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Knowledge and attitude of primary care physicians towards obstructive sleep apnea in the Middle East and North Africa region

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Abstract

Background/objectives Sleep disorders are highly prevalent in primary care. Obstructive sleep apnea (OSA) is one of the most common sleep disorders in the world, and it is estimated that only 10 to 20% of OSA cases are diagnosed. Primary care physicians (PCP) play an important role in screening for OSA. Knowledge of sleep disorders among PCP varies widely and has been generally reported as low. In this study, we aimed to assess the knowledge and attitudes towards OSA among primary care physicians in the Middle East and North Africa regions.

Methods A cross-sectional study using the Obstructive Sleep Apnea Knowledge and Attitudes (OSAKA) self-administered questionnaire was distributed to PCP attending the Lebanese Society of Family Medicine annual conference, the Lebanese Society of Internal Medicine annual conference, and World Organization of Family Doctors (WONCA) East Mediterranean region conference.

Results Of 300 physicians approached, 256 (85%) completed the questionnaires. The range of possible scores was 0 to 18. The mean total knowledge score with standard deviation (SD) was 12.6 (2.5). Internal medicine specialists showed a higher mean knowledge score of 14.1 (2.3) compared to general/family medicine specialists 12.4 (2.4) and other specialties 11.9 (2.8), $p = 0.001$. Though 78% of all physicians felt confident in identifying patients with OSA, only 26% felt confident in managing patients with continuous positive airway pressure. Overall, there was a weak positive correlation between knowledge and attitude.

Conclusion There were gaps in knowledge and attitudes regarding managing patients with OSA. Training in managing patients with OSA is needed.

Keywords Obstructive sleep apnea · Sleep disorders · Knowledge · Attitudes · Primary care

Introduction

Sleep disorders are highly prevalent in primary care. Obstructive sleep apnea (OSA) is one of the most prevalent worldwide sleep disorders [1] but is underdiagnosed and untreated. It was reported that over 100 million individuals experience OSA in the world [2].

Around 12–18 million Americans suffer from untreated OSA, and those numbers are projected to rise in the future due to obesity pandemic and population aging [3]. A recent systematic review including 24 studies found that the prevalence of OSA (apnea-hypopnea index, AHI ≥ 5) ranged from 9 to 38% and was higher in men [4], older adults, and obese individuals [4, 5]. There is a paucity of data regarding the prevalence of sleep disorders in the Middle Eastern region. The overall prevalence of OSA as defined by the Berlin questionnaire (BQ) was 37% in men and 34% in women in Saudi patients with end-stage renal disease [6]. Other studies conducted in the Gulf region revealed that men were at higher risk for OSA (19%) compared to women (15%) [7, 8].

OSA is characterized by partial or complete upper airway collapse during sleep resulting in sleep fragmentation,

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hypoxemia, and cortical arousals [9]. The diagnosis of OSA is based on having five or more apneas-hypopneas per hour of sleep (apnea-hypopnea index, AHI), accompanied by either excessive daytime sleepiness or two or more episodes of choking or gasping during sleep, as well as recurrent awakenings, unrefreshing sleep, daytime fatigue, or impaired concentration or memory [10].

The long-term effects of sleep fragmentation and intermittent hypoxia caused by OSA are associated with a magnitude of implications. A prospective study conducted to assess the relationship between sleep-disordered breathing and the development of hypertension demonstrated increased odds of developing the disease with increased apnea-hypopnea events per hour [11]. Additionally, patients with OSA are at an increased risk of suffering ischemic strokes and type 2 diabetes [12–14]. OSA was also found to increase the risk of motor vehicle accidents compared to the general population [15].

Primary care physicians play an important role in screening for OSA [16]. Knowledge of sleep disorders among primary care practitioners varies widely. A study conducted in France, assessing the knowledge of primary care physicians towards OSA, found that only about a third of them mentioned the combination of daytime somnolence, snoring, and apnea as the cardinal features of OSA. However, their knowledge regarding the complications of OSA such as cardiovascular sequelae was not sufficient [17]. Another study conducted in Canada yielded an average knowledge score of 69% which although it is a passing grade, it suggested that some gaps in knowledge are present [18]. Questions related to incidence were mostly answered wrongly, which give an idea of why OSA is underestimated and underdiagnosed in primary care [18]. On the other hand, the low level of knowledge and confidence attitudes towards managing patients with OSA was realized in other regions including Africa and Saudi Arabia [19–21].

Untreated OSA, especially severe OSA, is associated with several adverse health outcomes including cardiovascular disease, diabetes, stroke, and mortality [22, 23]. It is essential that the physicians are adequately educated regarding screening and treating sleep disorders such as OSA, given that sleep disorders might be modifiable risk factors for adverse health outcomes. Thus, determining the gaps in knowledge is important to devise educational strategies. In this study, we aimed to assess the knowledge and attitudes towards OSA among primary care physicians in the Middle East and North Africa (MENA) region.

Methodology

Study design

A cross-sectional study was conducted using a validated self-administered questionnaire. It was used to assess the knowledge and attitudes towards OSA among practicing primary care physicians in the Middle East and North Africa (MENA) region. Convenience sampling technique was used to recruit participants.

The surveys were distributed among primary care physicians attending the annual conferences of the Lebanese societies of Family Medicine (October, 2018), Internal Medicine (March, 2019), and the World Organization of Family Doctors conference in the East Mediterranean Region (March, 2019) WONCA (EMR). Physicians attending the conferences were approached by the data collectors at the registration desk area for enrollment in the study. Completed surveys within the sealed envelopes were collected in a box near the exit door.

The approval of the Institutional Review Board at the American University of Beirut (AUB) was obtained prior to commencing the study. Oral consent was obtained, after which participants were handed the questionnaire for self-completion.

Study instrument

Demographic survey is applied to obtain information about subjects' characteristics including physicians' age, gender, specialty, and duration of practice. The Obstructive Sleep Apnea Knowledge and Attitudes (OSAKA) self-administered questionnaire was used to gauge physicians' knowledge and attitudes concerning the identification and management of patients with OSA. The OSAKA is a validated questionnaire that was developed by Schotland and Jeffe 2003, which includes 18 knowledge items and five questions related to attitudes about OSA [24]. The questionnaire was applied in English since the conferences' presentations were in English, therefore assuming all participants had good English language.

The knowledge items cover different OSA domains about epidemiology, pathophysiology, symptoms, diagnosis, and treatment. Options for answers to knowledge questions are "true," "false," or "do not know," which is scored as an incorrect response. Knowledge scores range between 0 and 18 [24]. Mean knowledge scores for all correct answers to the 18 knowledge questions are computed. Two attitude questions asked about the importance of OSA, and the other three attitude questions dealt with one's confidence in diagnosing and treating patients with OSA.

Physicians were asked to rate the extent of their agreement with each of the 5 items using a 5-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree). Mean attitude scores were computed for each of the 2-item importance and 3-item confidence subscales as well as for the 5-item overall attitudes scale.

Data analysis

Baseline demographic characteristics and other study variables were summarized using descriptive statistics. They were expressed as means and standard deviations (SD) for the continuous variables and as frequencies and percentages for the categorical ones.

The association between demographic characteristics and OSA knowledge and attitude scores was examined using two-sample *t* test and ANOVA for continuous variables and chi-square test for categorical variables. ANOVA was followed by post hoc Tukey's test to determine whether there is a significant difference between groups, as appropriate. The correlation between knowledge and attitude scores was assessed using the Pearson correlation coefficient. All statistical analyses were performed using the Statistical Package for Social Sciences (SPSS, version 25). p value < 0.05 was used to indicate statistical significance.

Results

In our study, 256 from 300 physicians returned the questionnaires with a response rate of 85% (Table 1). Almost half of the study participants were less than 40 years old (56%), of which 47% were men and 53% were women. Primary care physicians (general/family medicine) constituted the majority with 73% of the answered surveys. Most of them are practicing in urban settings (66%), and 28% practice in both urban and rural areas. About 53% of study participants have been practicing for more than 10 years. Access to centers with capabilities to conduct sleep studies was available for 48%. Roughly two-thirds of the participants (69%) work in Lebanon (Table 1).

Table 1 Demographics and participants' characteristics ($N = 256$)

Variables	*N* (%)
Age[a]	
< 30	21 (17)
30–40	48 (39)
41–50	35 (28)
51–60	16 (13)
>60	4 (3)
Gender[a]	
Men	133 (53)
Women	120 (47)
Specialty[a]	
General medicine/family medicine	185 (73)
Internal medicine	37 (15)
Other	31 (12)
Currently practice[a]	
Rural	16 (6)
Urban	160 (66)
Both rural and urban	67 (28)
Type of practice	
Academic	93 (39)
Non-academic	68 (28)
Both academic and non-academic	80 (33)
Duration of practice	
< 5 years	80 (31)
5–10 years	40 (16)
>10 years	136 (53)
Sleep center or conducts sleep studies[a]	
Yes	118 (48)
No	115 (47)
Not sure	11 (5)
Countries[a]	
Lebanon	175 (69)
GCC	62 (24)
Other	19 (7)

Other: other countries including Jordan, Syria, Turkey, Egypt, Iran, Nigeria and Tunis

GCC Gulf Cooperation Council countries including Bahrain, Kuwait, Oman, Qatar, Saudi Arabia, United Arab Emirates

[a] Missing values

Knowledge

The average knowledge score was 12.6 (standard deviation (SD) 2.5) (Table 2). Internal medicine specialists scored higher with an average of 14.1 (SD 2.3) compared to general/family medicine specialists (12.4 SD 2.4, $p < 0.001$) and other specialties (11.9 SD 2.8, $p = 0.001$). Gender, the type and both duration and location of practice, and country did not exhibit significant differences as regards the knowledge score (Table 3). Respondents who have access to sleep centers had higher knowledge scores (13.2 SD 2.2, $p < 0.001$).

A further analysis using chi-square test showed that internal medicine physicians have high percentages of correct responses related to the definition, prevalence, and pathophysiology of OSA (except for OSA in children) followed by other specialty and family medicine/general practice physicians (Table 4). Similarly, physicians practicing in urban areas had high percentages of correct responses related to diagnosis, gender differences, treatment, and comorbidities of OSA followed by physicians working in both rural and only in urban areas (Table 4).

Attitude

The majority of study participants thought that OSA as a clinical disorder is very important/extremely important

Table 2 Proportions of correct answers to the knowledge items on the Obstructive Sleep Apnea Knowledge and attitude ($N = 256$)

OSAKA Questions	Correct answer *N* (%)
1. Women with OSA may present with fatigue alone	204 (81)
2. Uvulopalatopharyngoplasty is curative for the majority of patients with OSA	161 (64)
3. The estimated prevalence of OSA among adults is between 2 and 10%	134 (54)
4. The majority of patients with OSA snore	198 (80)
5. OSA is associated with hypertension	199 (79)
6. An overnight sleep study is the gold standard for diagnosing OSA	231 (91)
7. CPAP therapy may cause nasal congestion	115 (46)
8. Laser-assisted uvuloplasty is an appropriate treatment for severe OSA	100 (40)
9. The loss of upper airway muscle tone during sleep contributes to OSA	203 (81)
10. The most common cause of OSA in children is the presence of large tonsils and adenoids	221 (87)
11. A craniofacial and oropharyngeal examination is useful in the assessment of patients with suspected OSA	222 (88)
12. Alcohol at bedtime improves OSA	180 (72)
13. Untreated OSA is associated with a higher incidence of automobile crashes	222 (87)
14. In men, collar size 17 in or greater is associated with OSA	120 (48)
15. OSA is more common in women than men	181 (72)
16. CPAP is the first therapy for severe OSA	204 (82)
17. Less than 5 apneas or hypopneas per hour is normal in adults	84 (34)
18. Cardiac arrhythmias may be associated with untreated OSA	222 (87)
Mean OSA Knowledge score (mean (SD))	12.6 (2.5)

OSA obstructive sleep apnea, *CPAP* continuous positive airway pressure

(77%), identifying patients with OSA were very important/extremely important (76%) and 78% of physicians felt confident in identifying patients with OSA. However, 49% were confident in managing patients with OSA, and only 26% felt confident in managing patients on CPAP therapy. The average importance attitude, confidence attitude, and overall attitude scores were 4.0 (SD 0.7), 3.3 (SD 0.7), and 3.6 (SD 0.6), respectively (S.Table 1).

Internal medicine specialists had higher attitude scores (3.9 SD 0.6) compared to family physicians/general practitioners (3.6 SD 0.6, $p = 0.001$) and other specialties (3.5 SD 0.5, $p = 0.003$) (Table 5). Moreover, 72% of practitioners in internal medicine, 49% of practitioners in family medicine/general, and 24% of practitioners in other specialties felt confident in managing patients with OSA ($p = 0.003$). Also, 45% of practitioners in internal medicine, 22% of practitioners in family medicine/general, and 27% of practitioners in other specialties felt confident in managing patients on CPAP ($p = 0.006$). The attitude in other domains such as practice settings or duration did not result in statistically significant differences in scores.

Association between knowledge and attitudes

There was a positive correlation between knowledge and attitude concerning importance; however, the correlation was weak ($r = 0.244$, p value < 0.0001, Pearson correlation). The correlation was even weaker when it came to confidence attitude scores and knowledge ($r = 0.142$, $p = 0.025$). Nevertheless, confidence in managing patients on CPAP and knowledge did not result in a statistically significant correlation) (S.Table 2).

Discussion

The main objective of the present study was to assess the knowledge and attitude of primary care physicians towards OSA in the MENA region. We found relatively high knowledge scores among these physicians, but knowledge questions related to CPAP's side effects and attitude scores, especially regarding the confidence in managing OSA patients on CPAP, were low.

Knowledge

Our results indicate slightly lower knowledge scores than the results of the original OSAKA development study [24]. However, our study population scored higher than their counterparts in Latin America, Kenya, and Nigeria but lower than South Africans which may be explained due to differences in medical education and training [20].

Our mean knowledge score was higher compared to the findings of a recent study conducted on medical graduates in Saudi Arabia [19]. We assume that practicing

Table 3 Association between demographic characteristic with OSA knowledge and attitude

Demographic	Knowledge score		Attitude score	
	mean (SD)	*p* value	mean (SD)	*p* value
Gender		0.996		0.037
Men	12.6 (2.6)		3.7 (0.6)	
Women	12.6 (2.5)		3.5 (0.5)	
Specialty		< 0.001		< 0.001
General med/ Family med.	12.4 (2.4)	< 0.001^	3.6 (0.6)	0.001^
Internal med.	14.1 (2.3)	0.001*	3.9 (0.6)	0.003*
Other	11.9 (2.8)	0.533#	3.5 (0.5)	0.774#
Practice location		0.049		0.15
Rural	11.6 (2.6)	0.096†	3.6 (0.6)	
Urban	12.9 (2.2)	0.222	3.6 (0.6)	
Both rural and urban	12.4 (2.7)	0.525Φ	3.7 (0.5)	
Type of practice		0.927		0.28
Academic	12.7 (2.6)		3.6 (0.5)	
Non-academic	12.6 (2.5)		3.5 (0.5)	
Both academic and non-academic	12.6 (2.6)		3.7 (0.6)	
Duration of Practice		0.328		0.66
< 5 years	12.9 (2.3)		3.6 (0.6)	
5–10 years	12.5 (3.0)		3.7 (0.6)	
> 10 years	12.4 (2.5)		3.6 (0.6)	
Sleep center/conducts sleep studies		< 0.001		0.385
Yes	13.2 (2.2)	< 0.001ψ	3.6 (0.6)	
No	11.9 (2.6)	0.479π	0.6 (0.5)	
Not sure	11.0 (2.7)	0.012δ	3.8 (0.4)	
Country		0.665		0.266
Lebanon	12.6 (2.5)		3.6 (0.5)	
GCC	12.3 (2.6)		3.7 (0.6)	
Other	12.7 (2.4)		3.4 (0.7)	

^*p* value: general med/family med. versus internal med; #*p* value: general med/family med. versus other; **p* value: internal med. vs other; †*p* value: rural vs urban; *p* value: urban vs both; Φ*p* value: rural vs. both; ψ*p* value: yes vs. no; π*p* value: no vs. not sure; δ*p* value: yes vs. not sure

physicians have more experience in identifying and managing OSA patients compared to recent medical graduates. Moreover, around 72% of our study population works in academia. Academic physicians and level of institutional seniority may also influence knowledge scores [21]. Academic physicians are often actively involved in continuous medical education and teaching which may enhance their body of knowledge.

OSA attitude

Our study also indicated that more physicians acknowledged the importance of OSA as a clinical disorder and its identification and expressed confidence in identifying patients with OSA. However, lower attitude scores regarding their confidence in managing OSA patients on CPAP were reported, which indicates a gap in knowledge that is subsequently translated upon practice. The results are similar to studies conducted in USA, KSA, Africa, Asia, and Latin America [19, 20, 25–27]. This can be attributed to the lack of training in managing OSA using CPAP that is considered the gold standard treatment for this disorder [1, 26].

Managing OSA patients on CPAP machines mandates the application of knowledge and skills and may require hands-on training on CPAP-positive pressure calibration, mask fitting, and troubleshooting that may not be provided to graduates of primary care programs. While the OSAKA questionnaire assesses knowledge of OSA, it fails to measure CPAP clinical skills. Overall, there was a positive but weak correlation between knowledge and attitude scores. Better knowledge means recognizing the importance of OSA but does not translate into better confidence in treating patients with this condition.

Table 4 Knowledge (correct responses) stratified by specialty groups

Knowledge	Family medicine/general practice* ($n = 185$) $N(\%)$	Internal medicine* ($n = 37$) $N(\%)$	Other specialty* ($n = 31$) $N(\%)$	p value
The estimated prevalence of OSA among adults is between 2% and 10%	86 (48)	28 (78)	18 (60)	0.004
The loss of upper airway muscle tone during sleep contributes to OSA	139 (77)	34 (92)	28 (90)	0.037
The most common cause of OSA in children is the presence of large tonsils and adenoids	165 (90)	25 (68)	28 (90)	0.001
A craniofacial and oropharyngeal examination is useful in the assessment of patients with suspected OSA	163 (89)	34 (92)	22 (73)	0.037
In men, collar size 17 in. or greater is associated with OSA	83 (46)	24 (67)	13 (42)	0.049
Less than 5 apneas or hypopneas per hour is normal in adults	52 (28)	25 (71)	6 (20)	< 0.001
	Rural ($n = 16$)	**Urban ($n = 160$)**	**Both ($n = 67$)**	
OSA is associated with hypertension	8 (50)	128 (82)	53 (80)	0.010
An overnight sleep study is the gold standard for diagnosing OSA	11 (69)	152 (95)	60 (92)	0.001
OSA is more common in women than men	12 (75)	120 (77)	39 (60)	0.037
CPAP is the first therapy for severe OSA	12 (75)	138 (88)	49 (75)	0.045

*Missing values

Family medicine versus other specialties

Compared to family medicine respondents, our findings have showed higher knowledge scores among Internal Medicine physicians. Similarly, attitude scores regarding being confident treating patients with OSA and managing patients on CPAP were higher among Internal Medicine physicians than other specialties. These differences may be attributed to the different medical training they undergo during their residency training. Internal medicine training may provide better exposure to the diagnosis and treatment of sleep disorders compared to training in Family Medicine. However, our respondents had higher knowledge scores compared to a similar study done among Italian anesthetists [28]. A study by Gelir et al. showed the level of knowledge of OSA varied even among respondents from different specialties such as psychiatry and neurology, with the highest scores obtained in psychiatry, neurology, and pulmonary medicine respectively [21]. These results might reflect greater familiarity with OSA due to different post-graduate training programs [28].

There are some strengths and limitations to this study. The main strengths of the present study are the relatively large sample size and high response rate. However, the results are not generalizable to other settings since most of the participants were from Lebanon (69%) and worked in academia (72%), which may not provide an accurate reflection of the knowledge levels among practicing PCPs in MENA region.

In conclusion, this study showed adequate knowledge regarding OSA among primary care physicians in MENA. However, their confidence in managing OSA patients on CPAP was low. More education and training is needed to improve PCPs skills in managing patients with OSA. This can be achieved through continuing medical education (CME) and through enhancing residency training with the provision of sleep medicine rotations, lectures, and workshops on OSA screening, diagnosis, and management.

Table 5 Attitude stratified by specialty groups of physicians (significant ones only)

Attitude	Family medicine/general practice* ($n = 185$) $N(\%)$	Internal medicine* ($n = 37$) $N(\%)$	Other specialty* ($n = 31$) $N(\%)$	p value
Confidence in managing patients with OSA				0.003
Disagree/strongly disagree	37 (21)	3 (8)	10 (33)	
Neither agree	54 (30)	7 (20)	13 (43)	
Agree/strongly agree	89 (49)	26 (72)	7 (24)	
Confidence in managing patients on CPAP				0.006
Disagree/strongly disagree	93 (52)	7 (19)	12 (40)	
Neither agree	47 (26)	13 (36)	10 (33)	
Agree/strongly agree	39 (22)	16 (45)	8 (27)	

Author contributions HK and GA contributed to the study conception and design. HK performed the literature review and initial manuscript write-up. GA contributed to the literature review and initial manuscript write up. Data collection, analysis, and results write-up were performed by HK, HT, and RH. All the authors contributed to the discussion, critically reviewed, and advised on each draft. All the authors read and approved the final manuscript.

Compliance with ethical standards

Conflict of interest The authors declare that they have no conflict of interest.

Ethical approval All procedures performed in studies involving human participants were in accordance with the ethical standards of the American University of Beirut Review Board and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards.

Informed consent Informed consent was obtained from all individual participants included in the study.

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