E-ISSN:2320-8686
P-ISSN:2321-127X
Research Article
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International Journal of Medical Research and Review
2019 Volume 7 Number 3 May-June

Publisher
MEDRESEARCH
www.medresearch.in

Observational study to determine the pattern of distribution of stop - bang score in predicting OSA and its implication among female health care providers

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DOI: https://doi.org/10.17511/ijmrr.2019.i03.04

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Objective: To determine the pattern of distribution of STOP-Bang score in predicting OSA and its implication among female health care providers. **Methods**: In this study, we enrolled 100 female health care providers with age>20 years and excluded subjects on long term respiratory illness and with secondary cause of obesity. Detailed historyand clinical examination were done along withfilled STOP-Bang questionnaire. **Results:** We included 100 subjects, the mean age was 26.23 ± 1.74 years, mean BMI was 23.18+ 1.73. Our study results, Snoring, Tiredness and observed apnea were observed more than other parameters. In the study, the significance of snoring (8% with 'p' value 0.006), tiredness (52% with 'p' value 0.000) and observed apnea (17% with 'p' value 0.001) was statistically significant. The most common score on the STOP-Bang questionnaire was 1point (n = 42), followed by no points (n = 41). Subjects with low risk were 57; with high risk were 2 which were statistically significant. **Conclusion:** Snoring, tiredness and observed apnea play an important factor among females in STOP-Bang score which also was statistically significant.The STOP-Bang questionnaire performed adequately for OSA screening in female health care providersindicated that it could be used as an effective non-invasive screening tool for identifying subjects with high risk of OSA.

Keywords: Obstructive sleep apnea, STOP-Bang questionnaire, Female health care providers

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How to Cite this Article

Prabhu G, Selvamuthukumaran S, Jayasri S. Observational study to determine the pattern of distribution of stop - bang score in predicting OSA and its implication among female health care providers. Int J Med Res Rev. 2019;7(3):170-175. Available From https://ijmrr.medresearch.in/index.php/ijmrr/article/view/1053

To Browse

Manuscript Received	Review Round 1	Review Round 2	Review Round 3	Accepted
2019-04-20	2019-04-30	2019-05-06		2019-05-11

Conflict of Interest	Funding	Ethical Approval	Plagiarism X-checker	Note
No	Nil	Yes	6%	

Introduction

OSA is defined as episodes of complete or partial upper airway obstruction secondary to collapsed pharyngeal tissue during sleep and is associated with increased postoperative complications and mortality [1]. Obstructive sleep apnea (OSA) is a common medical condition affecting 2-26% of the general population [2] and can occur in all age groups [3]. Studies have shown that even asymptomatic OSA is independently associated with an increased risk of morbidity and mortality [4].

However, it is estimated that 82% of men and 92% of women with moderate to severe apnoea have not been diagnosed [5]. Because of the potentially serious adverse consequences associated with untreated OSA in the general population and surgical population, prompt diagnosis and treatment of unrecognized OSA becomes critical.

The reference standard for diagnosis of OSA is an overnight polysomnogram (PSG) which is time consuming, labor – intensive, and costly. Hence a number of screening tests were developed to identify high-risk patient'swhichwere lengthy, complicated and required upper airway assessment which was inconvenient for the patients and physicians together.

The STOP-Bang questionnaire is a scoring model consisting of eight easily administered questions starting with the acronym STOP-Bang (Appendix) and is scored based on Yes/No answers (score: 1/0) for each question with a maximum score of 8. Snoring, tiredness, observed apnea, High BP-BMI, Age, Neck circumference and gender were developed in response to the need for a concise, user friendly OSA screening tool (STOP-Bang questionnaire).

Thus, the scores range from a value of 0 to 8. A score of ≥3 has shown a high sensitivity for detecting OSA: 93% and 100% for moderate and severe OSA, respectively. Owing to its high sensitivity at a score of ≥3, the STOP -Bang questionnaire is considered very helpful to rule out patients having moderate and severe OSA. However, the specificity at the same cut-off is low: 47% and 37% for moderate and severe OSA, respectively, resulting in fairly high false-positive rates [6].

The scoring has a value for two important components in Gender and BMI which are biased for women.

Hence we chose a topic to determine the pattern of distribution of STOP-Bang score in predicting OSA and its implication among female health care providers.

Methodology

Type of study and setting: This is an observational study to determine the pattern of distribution of STOP- Bang score in predicting OSA and its implication among female health care providers in a 750 bedded tertiary health care centre in south India.

Sampling method: 100 subjects were randomly selected among female healthcare provided among the above setting.

Sample collection: After written consent for enrollment in the study, a detailed history was taken from all the subjects along with a detailed clinical examination and STOP – bang questionnaire was given and collected. (Annexure 1)

Stop Bang Questionnaires

1. Snoring Do you snore loudly (louder than talking or loud enough to be heard through closed doors?	Yes/No
2. Tired Do you often feel tired, fatigued, or sleepy during daytime?	Yes/No
3. Observed apnea Has anyone observed you stop breathing during your sleep?	Yes/No
4. Blood pressure Do you have or are you treated for high blood pressure?	Yes/No
5. BMI more than 36 kg/m2?	Yes/No
6. Age Age over 50 years old?	Yes/No
7. Neck circumference Neck circumference greater than 40 cm?	Yes/No
8. Gender Gender male?	Yes/No
High risk of OSA: answering yes to three or more items Low risk of OSA: answering yes to fewer than three items	

Inclusion criteria: All female health care providers above the age of >20 years.

Exclusion criteria: Subjects who were on treatment for any respiratory illness, pregnancy and subjects on steroid therapy.

Statistical method: The collected data was compiled and statistically analyzed by using Kruskal – Wallis test. Institutional ethical committee approval was obtained.

Results

Table-1: Age wise Distributionamong subjects

Age	No of Patients	% of patients
<25	62	62%
25-30	29	29%
31-35	06	6%
>35	03	3%
Total	100	100%

In our present study 91% of the patients age were between 20-30 years.

Table-2: Mean distributions of age and vital parameters among the subjects.

Mean age in years		26.23±1.74
Mean BP	Systolic mmhg	101.2±2.37
	Diastolic mmhg	74.6±1.98
Mean PR /min		81.2±1.24
Mean SpO2		98.8±0.65
Mean HT in CM		154±2.43
Mean WT in KG		52.45±1.98
Mean BMI		23.18±1.73

In our present study the mean age was 26.23±1.74. The vital parameters were normal in range and the mean BMI was 23.18±1.73.

Table-3: Distribution of STOP-Bang score.

STOP Bang Score	No of patients
0	41
1	42
2	15
3	02
4	-

In the present study number of subjects with score of 1 was 42% and with score of 0 was 41%.

Table-4: Pattern of STOP-Bang scoring subjects:

STOPBANG	No of patients	p value
S	08	P=0.006 (P<0.01) Test is highly significant
T	52	P=0.000(P<0.01) Test is highly significant
O	17	P=0.001(P<0.01) Test is highly significant
P	-	-
B	-	-
A	-	-
N	-	-
G	-	-

In our study the pattern of stop bang scoring distribution, Snoring -08 subjects, Tiredness -52 subjects and Observed apnea- 17 subjects.

All other five components did not have scoring at all.

Table-5: Risk pattern in the present study.

STOP BANG Score	No of patients	p value
High risk(answering yes to three or more items)	02	p=0.008 (p<0.01)
Low risk (answering yes to fewer than three items)	57	p=0.0000 (p<0.01)

In our present study to determine the risk of OSA with help of STOP-Bang were 2 subjects had a score of 3 (high risk) and 57 had a score of ≤ 2(low risk).

Discussion

Obesity and overweight are undesirable outcomes of changing lifestyle and behavior. It is also a major risk factor for development of diabetes, hyperlipidemia, and hypertension and so on. Obesity may lead to early disability and loss of job in majority of subjects because of OSA and associated complications like Diabetes and Coronary artery disease. The medical expense of obesity associated conditions is estimated to be around one hundred million dollars annually in the USA [7, 8]. Although the contribution of hereditary factor may account for about 30–70% of obesity [9], intake of high calorie diets and reduced expenditure of energy in the form of less physical activities, changing lifestyle and behaviors, particularly, in the modern societies, all are responsible for development of overweight and obesity. The prevalence of obesity varies significantly across the world. The rate of obesity and overweight among adult population ranges from 15 to 60% in various populations. It is usually more common in women than men [10]. According to WHO report, obesity has become an epidemic globally [11]. Though there are various studies to demonstrate various complications of obesity, the importance for OSA in its assessment is limited. Hence, utmost priority should be given for OSA for aforementioned reasons.

Various statistics state, that women are more obese when compared to men. So detection of risk for OSA in female population and catching them early will propel us to give lifestyle modifications, intensify the treatment when needed and will go far way in preventing the consequent complications of OSA. To predict the probability of OSA, various scoring systems are being followed, of which STOP-bang scoring is a convenient and feasible one.

In view of two valuable points in the scoring system namely gender and BMI which are having subject bias, we wanted to review the predictive value of STOP-bang among females. The relationship between various settings in which STOP-bang scores were used with the predicted probability of OSA has been investigated in five studies, two conducted with patients referred to sleep clinics [12, 13] and three with surgical patients. All the study data indicate that the probability of severe OSA has linear correlation with highSTOP- bang scores [14].

Studies in primary care patients demonstrate that the STOP-Bang questionnaire has predictive performance similar to that seen in surgical and sleep clinic patients [15]. Silva et al evaluated the STOP-Bang questionnaire in 4,770 participants in the Sleep Heart Health Study. The prevalence of moderate to severe OSA (respiratory disturbance index [RDI ≥ 15 events/h]) and severe OSA (RDI ≥ 30 events/h) in this population was 13% and 7%, respectively.

The sensitivity of a STOP-Bang score $ 3 was 89% to detect moderate to severe OSA (RDI ≥ 15 events/h) and 93% to detect severe OSA (RDI ≥ 30 events/h). Specificities were 30% and 29%, respectively. In another study of 178 patients with 60% OSA (AHI ≥ 5 events/h), the sensitivity of the STOP-Bang questionnaire to detect OSA (AHI ≥ 5 events/h) was 96% whereas the specificity was 24%, PPV was 66%, and NPV was 81 %[16]. With all these statistics further research is needed to investigate the association between STOP -Bang scores and OSA probability in the general population and especially in women.

There are various studies which have demonstrated that the prevalence of OSAis higher in men than in women [17,18]. In addition, Men generally present with typical symptoms, such as snoring and observed apnea, whereas Women are more likely to present with atypical symptoms, such as depression, fatigue, and insomnia [19]. Anthropometric and demographic data also differ between genders. Men generally have larger neck circumferences than women, [20] whereas women with OSA are generally older than Men. Hence we aimed to identify the usefulness of the same using the STOP bang questionnaire in female health care providersand also to explore the Gender and BMI bias in women for which limited data was available. As discussed in the beginning the incidence of overweight and obesity is more in women and in younger age.

In our study female health care providers our institutional female health care providers were chosen as the subjects because of their knowledge and willingness to participate in the screening procedure.

Our study details have been illustrated in the results: of which 59 (59%) have scoring of at least 1, 41% did not have scoring at all. Of the results, Snoring, Tiredness was observed more than other parameters. In the study, the significance of snoring (8% with ‘p’ value 0.006), tiredness (52% with ‘p’ value 0.000) and observed apnea (17% with ‘p’ value 0.001) was statistically significant. With the above results in our study we had 2% of subjects with high risk for OSA and 57% with low risk for OSA. Our study demonstrates significant predictors of OSA by STOP- Bang score in female health care providers. Our study demonstrated and goes in tandem with study done by Ricardo Luiz de Menezes Duartewho demonstrated the validation of the STOP-Bang questionnaire as a means of screening for obstructive sleep apnea in adults in Brazil[21].

Comparing various other studies

Study	Validated as predictor of OSA
In present study (female)	YES
Ricardo Luiz de Menezes Duarte[21]	YES (adults)
NagappaM[23]	YES (Sleep clinic)
C Pena et al[22]	No (m NO in midlife women.

Conclusion

In our study, Snoring, tiredness and observed apnea played an important factor among females in STOP-Bang score which also was statistically significant.

STOP-Bang questionnaire demonstrated the reliability in predicting OSA in female health care providers who play a part of young females among the general female population. Based on the observed results, we conclude, that the STOP bang score can be used as a reliable indicator for predicting the risk of OSA in young female subjects were no other study in the past has demonstrated the fact.

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