Prevalence of symptoms and risk of sleep apnea in middle-aged Saudi women in primary care

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ABSTRACT

الأهداف: تقييم مدى شيوع متلازمة توقف التنفس الإنسدادي (OSA) أثناء النوم لدى النساء السعوديات المتوسطات في العمر باستخدام استبيان موثوق في عيادات الرعاية الأولية.

الطريقة: تمت الدراسة في مستشفى الملك خالد – الرياض – المملكة العربية السعودية بين يناير 2007 و يوليو 2007. تمت تعبئة استبيان برلين بواسطة طلاب مدربين لكل المريضات السعوديات متوسطات العمر 60–35 عام اللاتي راجعن العيادات الأولية PHCC. بناء على المعلومات المجموعة، تم تصنيف المريضات إلى احتمال الإصابة بتوقف التنفس الإنسدادي (OSA) مرتفع و منخفض.

النتائج: تمت دراسة 400 سيدة متوسطة تبلغ كتلة الجسم لديهن $31.3+7.2 kg/m^2$. في مجموعة الدراسة تم تسجيل الشخير في 40.8% (بشكل يومي 15%، 4–3 مرات في الأسبوع 7.5%، و 2–1 مرة في الأسبوع 9.8%)، وتوقف التنفس أكثر من 3 مرات بالأسبوع 22.5%. كما تم تسجيل ارتفاع ضغط الدم في 24.8%. بناء على نتائج الاستبيان تم تصنيف 39% من المرضى على أن احتمال إصابتهن بتوقف التنفس OSA أثناء النوم مرتفع.

خاتمة: أن معدل الإصابة بتوقف التنفس الانسدادي (OSA) لدى السيدات السعوديات متوسطات العمر مرتفع في مركز الرعاية الأولية. كما أن 4 من 10 سيدات سعوديات متوسطات في العمر معرضات لخطر الإصابة بتوقف التنفس الإنسدادي OSA والذي يفيد في تقدير الإصابة ب OSA.

Objectives: To assess the prevalence of symptoms and risks of obstructive sleep apnea (OSA) in a sample of middle-aged Saudi women in a primary care using a validated questionnaire.

Methods: In this cross-sectional study, trained medical students administered the Berlin Questionnaire to a consecutive random sample of Saudi women in the age group 35-60 years, attending the primary health care center in King Khalid University Hospital, Riyadh, Kingdom of Saudi Arabia, between January and July 2007. Based on the questionnaire, individuals were classified into high-risk and low-risk groups for OSA.

Results: Four hundred women with a mean body mass index of $31.3+7.2 kg/m^2$ were surveyed in this study. Among the study group, 40.8% reported snoring (everyday in 15%, 3-4 times a week in 7.5%, and one-2 times a week in 9.8%). Breathing pauses more than 3 times per week was present in 22.5%. Hypertension was present in 24.8%. Based on the Berlin Questionnaire stratification for risk of OSA, 39% were considered as high-risk patients for OSA.

Conclusion: In the primary care setting, the prevalence of symptoms of OSA among middle-aged Saudi women is very high. Almost 4 out of 10 middle-aged Saudi women are at risk for OSA, and may benefit from proper evaluation for OSA.

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Obstructive sleep apnea (OSA) is one of the common sleep related breathing disorder. For decades, it was thought to be primarily a disease of males,[1-3] however, recent epidemiological studies have revealed a relatively high prevalence of OSA in women.[4] The prevalence of OSA in the middle-aged population was first estimated in 1993 by the ongoing population-based Wisconsin Sleep Cohort Study (WSCS)[4] in a sample of 625 employed adults. The investigators found that 9% of women, and 24% of men had at least ≥5

apneas, or hypopneas per hour of sleep.[4] When the presence of extreme daytime sleepiness was included as a criterion, the prevalence was estimated to be 2% in women, and 4% in men.[4] The OSA is under-recognized globally particularly in women, and this seems to be the case in the Kingdom of Saudi Arabia (KSA).[5,6] Based on available data, OSA appears to be common among Saudi women.[7,8] Despite that, the disorder is under-recognized among women. Under-recognition of OSA may result in serious complications like hypertension,[9] cardiovascular,[10] and cerebrovascular diseases,[11] motor vehicle and work related accidents, in addition to poor quality of life, and poor work, or school performance.[12] Furthermore, the WSCS suggested that there might be significantly a higher 5-year mortality for women with sleep disordered breathing than women without that diagnosis.[6] Additionally, the delay in diagnosis increases the cost and health care utilization in patients with OSA.[13,14] As sleep medicine is under-developed in KSA,[15] using attended or unattended polysomnography to confirm the prevalence of OSA in the general population is not feasible at present. Therefore, other practical validated screening tools or questionnaires should be used at this stage to obtain an estimate of the prevalence of the risk of this medical problem. The Berlin Questionnaire (BQ) is a simple, pre-designed, validated, and standardized questionnaire that has been studied in primary care settings.[16] Therefore, we designed this study to assess the prevalence of symptoms and risks of OSA in a sample of middle-aged Saudi women, using the BQ in a primary care settings. Additionally, we want to compare our data to that of other countries.

Methods. ***Study population.*** In this cross-sectional study, the population comprised of a consecutive random sample of Saudi female patients in the age group 35-60 years attending the primary health care clinics (PHCC) at King Khalid University Hospital, Riyadh, Kingdom of Saudi Arabia between January and July 2007. The BQ were administered to all patients attending the PHCC by female medical students who were trained on collecting data, and the details of the questionnaire were explained to the patients after explaining the procedure of the study, and obtaining their consent. We used the same questionnaire and methodology before in the primary care setting in a group of middle-aged Saudi men.[17] Approximately 18% of the women refused to participate in the study. The study was approved by the ethics committee in our institute.

Berlin questionnaire. The BQ is a validated questionnaire developed in 1996, and its validity and accuracy in primary care settings has been shown previously.[16] It explores known symptoms and features of OSA. The details of the questionnaire have been published previously.[16] Nevertheless, the questionnaire is divided into 3 sections. Section 1 addresses snoring and witnessed apnea. Those who snore are asked to rate their snoring with regard to loudness, frequency, and whether their snoring bothers other people. Section 2 addresses daytime fatigue and sleepiness, and frequency of falling asleep while driving, or in the car with a driver. And section 3 addresses personal history of hypertension, as well as, height, weight, and gender. Then, the body mass index (BMI) is calculated. For questionnaire validation, we used the same methodology used by Netzer et al.[18] Bilingual physicians translated the BQ from its original English version into Arabic. Translations were performed from the other languages back into English by other bilingual physicians, and were consistent with the intent of the original version. Prior to its use in the study, the questionnaire was piloted to 20 bilingual subjects, who, after filling out the Arabic language version, were also given the English version. Symptom attribution and risk grouping were similar. In addition, the reliability of self-reporting was tested in 30 subjects for age, height, weight, the presence or absence of hypertension, and the calculation of BMI for risk grouping. These self-reported data were comparable to those from medical chart reports.

Based on the data collected, patients were stratified into high-risk and low-risk according to responses. The 3 categories were defined based on the information collected. In category 1, a positive response was defined as frequent symptoms (>3 times per week) in the questions on snoring and witnessed apneas. In category 2, a positive response was defined as frequent symptoms in 2 or more questions regarding fatigue, sleepiness, or drowsy driving. And in category 3, a positive response was defined as a self-report of hypertension or a BMI >30 kg/m^2. Individuals who had positive scores in 2 of the 3, or all categories scored high risk for OSA. Individuals who did not meet the above criteria scored low-risk for OSA. The high-risk pre-test probability for OSA was found previously to predict an respiratory disturbance index of >5 with a sensitivity of 0.86, a specificity of 0.77, a positive predictive value of 0.89, and a likelihood ratio of 3.79.[16]

Statistical analysis. Data was entered into Microsoft Excel spread sheet. Sample size was calculated based on a prevalence of 35%, confidence interval of 95%, and precision of 5%. The estimated sample size was 350.[19] Numerical values were expressed as mean ± SD. Categorical data was expressed in the text and tables as percentages. The standard Statistical Package for Social Sciences version 16.0 (SPSS Inc., Chicago, Illinois, USA) was used for the analysis.

Results. Four hundred middle-aged Saudi women, with a mean age of 43.7 ± 6.3 years, and BMI of 31.3 ± 7.2 kg/m^2 were surveyed in this study. Hypertension was present in 24.8%. **Table 1** demonstrates the distribution of responses in the surveyed group, and the results from a similar survey in KSA (middle aged men), the United States of America (USA), and Europe (women).[17,18] In the surveyed group, BMI >30 kg/m^2 was present in 57% of the patients attending the primary care service. Snoring was present in 40.8%, and breathing pauses more than once per week was noticed in 32.3%. Snoring without witnessed apnea was present in 25.5%. Breathing pauses more than 3 times per week was present in 22.5%. The occurrence of daytime tiredness more than once per week was reported by 52.6%, and 32.5% reported falling asleep while in the car. Based on the BQ stratification for risk of OSA, 39% were considered as high-risk patients for OSA, which means that almost 4 out of 10 middle-aged Saudi women are at risk of having OSA, and may benefit from proper evaluation for OSA. **Table 2** presents a comparison between our data and a similar study carried out in KSA,[17] and 2 studies in the USA, one in an outpatient setting, and the other using telephone interview of a representative sample of US adults.[16,20]

Discussion. This study addresses snoring, the prevalence of OSA symptoms, and the risk of OSA in Saudi women using a standardized protocol. Although the study was conducted in a primary care setting, we feel that it has a good representation of middle-aged Saudi women with regard to the prevalence of obesity and hypertension. A comparable BMI (32.1 ± 6.4 kg/m^2) and prevalence of hypertension (23.9%) have been reported in middle-aged Saudi women recruited from the community.[21,22] The study demonstrates that the risk of OSA among middle-aged Saudi women in a primary care setting is much higher than that reported in other countries. It is our prediction that OSA may be more prevalent in Saudi women compared to

Table 1 - Distribution of some of the responses in the surveyed group, compared to the Saudi men and women in the United States and Europe.

Questions	Saudi		USA*[18]	Europe*[18]
	Women	Men[17]		
	(%)			
Category 1				
Do you snore?				
Yes	40.8	52.3	45.8	45.4
Does your snoring bother other people?				
Yes	21.2	36.1	45.7	46.2
How often have your breathing pauses been noticed?				
Almost every day	15.0	1.8	2.1	0.8
3-4 times/week	7.5	3.4	0.5	0.7
1-2 times/week	9.8	6.1	1.5	1.9
1-2 times/month	8.5	13.8	1.9	2.1
Never, or almost never	59.2	74.8	93.8	94.7
Category 2				
Are you tired after sleeping?				
Almost every day	33.0	0.0	28.7	11.9
3-4 times/week	9.5	19.3	13.3	5.8
1-2 times/week	13.8	16.2	19.1	10.5
1-2 times/month	8.3	22.4	14.7	11.5
Never or almost never	35.5	42.1	24.2	60.3
Are you tired during wake-time?				
Almost every day	33.0	8.6	28.6	10.9
3-4 times/week	7.3	10.6	15.8	6.5
1-2 times/week	12.3	18.7	21.3	11.8
1-2 times/month	10.0	17.4	18.2	12.7
Never or almost never	36.8	44.4	16.1	58.1
Category 3				
Do you have high blood pressure?				
Yes	24.8	18.0	26.8	27.2
BMI >30 kg/m^2				
Yes	57.0	26.5	30.4	18.7

*USA - United States of America. European patients were from Germany and Spain. Total number of female participants in the USA and Europe was 3,272. The number of participants in Saudi males was 578.

Table 2 - A comparison between the main findings of our study and other published studies.

Main findings	Age	Snoring	High risk
		%	
This study			
Women, n=400	43.74 ± 6.31	40.8	39.0
BaHammam et al[17]			
Men, n=578	45.02 ± 9.3	52.3	33.3
Netzer et al[16]			
Men + women, n=744	48.9 ± 17.5	52.2	37.0
Heistand et al[20]			
Men + women, n=1506	49	59	
Men			31.0
Women			21.0

women in the West, due to the fact that obesity is very prevalent among Saudi women.[7,23] A nationwide survey conducted between 1995-2000 reported prevalence of obesity (BMI ≥30 kgm^2) to be 50.2% in Saudi females between 40-49 years.[23] A number of studies have shown that the prevalence of obesity continues to increase.[24] Hence, we expect the current prevalence of obesity to be more than 50% in middle-aged Saudi women, which concurs with our findings.

Obesity is a major risk for OSA in general and in women in particular,[25] which may partially explain the high prevalence of risk for OSA among middle-aged Saudi women compared to the women in USA and Europe. Several previous studies have shown that women with OSA are much more obese than men.[4,8,26] Despite the high prevalence of OSA symptoms in women, OSA has been under-estimated in this group for a long time. The classical description of an OSA patient as being a middle-aged obese male has misled many physicians, and led to the under-diagnosis of OSA in women. Additionally, the differences in clinical presentation, difference in tolerance to symptoms, and rate of usage and referral to sleep services have enhanced this under-recognition.[8,27,28] The investigators of the WSCS estimated that OSA was under-diagnosed in more than 90% of women with moderate to severe OSA.[6]

In a previous study that assessed gender differences in OSA, we found that Saudi women referred to the sleep disorders center with clinical suspicion of OSA were older, more obese, and presented with insomnia more frequently than Saudi men. The prevalence of diabetes, hypertension, cardiac diseases, hypothyroidism, and asthma at presentation was more common among women compared to men.[8] Women with OSA usually have lower apnea/hypopnea index (AHI) than men. However, most of their apneas and hypopneas occur during rapid eye movement sleep.[8] These differences in the profile of OSA between men may result in different presentations in both genders, where females may be more symptomatic at a lower AHI. The mean age of Saudi women with OSA referred to the sleep disorders center was 53.9 ± 11.6 years, which is approximately 10 years older than our current study group that already have a high risk for OSA.[8] This may indicate a significant delay between symptoms onset, and referral to the sleep disorders center, which supports the belief that OSA is under-recognized, and under-diagnosed in women.

A limitation of this study, is the fact that polysomnography was not performed. Nevertheless, the study findings should stimulate sleep medicine researchers to conduct a national multicenter study that assess the prevalence of OSA utilizing polysomnography.

In summary, the current study revealed that the risk of OSA among middle-aged Saudi women in a primary care setting is very high. Primary care physicians should be aware of the high prevalence among middle-aged Saudi women, and realize the importance of early detection, and referral of these patients for proper work-up and treatment to avoid unnecessary complications.

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Related topics

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