

# STRONG CHILDREN'S RESEARCH CENTER

## Summer 2017 Research Scholar

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### ABSTRACT

**Title:** *Sleep Apnea in Children Referred for Elevated Blood Pressure*

**Background:** In adults, the comorbid relationship between obstructive sleep apnea (OSA) and elevated blood pressure (BP) is associated with increased risk of adverse cardiovascular outcomes and is predictive of the development of hypertension (HTN). In children, however, the relationship between OSA and elevated BP has yet to be well characterized. Studies have shown an association between OSA, behavioral problems and poor performance on neurocognitive examination in children. The American Academy of Pediatrics recommends that all children who are habitual snorers and exhibit comorbidities of OSA (e.g. overweight or hypertensive) undergo polysomnography or be referred to a sleep specialist or otolaryngologist (ENT) for evaluation of possible OSA.

**Objective:** To characterize the prevalence of habitual snoring and OSA in children referred for high BP, to estimate the compliance of clinicians with the AAP guidelines, and to determine the impact of OSA on BP elevation, cognitive, and/or behavioral problems.

**Methods:** A retrospective chart review of all consecutive new patients who attended the Pediatric Hypertension Clinic at the University of Rochester Medical Center between January 1<sup>st</sup>, 2013 and December 31<sup>st</sup>, 2016. Patients with secondary HTN were excluded. All patients were asked about habitual snoring (loud, nightly snoring), learning disability (presence of learning disability associated IEP or 504 plan), ADHD (medication for inattention), and behavioral medication. Mean office BP was recorded as the average of 2-3 manual right arm BP readings. Charts were reviewed for echocardiogram and left ventricular hypertrophy (LVH). Subject medical records were examined for previous referral to ENT, or UR Pediatric Sleep Clinic. Polysomnography results were reviewed and OSA severity was categorized using Apnea Hypopnea Index (AHI).

**Results:** Of 445 subjects who met the inclusion criteria, 103 had habitual snoring. Subjects with habitual snoring were more likely to have a higher BMI z-score ( $p < 0.001$ ), and Medicaid insurance ( $p = 0.005$ ). Of the habitual snorers, 95 were overweight, and therefore met AAP guidelines to be referred for assessment of OSA. Yet, only 34 (36%) had been previously referred for evaluation of OSA. Those previously referred had a higher average BMI z-score ( $p = 0.04$ ) and were more likely to have Medicaid insurance ( $p = 0.02$ ). In total, 73 individuals underwent polysomnography, and 56 (77%) were diagnosed with OSA, 21 (37.5%) with severe OSA. Those who received a diagnosis of OSA were not significantly different from those who did not in weight, BP, gender, age, or insurance. Of the subjects with severe OSA, 64.7% had BP in the stage two HTN range. These subjects had markedly higher systolic BP ( $p = 0.014$ ) than subjects with more mild cases of OSA, even when adjusted for age, sex, BMI z-score, and Medicaid status. Subjects with severe OSA had a higher prevalence of LVH, but this difference did not remain significant after controlling for BMI and BP. Subjects with severe OSA were not more likely to have cognitive or behavioral problems compared to subjects with milder OSA.

**Conclusion:** The majority of children with habitual snoring who are referred for elevated BP are diagnosed with OSA following polysomnography (77%), and 37.5% with severe OSA. The severity of OSA cannot be predicted by clinical characteristics. Children with severe OSA have a striking prevalence of BP within the stage two HTN range.