Recent medical graduates' knowledge and attitude toward obstructive sleep apnea in the Southern Region of Saudi Arabia: a cross-sectional study

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Introduction
Obstructive sleep apnea (OSA) is one of the most common sleep disorders and up to 80% of people with OSA remain undiagnosed and yet the present data suggest that medical graduates underreport OSA and is usually not given enough attention by medical colleges. We aimed to study recent graduated medical students' knowledge and attitude toward OSA.
Patients and methods
An observational cross-sectional survey conducted in Jazan, Abha, Najran, and Albaha cities among the recently graduated medical students using OSA knowledge and attitude questionnaire containing 27 questions including sociodemographic, knowledge, and attitude.
Results
A total of 180 questionnaires were completed; the mean total knowledge score was 8.46±3.260, and the median score was equal to 9. The maximum knowledge score was 15 and the minimum score was 0. There was no significant association between knowledge score and other variables. Of these, 141 participants had positive attitude and they represent 78.3% while 39 of the participants had negative attitude and they represent 21.7%.
Conclusion
The level of knowledge regarding diagnosis and management of OSA in the southern region of Saudi Arabia is not optimal. This study suggests that medical colleges should improve the curriculum to focus on clinical application of OSA.

Keywords:
attitude, knowledge, medical graduates, obstructive sleep apnea, Saudi Arabia

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Introduction

Obstructive sleep apnea (OSA) syndrome is a sleep disorder caused by recurrent partial or complete obstruction of the upper airway and it is characterized by attacks of stopping of breathing during sleep for a period of more than 10 s. Its prevalence among individuals aged 30–60 years is 3.4% in men and 2% in women, respectively [1]. Unfortunately, an estimated 82% of men and 93% of women with moderate or severe OSA have remained undiagnosed, and even mild OSA is associated with significant morbidity and mortality. OSA is recognized as a risk factor to many clinical conditions, such as hypertension, stroke, cardiovascular diseases, diabetes mellitus, automobile crash, daytime hyper somnolence, and impairment of an individual's quality of life [2,3]. However, many cases of OSA have gone undiagnosed, because of the poor knowledge about OSA among physicians and other medical practitioners [3,4]. Therefore, it is mandatory to assess the level of knowledge of physicians and all medical practitioners toward OSA [5]. The prevalence of OSA risk and symptoms among middle-aged Saudi men and women in a primary-care setting showed that three out of 10 Saudi men and four out of 10 Saudi women are at a high risk of developing OSA [6]. OSA has been distinguished as a free risk factor for high blood pressure, cardiovascular abnormalities in glucose metabolism, depression, and sleepiness-related accidents [7]. Untreated OSA patients are at a more serious risk of developing heart failure, arrhythmia, hypertension, and stroke. Furthermore, OSA is associated with the development of metabolic syndrome characterized by type 2 diabetes mellitus and dyslipidemia. The effect of OSA on the coagulation systems are also studied. In a large observational cohort study, untreated OSA significantly and independently increase the risk of stroke or death from any cause [1]. According to the

American Academy of Sleep Medicine classification of OSA syndrome severity considers both apnea and hypopnea index classification: 5–15 for mild, 15–30 for moderate, and more than 30 for severe and degree of daytime sleepiness [5]. According to contemporary treatment options for OSA there is no single approach in the treatment of OSA that is universally used but may include positional therapy, weight loss, avoiding alcohol, continuous positive airway pressure (CPAP), surgery, and oral appliances [2]. A study was done among recent medical graduates training in Ecuador revealed that most of the graduates have poor knowledge about OSA risk factors and management [7]. Many researches conducted in the USA, Nigeria, and India among medical school graduates revealed that the level of knowledge and attitude toward OSA was low [8,9]. Another study conducted among the anesthesiologists in China in 2011 showed lack of knowledge and low confidence about OSA [1]. Two recent researches conducted in Saudi Arabia and China to measure knowledge of medical students revealed limited knowledge about sleep disorders, but they did not focus on OSA [5,6]. A study in Latin America conducted among physicians in a primary health care revealed no significant association between seniority in practice and knowledge about OSA. Medical schools in Latin America have insufficient learning hours about sleep medicine. Medical colleges in Ecuador have 40 h for respiratory medicine and only 10% dedicated for sleep apnea. Therefore, knowledge of OSA at the time of graduation can give insight into their ability in the future to diagnose OSA clinically and identify its risk factors [7]. Improve awareness of the prevalence and unfavorable results of the disease may lead to increased investment in sleep research to provide relevant data that will improve recognition, diagnosis, and enhance effective treatment of OSA [10]. We hypothesized that the knowledge of medical graduates in Saudi Arabia is low and contributes to the high rate of undiagnosed cases of OSA in Saudi Arabia. We therefore aim in this study to assess the knowledge and attitudes of graduating medical students in the Southern Region of Saudi Arabia regarding OSA using a standard validated questionnaire.

Patients and methods

Study design, siting and population

A cross-sectional survey was conducted in Jazan, Abha, Najran, and Albaha cities where patients contacted one time only. The target study population are both male and female graduated medical students of the following universities: Jazan University, King Khalid University in Abha, Najran, and Albaha Universities.

Inclusion and exclusion criteria

Graduated medical students from both sex during the academic year 2018/2019 in Jazan, King Khalid, Najran, and Albaha Universities were included in the study. Otherwise was excluded.

Sample size

Jazan, King Khalid, Najran, and Albaha Universities are having collectively around 321 recently graduated medical students from both sexes during the academic year 2018/2019 (95 graduated medical students of both sexes from Jazan University, 173 graduated medical students of both sexes from King Khalid University, 40 graduated students from Albaha, and 13 from Najran, respectively). Using the website Raosoft, with a 95% confidence level, and 5% margin of error with assuming the poor knowledge is found in 50% among patients based on previous literature, the estimated sample size is 180 recently graduated medical students. To adjust the number of students in each university, probability proportional to size sampling was used.

Sampling technique

This is a convenient sampling where records that meet the inclusion and exclusion criteria were included in the study at the time of data collection.

Data collection methods and instruments

The data were collected using a structured self-administered questionnaire that is already validated. The patients were seen in their cities and verbal consent was perquisite. The questionnaire distributed and collected personally by the research team. This questionnaire consisted of 27 points and is divided into three sections. The first one is about sociodemographic data of the participants containing four variables which are age, sex, college, and grade point average (GPA). It is followed by a section of 18 points assessing several variables related to knowledge of the patients about OSA. Finally, the last section consisted of five points to assess the attitudes of students toward patients with OSA. All respondents were asked to fill out the survey separately to make sure that they do not duplicate each other's answers. The data collection process took place after ethical approval being obtained.

Date processing and statistical analysis

The questionnaire papers were verified and entered at home and then merged into one device. Categorical variables were described by frequencies and percentages, while numerical variables were presented as mean and SD. Associations were considered statistically significant when P value more than 0.05.

The analysis was conducted using the statistical package for the social sciences, version 20 (SPSS Inc., Chicago, Illinois, USA).

Ethical statement

This study was conducted in accordance with the ethical standards within the political borders of the Kingdom of Saudi Arabia. A verbal consent was obtained from all the participants after a prior orientation regarding the study. Participants then read, understood, and answer the questions accordingly. They had all rights to participate and their information was kept anonymous and confidential. The data which collected from students were used only for scientific purposes. Ethical clearance was obtained from the Jazan General Hospital Ethical Committee.

Results

A total of 180 graduated medical students agreed to take part in our study. Majority of them (52.8%) belong to the age group 25–27 years. The mean age and SD of the included patients were 24.72±1.02 years (range, 22–28 years). The patients included 94 (52.2%) men and 86 (47.8%) women. Moreover, most of the participants 98 (54.4%) were from King Khalid University, followed by 51 (28.3%) from Jazan University, 24 (13.3%) from Albaha University, and only seven (3.9%) from Najran University. Majority of study patients (*N*=68, 37.8%) have a GPA of between 3.5 and 3.99, followed by those with a GPA of between 4 and 4.49 (*N*=40, 22.2%), while only two students reported a GPA of between 2 and 2.49 (1.1%). Overall, the median GPA of the participants was 3.0 (Table 1).

Table 1 Sociodemographic characteristics of the study population (*N*=180)

Characteristics	Frequency (%)
Age group	
Less than 25 years	82 (45.6)
25–27 years	95 (52.8)
More than 27 years	3 (1.7)
Sex	
Male	94 (52.2)
Female	86 (47.8)
University	
Jazan University	51 (28.3)
King Khalid University	98 (54.4)
Albaha University	24 (13.3)
Najran University	7 (3.9)
GPA	
4.5–5	19 (10.6)
4–4.49	40 (22.2)
3.5–3.99	68 (37.8)
3–3.49	39 (21.7)
2.5–2.99	12 (6.7)
2–2.49	2 (1.1)

GPA, grade point average.

Regarding the knowledge of graduated students on OSA, the most common item was answered correctly by 122 (67.8%) of the patients was 'majority of patients with OSA snore,' followed by 121 (67.2%) knew that overnight sleep study is the gold standard to diagnose OSA. In addition, it has been (*N*=119, 66.1%) agreed that adenotonsillar enlargement is the most common cause of OSA in children, 55% (*N*=99) believes that craniofacial and oropharyngeal examination is useful in the assessment of patients with large adenoids and tonsils; 52.2% (*N*=94) stated that loss of upper airway muscle tone during sleep contributed to OSA, and the same stated that CPAP is the first-line therapy for OSA. However, only 27.2% (*N*=49) of students answered correctly that uvulopalatopharygoplasty is curative for majority of OSA patients (Table 2).

Overviewing the students' attitude toward OSA revealed that 92.8% of them considered OSA to be important or extremely important as a clinical disorder. Similarly, 97.2% considered identifying patients with OSA as important to extremely important. More than half of the respondents (68.9%) agreed or strongly agreed that they were confident in identifying patients with OSA. Only 66.7% agreed or strongly agreed that they were confident in their ability to manage OSA, and just 65.6% agreed or strongly agreed that they were confident in their ability to manage patients with CPAP therapy (Table 3).

The total knowledge score ranged from 0 to 15. The mean score of the participants was 8.46±3.260, and the median score was equal to 9. The maximum knowledge score was 15 and the minimum score was 0. Four of the total participants scored 0 (2.2%), and two scored 1 (1.1%), representing the minimal scores. Regarding the highest scores, two of the participants had a total score of 15 (1.1%), and four had 14 (3.3%). Regarding the association between participant's sociodemographic factors and their knowledge score of OSA, there was no statistically significant association between age and knowledge score of OSA (*P*=0.287). The level of knowledge is also shown to be not affected by sex and GPA (*P*=0.620, 0.201, respectively). There is a statistically significant association between university and knowledge score of OSA (*P*=0.001). Sixty-seven percent of King Khalid Medical College graduates have good knowledge as the highest score among other medical collages; On the other hand, the lowest score (28%) was recorded in Najran Medical College graduates (Table 4).

Table 2 Patients' knowledge about obstructive sleep apnea (*N*=180)

OSAKA question	Correct answer [*n* (%)]	Incorrect answer [*n* (%)]
Women with OSA may present with fatigue only	99 (55)	81 (45)
Uvulopalatopharygoplasty is curative for majority of OSA patients	49 (27.2)	131 (72.8)
Prevalence of OSA among adults, 2–10%	79 (43.9)	101 (56.1)
Majority of OSA patients snore	122 (67.8)	58 (32.2)
OSA associated with hypertension	59 (32.8)	121 (67.2)
Overnight sleep study is the gold standard to diagnose OSA	121 (67.2)	59 (32.8)
CPAP therapy may cause nasal congestion	81 (45)	99 (55)
Laser uvuloplasty is an appropriate treatment for severe OSA	68 (37.8)	112 (62.2)
Loss of upper airway muscle tone during sleep contributes to OSA	94 (52.2)	86 (47.8)
Most common cause of OSA in children is adenotonsillar enlargement	119 (66.1)	61 (33.9)
Craniofacial and oropharyngeal examination is useful in the assessment of patients with large adenoids and tonsils	99 (55)	81 (45)
Alcohol at bedtime improves OSA	81 (45)	99 (55)
Untreated OSA associated with higher incidence of automobile crashes	81 (45)	99 (55)
In men, a collar size of 17 in.or greater is associated with OSA	63 (35)	117 (65)
OSA is more common in women than men	62 (34.4)	118 (65.6)
CPAP is first-line therapy of OSA	94 (52.2)	86 (47.8)
Less than 5 apneas or hypopneas per hour is normal in adults	59 (32.8)	121 (67.2)
Cardiac arrhythmias may be associated with untreated OSA	93 (51.7)	87 (48.3)

CPAP, continuous positive airway pressure; OSA, obstructive sleep apnea; OSAKA, obstructive sleep apnea knowledge and attitude.

Table 3 Patients' attitude and percieved comptence toward obstructive sleep apnea (*N*=180)

	Extremely important (%)	Very important (%)	Important (%)	Somewhat important (%)	Not important (%)
Importance of OSA as a clinical disorder	38.9	35.0	18.9	5.6	1.7
Importance of identifying patients with possible OSA	36.1	33.3	27.8	1.7	1.1
	Strongly agree	Agree	Neutral	Disagree	Strongly disagree
Confident in identifying patients at risk for OSA	28.9	40	22.8	4.4	3.9
Confident in ability to manage patients with OSA	30.6	36.1	21.7	8.3	3.3
Confident in ability to manage patients on CPAP therapy	30.0	35.6	25.6	5.0	3.9

CPAP, continuous positive airway pressure; OSA, obstructive sleep apnea.

Regarding attitude, the mean is 18.33, the median is 19, SD at 2.918. There is one participant who had a minimal score of 8 and represents 0.6%, there is one participant who had a score of 9 and represents 0.6% ;three participants had a maximum score of 23 and they represent 1.7% and 15 participants had a score of 22 and they represent 8.3%. The level of attitude toward OSA was seen to be not affected by the age of the participants (P=0.409). The results show that there is no statistical significance between sex and attitude toward OSA (P=0.621). Results demonstrate a statistical significance between the participant's university and attitude of OSA (P=0.001), and there is an association between the GPA and attitude toward OSA (P=0.042). In general, more than half of the participants have a good knowledge (53.9%, N=97), and 46.1 (N=83) have a poor knowledge about OSA, while 78% of the population have a positive attitude (Fig. 1).

Discussion

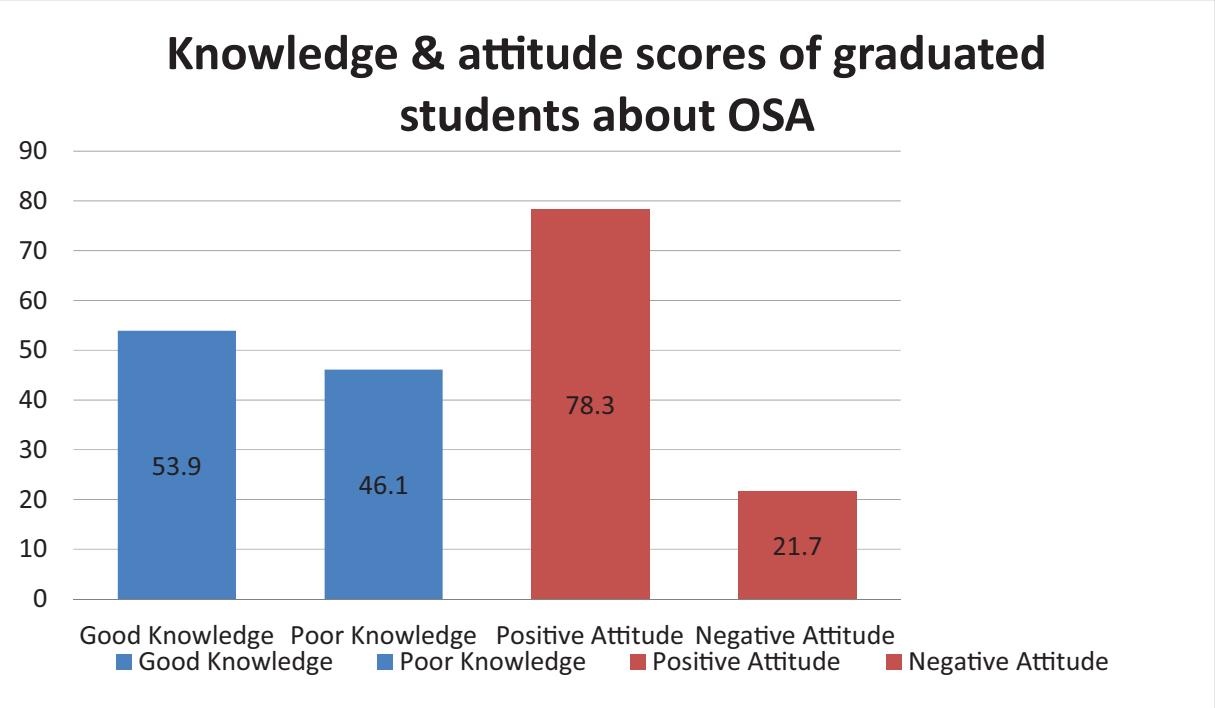
The main purpose of the present study was to assess the knowledge and attitude of graduated medical students toward OSA. The physician especially in developing countries are not engaged in formal postgraduate training programs and the level of doctor's knowledge at the time of graduation from the medical school may affect the quality of their practice after graduation. Patients with OSA symptoms may present to any doctor irrespective of his/her specialty and the knowledge of OSA is considered important for appropriate treatment or referral of the patient. In our study, we found that 53.9% (N=97) of the graduated medical students have good knowledge regarding OSA diagnosis and management. Instead of good recognition of OSA as an important clinical disorder, the level of confidence in diagnosing and managing OSA was low

Table 4 Association between sociodemographic factors, university, grade point average, and knowledge about obstructive sleep apnea

Characteristics	Good knowledge [*n* (%)]	Poor knowledge [*n* (%)]	χ^2	*P* value
Age				
Less than 25 years	39 (47.6)	43 (52.4)	2.497	0.287
25–27 years	56 (58.9)	39 (41.1)		
More than 27 years	2 (66.7)	1 (33.3)		
Sex				
Male	49 (52.1)	45 (47.9)	0.246	0.620
Female	48 (55.8)	38 (44.2)		
University				
Jazan University	20 (39.2)	31 (60.8)	15.962	0.001
King Khalid University	66 (67.3)	32 (32.7)		
Albaha University	9 (37.5)	15 (62.5)		
Najran University	2 (28.6)	5 (71.4)		
GPA				
4.5–5	7 (36.8)	12 (63.2)	7.273	0.201
4–4.49	19 (47.5)	21 (52.5)		
3.5–3.99	36 (52.9)	32 (47.1)		
3–3.49	26 (66.7)	13 (33.3)		
2.5–2.99	7 (58.3)	5 (41.7)		
2–2.49	2 (100)	0 (0.0)		

GPA, grade point average.

Figure 1



Total knowledge and attitude score about OSA.

and this is similar to the study that was conducted in Nigeria [10]. In the current study, OSA is considered important or extremely important by more than 90% participants, in comparison to the Nigerian study which was 86% [10]. When we compared the present study with that of a previously published study done in Ecuador in which researchers also used the obstructive sleep apnea knowledge and attitude questionnaire, we found that the level of knowledge among graduated medical students was close to 53.9% compared with 52% in the Ecuadorian study [7]. Underrepresentation of sleep medicine in the medical educational modules has been credited to a number of factors, including convictions that sleep medicine is a low need or

unessential based on light of restricted epidemiologic data from some parts of the world, time requirements, and absence of qualified personnel and other resources for proper training giving formal instruction on sleep medicine [6]. This research shows that the medical students graduated from the South Region of Saudi Arabia do not have the optimal knowledge regarding diagnosis and management of OSA and they should increase their knowledge about OSA. Therefore, it is crucial that medical colleges must improve their curriculum and develop a training program that focus on the clinical application of OSA for the undergraduate medical students. This stretchered training program will help in gaining considerable knowledge and sharpening the clinical skills for those future doctors to be confidently establishing diagnosis and management of such a diseases. The research team suggests that all medical schools should enroll in and have an intensive exposure of clinical practice on sleep disorders.

Conclusion

Most of the recent medical students graduated from the South Region of Saudi Arabia did not have the optimal clinical practice regarding diagnosis and management of OSA. This reflect the poor educational level regarding OSA. Therefore, it is crucial to focus more on gaining considerable knowledge and sharpening the clinical skills toward sleep disorders and specially OSA in the medical school education. Finally, it is hoped this could improve the outcomes of patients suffering from OSA.

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Limitations: It is a cross-sectional study and cannot establish the causal relationship between low knowledge and low education programs.

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Conflicts of interest

There are no conflicts of interest.

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