

# Prevalence of obstructive sleep apnoea in young children with Down syndrome

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## Introduction

- Down Syndrome (DS) affects between 1/650 and 1/1000 live births worldwide.
- It is the leading genetic cause of intellectual disability in childhood.
- Children with DS are at high risk of obstructive sleep apnoea (OSA) due to macroglossia, mid-facial hypoplasia and obesity.
- Importantly, they may have increased risk of cognitive, behavioural and cardiovascular consequences of OSA due to limited cognitive reserve and underlying cardiac problems.
- Prevalence rates of OSA between 54% to over 90% have been reported, in contrast to 1–4% in otherwise healthy, typically developing children.
- Small samples, selection bias, retrospective reports and use of non-standard scoring and diagnostic criteria limit interpretation of prior studies.

## Aims

- To determine the prevalence of OSA in young children with DS.
- To establish a cohort for future follow-up.

## Methods

- Children with DS aged 6 months to 6<sup>th</sup> birthday were recruited from community clinics, hospital registers and parent support groups.
- Exclusion criteria included use of home oxygen, CPAP/BiPAP or cardio-respiratory screening in the preceding 3 months.
- Children attended one of 3 participating research centres.
- Measures included height, weight and socio-demographic data.
- Parents were trained to set up a cardiorespiratory device (Somnotouch, Somnomedics, Germany) at home unless they expressed a preference for sleep laboratory assessment.
- Measures included chest and abdominal RIP, nasal pressure flow, toe pulse oximetry, actigraphy, body position and snore sensor.
- Studies recording  $\geq 4$  hrs of sleep were scored by an experienced sleep technologist using AASM (2012) rules.
- Parents were contacted 3 months after their child's study to feedback on their experience of domiciliary monitoring.

**Figure 1 Domiciliary cardiorespiratory polygraphy**



## Results

Here we report preliminary data on the first 94 of an anticipated 180 children recruited.

### Demographics

- Mean age is 39.5 months (SD 21.5) with more male participants (n = 55)
- 69% have a congenital cardiac disease; 34% are on prophylactic treatment for asthma & 27% have allergic rhinitis; 27% had a history of laryngomalacia and 3% have epilepsy.
- 14 children had a history of tonsillectomy on average 18.8 months earlier. These children were significantly older, mean age 54.5 months.

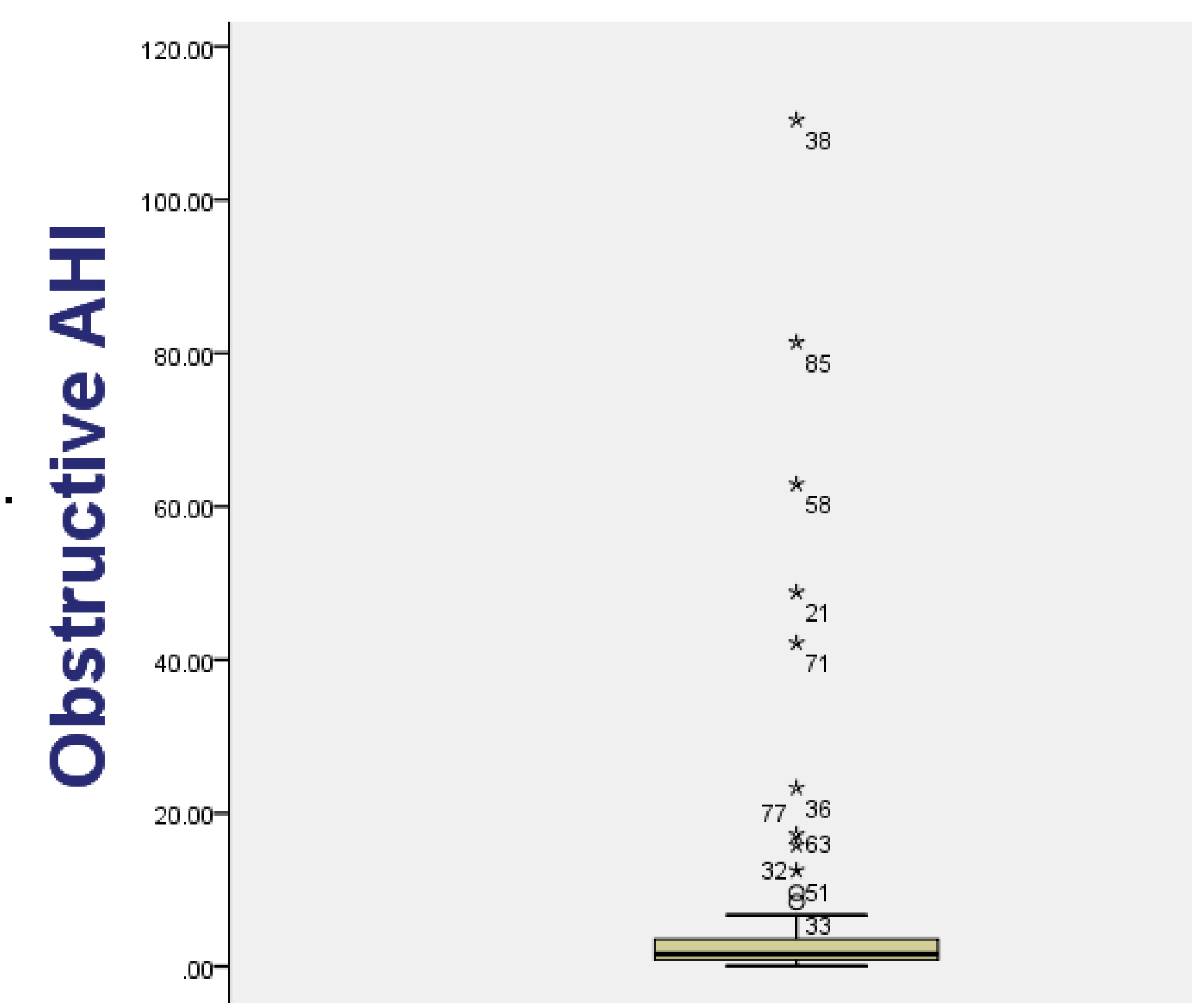
### Acceptability of domiciliary studies

- 92/94 parents opted for domiciliary studies. Of these, 11 studies did not meet quality standards: 6/7 were successfully repeated at home and 3/4 as attended studies in hospital.
- The overall success rate for domiciliary studies (7% repeats) was 93%.
- Of 48 parents interviewed after 3 months, 34 reported domiciliary set up easy or OK and 14 as difficult.
- Despite this, 45 would repeat the study at home if needed, 2 were unsure and 1 would choose a study in hospital.

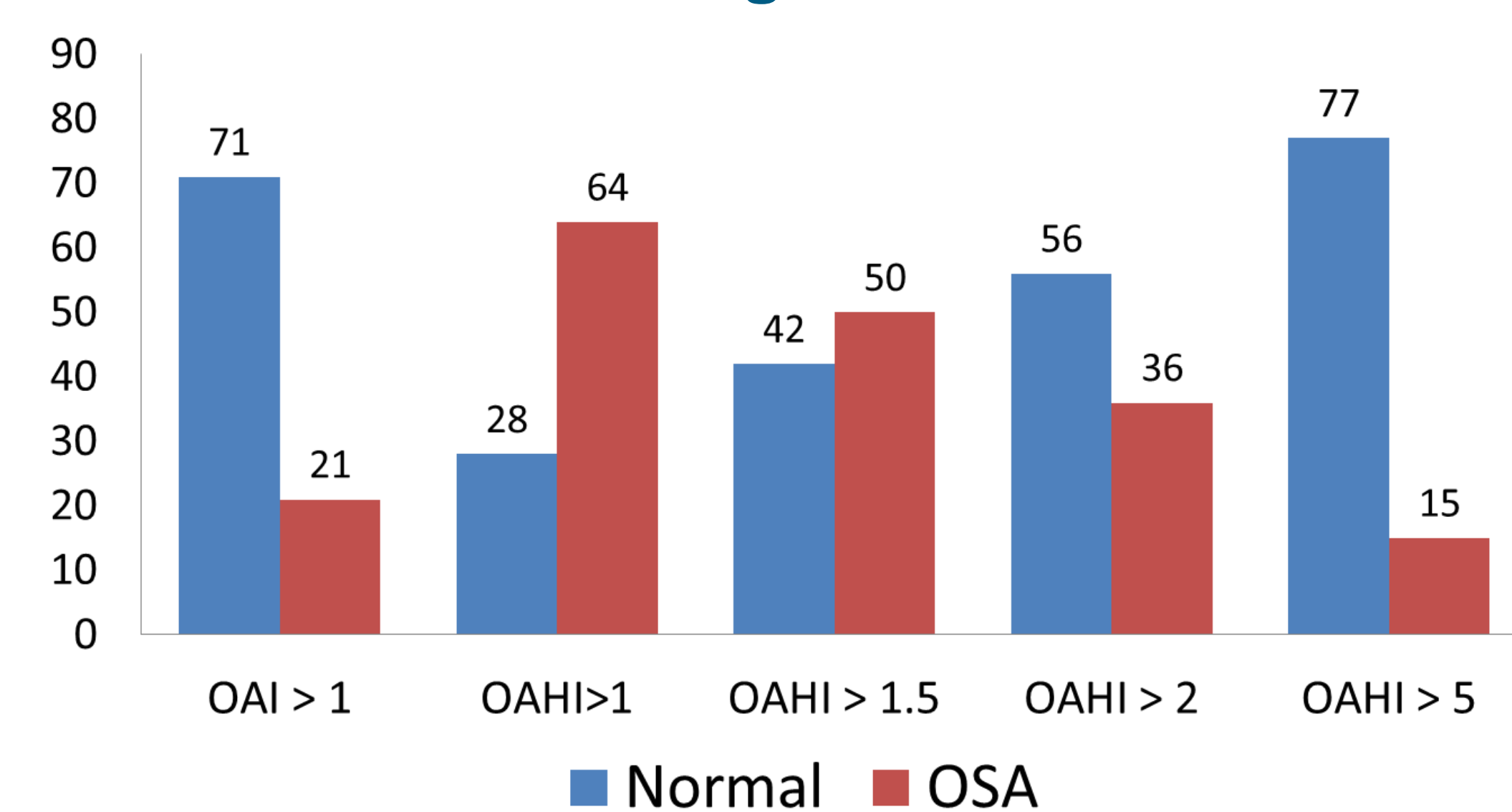
### Prevalence of OSA

- OAHl demonstrated a skewed distribution with the majority (53%) of children having mild OSA. (OAHl > 1 < 5/hr) illustrated in Figure 2.
- Different thresholds for a diagnosis of OSA have been used in recently published data. Figure 3 illustrates number of cases of OSA for each.

**Figure 2: Obstructive apnoea/hypopnoea indices**



**Figure 3: Prevalence of OSA according to choice of diagnostic threshold**



### Diagnostic thresholds

- CHAT study\* OAI  $\geq 1$  OR OAHl  $\geq 2$ /hr
- Nadel et al\*\* OAHl > 1.5/hr
- POSTA study\*\*\* OAHl  $\geq 1$ /hr
- UK surgical referral OAHl  $\geq 5$ /hr

### Further analysis

- OAHl was not associated with age; history of cardiac disease or laryngomalacia, asthma or rhinitis.
- Children had high central apnoea indices, median 1.4/hour (range 0.1-8.5), this was not associated with age.

## Discussion

- We believe this to be the largest reported study of OSA in very young children with DS and the first to use unattended domiciliary cardiorespiratory monitoring.
- Consistent with previous studies we report a high rate of OSA ranging from 16 -70% depending on the diagnostic threshold used.
- Importantly there was no association with age suggesting that clinicians should screen children for OSA from infancy.

### References

- \* Marcus et al. New England J of Med. 2013; 368: 2366-76
- \*\* Breslin et al. Dev Med Child Neurol. 2014, 56: 657-664
- \*\*\*The Preschool Obstructive Sleep Apnoea Tonsillectomy, Adenoidectomy child study ACTRN12611000021976