

# Obesity and Hypertension Induced Sleep Apnea in Men

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## Abstract

Global obesity and hypertension epidemic continues to gain momentum as reported in several studies that association between obstructive sleep apnea, hypertension and weight gain has resulted in a corresponding increase in the frequency of this health issue. Therefore this analytical study was conducted with the help of a self-developed validated questionnaire designed to find the prevalence of sleep apnea and its relationship with obesity and hypertension in 100 male participants. Obtained results revealed that out of 69 obese male individuals, 64 were suffering from sleep apnea along with apparent symptoms of hypertension indicating its high prevalence. If untreated, may affect quality of life, morbidity and mortality.

**Keywords:** Obesity; Hypertension; Sleep apnea; Prevalence

## Introduction

Sleep apnea causes daytime hypertension since previous studies showed that patients with sleep apnea had high incidence of clinical hypertension [1,2]. However, in specific, hypertension may be caused by a number of other factors that includes obesity, age, high alcohol intake, smoking, low exercise and high caffeine intake [3-13]. Early findings indicated that sleep apnea is associated with hypertension and obesity [14-17]. Epidemiologic studies indicate a direct association between hypertension and obesity [18]. According to an investigation it was found that 78% of hypertension in men and 65% in women can be linked to rapid weight gain [19]. But in some studies a direct relation was discovered between BMI and blood pressure [20].

Nevertheless, correlation between excessive weight gain and hypertension is multifarious caused by interaction of different genetic, hormonal, environmental and demographic factors. Therefore underlying link between sleep disordered breathing, hypertension and obesity is far from proved, though there are good theoretical reasons for suspecting that such a link might exist. Obesity and sleep apnea often coexist and is dependent on one another. Hence it is quite convincing that affiliation of obesity and hypertension is related to the existence of obstructive sleep apnea. Examining of sleep apnea is not that easy due to night to night variation and also because it is still vague that what factors might trigger hypertension in an individual [21]. Thus it is difficult to design experiments with hundred percent reliability and accuracy to investigate the causal links between sleep apnea, hypertension and obesity; it is indeed besieged with difficulties. So in order to get to the root of this disorder one must first find out the contributing factors which provoke sleep apnea and then explore its correlation with obesity and hypertension. These must then be accounted to propose that sleep apnea is a health hazard worthy of attention. Therefore the main aim of this study was to determine that sleep apnea might be strongly linked with obesity and hypertension in men.

## Materials and Methods

Male participants were selected at random with their informed consent keeping the sample size 100. Male participants with age ranges from 35-45 years were included in the study. This analytical study was conducted with the help of a self-developed validated questionnaire designed to find the prevalence of sleep apnea and its relationship with obesity and hypertension. BMIs of the individuals were also calculated using the given formula to assess the weight status of the participants. Participants were also categorized as normal, under/overweight and obese based on their measured BMIs. Based on the measured blood pressure using sphygmomanometer, individuals were recognized with the condition of hypertension. Statistical analysis of the data was done by means of Microsoft excel.

## Results & Discussions

Out of 100 male participants, 69% were found to be obese while 9 % were overweight as depicted in Table 1 and Figure 1.

S.no	BMI category	Weight range	No of students (%)
			(n=100)
1	<18.5	Under weight	14
2	18.5-24.9	Normal	8
3	25.0-29.9	Over weight	9
4	>29.9	Obese	69

**Table 1:** BMIs of male participants.

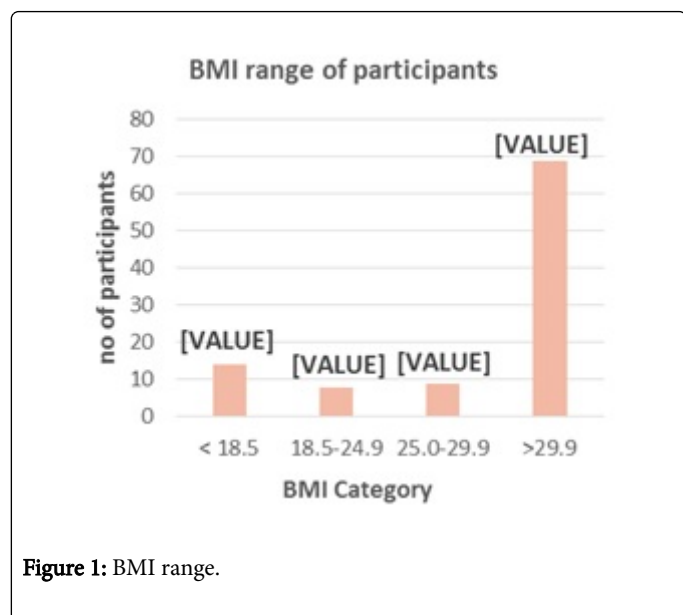


Figure 1: BMI range.

Numerous studies have reported that a consistent relationship occurred between obesity and sleep apnea [22]. As indicated by the obtained result that out of 69 obese male individuals, 64 were suffering from sleep apnea. Similarly it was stated that a 10% increase in weight resulted in a 6-fold rise in the odds of development of sleep apnea and a 10% weight loss indicated a 26% decrease in the apnea index Table 2 and Figure 2 [23].

Likewise weight loss in patients with obstructive sleep apnea led to a considerable decrease in its frequency [24,25]. However the underlying effect mechanism of obesity on sleep apnea is still unknown.

S.no	Hypertension	No of participants (%)
1	yes	74
2	no	26
	Total	100

Table 2: Hypertension affected participants.

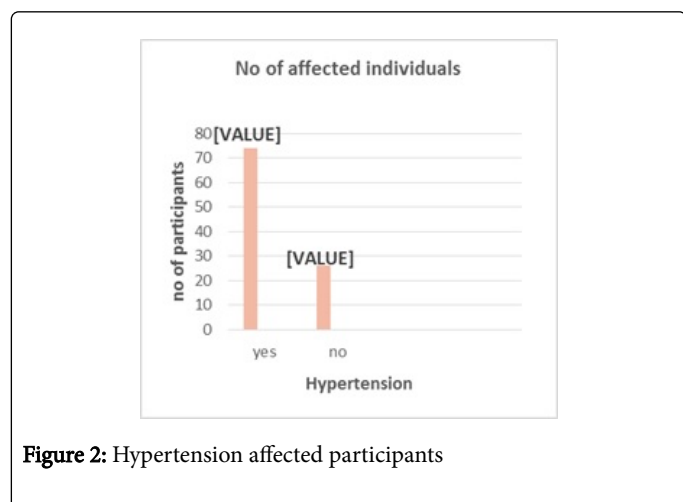


Figure 2: Hypertension affected participants

Fat deposition on airway anatomy may be the reason as it was seen in sleep apnea that weight loss have been associated with a decrease in with upper airway collapsibility [25]. Newly diagnosed patients with sleep apnea was found to have a history of obesity in the period prior the diagnosis [26,27]. Further evidences revealed that an etiologic link exists between body mass and sleep apnea depending on multifactorial. Such as patients' lifestyle, eating disorders, low physical activities, high blood pressure, obesity etc. [28]. Based on our findings, it appears that obesity and sleep apnea mutually enhance their progression and severity indicating a reciprocal relation between them. Our results suggested that 74% of individuals were suffering from hypertension and majority of these affected ones had obstructive sleep apnea Table 3 and Figure 3.

S.no	Sleep apnoea associated symptoms	No of participants (%)
1	Snoring	
	yes	66
	no	34
2	Feeling tired, fatigued	
	yes	71
	no	29
3	Observed paused breathing during sleep	
	yes	37
	no	63
4	High blood pressure	
	yes	64
	no	36

Table 3: Presence of sleep apnea associated symptoms.

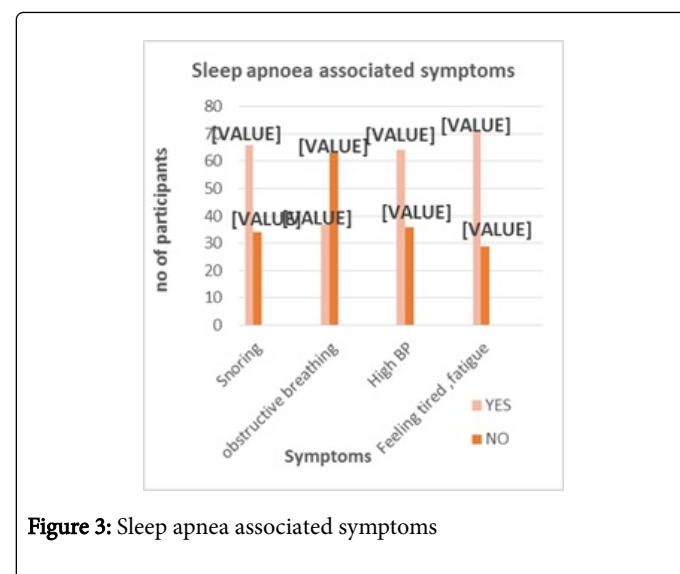


Figure 3: Sleep apnea associated symptoms

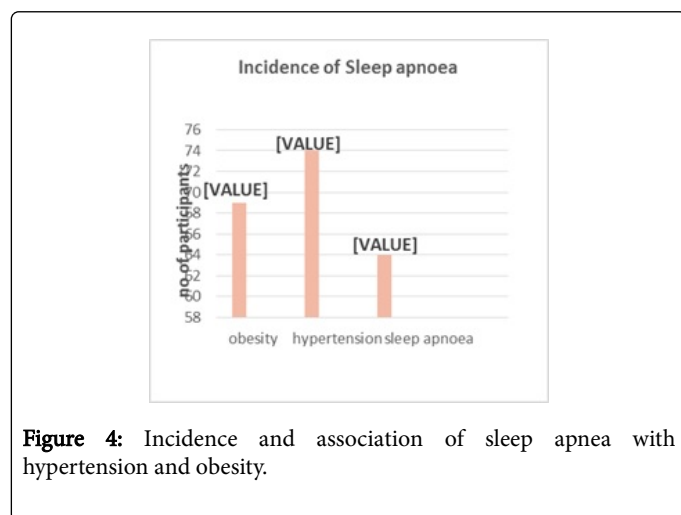
Association between sleep apnea and hypertension is persuasive as supported by the fact that incidence of hypertension is greater in

patients affected with sleep apnea and vice versa [29]. Wisconsin Sleep Cohort Study perhaps revealed a plausible relationship between sleep apnea and hypertension [30].

Based on our valuable findings, diagnosis of obstructive sleep apnea in men is of potent and considerable clinical importance because according to a recent report, sleep apnea is one of the prime reasons behind hypertension therefore suspected in individuals with hypertension, unexplained rapid weight gain, snoring, observed apnea, poor sleep quality and excessive daytime somnolence Table 4 and Figure 4 [31].

S.no	Obesity (n=100)	Hypertension (n=100)	Sleep apnea (n=100)
1	69	74	64 (High incidence)

**Table 4:** Incidence of sleep apnea.



**Figure 4:** Incidence and association of sleep apnea with hypertension and obesity.

## Conclusion

Sleep apnea, hypertension and obesity often coexist and interact. It may contribute to various serious health and pathological processes if not recognized as serious health hazard.

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