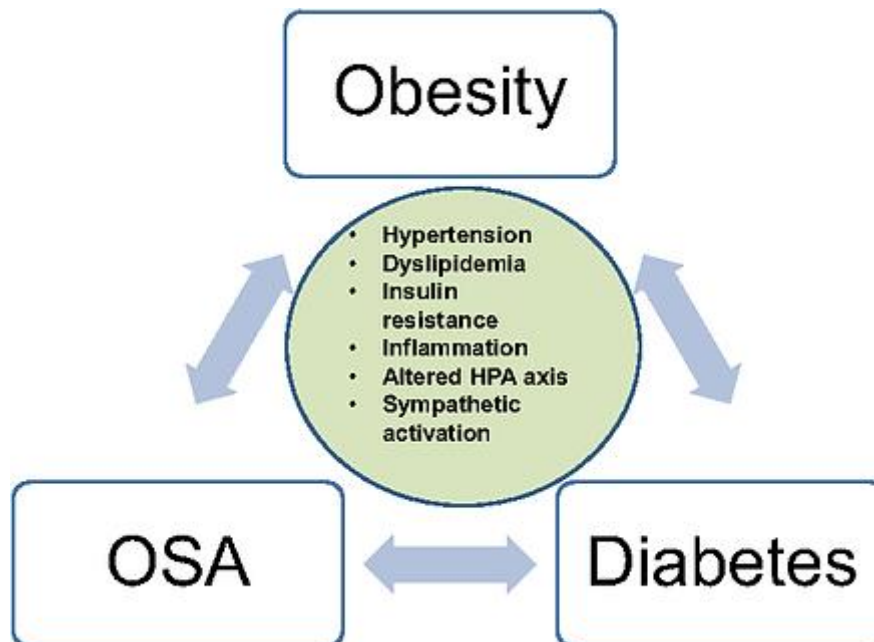


3. The relationship between Sleep Apnoea, Obesity and Type 2 diabetes

This is the 3rd in a series of 5 blogs that explores the concept of supporting the delivery of personalised sleep medicine.

Sleep apnoea, obesity, and type 2 diabetes are closely interlinked conditions that can exacerbate each other in a vicious cycle. Here's a breakdown of their complex relationship:



Obesity and sleep apnoea:

The prevalence of OSA in the general population is estimated to be 3 to 7% for men and 2 to 5% for women and prevalence rates are especially high for those who are obese (1). Obesity and OSA share common risk factors including genetic predisposition, sex, age, and lifestyle factors such as diet and physical inactivity (2). So in essence obesity is a major risk factor for OSA, with excess weight, especially around the neck, can narrow the upper airway and increase the likelihood of airway collapse during sleep, leading to

breathing disruptions characteristic of OSA. Some non-obese individuals can also have OSA and may exhibit additional risk factors that may contribute development of obstructive apnoea's (3).

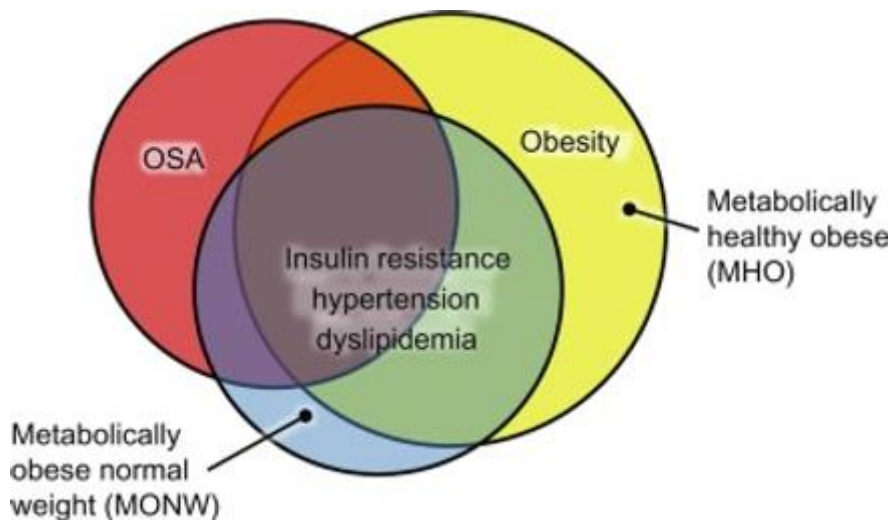
Sleep apnoea and Type 2 diabetes:



Sleep apnoea can contribute to the development of type 2 diabetes through various interconnected mechanisms:

- Many epidemiologic and experimental studies have demonstrated that OSA is associated with glucose intolerance and insulin resistance via intermittent hypoxia, sleep fragmentation, and sleep deprivation (4).
- Several studies have found an independent association between OSA and impaired glucose tolerance, even after adjusting for obesity (5).
- A meta-analysis estimated that the risk for incident diabetes in the setting of moderate to severe OSA was increased by 63% (6).
- The relationship with OSA is bidirectional, as type 2 diabetes can also increase the risk of developing OSA, possibly due to the effects of diabetes on the autonomic and central nervous systems.

Impact on metabolic control:



Untreated OSA is associated with development of type 2 diabetes and can worsen glycemic control in people with existing type 2 diabetes. OSA alters glucose metabolism, promotes insulin resistance.

Studies have found a positive correlation between the severity of OSA (measured by the apnea-hypopnea index) and higher HbA1c levels, even after controlling for confounding factors (7).

Treatment Implications:

Treating OSA with continuous positive airway pressure (CPAP) therapy can improve insulin sensitivity and glucose metabolism, potentially leading to better long term glycaemic control in individuals with type 2 diabetes. The amount of improvement is dependent on the hours of CPAP adherence and thus optimal to CPAP usage should be the aim in all cases (8).

The relationship between sleep apnoea, obesity, and type 2 diabetes is intricate and interconnected. Tackling these conditions simultaneously with lifestyle changes, weight

management, and suitable treatments can disrupt this harmful cycle and enhance overall health outcomes. Again bluetooth CPAP connected devices like activity trackers that can also monitor heart rate variability and connected weighing scales can be recommended by clinicians to encourage patients to be involved in the management of their condition, thus making their care more personalised in line with current evidence.

1. [Obstructive Sleep Apnea and Obesity: Implications for Public Health - PMC \(nih.gov\)](#)
2. [Approach the Patient With Obstructive Sleep Apnea and Obesity | The Journal of Clinical Endocrinology & Metabolism | Oxford Academic \(oup.com\)](#)
3. [Obstructive sleep apnea syndrome in non-obese patients - PMC \(nih.gov\)](#)
4. [Obstructive Sleep Apnea and Abnormal Glucose Metabolism - PMC \(nih.gov\)](#)
5. [Diabetology | Free Full-Text | Narrative Review: Obesity, Type 2 DM and Obstructive Sleep Apnoea—Common Bedfellows \(mdpi.com\)](#)
6. [Sleep Apnea in Type 2 Diabetes - PMC \(nih.gov\)](#)
7. [Sleep Apnea in Type 2 Diabetes | Diabetes Spectrum | American Diabetes Association \(diabetesjournals.org\)](#)
8. [Obstructive sleep apnea therapy for cardiovascular risk reduction—Time for a rethink? - PMC \(nih.gov\)](#)