



# STOP-BANG Questionnaire for Assessing Risk of Obstructive Sleep Apnoea in Bariatric Surgery Patients

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## Introduction

Patients with obstructive sleep apnoea (OSA) have increased risk of accidents, stroke, coronary artery disease, hypertension, atrial fibrillation and postoperative complications. A number of screening questionnaires are available to identify risk for OSA prior to surgery.

Epworth Sleepiness Score (ESS) is unreliable in predicting the risk of Obstructive Sleep Apnoea (OSA) in bariatric surgery patients – hence, they often undergo Polysomnography (PSG)<sup>1</sup>.

A STOP-BANG score of  $\geq 3$  is generally regarded to indicate need for PSG in these patients<sup>3</sup>. We aimed to define the prevalence of OSA and validate the STOP-BANG questionnaire as a screening tool in our patients.

## Methods

We prospectively collected clinical data and sleep study results from 61 bariatric patients who underwent sleep studies between January and March 2011 at Whittington Health, NLOSS. We retrospectively calculated STOP-BANG scores and correlated these with PSG results. An Apnoea-Hypopnea Index (AHI) of  $>15$  was defined as significant OSA which may require treatment with preoperative Continuous Positive Airway Pressure (CPAP).

## Results

There were 61 patients (87.3% female) with a mean age of 45 years – the mean BMI was 46.2 kg/m<sup>2</sup>. The mean ESS was 6.5 (0-20) - 55.7% had STOP-BANG score of  $\geq 4$ , 44.3% had score of  $\leq 3$ . On PSG, 68.9% had AHI  $< 15$ , 18% had AHI 15-30 and 13.1% had AHI  $>30$ .

Characteristics	
Female	87.3%
Age	45 years
BMI (mean)	46.2 kg/m <sup>2</sup>
ESS	6.5
STOP-BANG $\geq 4$	55.7%
PSG AHI $<15$	68.9%
PSG AHI $>15$	31.1%

Patients with AHI $>15$  had mean BMI 47.2 kg/m<sup>2</sup>, mean neck circumference 41.4cm and mean ESS 8.5 - 66.6% had ESS  $<11$  and 89.4% were loud snorers. A STOP-BANG score of  $\geq 4$  had 94.7% sensitivity, 61% specificity, 52.9% positive predictive value (PPV) and 96.2% negative predictive value (NPV) to screen for OSA with AHI  $>15$ .

AGI $>15$ , STOP-BANG $\geq 4$	
Sensitivity	94.7%
Specificity	61%
PPV	52.9%
NPV	96.2%

## Discussion

A score of 10 or greater in Epworth Questionnaire may be used to screen for risk of OSA – these patients can then be subjected to a PSG. However, previous studies have shown that ESS may not reflect objective measures of sleepiness or OSA<sup>4</sup>. In a previous study in our unit we found that ESS had a poor predictive value in our patients – hence we instituted routine sleep study in all of our bariatric surgery patients pre-operatively<sup>1</sup>. This has significantly increased the number of PSGs performed in our unit.

Activity	Chance of Dozing (0= would never doze, 1= slight chance of dozing, 2= moderate chance of dozing, 3= high chance of dozing)
Sitting and reading	
Watching TV	
Sitting inactive in a public place	
As a passenger in a car for an hour	
Lying down to rest in the afternoon	
Sitting and talking to someone	
Sitting quietly after a lunch without alcohol	
In a car while stopped for a few minutes	
<b>Total</b>	<b>/24</b>

Recently, it had been suggested that STOP-BANG is a better predictor of OSA<sup>3</sup>. However, many patients have a STOP-BANG score of 3 e.g. a male with BMI  $>35$  and a history of snoring will score 3! Hence, a large proportion of patients would end up requiring PSG stretching resources, without significant benefit. Our validation study demonstrated that a STOP-BANG score of  $\geq 4$  would identify 90% of those at risk of significant OSA.

Parameter	Question	Response
Snoring	Do you snore loudly	Yes No
Tired	Do you often feel tired, fatigued or sleepy in daytime?	Yes No
Observed	Has anyone observed you stopping breathing in sleep?	Yes No
Pressure	Do you have or are you being treated for high blood pressure?	Yes No
BMI	BMI more than 35 kg/m <sup>2</sup> ?	Yes No
Age	Age over 50 years old?	Yes No
Neck	Neck circumference greater than 40cm?	Yes No
Gender	Gender – male?	Yes No
<b>SCORE</b>	Score 1 for each affirmative answer	<b>/ 8</b>

## Conclusions

Only 31% of our patients had significant OSA and ESS was poorly predictive of risk. A STOP-BANG score of  $< 4$  had a high NPV of 96.2% for AHI  $>15$  – a score of  $\geq 4$  had a high sensitivity but poor specificity. Therefore STOP-BANG questionnaire using a cut-off risk score of 4 may be used as a screening tool to rule out significant OSA and avoid PSG in a significant proportion of bariatric surgery patients.

## References

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