Obstructive Sleep Apnoea Syndrome and Type 2 Diabetes

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Introduction

Obstructive Sleep Apnoea Syndrome (OSAS) is a sleep disorder in which recurrent episodes of collapse of the upper airway occur during sleep. These episodes may be apnoeas (complete cessation of airflow) and/or hypopnoeas (reduction of airflow). Intermittent hypoxia and increased sympathetic drive leads to brain arousal resulting in sleep fragmentation, poor sleep quality and wake-time sleepiness.

The three main symptoms of (OSAS) are excessive daytime sleepiness (EDS), snoring and witnessed disordered breathing episodes during sleep.

Untreated OSAS has important clinical, epidemiological and public health implications. OSAS can be successfully managed with overnight continuous positive airway pressure (CPAP) therapy[1]. This modification could be expected to reduce associated morbidity.

Obesity is a risk factor for type 2 diabetes (T2D) and OSAS[2] but there is an independent association between the two conditions which may be bidirectional[3].
Potential mechanisms for this association include increased sympathetic activation, change in activity of the hypothalamic pituitary axis, free oxygen species and adipocyte derived factors and cytokines[4].

T2D and OSAS are common. The estimated prevalence of OSAS in the general population is 3%[5].

The aim of this study is to estimate the prevalence OSAS in T2D patients in Wales.

Methods

Consecutive patients attending the diabetes clinic at the Royal Gwent Hospital completed a questionnaire which incorporated suitable questions from the Berlin Sleep Questionnaire and included the Epworth Sleepiness Scale. A sample questionnaire was given to five normal subjects to assess practical use. Questions covered the presence of symptoms suggestive of OSAS, EDS and other sleep disorders. Responses were used to define patients at a high or low risk of having OSAS. Information was also collected about demographics, blood pressure, BMI, and HbA1c.

Patients diagnosed with diabetes before the age of 25 were excluded.

Data was analysed using SISA online statistical analysis. A p-value <0.05 was considered significant.

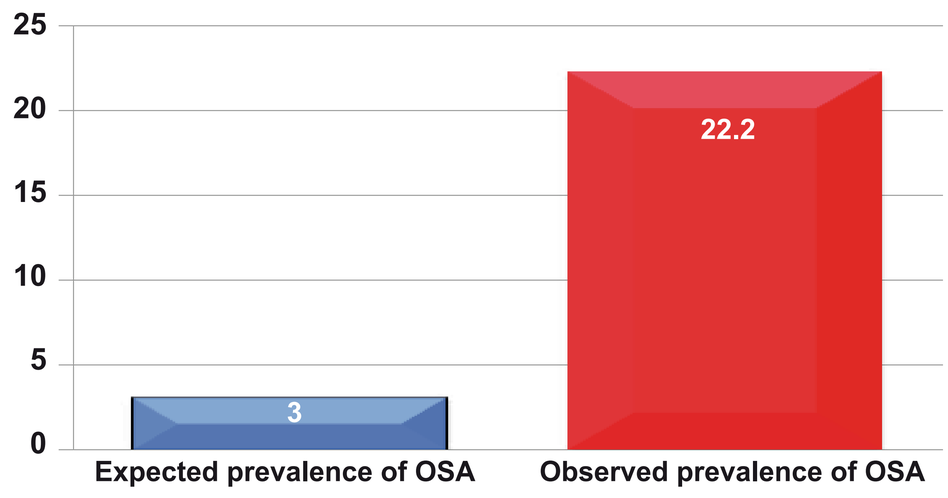
Results

	OSAS symptom group	Non symptom group	Total	P value
Age [Median (SD)] years	57.5 (8.5)	61 (15.7)	61 (14.8)	N/S
Gender [Proportion male]	0.7	0.45	0.51	N/S
HbA1c [Median (SD)]	71 (14.4)	70 (17.2)	70 (10.40)	N/S
Systolic BP [Median (SD)] mmHg	139 (23.1)	137 (15.0)	137 (16.9)	N/S
ESS [Median (SD)]	10.5 (4.3)	5 (3.7)	6 (4.1)	P=0.003
BMI [Median (SD)]	37 (6.2)	31 (5.6)	33 (5.9)	P=0.02
Length of T2D [Median (SD)] years	11 (5.1)	14 (9.9)	12 (9.0)	N/S

Table 1

- Fifty patients completed the questionnaire. Table 1
- Six patients were high risk with one having the three main symptoms of OSAS, and five having EDS and snoring.
- Four patients had proven OSAS with symptoms controlled on CPAP therapy.
- 22.2% (10/50) of patients had symptoms indicating OSAS. This is a significant increase compared to the normal population (p=0.0023, CI [-0.33,-0.88]). Graph 1
- Variables (including age, BMI, HbA1c, and blood pressure) were analysed using the Chi2 test. Some of these showed a relationship with OSAS symptoms but only the BMI showed a significant correlation (BMI > 30, p<0.04). Graph 2
- Patients with T2D also described symptoms of other sleep disorders. Chart 1

Graph 1. Expected prevalence of OSAS (3%) compared to the prevalence of significant OSAS symptoms found in this sample (22.2%).



Graph 2. Proportion of participants with BMI>30, and BMI>35 in those with significant symptoms of OSAS and those without symptoms of OSAS.

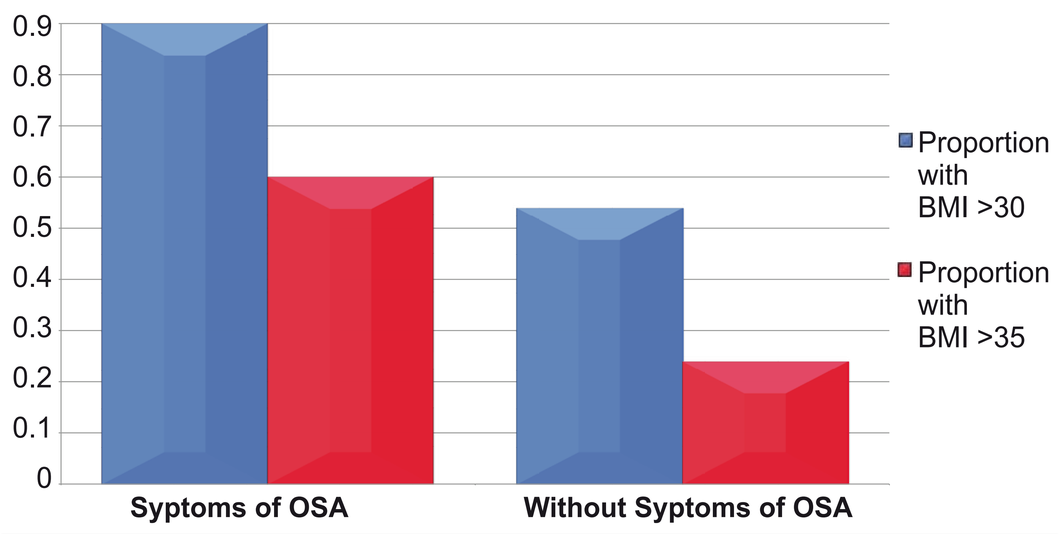
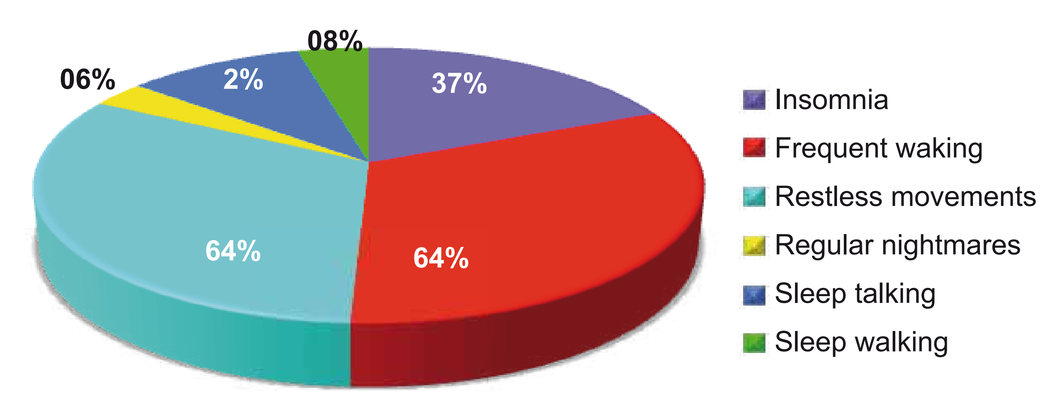


Chart 1. Symptoms of other sleep disorders



Conclusions

The prevalence of OSAS in this clinic group of T2D patients in Wales was 22.2% which is higher than expected compared to the general population.
In our study a higher BMI indicated a higher risk of OSAS.
Healthcare professionals involved in the management of patients with T2D should be aware of symptoms of OSAS and could utilise questionnaires as screening tools.
Patients identified at high risk of OSAS could then be referred for sleep investigation and possible CPAP therapy. Weight loss management may also have a role.
Patients also described symptoms associated with other recognised sleep disorders which may be treatable.

References.

1. Malhotra A, White D. Obstructive Sleep Apnoea. The Lancet, 2002, Vol 360, pp 237-245
2. West S, Nicoll D & Stradling JRS. Prevalence of Obstructive Sleep Apnoea in Men With Type 2 Diabetes. Thorax, 2006 Vol 61, pp 945-950.
3. Aurora R, Punjabi N. OSA and type 2 diabetes mellitus: a bidirectional association. The Lancet, 2013,vol1,pp329-338.
4. Vgontzasa AN, Bixlera EO, Chrousosb GP. Sleep apnea is a manifestation of the metabolic syndrome. Sleep Medicine Reviews, 2005, Vol 9, pp 211–224
5. Young T, Palta M, Dempsey J, Skatrud J, Weber S, and Badr S. Occurrence of Sleep Disordered Breathing Among Middle Aged Adults. New England Journal Of Medicine, 1993, Vol 328,17, pp 1230-1235.

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