International Journal of Science and Research (IJSR)
ISSN: 2319-7064
Impact Factor 2024: 7.101

Risk of Obstructive Sleep Apnea in Diabetic Patient in Pravara Rural Hospital: An Observational Study

Dr. Meghna Ugale[1], Dr Sambhaji Gunjal[2]

[1]PG Student, Dr. A. P. J. A. K. College of Physiotherapy Loni, Ahmednagar, Maharashtra, India
Email: *meghnaugale[at]gmail.com*

Professor, Dr. A. P. J. A. K. College of Physiotherapy Loni, Ahmednagar, Maharashtra, India
Corresponding Author Email: *gunjalsambhaji90[at]gmail.com*

Abstract: ***Background: A metabolic condition known as diabetes mellitus is characterized by a rise in blood glucose levels. Diabetes is a chronic condition brought on by insufficient insulin production by the pancreas or inefficient insulin utilization by the body. Obstructive Sleep apnea: high prevalence of OSA in patients with diabetes. That the association between OSA and diabetes is bidirectional, meaning that the neuropathy of diabetes can affect the central control respiration and upper airway neural reflexes results in OSA. Aim and Objective: To see the risk Of Obstructive Sleep Apnea in Hospitalized Diabetes Patients. Methodology: Participants will be selected according to inclusion and exclusion criteria. Explanation and written consent form will be given to participants regarding the study prior to the study. Each participant will be assessed according to Stop Bank Questionnaire All data will be collected and assessed. According to data collection conclusion will drawn out. Result: According to stop bank Questionnaire of High risk of OSA is seen in 19 Patient. Moderate risk OSA is seen in 23 Patient and Low risk of OSA is seen in 8 patients. So, there is Moderate to high Risk of obstructive Sleep Apnea in diabetes patients. Conclusion: This study concluded that there is moderate risk of obstructive sleep apnea in patients with diabetes mellitus.***

Keywords: Diabetes mellitus, obstructive sleep apnea, stop bank questionnaire

1. Introduction

A metabolic condition known as diabetes mellitus is characterized by a rise in blood glucose levels. Diabetes is a chronic condition brought on by insufficient insulin production by the pancreas or inefficient insulin utilization by the body. Insulin regulates the level of blood sugar. An elevated blood sugar level, or hyperglycemia, is a typical side effect of diabetes that, over Diabetes is primarily divided into the following types: 1) Type 1 (also known as insulin - dependent, childhood - onset) is defined by an inability to produce enough insulin, necessitating daily insulin injection. The signs, which include excessive urination (polyuria), excessive thirst (polydipsia), Persistent hunger, loss of weight, alterations in vision, and exhaustion, might appear rapidly. (5) 2) Type 2 diabetes, also known as adult - onset or non - insulin - dependent, is brought on by the body's inefficient use of insulin. About 95% of diabetics have type 2, which is primarily brought on by being overweight and although frequently less severe, the symptoms of type 2 diabetes might be comparable to those of type 1 Symptoms of diabetics are: loss of consciousness, intense thirst, vision problems, risk of heart disease, hypertension, exhaustion and lack of energy, excessive urine, damaged blood vessels, and nerve damage are some of the symptoms that can arise from diabetes.

Numerous problems can arise from diabetes, including a higher prevalence of cardiovascular illnesses, renal, and ophthalmologic issues (5) Patients with type 2 diabetes frequently have OSA, a persistent, curable sleep problem. In laboratory studies, it has been shown that key characteristics of OSA, such as intermittent hypoxemia and sleep fragmentation, are associated with impaired glucose metabolism. (2) Type 2 diabetes incidentally developing has also been connected to OSA The Complications of diabetes: People with type 2 diabetes are more likely to experience a wide range of problems, which are mostly brought on by intricate and interrelated mechanisms such as hyperglycemia, insulin resistance, low - grade inflammation, and accelerated atherogenesis. Cardiac and cerebral diseases, such as coronaropathy, stroke, and heart failure, are frequently linked to type 2 diabetes and can be fatal. Their clinical symptoms can occasionally be unusual and silent for an extended period of time (3) Obstructive Sleep apnea: high prevalence of OSA in patients with diabetes. That the association between OSA and diabetes is bidirectional, meaning that the neuropathy of diabetes can affect the central control respiration and upper airway neural reflexes results in OSA. In night time hypoxia caused by OSA is correlated with glucose intolerance and insulin resistance a study foster reported that 86.6% of patients with diabetes suffered from OSA. the results were also indicative of a higher OSA prevalence in women, compared to men. Generally OSA has seen as a male disease due to higher involvement of men compared to women. (1) Obstructive sleep apnea is a disorder when the upper airway repeatedly collapses while asleep, causing oxygen desaturation and interrupted sleep. Snoring, observed apneas, and drowsiness are characteristics of Obstructive Sleep Apnea. Small upper airway lumen, unstable respiratory control, a low arousal threshold, a small lung volume, and malfunctioning upper airway dilator muscles are some contributing variables. Pathogenesis varies. Obesity, ageing, menopause, fluid retention, and smoking are risk factors of OSA. Although not conclusively, it has also been connected to myocardial infarction, congestive heart failure, stroke, and diabetes mellitus. (4) One of the main issues with diabetic patients that might aggravate their condition is obstructive sleep apnea (OSA), which has been linked to poor blood glucose management and macro and microvascular difficulties in patients with OSA is generally understood to be the

suspension of airflow for ten seconds or longer that occurs during sleep as a result of upper airway collapse and is associated with symptoms such frequent awakenings, fragmented sleep, and intermittent hypoxemia Thus, patients with diabetes frequently lament their persistent tiredness, excessive daytime sleepiness, and morning headaches. (1) Obstructive sleep apnea syndrome (OSA), a condition that is particularly common in persons with type 2 diabetes and which raises cardiovascular morbidity and death, is one of these conditions. OSA has been noted as a separate risk factor for the emergence of insulin resistance, glucose intolerance, and type 2 diabetes mellitus in a number of studies. Chronic intermittent hypoxia, sleep fragmentation, stimulation of the sympathetic nervous system, the hypothalamic - pituitary - adrenal stress axis, pro - inflammatory pathways, or oxidative stress are likely the mediators of disorders of glucose homeostasis in OSA patients. Even though type 2 diabetes patients have a high prevalence of OSA and continuous positive airway pressure (CPAP) medication has been shown to reduce mortality, the majority of OSA patients go undetected. (2) Stop bang is an assessment tool to help diagnosed obstructive sleep apnea The STOP - Bang Questionnaire is designed to provide doctors with a simple tool to help them spot patients who may have obstructive sleep apnea. Eight yes - or - no questions based on the main OSA risk factors make up the questionnaire The name STOP - Bang is an abbreviation for the first letter of each physical characteristic or symptom frequently linked to OSA. The answer to this question will indicate whether a patient snore loudly enough to wake up patient sleeping fellow. Tiredness: This symptom refers to feeling sleepy during the day, which may cause you to mood off while performing routine. Blood pressure: A symptom is also high blood pressure BMI: A body mass index of greater than 35 is desired by medical professionals. Age: People over 50 have an increased risk of developing OSA. Neck's circumference is measured by medical professionals. A risk factor is a measurement greater than 16 inches. Gender: OSA is thought to affect men more frequently than women. Observed Apnea: OSA may be present if patient bed companion has seen patient stop breathing. The Meaning of STOP - Bang Scores One point is awarded for each symptom or risk factor on the STOP - Bang questionnaire, up to a maximum of eight points. A person is more likely to have moderate or severe OSA in general the higher their questionnaire score. Additionally, greater STOP - Bang scores have been linked to OSA that is more severe, according to studies. For either moderate or severe OSA, STOP - Bang: Score of 0 - 2 low risk, OSA. Score 3 - 4 Intermediate Risk OSA Score 5 - 8 High Risk OSA (6)

2. Methodology

Source of data: The sample will collected from Pravara Institute of Medical Sciences and Pravara Rural Hospital.

Study Setting: Dr. APJ Abdul Kalam College of Physiotherapy. Duration of Study 6 month.

Study Design observational study
Sample size 50 Sampling simple random sampling.

Inclusion

- Both male and female patients
- Known case of diabetes type1 or type 2
- Diagnosed case since 2 years
- Age group between 20 to 70 years
- Normal BMI & overweight (18 - 29 kg/m2)

Exclusion:

- k/c/o of thyroid disease
- on antipsychotic drugs
- K/C/O Psychiatric condition
- Obesity grade 1 - 3
- Any neurological disease (CVA)
- CCF

Description of Outcome

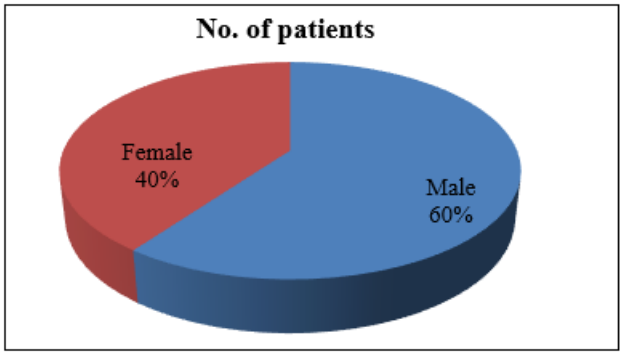
1) Stop Bank Questionnaires: - Stop bang is an assessment tool to help diagnosed obstructive sleep apnea The STOP - Bang Questionnaire is designed to provide doctors with a simple tool to help them spot patients who may have obstructive sleep apnea. Eight yes - or - no questions based on the main OSA risk factors make up the questionnaire The name STOP - Bang is an abbreviation for the first letter of each physical characteristic or symptom frequently linked to OSA. STOP - Bang scores have been linked to OSA that is more severe, according to studies. For either moderate or severe OSA, STOP - Bang: Score of 0 - 2 low risk, OSA.
Score 3 - 4 Intermediate Risk OSA
Score 5 - 8 High Risk OSA

Study Procedure
The study will be conducted on diabetic patients at Pravara Rural Hospital, Loni. Participants will be selected according to inclusion and exclusion criteria. Explaination and written consent form will be given to participants regarding the study prior to the study. Each participant will be assessed according to Stop Bank Questionnaire All data will be collected and assessed. According to data collection conclusion will drawn out.

3. Result

Table 1.1: Gender wise classification of Patients

Gender	No. of Patients	Percentage
Male	30	60%
Female	20	40%

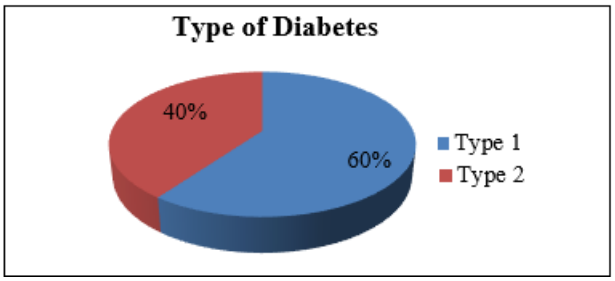


Graph 1.1: Signifies the gender wise classification of patients

Result: The above table and pie chart shows that there were a total of 50 Patients of which 40% were females and 60% were Males.

Table 1.2: Represents Type of Diabetes

Type of Diabetes	No. of Patients	Percentage
Type 1	30	60%
Type 2	20	40%

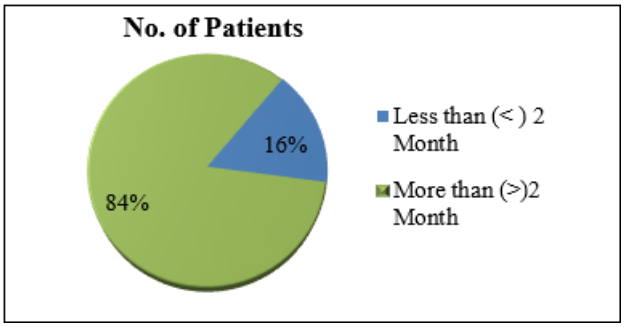


Graph 1.2: Signifies type of Diabetes

Result: The above table and pie chart shows that there were a total 50 patients of which 40% were type1 Diabetes and 60% were Type2 Diabetes.

Table 1.3: Represents Diabetes is diagnosed since

Diagnosed since	No. of Patients	Percentage
Less than (<) 2 Month	8	16%
More than (>) 2 Month	42	84%

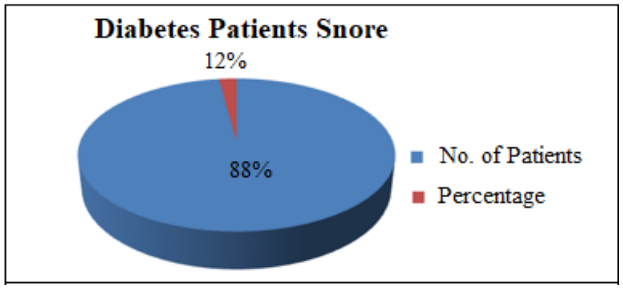


Graph 1.3: Signifies Diabetes diagnosed since

***Result*:** The above table and pie chart shows that there were a 50 patients of which 16% were diabetes diagnosed since less than (<) 2 month and 84% were diabetes diagnosed since more than (>) 2 months**.**

Table 1.4: Represents how many diabetes patients are snore

Do you Snore ?	No. of Patient	Percentage
Yes	44	88%
No	6	12%

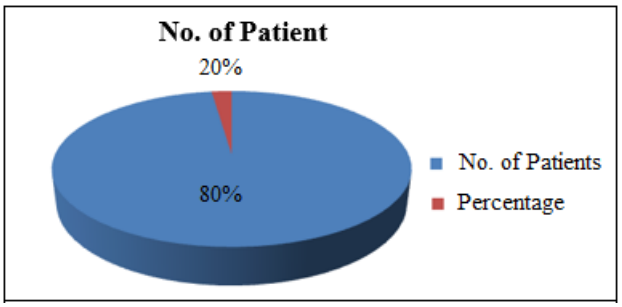


Graph 1.4: Signifies how many diabetes patients are snore

Result: The above table and pie chart shows that there were a 50 diabetes Patients of which 12 % are not snore and 88% are Snore.

Table 1.5: Represents how many diabetes patients feel often tired fatigue or sleepy during daytime

Do you feel often tired fatigue or sleepy during daytime	No. of Patients	Percentage
Yes	40	80%
No	10	20%

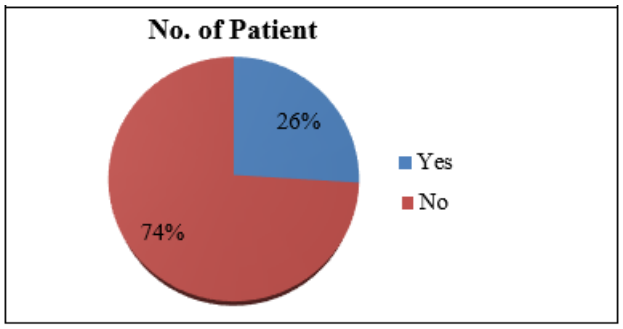


Graph 1.5: Signifies how many diabetes patients feel Often tired fatigue or sleepy During daytime.

***Result*:** The above table and pie chart shows that there were a 50 diabetes patients of which 20 % are Not feel often tired fatigue or sleepy during daytime. And 80% feel often tired fatigue or sleepy during daytime.

Table 1.6: Represents How many diabetes Patients observed stop breathing, chocking, while sleeping?

Has anyone observed you stop breathing, chocking, while you were sleeping?	No of Patients	Percentage
Yes	13	26%
No	37	74%

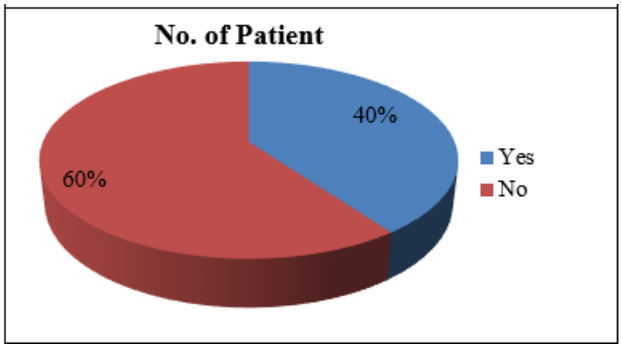


Graph 1.6: Signifies how many diabetes patients observed stop breathing, chocking, while sleeping.

Result: The above table pie chart shows that there were 50 diabetes patients of which 26% patients observed stop breathing chocking while sleeping. And 74% patients Not observed stop breathing chocking while sleeping

Table 1.7: Represents How many diabetes Patients treated for blood pressure

Are you treated for blood pressure?	No of patient	Percentages
Yes	20	40%
No	30	60%

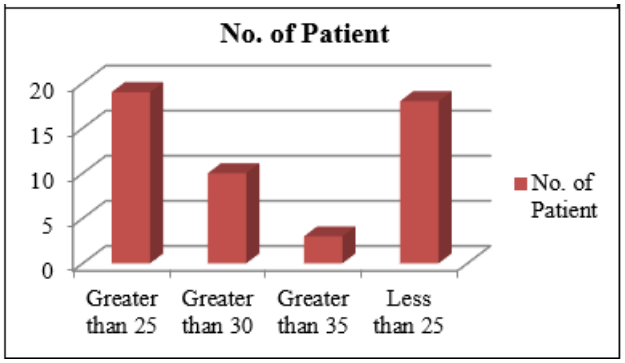


Graph 1.7: Signifies how many diabetes patients treated for blood pressure

***Result*:** The above table pie chart shows that there were 50 diabetes patients of which 40% are treated for blood pressure. And 60% are not treated for blood pressure.

Table 8: Represents diabetes patients BMI

What is your BMI?	No. of Patient	Percentage
Greater than 25	19	38%
Greater than 30	10	20%
Greater than 35	3	6%
Less than 25	18	36%

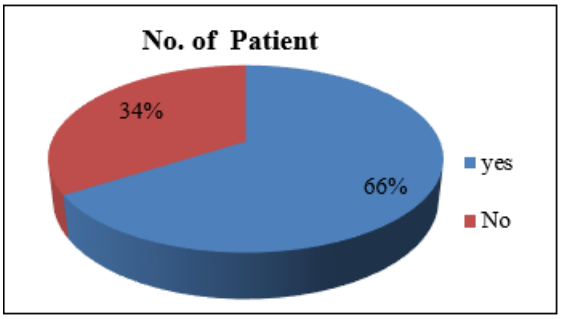


Graph 1.8: Signifies diabetes patients BMI

Result: The above table Bar chart shows that there were 50 diabetes Patients of which 38% patients BMI is Greater than 25. And 20% patients BMI is Greater than 30. And 6% Patients BMI Greater than 35. And 36% patients BMI is Less than 25.

Table 1.9: Represents how many diabetes patient older than 50

Are you older than 50.	No. of patient	Percentage
Yes	33	66%
No	17	34%

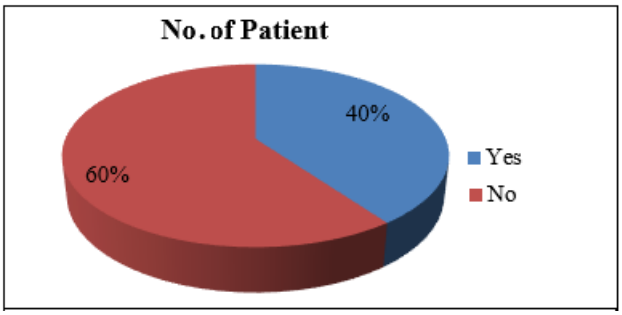


Graph 1.9: Signifies how many diabetes patient older than 50

Result: The above table pie chart shows that there were 50 diabetes patients of which 66% patients older than 50. And 34% patients are Not older than 50.

Table 1.10: Represents how many diabetes patients neck size is larger than 43 cm for males and 41 cm for female.

Is your Neck size is larger than 43 cm for male and 41 cm for female ?	No. of Patient	Percentage
Yes	20	40%
No	30	60%



Graph 1.10: Signifies how many diabetes patients neck size is larger than 43 cm for male and 41 cm for female

Result: The above table and pie chart shows that there were 50 diabetes patient of which 40% patients neck size is larger than 43 cm for male and 41 cm for female. And 60% patient's neck size is Not larger than 43 cm for male and 41 cm for female. According to the stop bank questionnaire of obstructive sleep Apnea Total score is 3 - 4 questions (yes) responses. So, there is Intermediate Risk of obstructive Sleep Apnea in diabetes patient

4. Discussion

The Present study Conducted on Risk of Obstructive Sleep Apnea in Diabetic Patient in pravara Rural hospital an Observational study. The Purpose of the study, to see the Risk of Obstructive Sleep apnea in diabetic patients. Sample size was 50 for this study. The participants were selected on the basis on sampling method and according to inclusion and exclusion criteria total 100% responses are recorded. The sample was collected from pravara rural hospital.

The result of the study shown that 1. Patient who responded to survey majority of them were males is 60% and remaining response were females 40% with type 1 diabetics was 60% and type 2 was 40%. With BMI greater than 35 was 6% of diabetics patients have high risk of OSA. Were diabetics diagnosis since less than 2 month is 16% and more than 2 months is 84% with the patient are in diabetes are snore is 88% and patients feel often tired fatigue or sleepy during daytime are 80%. Diabetes patients observed stop breathing, chocking while sleeping are 26% of patients. With 40% of diabetes patients treated for blood pressure and diabetes patient older than 50 are 66% have risk of of diabetes patients have risk of obstructive sleep apnea.

Diabetes can affect the central control of respiration and upper airway neural reflexes result in osa. Nighttime hypoxia caused by OSA are correlated with glucose intolerance and insulin resistance. OSA had seen as male

disease due to higher involvement of men compared to women hormonal factors difference in fat distribution in the body and pharyngeal anatomy and function are the cause of the difference in the prevalence osa in men and women. OSA prevalence had an ascending trend with increased mean age duration of disease, high age and obesity are the mutual causes of osa and diabetes in a way that increase of age and gaining weight increases the risk of diabetes and osa. Aging increases the risk of disease for patients with diabetes in addition the possibility of the emergence of diabetes complications by aging which can have adverse effects on the sleep condition of patients with diabetes.

Arezoo fallahi et al. conducted study on prevalence of obstructive sleep apnea in patients with type 2 diabetes. This study concluded that there was a high OSA prevalence in patients with type 2 diabetes.

Mandana sarokhani et al. This study concluded that high prevalence of sleep apnea in Iran, identifying people at risk and providing instructional materials for controlling and treating sleep apnea is necessary. Cong wang et al conducted study on obstructive sleep apnea, prediabetes and progression of type 2 diabetes. this study concluded that risk of developing prediabetes and diabetes was higher in patients with OSA.

Ranran Qie. at al conducted a study on obstructive sleep apnea and risk of type 2 diabetes mellitus. Study concluded that dose response meta - analysis revealed a linear association between OSA and type 2 diabetes mellitus.

5. Conclusion

This study concluded that there is moderate risk of obstructive sleep apnea in patients with diabetes mellitus.

6. Clinical Implications

As obstructive sleep apnea in very common in diabetic patients so exercise prescription should be done for preventing OSA

7. Limitations and Future Directions

The sample size was relatively small, which may limit the generalizability of the results. Additionally, the duration of the intervention was relatively short

References

[1] Fallahi, Arezoo, et al. “Prevalence of Obstructive Sleep Apnea in Patients with Type 2 Diabetes: A Systematic Review and Meta - Analysis. ” Diabetes & Metabolic Syndrome: Clinical Research & Reviews. vol.13, no.4, 2019, pp.2463–2468., doi: 10.1016/j. dsx.2019.06.030.
[2] Obstructive Sleep Apnea and Diabetes: A State of the Art Review DOI: 10.1016/j. chest.2017.05.009. https: //pubmed. ncbi. nlm. nih. gov/28527878
[3] Schlienger, J. L. (2013) Type 2 Diabetes Complications. La Presse Médicale, 42, 839 - 848. http: //dx. doi. org/10.1016/j. lpm.2013.02.313 has been cited by the following article: TITLE: Efficacy and Safety of Vortioxetine and Duloxetine 60 mg Compared Placebo for the Treatment of Major Depressive Disorder: A Systematic Review and Meta – Analysis https: //www.scirp. org/reference/ReferencesPapers. aspx?ReferenceID=1563256
[4] Adult obstructive sleep apnea – PubMed DOI: 10.1016/S0140 - 6736 (13) 60734 - 5 Abstract Obstructive sleep apnoea is an increasingly common disorder of repeated upper airway collapse during sleep, leading to oxygen desaturation and disrupted sleep. Features include snoring, witnessed apneas, and sleepiness. https: //pubmed. ncbi. nlm. nih. gov/23910433
[5] https: //www.who. int/news - room/fact - sheets/detail/diabetes 10 November2021 High - Intensity Interval Training Improves Cardiac Autonomic Function in Patients with Type 2 Diabetes: A Randomized Controlled Trial Study year 2021, published 2022. Biology journal volume 11, 66 issue
[6] STOP - BANG Score for Obstructive Sleep Apnea – MD Calc STOP - BANG Score for Obstructive Sleep Apnea Screens for obstructive sleep apnea.