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Obstructive Sleep Apnoea in Obesity Clinics: The Comorbidity That Is Screened for Last

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Abstract

Obstructive sleep apnoea is present in most patients attending obesity and bariatric services and is frequently undiagnosed when they arrive. In 124 consecutive candidates for bariatric surgery, 74.2 per cent had sleep apnoea on cardiorespiratory polygraphy while only 28.2 per cent carried a prior diagnosis. The screening questionnaires used to decide who is tested perform poorly in this population, not because they are insensitive but because almost everyone screens positive: in obese and severely obese surgical patients a STOP-Bang score of 3 or more has a reported sensitivity of 91 to 100 per cent with specificity of 7 to 28 per cent. This short communication argues that where pre-test probability is this high, a questionnaire adds delay rather than information.

Keywords: *Obstructive sleep apnoea; Obesity; Bariatric surgery; STOP-Bang; Screening*

Introduction

Obstructive sleep apnoea is strongly associated with obesity, and its prevalence among candidates for bariatric surgery is reported at between 63 and 83 per cent [1,2]. It matters in this setting for two reasons: undiagnosed apnoea raises perioperative risk, and untreated apnoea contributes to cardiometabolic burden independently of weight [3,4]. Consensus guidance for perioperative management assumes the diagnosis has already been made [13].

Because events occur during sleep, patients are frequently unaware of them, and up to 80 per cent of those with moderate to severe disease are estimated to remain undiagnosed [5]. Around 60 per cent of surgical patients with moderate to severe apnoea are not recognised before operation [5,6]. Under-recognition among bariatric candidates has been documented directly [14], and weight change itself alters severity over time [15]. This short communication examines how well the usual screening step performs in an obesity clinic population.

Observations

Prevalence against recognition: A prospective single-cohort study assessed 124 consecutive candidates for bariatric surgery with cardiorespiratory polygraphy alongside three sleep questionnaires. Sleep apnoea was present in 74.2 per cent, while only 28.2 per cent had been diagnosed beforehand (Figure 1) [1]. In a separate series of surgical patients with a body mass index of 35 or above, 84 per cent had an apnoea-hypopnoea index above 5, 47 per cent above 15 and 27 per cent above 30 [5].

How the questionnaires perform: In the same cohort of 124, the STOP-Bang questionnaire achieved a sensitivity of 93.3 per cent for moderate to severe apnoea with a specificity of 33.8 per cent, while the Epworth Sleepiness Scale showed no significant association with the presence of apnoea [1]. In a database cohort of 484 bariatric patients, a STOP-Bang score of 4 gave a sensitivity of 55.6 per cent and specificity of 36.8 per cent, and a Berlin score of 3 gave 47.5 and 69.1 per cent respectively (Figure 2) [7].

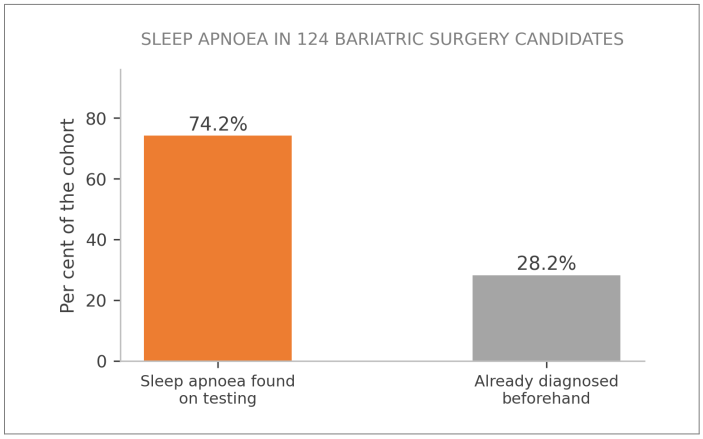

Figure 1: Sleep apnoea found on testing against prior diagnosis in 124 bariatric surgery candidates [1]

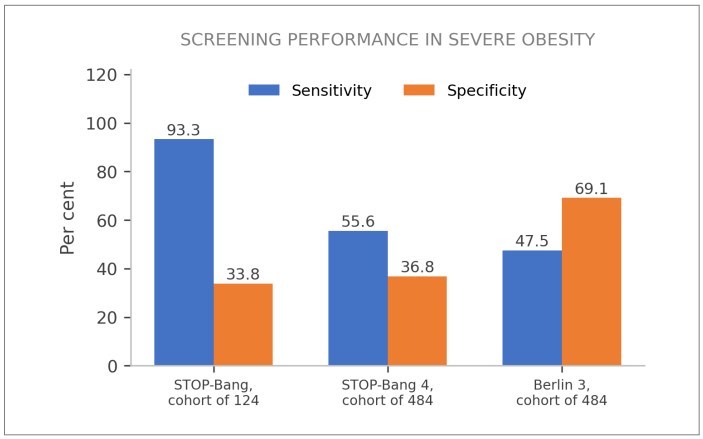

Figure 2: Reported screening performance in patients with severe obesity [1,7]

Why discrimination is poor: The explanation is arithmetic rather than psychometric. Body mass index and neck circumference are themselves items in the questionnaire, so a patient attending an obesity clinic scores points before any symptom is considered. In a cohort of 49 bariatric patients, 88 per cent were classified as high risk at a threshold of 3 while 73 per cent actually had apnoea, giving a specificity of 33 per cent (Figure 3) [8]. Across obese and severely obese surgical patients, a threshold of 3 yields sensitivity of 91 to 100 per cent against specificity of 7 to 28 per cent [5]. Meta-analysis across populations reports the same trade-off, with performance depending heavily on the setting in which the tool is applied [11], and the Berlin questionnaire was likewise developed in a primary care population [12].

That is not a defect of the instruments so much as a mismatch between the instrument and the setting. STOP-Bang was designed for surgical populations in general, where prevalence is around 7 per cent, and it includes body mass index and neck circumference among its eight items [5,6]. Applied where every patient already meets those criteria, the score compresses towards the positive end and its discriminating power comes only from the symptom items.

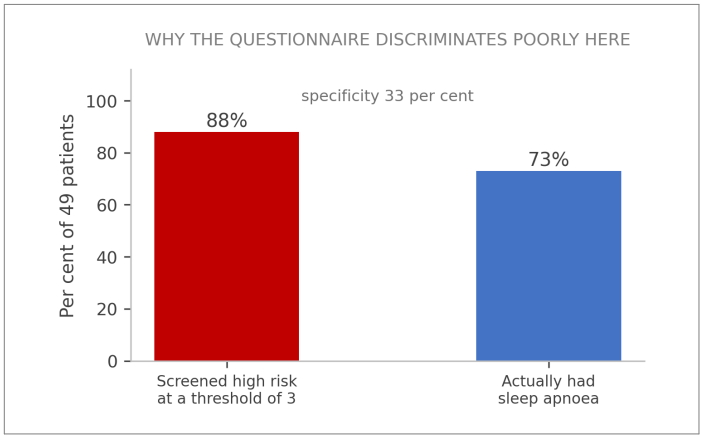

Figure 3: Proportion screening high risk against proportion with apnoea [8]

Cohort	Threshold	Sensitivity	Specificity
124 bariatric candidates [1]	STOP-Bang	93.3%	33.8%
484 bariatric patients [7]	STOP-Bang 4	55.6%	36.8%
484 bariatric patients [7]	Berlin 3	47.5%	69.1%
Obese surgical patients [5]	STOP-Bang 3	91% to 100%	7% to 28%

Table 1: Reported performance of screening questionnaires in populations with obesity

Discussion

Two findings sit awkwardly together. Sleep apnoea is present in around three quarters of bariatric candidates and diagnosed beforehand in under a third [1]. At the same time the questionnaires used to triage testing classify almost everyone as high risk, with specificity as low as 7 per cent [5,8]. A test that returns positive for nearly all patients has not stratified them.

The literature also disagrees with itself, which is worth stating plainly. One cohort reports sensitivity of 93.3 per cent, another finds areas under the curve between 0.584 and 0.660 and concludes that neither STOP-Bang nor the Berlin questionnaire is an effective tool in this population [1,9]. Both cannot be a reliable guide to practice.

Screening also has a cost that is rarely counted. In the database cohort, 21 per cent of patients experienced a delay in submission for surgery related to sleep apnoea workup, averaging 41.5 days [7]. Where a questionnaire is unlikely to exclude anyone, that delay buys very little.

The reasonable inference is that in a population with a pre-test probability above 70 per cent, the question is not who should be tested but how testing can be delivered efficiently. Home cardiorespiratory polygraphy is less resource-intensive than laboratory polysomnography and was the reference standard in the largest cohort cited here [1,10]. Direct testing would also remove the step at which patients are currently lost, since a negative questionnaire in this group is weak evidence of absence.

Limitations

These are observations from a small literature. The principal cohort includes 124 patients from a single centre, and the questionnaire comparisons come from cohorts of 484 and 49 with differing reference standards and thresholds [1,7,8]. Reported sensitivity and specificity vary substantially between studies, and at least one analysis concludes the questionnaires perform no better than modestly [9]. No randomised comparison has tested direct polygraphy against questionnaire-led triage on patient outcomes or cost, so the argument advanced here is inferential rather than demonstrated.

Conclusion

Most patients attending bariatric services have obstructive sleep apnoea and most arrive without the diagnosis. The questionnaires used to decide who is investigated classify nearly all of them as high risk, which means they add a step without adding information, and in one cohort added an average of six weeks to the pathway. Where prevalence is this high, testing directly is the more defensible design.

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Conflict of Interest

The authors declare no competing interests.

Ethics Statement

This article reviews previously published studies only. No new patient data were collected, so ethical approval was not required.

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