The impact of type 2 diabetes and glycaemic control on the severity of sleep related breathing disorders in adults with class 3 obesity

**Aim:**

This study aimed to examine the relationships between type 2 diabetes mellitus (T2DM), glycaemic control, and severity of sleep related breathing disorders (SRBD), such as obstructive sleep apnoea, in adults with class 3 obesity enrolled in a multidisciplinary weight management program.

**Method**:

Adult patients (≥18 years) with body mass index (BMI) ≥40 kg/m2 enrolled in a multidisciplinary weight management program in Sydney who underwent polysomnography between January 2020 and December 2024 were included. Demographic details, anthropometric variables, clinical data, and polysomnography parameters were collected. Severity of SRBD was classified according to the total sleep time respiratory disturbance index (TST-RDI). Independent T-test was used to compare group means. Univariate and multivariate regression analyses were employed to assess associations between HbA1c and SRBD severity measures using SPSS v29.

**Results**:

Of 172 patients included, with mean (±standard deviation) age 42.9±12.5 years, mean BMI 52.9±9.7 kg/m², mean HbA1c 6.3±1.4%, predominately female (76.2%) and Caucasian (74.5%), 28% had T2DM. Severe SRBD, defined by TST-RDI >30 events/hour, was present in 70.3% of the cohort. Patients with T2DM (n=47), compared to those without T2DM (n=121), had no difference in TST-RDI (52.1±38.1 events/hour vs 55.6±39.3 events/hour; *p*=0.597) but had significantly higher proportion of sleep with oxygen saturation <90% (pS<90%) (28.0±31.9% vs 12.2±21.8%; *p*=0.003) despite having significantly lower BMI (49.1±8.4 kg/m² vs 54.9±9.5 kg/m²; p=0.001). On univariate and multivariate regression analyses adjusted for age, sex, ethnicity and BMI, HbA1c was significantly associated with nadir oxygen saturation (β -1.42, univariate *p*=0.032, multivariate *p*=0.022) and log transformed pS<90% (β 0.40, univariate *p*=0.001, multivariate *p*<0.001) but not TST-RDI.

**Conclusion**:

In adults with class 3 obesity and SRBD, the presence of T2DM is associated with more severe sleep related hypoxia despite lower BMI and independent of RDI. Poorer glycaemic control, reflected by higher HbA1c, correlates with greater burden of hypoxia during sleep.