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Original Research Article

Online screening for obstructive sleep apnea in adult non-obese individuals in the society the importance of application of modern technology in mass screening

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ABSTRACT

Background: Obstructive sleep apnoea (OSA) is a potentially serious sleep order which is being proven to be an important etiological factor for multiple diseases. Obesity is most commonly associated with OSA. This study was conducted to know the prevalence of OSA in non-obese adult individuals using modified STOP-Bang questionnaire through online surveys and to evaluate the importance of internet and modern technology in the mass screening of OSA.
Methods: Modified STOP-BANG questionnaire was used to study the prevalence of obstructive sleep apnoea in non-obese individuals. Instead of the routine marking of answers in a paper we used internet medium to do the study.
Results: The study results showed 14.5% of the non- obese adult population involved in the study belong to the high-risk category of obstructive sleep apnoea.
Conclusions: The study concluded that obstructive sleep apnoea not only occurs in obese adults but also prevalent among non-obese adults.

Keywords: Online, Apnoea, STOP-BANG, Obesity, Prevalence

INTRODUCTION

Obstructive sleep apnea (OSA) is a potentially serious sleep order which is being proven to be an important etiological factor for multiple diseases. Obesity is most commonly associated with OSA.[1] Many prevalence studies have been conducted worldwide in different population groups. Very few studies have been conducted in India and no study has laid emphasis on prevalence of OSA in non-obese individuals.[2] STOP-Bang questionnaire is considered to be the most validated screening tool for OSA for various population groups.[3] In this survey we have used modified STOP-Bang questionnaire which requires relatively less time for response. Also this study was conducted with the help of online survey which made the response time much lesser. A sample of 600 non-obese individuals was screened and results were analysed.

Aim of the present study was to study the prevalence of OSA in non-obese adult individuals using modified STOP-BANG questionnaire through online surveys and to evaluate the importance of internet and modern technology in the mass screening of OSA.

METHODS

This was a prospective study conducted during the period from January 2018 to February 2018.

Selection criteria

All individuals between 20-60 years of age were included in the study and individuals with body mass index >30 km/m^2 were excluded.

Method of data collection

STOP-BANG questionnaire is a validated tool for screening of obstructive sleep apnea.[3] Various modifications of STOP-BANG questionnaire have been made in various studies around the world according to the requirements of the study. We modified the STOP-BANG questionnaire (Stanley version) to screen non-obese individuals for OSA.

STOP-BANG questionnaire

- S- Snoring
- T- Tiredness
- O- Observed apneic spells
- P- Blood Pressure
- B- BMI
- A- Age
- N- Neck circumference
- G- Gender

Modified STOP-BANG questionnaire[4]

- Snoring
- Tiredness
- Observed apneic spells
- High BP
- Sleep refreshing
- Smoking/alcohol

With the changing lifestyle that includes altered food and sleep habits, more mental and less physical works people have already started acquiring obesity and related disorders. Due to lack of permission to avail leave at work places, increased transport time every day, the cooperation from the society to participate in the screening trials is becoming very difficult. And for the same reasons practical difficulties are encountered by the persons who conduct the study. Online surveys would reduce the time and money spent for mass screening of the society. Thus the participants can take part in the survey without affecting their work.

Hence we decided to use internet as a medium to conduct the survey. The questionnaire was uploaded in the survey monkey website in the investigator's account. The link of the survey was sent to the candidates. Candidates willing to take part in the survey can click on the link which will take them to the questionnaire. After completing the survey, the candidates should click the submit button and the responses will be sent to the investigators account. The settings were made such that a survey can't be taken up more than once from a device. The survey can be taken up using a desktop computer, laptop, smartphones. The investigator will get all the responses from an individual and can analyse and access everyone's responses. The link was sent to as many individuals as possible.

The body mass index (BMI) was calculated from the data provided by the candidates and obese individuals were excluded from the study. The responses of the remaining non-obese individuals were then analysed using IBM. SPSS statistics software 23.0 version.

RESULTS

Among the 640 individuals participated in the survey 600 belonged to the non-obese category. 21% belonged to less than 25 years of age. 34% belonged to 26-35 years of age. 36-45 age groups contained 19%. 17% and 9% of the individuals belonged to 46-55 age groups and greater than 55 years of age respectively (Figure 1).

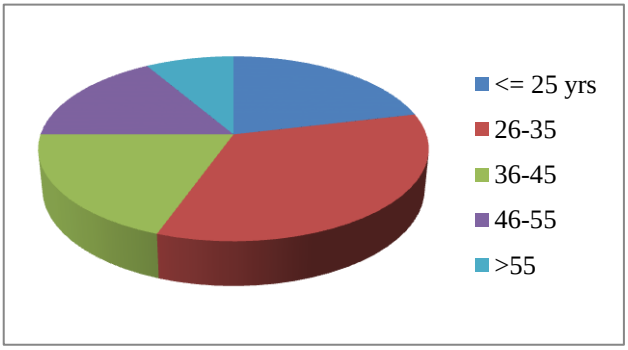

Figure 1: Age distribution (in years).

Among the individuals participated in the study 18% reported that they would snore loudly during sleep (Figure 2). 26% of the study population experienced day time tiredness (Figure 3). 6% of the individuals reported to have choking spells during night (Figure 4). 19% of the study population reported that their sleep is not refreshing (Figure 5). 59% were females and 41% were males (Figure 6). While 7% of the individuals had the habit of smoking cigarettes, 10% had the habit of consuming alcohol (Figure 7). Varying proportions of study individuals were found to be affected by hypertension, diabetes mellitus and thyroid disorders.

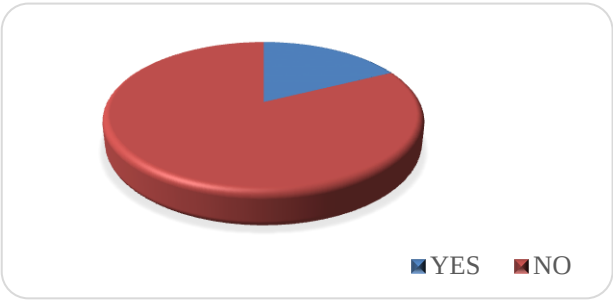

Figure 2: Snoring population.

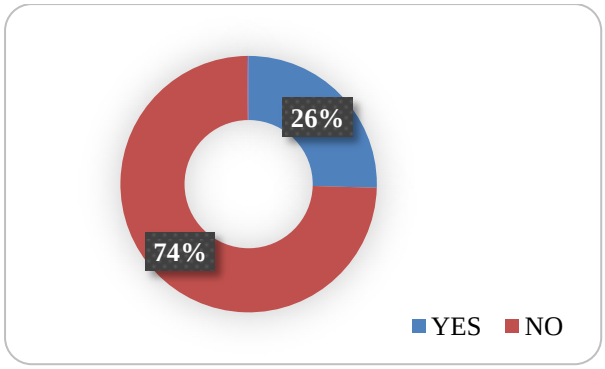

Figure 3: Day time fatigue.

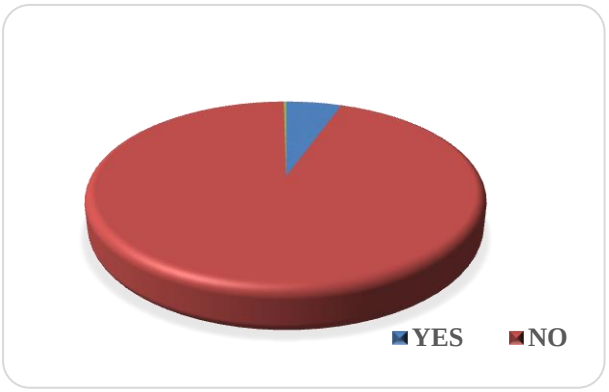

Figure 4: Apneic spells.

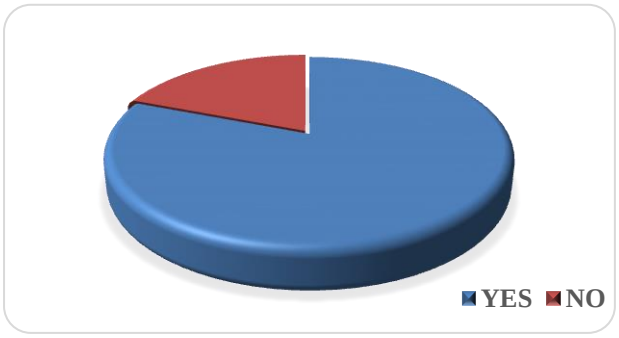

Figure 5: Refreshing sleep.

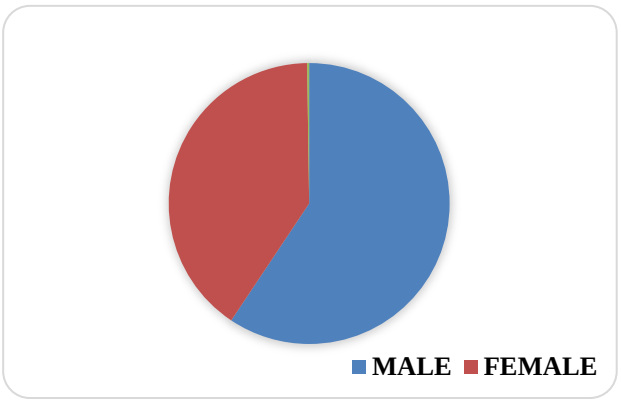

Figure 6: Gender distribution.

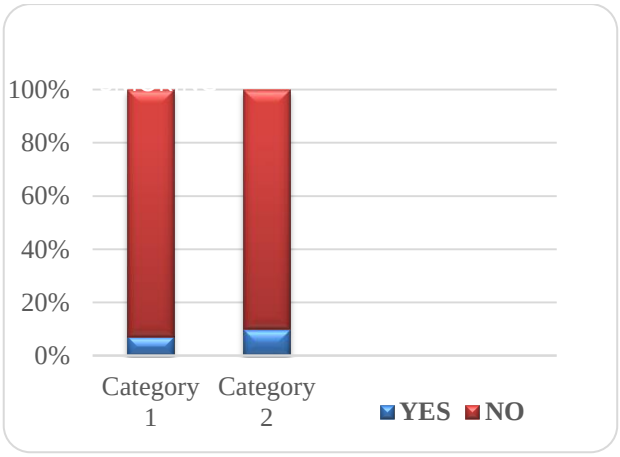

Figure 7: Smoking and alcohol habits.

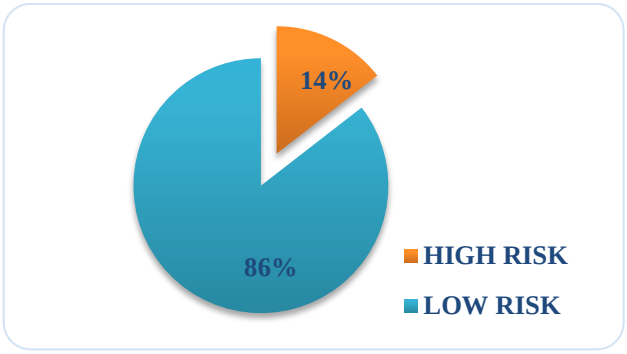

Figure 8: High risk and low risk groups.

Of the 6 questions in the questionnaire a positive response to 3 or more questions was considered to be in high risk group. In our study 14% of the study population belonged to the high risk group (Figure 8). As expected age and gender had a significant association with the high-risk group.

DISCUSSION

There is increasing evidence that sleep abnormalities in general and sleep-disordered breathing, such as snoring, have deleterious effects beyond the neuro-cognitive realm.[5] The prevalence of OSA in USA, Australia and China are approximately 26%, 18%, 17% respectively.[6] The prevalence in India ranges from 15% to 29%.[7] Prevalence studies have been conducted in Tamil Nadu and relation between OSA and obesity, thyroid disorders have been studied. 40% is the prevalence found to be associated with metabolic abnormalities.[8] No studies have been conducted to study the prevalence of OSA in non-obese individuals.[9] This study shows that 14% of the non-obese individuals are at high risk of developing OSA. The next phase of the study will progress in the direction of conducting polysomnography for the high-risk patients.

The major highlights of this study will be the use of the modern technology to conduct a survey for more than

600 persons within a week. With smart phones being available to almost everyone now-a-days they can be used for many such purposes. Another highlight will be studying the prevalence of OSA among non-obese individuals. With OSA being one of the major causes of many co-morbid conditions it is essential to screen as early as possible. Though obesity is commonly associated with OSA syndrome it should be borne in mind that it is also prevalent in non-obese individuals. This study substantiates the same.

Limitations

This study has certain limitations. Smartphones and access to internet is not completely available to everyone in our place. Hence risk groups in those population groups can't be screened by this method. The height and weight measurements given by the individuals may not be absolutely accurate.

CONCLUSION

STOP-BANG questionnaire is a very useful tool in screening OSA syndrome and this questionnaire has been modified by various experts worldwide who are involved in sleep medicine according to the needs. This modified version is useful in the screening of OSA in the individuals of the society. OSA a does occur in non-obese individuals and early diagnosis and treatment is therefore essential since the manifestations are hidden when compared to that of obese population. Internet and associated technology can be made use in such mass screening activities as it reduces the time and money spent and increases the compliance.

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Conflict of interest: None declared
Ethical approval: The study was approved by the Institutional Ethics Committee

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