

# Medication Is Not Associated with Hypoventilation in Patients with Suspected Sleep Apnea

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## Introduction

Obesity hypoventilation syndrome (OHS) consists of a combination of obesity and chronic hypercapnia accompanied by sleep disordered breathing (SDB)<sup>1,2,3,4</sup>. Hypoventilation is frequently associated with obesity or a co-morbidity of sleep apnea and obesity. We evaluated the association of concomitant medication with the incidence of a new diagnosis of hypoventilation using the systematic monitoring of main stream end-tidal CO<sub>2</sub> (EtCO<sub>2</sub>).

## Methods

We surveyed 518 community-based individuals who were referred for clinically suspected sleep apnea. Participants were evaluated by a sleep medicine specialist, questionnaire and one night of polysomnography. All patients were monitored with main stream EtCO<sub>2</sub> (Figure 1) during nocturnal polysomnography. Hypoventilation was identified as an EtCO<sub>2</sub> ≥ 50 mm Hg for ≥10% TST. All medications were coded for opiates, antipsychotics, benzodiazepines, benzodiazepine receptor antagonists (BZDRA), antidepressants and respiratory drugs.



Figure 1: EtCO<sub>2</sub> nasal/oral probe with integrated pressure transducer

## Results

Patients were a mean age of 49.9 (SD±12.1) years and 69% were men. Of these patients, 398 (77%) met diagnostic criteria for at least moderate obstructive sleep apnea.

Age	49.9 (SD ±12.1)
Gender	M= 356 (69%) F= 162 (31%)
BMI (kg/m <sup>2</sup> )	18.0-24.9 → 124 (23.9%) 30.0-34.9 → 206 (39.8%) 35.0-39.9 → 102 (19.7%) ≥40.0 → 86 (16.6%)
Epworth Sleepiness Scale	$\bar{x}$ = 11 (SD±5.5)
AHI	$\bar{x}$ = 45.4 (SD±36.2)
Therapy Prescribed	None= 146 CPAP= 116 APAP= 163 BiPAP= 13 ASV= 1 Unknown= 79

Table 1: Baseline characteristics

Overall, 101 (19%) patients spent at least 10% of sleep time in hypoventilation while 24 (4.6%) had at least 10% of total sleep time with an EtCO<sub>2</sub> of 50 mmHg or higher. None of these patients were known for hypoventilation prior to polysomnography. The use of antidepressants is associated with hypoventilation (low odds ratio with 95% intervals that span below 0). However, after Bonferroni correction for multiple comparisons, this is no longer significant ( $p= 0.0125$ ).

Benzodiazepines	0.96 (0.41-2.25)
Benzodiazepine receptor antagonists (BZDRA)	0.55 (0.12-2.41)
Antidepressants	0.48 (0.20-0.93)
Respiratory drugs	0.56 (0.20-1.40)

Table 3: Odds ratio for association with hypoventilation (95% confidence interval)

### References:

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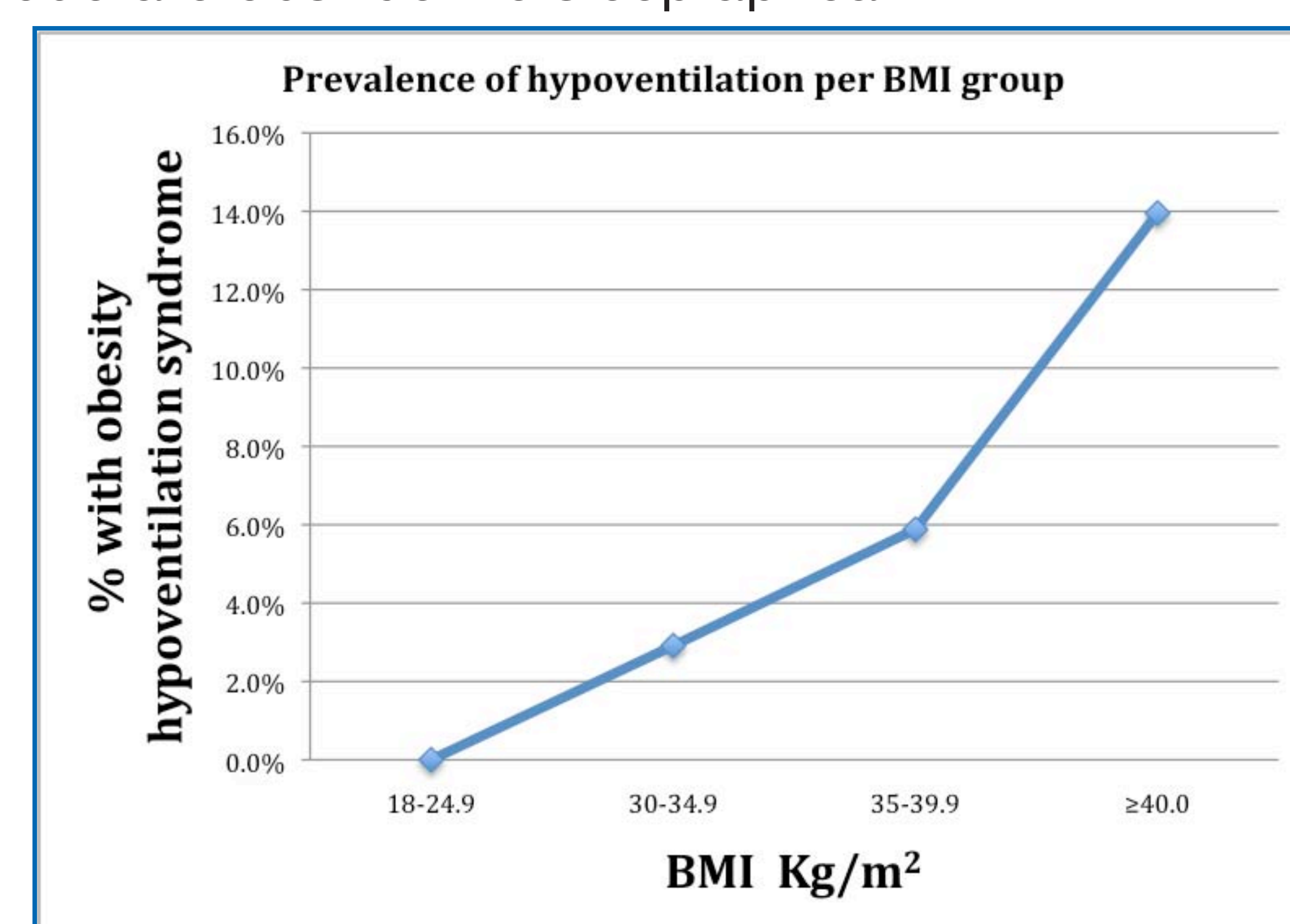


Figure 2: Prevalence of hypoventilation per BMI group

Opiates	4 (0.8%)
Antipsychotics	8 (1.5%)
Benzodiazepines	37 (7.1%)
Benzodiazepine receptor antagonists (BZDRA)	17 (3.3%)
Antidepressants	77 (14.9%)
Respiratory drugs	42 (8.1%)

Table 2: Prevalence of studied medication

## Conclusion

We conclude that hypoventilation is frequent in patients with suspected sleep apnea, and that medications do not appear to be a useful risk factor to aid in predicting hypoventilation. Therefore, the continuous monitoring of main stream EtCO<sub>2</sub> facilitates diagnosis.



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