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ORIGINAL ARTICLE

Primary Healthcare Physicians' Knowledge and Attitude Toward Obstructive Sleep Apnoea in the Qassim Region, Saudi Arabia

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Abstract

Background/Aim: Obstructive sleep apnoea (OSA) is a prevalent disorder worldwide. The prevalence is increasing as obesity becomes more common. OSA is also related to different serious conditions such as cardiovascular diseases and cerebrovascular diseases. Although it's a common condition OSA is underdiagnosed and undertreated. The aim of the study was to assess primary healthcare physicians' (PHC) knowledge and attitude toward obstructive sleep apnoea and examine their relationship with demographic variables in the Qassim region.

Methods: A cross-sectional study design was used among 190 PHC physicians in the Qassim region. Data was collected through a validated self-administered online questionnaire distributed to 325 PHC centre physicians and the response rate was 58.4 %. Data was analysed using the SPSS 21.0 version. For inferential statistics, the Chi-square test and independent t-test were applied.

Results: A total of 190 physicians participated in this study, with the majority being male (56 %) and an average age of 39 ± 9.18 years. The findings revealed that 67.9 % of participants had insufficient knowledge about OSA. However, physicians with higher education and more experience demonstrated significantly better knowledge (69.7 %) compared to those with lower qualifications and less experience (24.2 %) ($p < 0.001$). Regarding attitudes, 54.2 % of PHC physicians exhibited a positive attitude toward OSA. Notably, family medicine specialists and consultants had a significantly more positive attitude (69.7 %) compared to general practitioners and family medicine residents (51.0 %) ($p < 0.05$).

Conclusion: Overall, PHC physicians in the Qassim region have inadequate knowledge about OSA, with more experienced and highly educated physicians demonstrating better understanding. While the overall attitude toward OSA is positive, specialists and consultants exhibit a significantly more favourable perspective than general practitioners and residents. Lectures and seminars about OSA are to be held to help physicians who didn't have adequate postgraduate training to improve their practice.

Key words: Primary healthcare; Physicians; Sleep apnoea, obstructive; Knowledge; Attitude; Qassim province; Saudi Arabia.

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Introduction

Obstructive sleep apnoea (OSA) is a common condition worldwide affecting many people around the globe, with an estimated 1 billion people being affected.[1] It is also the most common sleep-re-

lated breathing disorder and its prevalence is rising as a result of increasing obesity prevalence.[2] A study by Senaratna and colleagues[3] stated that the prevalence of OSA ranges from 9 % to 38 % in the adult general population worldwide, based on the apnoea-hypopnea index (AHI) as a cut-off value. In Saudi Arabia, one study showed that around 8.8 % of the screened participants had OSA.[4]

OSA causes recurrent partial (hypopnoea) or complete (apnoea) obstruction of airway passage during sleep; people with obstructive sleep apnoea may complain of snoring, being witnessed having apnoea during sleep or sleep disturbance.[5] During the day, patients may have increased sleepiness, difficulty concentrating and emotional stress.[6] People who are at high risk of developing obstructive sleep apnoea include those with obesity, with a neck circumference of more than 18 inches, or those who are 40 years or older.[7]

The negative consequences of OSA are not limited to sleep disturbance and fragmentation, frequent arousal and daytime sleepiness. There is a well-documented relationship between OSA and cardiovascular diseases like hypertension, heart failure and coronary artery diseases.[8] Despite its prevalence and debilitating complications, OSA is underdiagnosed and undertreated. One of the possible reasons for this situation is the limited knowledge and poor attitude of generalists toward OSA.[9] People with symptoms suggestive of OSA usually contact their primary healthcare (PHC) physician first.[10]

Physicians in the PHC setting have a vital role in recognition of OSA and management of several comorbidities. Most of the time, patients presenting with sleep-related problems have undiagnosed OSA. For this reason, it is critical to involve primary care physicians in managing this condition. Moreover, OSA is related to multiple comorbidities that can be addressed and managed in the primary care setting.[11] Although primary care physicians' role is recognised, multiple studies have been done that show primary care physicians have limited knowledge and poor attitude.[12, 13] Studies assessing PHC knowledge and attitude toward OSA have been done worldwide and locally.[14]

Saudi Arabia's healthcare system is primarily government-run, with the Ministry of Health responsible for both regulating and providing medical services. The country is divided into 13 administrative provinces, each of which contains one or more health clusters.[15] These clusters are tasked with managing and delivering healthcare services to the population within their designated areas.

In the Qassim region, the Qassim Health Cluster plays a key role in overseeing hospitals, ensuring they operate efficiently and provide high-quality medical care. Each hospital, in turn, supervises the nearby PHCs, which serve as the first point of contact for patients seeking medical attention. PHCs offer a comprehensive range of services, including preventive care, routine check-ups, vaccinations, management of chronic diseases, minor surgical procedures and maternal and child health services. Additionally, they provide essential diagnostic support through basic laboratory tests and imaging services, helping to facilitate early detection and treatment of various health conditions.[16]

Each PHC is staffed by at least one physician, who may be either a family physician with a postgraduate qualification in family medicine or a general practitioner holding a bachelor's degree in medicine.[17] Together, these healthcare professionals ensure that residents have access to essential medical services, contributing to the overall well-being of the community.

Since primary care physicians have a crucial role in identifying and screening for OSA, assessing their knowledge and attitude toward OSA is important to help improve healthcare.[18] To the best of authors' knowledge, no study in the Qassim region, Saudi Arabia, assesses primary healthcare physicians' knowledge and attitude toward OSA. Therefore, the aim of the study was to assess the PHC physicians' knowledge and attitude about OSA and examine their relationship with demographic variables in the Qassim region.

Methods

Study design and sample

This cross-sectional study was conducted among PHC physicians, including general practitioners, family medicine residents, family physician specialists and family physician consultants. The study setting was the Qassim region, the region is located in the centre of Saudi Arabia with res-

idents around 1 million. The region is organised into 12 governorates. The three biggest governorates (Buraidah, Onaizah and Al-rass) account for most of the region's residents. The data was collected from 15 August 2024 to 27 October 2024.

According to the Ministry of Health, around 155 PHC centres operate within Qassim province, with around 450 physicians. According to the *Open Epi* sample size calculator, with an assumed prevalence of 50 %, 95 % confidence limits and a design effect of one, the sample estimate would be 208.

The Qassim Health Cluster administration provided 325 physicians' contact numbers representing the Qassim PHC physicians' *WhatsApp* group. Then, the questionnaire was shared with all of them *via Google* link through direct messages.

All PHC physicians (general practitioners, family medicine residents, family physician specialists and family physician consultants) working in the Qassim region were included. Exclusion criteria were dentists, nurses and physicians on leave during data collection. Physicians working at private clinics, polyclinics and hospitals were also excluded.

Ethical considerations

The research team handled the data and obtained information from participants only. The final report did not include any data that exposed the participants' identities, such as names. Data was collected after obtaining the regional research Ethical Committee in Qassim province. Informed consent was obtained from every participant, which was inferred through the form attached to each online questionnaire before answering the questionnaire. Confidentiality and privacy were maintained and data was not shared with any private agency.

After the ethical committee's approval, a pilot study was conducted on 15 participants. The pilot study helped determine the feasibility of the study such the clarity of questions, the effectiveness of distribution method the order of the questions and time management. After the pilot study, no changes were made to the questionnaire and the pilot study sample was not included in main study sample.

Instruments and variables

The data was collected using the validated Obstructive Sleep Apnoea Knowledge and Attitude Questionnaire (OSAKA) after securing an ethical approval from the regional research ethical committee in Qassim. All study participants were offered informed consent.[19]

The first part covered demographic data questions, which include age (25 - 35 years, 36 - 45 years, older than 45 years), gender (males or females), position of the physicians (general practitioner and family medicine resident, family medicine specialist or family medicine consultant), experience of practice and were formulated based on the intended objectives.

The second part was about OSA Knowledge and Attitude questions. The knowledge section consisted of true-or-false questions. These questions assessed five areas: epidemiology, pathophysiology, symptoms, diagnosis and treatments. The questions were presented as statements of true false and I don't know options. One point was assigned to the correct choices and no points were assigned to other choices.[19] The study included 18 knowledge questions, with a score range from 0 to 18, where a correct answer earned 1 point and an incorrect answer earned 0 point. Physicians scoring more than 12 were classified as having good knowledge, while those with less than 12 were considered to have poor knowledge.

The attitude section contained five questions designed as a 5-choice Likert scale. The first two questions measured the perceived importance of OSA and its diagnosis with categories as (not important, somewhat important, important, very important and extremely important). The remaining three questions measured physicians' confidence in different aspects of the condition with categories as (strongly disagree, disagree neutral, agree and strongly agree). Additionally, 5 attitude questions were included, each scored between 1 and 5, with a maximum possible score of 25 and a minimum of 5. A score of 17 or higher was considered a good attitude, while a score below 17 was regarded as a poor attitude.

The third part contained three questions related to primary care physicians' practice. The first question was about the exposure of physicians to OSA cases. The options included: no previous exposure, 1-5 patients per month, 5-10 patients per month, 10-15 patients per month and more than

15 patient per month). The second question was about how frequently physicians ask about sleep disturbance during clinic visit and the respective categories were: never, less than 25 % of the time, less than 50 % of the time, less than 75 % of the time and 100 % of the time. The third question was the referral pattern of physicians and categories were: no referral, to pulmonology, to sleep clinic, to ENT or to neurology.

Statistical analysis

Data was collected, entered, cleaned, coded and analysed with SPSS software 21.0 version. For continuous variables like age, years of practice and number of OSA patients seen per month, means and standard deviations (SD) were calculated. For other demographic variables like gender and other categorical demographic variables, frequencies and percentages were calculated. PHC physicians' total mean knowledge score and mean attitude score were compared with gender and a sub-group analysis of the position of the physician (general practitioners, family medicine residents, family physician specialists and family physician consultants) was performed using an independent t-test. A Chi-square test was applied for the same scores categories of good and poor scores with demographic characteristics categories of the participants. Statistical significance in study was considered at a 95 % confidence interval, defined as a probability (p) value of less than or equal to 0.05.

Results

In the present study, 325 physicians were invited to complete a questionnaire *via a Google* link and 190 primary healthcare physicians participated. The response rate was approximately 58.4 % (190/325). The average age of participants was 39 ± 9.18 years, with a range of 34 years (minimum 25 years and maximum 59 years) and 75 % were under 46 years of age. The mean years of practice were 10 ± 7.54 years, with a range of 29 years (minimum 1 year and maximum 30 years). Most participants were male (56.3 %, n = 107) and 82.6 % (n = 157) were family medicine residents or general physicians. The average years of practice for the study group were 10 ± 7.54 years and most physicians (41.6 %, n = 79) were based in Buraidah (Table 1).

Table 1: Demographic characteristics of the physicians working at primary healthcare physicians centre (PHCC) of Qassim province

Demographic variables	N	%
Age ± SD	39 ± 9.18 years	
Age category		
25-35 years	70	36.8
36-45 years	68	35.8
> 45 years	52	27.4
Gender		
Male	107	56.3
Female	83	43.7
Current professional level of doctor		
Family medicine resident and general practitioners	157	82.6
Family medicine specialist	28	14.7
Family medicine consultant	5	2.6
Work place		
Buraidah	79	41.6
Unaizah	22	11.6
Alrass	21	11.1
Family medicine academy	28	14.7
Other	40	21.1
Mean number of years in practice ± SD	10 ± 7.54 years	
The average knowledge score about OSA among physicians ± SD	9.5 ± 3.53 (Range 16; 2-18)	
The mean attitude score about OSA ± SD	17 ± 4.0 (Range 17; 8-27)	

OSA: obstructive sleep apnoea; SD: standard deviation;

The average knowledge score about OSA among the physicians was 9.5 ± 3.53, with a range of 16 (minimum score was two and maximum score was 18). The mean attitude score about OSA was 17 ± 4.0, with a minimum score of eight and a maximum score of 25.

Figure 1 revealed that about 32.10 % (n = 61) of PHC physicians had good knowledge of OSA. Figure 2 revealed that about 54.2 % (n = 103) of PHCC physicians had a good attitude toward OSA.

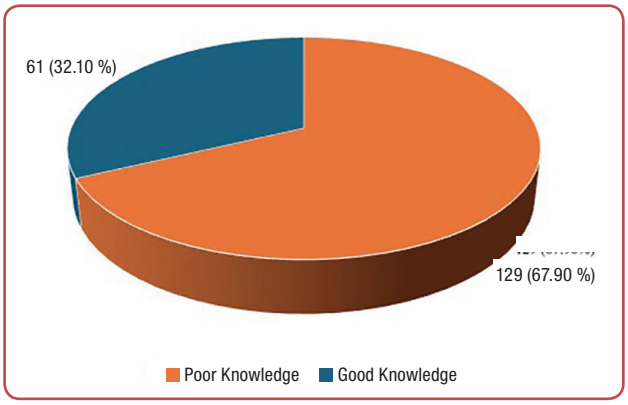

Figure 1: Primary healthcare centre physicians' knowledge about obstructive sleep apnoea (OSA)

Table 2 presents the knowledge status of PHC physicians' OSA. No question was answered correctly by 100 % of the participants. The questions with most correct response from participants were those related to symptoms and diagnosis. The least frequently correct answers were for management. More than two-thirds of physicians (69.5 %) associated OSA with hypertension and a slight majority linked OSA with cardiac arrhythmias. Overall, physicians demonstrated a better understanding of OSA symptoms, pathophysiology and diagnosis than epidemiology and treatment.

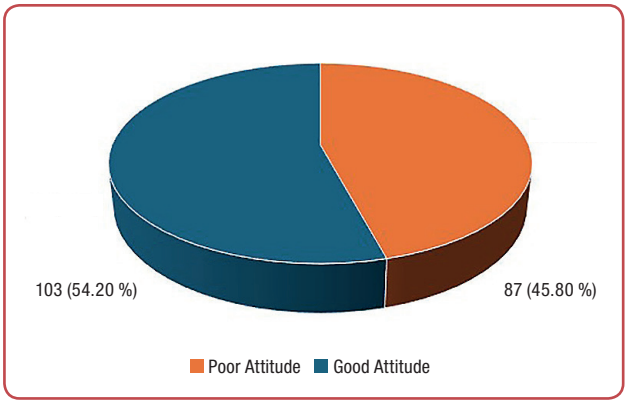

Figure 2: Primary healthcare centre physician's attitude about obstructive sleep apnoea (OSA)

Table 2: Knowledge status of primary healthcare centre physicians about obstructive sleep apnoea (OSA)

Knowledge questions	True (%)	False (%)	Total (%)
Women with OSA may present with fatigue alone	120 (63.2 %)	70 (36.8 %)	190 (100 %)
Uvulopalatopharyngoplasty is curative for the majority of patients with OSA	41 (21.6 %)	149 (78.4 %)	190 (100 %)
The estimated prevalence of OSA among adults is between 2 and 10 %	92 (48.4 %)	98 (51.6 %)	190 (100 %)
The majority of patients with OSA snore	173 (91.1 %)	17 (8.9 %)	190 (100 %)
OSA is associated with hypertension	132 (69.5 %)	58 (30.5 %)	190 (100 %)
An overnight sleep study is the gold standard for diagnosing OSA	135 (71.1 %)	55 (28.9 %)	190 (100 %)
CPAP (continuous positive airway pressure) therapy may cause nasal congestion	89 (46.8 %)	101 (53.2 %)	190 (100 %)
Laser-assisted uvuloplasty is an appropriate treatment for severe OSA	48 (25.3 %)	142 (74.7 %)	190 (100 %)
The loss of upper airway muscle tone during sleep contributes to OSA	120 (63.2 %)	70 (36.8 %)	190 (100 %)
The most common cause of OSA in children is the presence of large tonsils and adenoids	152 (80.0 %)	38 (20.0 %)	190 (100 %)
A craniofacial and oropharyngeal examination is useful in the assessment of patients with suspected OSA	113 (59.5 %)	77 (40.5 %)	190 (100 %)
Alcohol at bedtime improves OSA	34 (17.9 %)	156 (82.1 %)	190 (100 %)
Untreated OSA is associated with a higher incidence of automobile crashes	123 (64.7 %)	76 (35.3 %)	190 (100 %)
In men, a collar size 17 in. or greater is associated with OSA	95 (50.0 %)	95 (50.0 %)	190 (100 %)
OSA is more common in women than in men	69 (36.3 %)	121 (63.7 %)	190 (100 %)
CPAP is the first line therapy for severe OSA	126 (66.3 %)	64 (33.7 %)	190 (100 %)
Less than 5 apnoeas or hypopneas per hour is normal in adults	57 (30.0 %)	133 (70.0 %)	190 (100 %)
Cardiac arrhythmias may be associated with untreated OSA	96 (50.5 %)	94 (49.5 %)	190 (100 %)

Table 3 indicates no significant gender differences in physicians' knowledge ($p > 0.05$). Physicians with good knowledge had a mean age of 42.68 years, compared to 37.36 years for those with poor knowledge. More than 80 % of physicians aged 25 to 35 had poor knowledge, while half of physicians older than 45 had good knowledge. Family medicine specialists and consultants had a significantly higher percentage of good knowledge (69.7 %) compared to general practitioners and family medicine residents (24.2 %) ($p < 0.001$). Physicians with good knowledge also had more years of practice, with an average of 13.32 years compared to 9.45 years for those with poor knowledge. These findings suggest that older physicians, those with higher qualifications and those with more experience demonstrated better knowledge.

Table 4 shows that 62.6 % (n = 119) of participants considered OSA to be an extremely or very important clinical disorder and 61.1 % (n = 116) agreed that identifying patients with OSA is very and extremely important. Regarding self-confidence in diagnosing OSA, 67.4 % (n = 128) felt confident in identifying patients, but only 43.6 % (n = 83) felt confident in managing OSA patients and just 22.6 % (n = 43) were confident in managing patients on continuous positive air pressure (CPAP) therapy. These results suggest that while most physicians recognised the importance of OSA and felt confident in diagnosing it, fewer were confident in managing OSA patients or those on CPAP.

Table 5 indicates that female physicians were more likely to have a good attitude about OSA

Table 3: Demographic characteristics associated with primary healthcare centre physicians' knowledge about obstructive sleep apnoea (OSA)

Variables		Poor knowledge (n = 129)	Good knowledge (n = 61)	p-value
Gender				
	Male	71 (66.4 %)	36 (33.6 %)	p = 0.606
	Female	58 (69.9 %)	25 (30.1 %)	
Age (mean ± SD)		37.36 ± 8.93	42.68 ± 8.70	p = 0.001
Age category				
	25-35 years	57 (81.4 %)	13 (18.6 %)	p = 0.001
	36-45 years	46 (67.6 %)	22 (32.4 %)	
	> 45 years	26 (50.0 %)	26 (50.0 %)	
Current position				
	General practitioners and family medicine resident	119 (75.8 %)	38 (24.2 %)	p = 0.001
	Family medicine specialist and family medicine consultant	10 (30.3 %)	23 (69.7 %)	
	Years in practice (mean ± SD)	9.45 ± 7.37	13.32 ± 7.28	p = 0.001

Table 4: Attitude and confidence of primary healthcare centre physicians on diagnosing and managing obstructive sleep apnoea (OSA)

Attitude questions	Not important N (%)	Somewhat important N (%)	Important N (%)	Very important N (%)	Extremely important N (%)	Mean ± SD
As a clinical disorder, obstructive sleep apnoea is	9 (4.7 %)	18 (9.5 %)	44 (23.2 %)	61 (32.1 %)	58 (30.5 %)	3.74 ± 1.13
Identifying patients with possible obstructive sleep apnoea is	4 (2.1 %)	23 (12.1 %)	47 (24.7 %)	57 (30.0 %)	59 (31.1 %)	3.76 ± 1.08
Response	**Strongly disagree**	**Disagree**	**Neither agree or disagree**	**Agree**	**Strongly agree**	**Mean ± SD**
I feel confident identifying patients with obstructive sleep apnoea	4 (2.1 %)	18 (9.5 %)	40 (21.1 %)	87 (45.8 %)	41 (21.6 %)	3.75 ± 0.96
I feel confident in my ability to manage patients with obstructive sleep apnoea	19 (10.0 %)	38 (20.0 %)	50 (26.3 %)	66 (34.7 %)	17 (8.9 %)	3.13 ± 1.13
I feel confident in my ability to manage patients on CPAP therapy	39 (20.5 %)	59 (31.1 %)	49 (25.8 %)	34 (17.9 %)	9 (4.7 %)	2.55 ± 1.14

CPAP: continuous positive airway pressure;

Table 5: Demographic characteristic associated with primary healthcare centre physicians' attitude about obstructive sleep apnoea (OSA)

Variables		Poor attitude N (%) (n = 87)	Good attitude N (%) (n = 103)	p-value
Gender				
	Male	56 (52.3 %)	51 (47.7 %)	p = 0.040
	Female	31 (37.3 %)	52 (62.7 %)	
Age (mean ± SD)		35.71 ± 8.27	41.91 ± 8.99	p = 0.001
Age category				
	25-35 years	48 (68.6 %)	22 (31.4 %)	p = 0.001
	36-45 years	25 (36.8 %)	43 (63.2 %)	
	> 46 years	14 (26.9 %)	38 (73.1 %)	
Current position				
	General practitioners and family medicine resident	77 (49.0 %)	80 (51.0 %)	p = 0.049
	Family medicine specialist and family medicine consultant	10 (30.3 %)	23 (69.7 %)	p = 0.001
	Years in practice (mean ± SD)	8.11 ± 6.61	12.87 ± 7.62	

(62.7 %) compared to males (47.7 %) and this difference was statistically significant ($p < 0.05$). A significant mean difference in attitude was observed between older physicians (41.91 ± 8.99 years) and younger physicians (35.71 ± 8.27 years), with older physicians displaying better attitudes ($p < 0.001$). Family medicine specialists and consultants had a significantly better attitude about OSA (69.7 %) compared to general practitioners and family medicine residents (51.0 %) ($p < 0.05$).

Table 6 reveals that most physicians reported little exposure to OSA cases, with many seeing fewer than 5 suspected OSA patients per month was 41.1 %. Most physicians also reported asking about sleep issues in fewer than 50 % of the time in patients presenting with non-sleep-related complaints. When it comes to referrals, most physicians preferred referring patients to ear, nose and throat (ENT) (40 %) and sleep clinics 33.7 %, with about a third referring to pulmonology approximately 20 %.

Table 6: Primary healthcare centre physicians' current practice about obstructive sleep apnoea (OSA)

How frequent you were exposed to diagnosed / suspected OSA patients	**No previous exposure**	**Less than 5 patients/ month**	**5-10 patients/month**	**10-15 patients/month**	**>15 patients/month**
Response - N (%)	80 (42.1)	78 (41.1)	20 (10.5)	10 (5.3)	2 (1.1)
How frequent would you ask patients presenting with non-sleep related issues about sleep problems	**0 % of the time**	**25 % of the time**	**50 % of the time**	**75 % of the time**	**100 % of the time**
Response - N (%)	47 (24.7)	64 (33.7)	32 (16.8)	30 (15.8)	17 (8.9)
If you suspect a patient to have OSA you would	**Not offer referral**	**Refer to ENT**	**Refer to pulmonology**	**Refer to neurology**	**Refer to sleep clinic**
Response - N (%)	10 (5.3)	76 (40.0)	39 (20.5)	1 (0.5)	64 (33.7)

ENT: ear, nose trout clinic.

Discussion

It is essential to engage primary care physicians in the management of OSA, as it is linked to several comorbidities that can be addressed in the primary care setting. Effective management can help reduce the morbidity associated with OSA and improve patients' quality of life.

In this study, the mean knowledge score of OSA PHC physicians was 9.5 ± 3.53, with approximately 67.9 % of physicians demonstrating poor knowledge of the condition. This finding suggests a significant lack of understanding of OSA among primary care physicians.

These results are consistent with several other studies.[13, 20-23] For instance, Devaraj's study in Kuala Lumpur, Malaysia, reported a mean knowledge score of 11.6 ± 2.8.[13] Wang also has reported an OSA knowledge score of 11.2 in his study.[24] Similarly, studies in Saudi Arabia by Alrasheedi et al and Alghamdi et al revealed that 43.9 % and 62.2 % of physicians, respectively, had poor knowledge about OSA.[20, 21]

Chang and colleagues found varying knowledge levels among primary care physicians in Kenya, Nigeria and South Africa, with South African physicians scoring the highest (83.3 %) compared to Kenyan (66.7 %) and Nigerian physicians (61.1 %).[25] Other studies, such as those by Schotland and Corso reported higher knowledge scores of 13.2 and 12, respectively.[19, 26] In contrast, a study assessing ENT residents' knowledge and attitudes towards OSA found a significantly higher mean knowledge score of 16.[22] These differences in knowledge scores likely reflect the varying populations, with specialists like otolaryngologists and anaesthesiologists showing greater knowledge than general practitioners.

In the current study, the questions with the highest correct answer rates were those concerning common OSA symptoms, such as snoring in the majority of patients, large tonsils and adenoids as the primary cause of OSA in children and the gold standard for diagnosing OSA is an overnight sleep study, with correct answer rates of 91 %,

80 % and 71 %, respectively. These findings align with Alrasheedi's study, where the highest correct answer rates were similarly around 81.9 %, 81.4 % and 78 %, respectively.[20] Alghamdi's study results are also consistent with presented results.[21] Furthermore, more than two-thirds of participants correctly identified the relationship between OSA and hypertension, which was also noted in other studies, such as Shrestha's[27] and Embarak's studies.[23] Other studies, like the one done by Hussain, reported that more than half of the participants failed to identify the association between OSA and hypertension.[28]

Conversely, only 17.9 % of participants correctly responded to the statement that stated alcohol improves OSA. The other questions with the least correct answers were the statements regarding uvulopalatopharyngoplasty and laser-assisted uvuloplasty as treatment options for OSA. Obianuju also reported that more than 70 % of his participants answered incorrectly when asked about uvuloplasty as a treatment option for OSA.[29] Devaraj reports a similar finding.[13] These findings demonstrate that general physicians have good knowledge of the signs and symptoms of OSA and its causes but inadequate knowledge of treatment options.

In terms of demographic factors, there was no significant difference in knowledge between genders in the current study. However, physicians with better knowledge were generally older (mean age 42.6 years) and had more years of experience (mean 13.3 years). Family medicine consultants and specialists scored better on knowledge tests (69.7 %) compared to residents and general practitioners (24.2 %). In a similar context, Alsaif et al conducted a study among otorhinolaryngology residents in Saudi Arabia and found that senior-level residents had better mean total knowledge and attitude scores than junior-level residents.[14] This suggests that a physician's knowledge of OSA is positively correlated with age, experience and higher qualifications. This trend is consistent with other studies, such as those by Al-Khafaji et al and Alghamdi et al.[12, 21] However, by Ansari and Corso, found no correlation between demographic characteristics and knowledge scores.[22, 26] A study in Ecuador by Ojeda found that practicing physicians had a higher knowledge score (60.4 %) compared to recent medical graduates (53.5 %), though both groups still demonstrated poor knowledge of OSA.[30]

Regarding attitudes, the mean attitude score of the physicians in our study was 17 ± 4.0, indicating a generally positive attitude towards OSA. This result aligns with findings from other studies.[13, 20, 23] Participants perceived OSA to be important as a clinical disorder, with 62.6 % answering extremely important or very important, which was higher than what Alrasheedi and Devaraj have reported in their studies (50.8 %) and 59 %, respectively.[13, 20] However, presented findings are lower than those reported by Ansari, who found that 100 % of participants regarded OSA as an important disorder.[22]

In terms of self-confidence, 67.4 % of participants were confident in identifying patients with OSA, but only 43.6 % felt confident in managing OSA patients and just 22.6 % were confident in managing patients using CPAP therapy. This reflects a general trend in other studies, where physicians tend to have greater confidence in identifying OSA but feel less confident in managing it. For example, in Alrasheedi's study, 73.9 % of physicians were confident in identifying OSA, but only 43.3 % were confident in managing it. Similarly, an Egyptian study found 59.3 % confidence in identification but lower confidence in management.[20, 23] Some studies reported a higher confidence level, like Ansari, who reported that (86.9 %) of respondents were confident in identifying OSA, but only (45.5 %) had confidence in managing OSA.[22] Overall, physicians have more confidence in identifying OSA than they have in managing it. Different studies showed similar trends.[22, 23, 30]

In presented study, female physicians and those with higher qualifications had better attitude scores, which is consistent with the findings of Embarak, who also found that staff physicians had a better attitude than residents.[23] Corso's study similarly found that females, older physicians and those with higher qualifications had more positive attitudes toward OSA.[26]

When examining the participants' referral patterns for patients with OSA, 40 % of physicians would refer patients to ENT, 33.7 % would refer them to sleep clinics and 20.5 % would choose pulmonology clinics. These patterns were also present in Alrasheedi et al study, where reported that 39.4 % of physicians would refer patients to ENT, 21 % would refer them to a sleep clinic and 18 % chose to refer to a pulmonology clinic.[20] Devaraj also reported ENT to be the most common referral choice.[13]

This study was conducted in the Qassim region, which included all Qassim urban and rural areas and was a region-exclusive study. The outcomes of this study reflect the knowledge and attitude of Qassim PHC physicians and can be used along with other similar Saudi Arabia regional studies to give a national perspective. Another strength of the study is the OSAKA questionnaire, which is a validated questionnaire that has been used in many studies.[19] The study's weakness is due to the time constraint; the sample was 190, less than the planned 208. Also, like all self-administered questionnaire studies, there is a risk of some reporting bias.

Conclusion

Based on the study findings, overall, PHC physicians in the Qassim region have inadequate knowledge regarding OSA. Albeit physicians with more experience and higher education have better knowledge than less experienced physicians and those without higher education. Female physicians have demonstrated a good attitude towards OSA. Physicians with more experience and higher education have a better attitude.

Lectures and seminars about OSA are recommended to be held to help physicians who didn't have adequate postgraduate training to improve their practice. Also, since there is no agreed-upon referral protocol, a national guideline to help physicians deliver optimum care should be adopted.

Ethics

Data was collected after obtaining the Institutional Ethical Committee certificate from the Qassim Regional Ethics Committee in accordance with the National Bioethics Committee, KACST with approval No 607-46-1305, dated 12 August 2024. The authors gave importance to the participant data information and assured the confidentiality of the individual information.

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Conflicts of interest

The authors declare that there is no conflict of interest.

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Data access

The data that support the findings of this study are available from the corresponding author upon reasonable individual request.

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