Sleep Health and Attention Dysregulation in a National Study of Infants and Preschool Aged Children with Atopic Dermatitis (AD)

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Introduction
Atopic dermatitis (AD) is a common childhood condition. Most children with AD are diagnosed by five years old and many suffer from sleep disturbance and problems with attention regulation. These associated symptoms have long-term sequelae on academic performance and neurocognitive development. Using recently developed, developmentally sensitive assessment tools, we sought to determine the impact of AD severity on these symptoms in young children with AD and better characterize and identify features of sleep and attention dysregulation that should be targeted for treatment.

Methods
A national survey distributed via panel company OP4G and the National Eczema Association was conducted with parents of children with AD aged 1-5 years. Questionnaires were administered about sleep health (Patient Reported Outcomes Measurement Information Systems Early Childhood Sleep Health Measures), attention dysregulation related to inattention and hyperactivity (Multidimensional Assessment Profile of Attention Regulation, MAPS-AR), itch severity numeric rating, quality of life and demographic variables. A linear regression model was performed to determine the predictors of sleep health and attention dysregulation.

Results
Children (n=60) with AD were 55% male, 32% Black, aged 2.78±0.98 years, with disease severity: severe (42%), moderate (42%) or mild (16%). Significantly worse sleep health (T-score

≥ 60) was reported in 86% of children with moderate/severe disease. Seventy-six percent of parents of children with severe AD reported sleep disturbance at least five nights per week, compared to moderate (24%) and mild (0%). Poor sleep resulted in significant mood impairments. Sixty-eight percent of parents of children with moderate/severe AD reported their children cried easily due to poor sleep. A suboptimal sleep environment was identified more frequently in children with severe AD with 44% of children having too much noise in the bedroom, 44% using electronic devices before bed, and 68% needing someone with them in order to fall asleep.

AD severity also positively correlated with more attention dysregulation via the MAPS-AR scores ($r=0.65$, $p<0.01$). Parents of children with more severe AD were more likely to report inattentive and hyperactivity symptoms in comparison to parents of children with mild/moderate AD ($p<0.01$). Most (72%) parents reported their child with severe AD had trouble paying attention in the developmentally atypical context of "no matter what was going on around him/her" at least three times per week, as compared to moderate (40%) and mild (20%).

Parents of children with more severe AD reported more itch-related burden and significantly decreased quality of life for their children. Seventy-six percent of parents with children who had severe AD reported "because of itch their child was frustrated," compared to 44% with moderate AD and 10% with mild AD.

In fully adjusted models, AD severity ($B=0.79$, $p<0.01$) and being Black ($B=3.89$, $p=0.03$) were significant predictors of worse sleep health. AD severity ($B=1.22$, $p<0.01$) and being Black ($B=7.79$, $p<0.01$) also predicted more attention dysregulation.

Conclusions

Worse sleep health and attention regulation problems are common in young children, with a greater burden in children with worse AD severity. Clinicians should advise on modifiable sleep hygiene practices and consider screening for attention regulation in preschool aged children with moderate/severe AD. Of racial groups studied, we found Black children with AD were at higher risk for sleep disturbance and inattention even when controlling for socioeconomic status and despite similar AD severity compared to White and other racial groups. This current study highlighted associations between AD severity, itch severity, sleep health, and attention regulation problems in young children with AD. Future studies with larger samples sizes should be performed in order to establish directional effects between these different variables.