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Research Article

**KNOWLEDGE, ATTITUDE OF FAMILY MEDICINE
RESIDENTS TOWARDS OBSTRUCTIVE SLEEP APNEA IN
MINISTRY OF HEALTH (MOH) CLUSTER 2 INRIYADH,
SAUDI ARABIA**

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Abstract:

Background: Obstructive sleep apnea (OSA) is a prevalent sleep disease that, if left untreated, can result in considerable morbidity and mortality. Residents in family medicine play a significant role in the diagnosis and treatment of OSA. However, few studies have been undertaken to evaluate their OSA knowledge, attitudes, and confidence. Consequently, the purpose of this study was to evaluate the knowledge, attitudes, and confidence of family medicine residents regarding OSA, as well as to investigate the association between these variables and demographic parameters.

Methodology: This cross-sectional study was conducted among Saudi Arabian family medicine residents in cluster 2 of the Ministry of Health. A self-administered survey was utilised to collect data on OSA-related knowledge, attitudes, and confidence. The questionnaire comprised of 18 knowledge questions, five attitude questions, and five confidence questions. The information was examined using descriptive and inferential statistics.

Results: 110 residents in family medicine participated in the study. Results indicated that family medicine residents have modest OSA knowledge. The average knowledge question score was 7.77 out of 18. (43.2 percent). The study also revealed that family medicine residents are aware of the significance of OSA as a clinical disease but lack confidence in diagnosing and treating patients with OSA. The training level was the most influential demographic component in predicting OSA knowledge scores, attitudes, and confidence. R3 level inhabitants had the greatest mean knowledge and attitude scores about the significance of OSA. **Conclusion:** The study reveals the knowledge gaps and lack of confidence among family medicine residents about the management of OSA patients. The findings imply that educational programmes focused at enhancing the knowledge of family medicine residents about obstructive sleep apnea may improve the quality of treatment offered to patients with obstructive sleep apnea. In addition, demographic characteristics such as training level and expertise have a crucial impact in affecting the confidence and attitude of family medicine residents toward OSA. To ensure that family medicine residents have a solid foundation in OSA management, educational interventions should be targeted at earlier levels of training.

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INTRODUCTION:

Sleep disorders are a highly prevalent health conditions, with Obstructive sleep apnea (OSA) as one of the most prevalent worldwide sleep disorders that remains underdiagnosed and untreated [1]. (OSA) defined as a clinical disorder marked by frequent pauses in breathing during sleep usually accompanied by loud snoring. These pauses cut off the oxygen supply to your body for a few seconds and halt the removal of carbon dioxide [2]. A 2019 Study assessed the global disease burden of OSA, based on data collected from 17 countries and defining OSA by the AASM 2012 diagnostic criteria estimated that 425 million have moderate to severe OSA. The number of afflicted were highest in china followed by USA [3]. A systematic review which included 24 studies estimated the prevalence of OSA (apnea-hypopnea index, AHI ≥ 5) to range from 9-38% and was higher in men, older adults, and obese individuals [4,5]. A 2017 study in Saudi Arabia assessed the prevalence of OSA to Be approximately 8.8% (12.8% in men and 5.1% in women) [6]. Two studies conducted in the Gulf region estimated that the risk for OSA was higher in men (19%) compared to women (15%) [7,8].

OSA a disorder in which there's a loss of pharyngeal dilator muscle tone during sleep which causes recurrent airway collapse (apnea). This causes repetitive hypoxia and CO₂ retention, and provoke Arousal which restores the normal airflow, this cycle is repeated during the night [9].

OSA is defines as the patient having five or more apneas-hypopneas per hour of sleep (apnea-hypopnea index, AHI) with either excessive daytime sleepiness or two or more episodes of choking or gasping during sleep, recurrent awakenings, unrefreshing sleep, daytime fatigue, or neurocognitive impairment [8].

The long-term effects of the cycle of interrupted sleep and recurrent hypoxia that is caused by OSA are associated with a wide range of comorbidities. A prospective study was done to assess the relationship between sleep disordered breathing and hypertension, which revealed an increase in the odds of developing hypertension with the increase in apnea-hypopnea events per hour [10]. In addition to that, OSA patient have higher risk of ischemic stroke and type 2 diabetes mellitus [11,12]. It has been observed that Motor vehicle accident risk increases in patient with OSA in comparison to the general population [13]. An important role provided by primary care physicians in detecting OSA [14].

There is a Wide range in Variability of OSA knowledge among Primary care physicians. A study conducted in France assessing the knowledge of primary care physicians of OSA, which demonstrated that only about a third of them mentioned the combination of daytime somnolence, snoring and apnea as cardinal presentation of OSA. The Same study also demonstrated insufficient knowledge about OSA complication [15]. Another study in Canada showed an average knowledge score 69%, which while a passing grade, is indicative of a gap in OSA knowledge [16]. Questions related to incidence of OSA were commonly answered wrongly, which indicates the reason of why OSA is underestimated and underdiagnosed in primary care [16]. A low OSA management awareness shows defect in knowledge which was realized in Africa and Saudi Arabia [17,18]. Untreated OSA, especially severe OSA, is associated with several adverse health outcomes including cardiovascular disease, diabetes, stroke, and mortality [19,20].

It is crucial that physicians must be well educated in the screening and management of sleep disorders such as OSA, which in turn can lead to the prevention of serious complications. Thus, determining the gaps in knowledge is vital to devise educational strategies. In this study, we aim to assess the knowledge and attitudes towards OSA Family Medicine Residents in the second Cluster C2 of MOH in Riyadh Saudi Arabia.

METHODOLOGY:

The purpose of this cross-sectional study was to evaluate the knowledge and attitudes of family medicine residents in C2, Riyadh, Saudi Arabia, regarding obstructive sleep apnea (OSA).

Obstructive Sleep Apnea Knowledge and Attitudes (OSAKA) questionnaire was used to obtain data on the participants' knowledge and attitudes towards OSA.

Sampling:

Through the Saudi Commission for Health Specialties, all active family medicine residents in C2, Riyadh, Saudi Arabia were included in the study population (SCFHS). A total of 150 participants were recruited in the study based on the following formula for calculating sample size: $Z_{1-\alpha/2} \cdot 2 \cdot SD_2 / d$. The standard normal variate ($Z_{1-\alpha/2}$) was established at 1.96 for a type 1 error rate of 5%. The variable's standard deviation (SD) was not stated, thus it was presumed to be 0.5. The value for absolute accuracy (d) was set to 0.05. Due to the possibility of missing data, the calculated minimum sample size of 138

participants was rounded up to 150 participants.

Data collection:

Family medicine residents in C2, Riyadh, Saudi Arabia, who were contacted via the SCFHS, provided the data. Two portions of a self-administered questionnaire were utilised in this study: a demographic survey and the Obstructive Sleep Apnea Knowledge and Attitudes (OSAKA) questionnaire.

The demographic survey gathered information on the age, gender, speciality, and length of practise of the participants. The OSAKA questionnaire tested the knowledge and attitudes of participants on obstructive sleep apnea (OSA). The OSAKA questionnaire consisted of 23 questions separated into three sections: 18 knowledge questions, 2 attitude questions on the significance of OSA, and 3 attitude questions regarding confidence in identifying and treating OSA patients. The knowledge questions included a variety of OSA-related topics, including epidemiology, pathophysiology, symptoms, diagnosis, and treatment.

Participants received either a physical copy or a digital copy of the questionnaire, depending on their desire. Participants were informed of the objective of the study and their ability to withdraw participation without repercussions. Before completing the questionnaire, participants who consented to participate signed a consent form indicating their understanding of the study's purpose and procedures. The questionnaire was administered anonymously, and the confidentiality of the participants' information was preserved throughout the duration of the study.

Data Analysis:

The data were analysed using version 28.0 of the Statistical Package for the Social Sciences (SPSS). The data were summarised using descriptive statistics, with numbers and percentages for categorical data and mean and standard deviation for continuous data. Using the Chi-square test and/or independent t-test, a univariate analysis was performed to assess the relationships between responses and demographics. A p-value of less than 0.05 was regarded as statistically significant.

Ethical Considerations:

This was a questionnaire-based study that posed no risk of injury to participants. Participants were only included in the study if they consented to take part and completed an informed consent form, with strict regard for the confidentiality of their personal information. Before data collection, the study protocol was evaluated and approved by the appropriate institutional reviewboard (IRB).

RESULTS:

A total of 150 family medicine residents were invited to participate in the study, and 110 responded, for a response rate of 73.3%. Table 1 displays the demographic characteristics of the participants. 57 (52.3%) of the 110 participants were male, while 52 (47.7%) were female. The bulk of participants (86.4 percent) were unmarried, while only 15 (13.6 percent) were married. Regarding training level, forty-four (40%) were R1 residents, thirty-five (31.8%) were R2 residents, and thirty-one (28.2%) were R3 residents.

Table 1: Demographic factors of the participants (N=110)

		Count	Column N %
Gender	Male	57	52.3%
	Female	52	47.7%
Marital status	Single	95	86.4%
	Married	15	13.6%
Training level	R1	44	40.0%
	R2	35	31.8%
	R3	31	28.2%

Table 2 displays the reactions of participants to several characteristics of obstructive sleep apnea (OSA). For each of the table's 18 knowledge questions, the number and percentage of correct and incorrect/unknown responses are presented. Only six (5.5 percent) of the participants answered wrong to question 12, which suggested that drinking alcohol before bedtime helps obstructive sleep apnea. The item with the fewest correct responses was question 2, which claimed that Uvulopalatopharyngoplasty is curative for the majority of OSA patients. Only 42 participants (38.2%) responded correctly. The average score on the knowledge questions was 7.77 out of 18, or 43.2%, showing a moderate level of knowledge.

Table 2: Participants' response toward different aspect of sleep apnea

	Wrong/ I do not know		Correct	
	Count	Row N %	Count	Row N %
1. Women with obstructive sleep apnea may present with fatigue alone.	53	48.6%	56	51.4%
2. Uvulopalatopharyngoplasty is curative for the majority of patients with obstructive sleep apnea.	68	61.8%	42	38.2%
3. The estimated prevalence of obstructive sleep apnea among adults is between 2% and 10%.	79	71.8%	31	28.2%
4. The majority of patients with obstructive sleep apnea snore.	36	33.0%	73	67.0%
5. Obstructive sleep apnea is associated with hypertension.	34	30.9%	76	69.1%
6. An overnight sleep study is the gold standard for diagnosing obstructive sleep apnea.	37	33.6%	73	66.4%
7. CPAP (continuous positive airway pressure) therapy may cause nasal congestion.	80	73.4%	29	26.6%
"8. Laser-assisted uvuloplasty is an appropriate treatment for severe obstructive sleep apnea.	76	69.7%	33	30.3%
9. The loss of upper airway muscle tone during sleep contributes to obstructive sleep apnea.	60	55.0%	49	45.0%
"10. The most common cause of obstructive sleep apnea in children is the presence of large tonsils and adenoids.	47	43.1%	62	56.9%
"11. A craniofacial and oropharyngeal examination is useful in the assessment of patients with suspected obstructive sleep apnea.	52	48.1%	56	51.9%
12. Alcohol at bedtime improves obstructive sleep apnea	104	94.5%	6	5.5%
13. Untreated obstructive sleep apnea is associated with a higher incidence of automobile crashes.	49	44.5%	61	55.5%
14. In men, a collar size 17 inches or greater is associated with obstructive sleep apnea.	78	71.6%	31	28.4%
15. Obstructive sleep apnea is more common in women than men.	53	48.2%	57	51.8%
"16. CPAP is the first line therapy for severe obstructive sleep apnea.	57	52.3%	52	47.7%
17. Less than 5 apneas or hypopneas per hour is normal in adults.	98	89.1%	12	10.9%
18. Cardiac arrhythmias may be associated with untreated obstructive sleep apnea.	54	49.1%	56	50.9%
General mean score : Mean (SD)	7.77 (3.80)			

Table 3 shows the attitude of the participants towards the importance of obstructive sleep apnea (OSA) and their confidence in diagnosing and managing patients with OSA. The table includes five attitude questions, and for each question, the count and column percentage of the responses are provided. The majority of the participants (97.3%) agreed that OSA is important or very important as a clinical disorder. However, when it comes to confidence in identifying patients at risk for OSA, only 9.1% of the participants strongly agreed that they were confident, while the majority (62.7%) strongly disagreed. Similarly, when it comes to confidence in managing patients with OSA, only 6.4% of the participants strongly agreed that they were confident, while 42.7% strongly disagreed. The mean score for the attitude questions related to the importance of OSA was 3.93 out of 5 (78.5%), indicating a relatively high level of importance placed on the disorder. However, the mean score for the confidence questions related to diagnosing and managing patients with OSA was only 1.88 out of 5 (37.6%), indicating a low level of confidence. The total mean score for the attitude questions was 2.70 out of 5 (54%), indicating a moderate level of attitude towards OSA.

Table 3: Attitude of the participants about the important of OSA and their confidence toward diagnosis

		Count	Column N %
A. As a clinical disorder, obstructive sleep apnea is:	Not Important	0	0.0%
	Somewhat important	2	1.8%
	Important	39	35.5%
	Very important	35	31.8%
	Extremely important	34	30.9%
A. As a clinical disorder, obstructive sleep apnea is:	Not Important	0	0.0%
	Somewhat important	3	2.7%
	Important	36	32.7%
	Very important	35	31.8%
	Extremely important	36	32.7%
	Strongly disagree	69	62.7%
	Strongly disagree	15	13.6%
C. I feel confident identifying patients at-risk for obstructive sleep apnea.	Neither agree nor disagree	16	14.5%
	Agree	0	0.0%
	Strongly agree	10	9.1%
"D. I am confident in my ability to manage patients with obstructive sleep apnea.	Strongly disagree	47	42.7%
	Strongly disagree	28	25.5%
	Neither agree nor disagree	28	25.5%
	Agree	0	0.0%
	Strongly agree	7	6.4%
E. I am confident in my ability to manage patients on CPAP therapy.	Strongly disagree	55	50.0%
	Strongly disagree	28	25.5%
	Neither agree nor disagree	22	20.0%
	Agree	0	0.0%
	Strongly agree	5	4.5%
Attitude toward importance of OSA	Mean (SD)	3.93 (0.83)	
Confidence in diagnosis and management of patients with OSA	Mean (SD)	1.88 (0.788)	
Total score of attitude	Mean (SD)	2.70 (0.65)	

Table 4 shows the relationship between knowledge scores and demographic factors of the participants. The table includes three demographic factors: gender, marital status, and training level. For each factor, the mean and standard deviation of the knowledge scores are provided, as well as the p-value of the statistical test used to determine if there is a significant relationship between the factor and the knowledge scores. The results indicate that there is a significant relationship between training level and knowledge scores (p=0.000). Specifically, R3 level residents had the highest mean knowledge score of 10.13 out of 18 (56.3%), followed by R2 level residents with a mean score of 7.69 out of 18 (42.7%), and R1 level residents with a mean score of 6.18 out of 18 (34.3%). This suggests that as the training level of family medicine residents increases, so does their knowledge of OSA. There was no significant relationship between gender and knowledge scores, with male and female residents having similar mean scores of 7.79 out of 18 (43.3%). However, there was a marginally significant relationship between marital status and knowledge scores (p=0.087), with married residents having a higher mean score of 9.33 out of 18 (51.8%) compared to single residents with a mean score of 7.53 out of 18 (41.8%).

Table 4: The relation between knowledge and demographic factors of the participants

		Knowledge		
		Mean	Standard Deviation	P-Value
Gender	Male	7.79	3.71	0.999
	Female	7.79	3.97	
Marital status	Single	7.53	3.88	0.087
	Married	9.33	2.92	
Training level	R1	6.18	3.56	0.000*
	R2	7.69	4.09	
	R3	10.13	2.43	

Table 5 shows the relationship between the attitude of the participants towards OSA and demographic factors and knowledge. The results indicate that there is a significant relationship between training level and attitude towards the importance of OSA (p=0.011). Specifically, R3 level residents had the highest mean attitude score of 4.29 out of 5 (85.8%), followed by R2 level residents with a mean score of 3.89 out of 5 (77.8%), and R1 level residents with a mean score of 3.72 out of 5 (74.4%). This suggests that as the training level of family medicine residents increases, so does their attitude towards the importance of OSA. There is also a significant positive correlation between knowledge scores and attitude towards the importance of OSA (r=0.580, p=0.000) and confidence in diagnosing and managing patients with OSA (r=0.288, p=0.002). This indicates that as the knowledge of family medicine residents regarding OSA increases, their attitude towards the importance of OSA and confidence in managing patients with OSA also increase. There was no significant relationship between gender or marital status and attitude or confidence scores.

Table 5: The relation between attitude of the participants toward OSA and demographic factors and knowledge

		Attitude questions asked about the importance of OSA			Confidence			Attitude		
		Mean	Standard Deviation	P-value	Mean	Standard Deviation	P-value	Mean	Standard Deviation	P-value
Gender	Male	3.95	.84	0.927	1.91	.80	0.833	2.72	.66	0.831
	Female	3.93	.82		1.88	.78		2.70	.64	
Marital status	Single	3.90	.84	0.314	1.89	.81	0.738	2.69	.66	0.775
	Married	4.13	.74		1.82	.66		2.75	.59	
training level	R1	3.72	.84	0.011*	1.85	.80	0.166	2.59	.64	0.021*
	R2	3.89	.82		1.74	.67		2.60	.59	
	R3	4.29	.72		2.10	.87		2.97	.66	
Knowledge	Pearson correlation	0.580		0.000*	0.288		0.002*	0.506		0.000*

DISCUSSION:

Obstructive sleep apnea (OSA) is a prevalent sleep disease that, if left untreated, can result in considerable morbidity and mortality [21,22]. Residents in family medicine play a significant role in the diagnosis and treatment of OSA [23]. However, few studies have been undertaken to evaluate their OSA knowledge, attitudes, and confidence [24,25]. Consequently, the purpose of this study was to evaluate the knowledge, attitudes, and confidence of family medicine residents regarding OSA, as well as to investigate the association between these variables and demographic parameters.

According to the results of the study, family medicine residents show moderate knowledge of OSA. The average knowledge question score was 7.77 out of 18. (43.2 %). This score is lower than reported in previous study which showed that the mean OSAKA knowledge score of 11.8 (SD=2.5) [26]. In addition, another study showed that the mean total knowledge score among otorhinolaryngology trainee residents in Saudi Arabia was 13.98 ± 2.4 out of 18 (equivalent to 77.7%) [27]. In the original OSAKA study, the included population (internists, pediatricians, and family practitioners) had a mean overall knowledge score of 13.3, SD=2.8 (73.9 percent) [28].

The average total knowledge scores of final year medical students in Nigeria was 7.6 3.2 (42.2%) [29], recent medical graduates in Ecuador 10.4 2.7 (57.5%) [30], internal medicine residents in Nigeria 10.8 2.5 (60%) [31], Latin American primary care physicians 10.8 (60%) [32], and anesthesiologists in China were 11.21 ± 2.89 (62.3%) [33]. The median total knowledge score was 16 out of 18 among Canadian otolaryngology-head and neck surgery (ORL-HNS) residents who completed the same questionnaire [34]. Recent studies conducted in Saudi Arabia also reported a similar finding, and their results found that the respondents' mean score was around 10 out of 18 [35]. Results indicate that family medicine residents lack expertise in a number of areas, including the curative potential of Uvulopalatopharyngoplasty, the use of mandibular advancement devices, and the link between OSA and metabolic syndrome. Educational programmes focused at enhancing the knowledge of family medicine residents about obstructive sleep apnea (OSA) may enhance the quality of care offered to patients with OSA.

The study discovered that family medicine residents acknowledge OSA as a significant clinical problem. The average score on the attitude questions about the significance of OSA was 3.93 out of a possible 5, indicating a rather high level of significance for the

disorder (78.5%). However, the mean confidence score for diagnosing and managing OSA patients was just 1.88 out of 5, or 37.6%, showing a poor degree of confidence. In a previous study, the authors found that 73.5% of the physicians felt confident in identifying patients at risk for OSA, only 35.4% felt confident in managing those patients and 22.1% felt confident in managing patients with continuous positive airway pressure (CPAP) therapy [32]. CPAP is one of the initial treatment options for adult OSA patients and obese OSA patients in particular.[36,37]. In our study, 75.5 % of the included trainee residents did not feel confident about their ability to manage patients on CPAP therapy. The findings indicate that family medicine residents lack confidence in recognising and treating OSA patients. This emphasises the necessity for educational initiatives aimed at enhancing their self-assurance and proficiency in managing OSA patients.

The training level was determined to be the most significant demographic component connected with OSA knowledge scores, attitudes, and confidence. R3 level inhabitants had the greatest mean knowledge and attitude scores about the significance of OSA. As the training level of family medicine residents grows, so do their awareness of and appreciation for OSA's significance. The study also identified a strong positive link between knowledge scores, attitudes towards the significance of OSA, and confidence in identifying and managing OSA patients.

This conclusion was also documented in other studies, such as Corso R. *et al* study, which demonstrated that residents with greater understanding of OSA were more confident in diagnosing and treating OSA patients [26] as well as many different studies [32,38-40]. This suggests that increasing the knowledge of family medicine residents about OSA can lead to more favorable attitudes and better confidence in managing OSA patients.

This study concludes by highlighting the knowledge gaps and lack of confidence of family medicine residents in addressing OSA patients. The findings imply that educational programmes focused at enhancing the knowledge of family medicine residents about obstructive sleep apnea may improve the quality of treatment offered to patients with obstructive sleep apnea. In addition, demographic characteristics such as training level and expertise have a crucial impact in affecting the confidence and attitude of family medicine residents toward OSA. To ensure that family medicine residents have a solid foundation in OSA management, educational

interventions should be targeted at earlier levels of training.

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