health. 20:224–233.
Zailinawati AH, Mazza D, Teng CL. 2012. Prevalence of insomnia and its impact on daily function amongst Malaysian primary care patients. Asia Pac Fam Med. 11:9.