Auditory Sensitivity Issues in Children with Autism Spectrum Disorders: Characteristics and Burden

J. Kiely Law, MD, MPH; Eric Rubenstein, ScM; Alison R. Marvin, PhD; Jaimie Toroney, MHS; Paul H. Lipkin, MD

Department of Medical Informatics, Kennedy Krieger Institute, Baltimore, MD, USA; Department of Pediatrics, Johns Hopkins University School of Medicine, Baltimore, MD, USA; Department of Epidemiology, University of North Carolina School of Global Health, Chapel Hill, NC, USA

Background

Sensory sensitivity issues are strongly associated with autism spectrum disorders (ASD). Research suggests 30-90% of people with ASD either over or under react to sensory stimuli. Auditory hypersensitivity is most common, affecting 30-50%, and is highly concerning due to the often unpredictable nature of the stimulation, and the potential to lead to avoidant or challenging behaviors.

Objective

To describe auditory hypersensitivity and hyposensitivity issues in children with ASD.

Methods

 Parent participants in the Interactive Autism Network (IAN), a large, validated and verified autism research registry, were invited to complete the Auditory Sensitivity and Child Safety Study during 2015.
 Parents completed a survey about their children ages 2-17 years with ASD.
 The survey asked about the child's past and current levels of auditory sensitivity, and how auditory sensitivity affects the child's behavior and impacts their family.

Results

 Surveys completed for 814 children with ASD
 Child characteristics:
   82.4% male
   87.5% non-Hispanic
   84.8% white
   Age: Median = 10.3 years
   Interquartile Range (IQR) = 6.66 years

Results: HYPERsensitivity

- Reported Rates
   17.4% Never
   9.0% Revised
   77.6% Current

- Child’s Emotional State
   Strained: 77.7%
   Irritable: 61.6%
   Scared: 55.1%
   Nervous: 36.4%
   Frustrated: 43.0%
   Anxious: 40.6%

- Child’s Physical Response
   85.9% Covers ears
   52.8% Walks or screams
   42.3% Runs to area
   36.3% Cries
   32.2% Try to stop sound/noise
   25.3% Try to hide

- Median age
   Onset: 2.0 years
   Resolution: 7.5 years
   Worst symptoms: 4.5 years

- Common Interventions

Results: HYPERsensitivity (Continued)

 Higher ASD Severity: Children with hypersensitivity experienced more severe ASD symptoms by SRS raw score: 111.6 vs. 99.3 (p<.001).
 Link with Seizure Disorders: Children with hypersensitivity were more likely to have Epilepsy/Seizure Disorders: 11.3% vs. 7.3% (χ2<.001 FET).
30% (18/60) reported seizures related to auditory triggers.
 Limits social participation (“always” or “frequently”): 31.1% Family activities
   29.8% School activities
   38.5% Community activities
 High burden: 63.4% of children have weekly episodes (26.0% daily)
49.5% of parents reported moderate/extreme difficulty managing
 Safety concerns:
   63.4% of children were reported to be in an unsafe situation
   63.4% of children were themselves physically injured
   28.1% of children physically injured others

Results: HYPOsensitivity

- Reported Rates
   29.9% Never
   55.3% Current
   14.8% Resolved

- Median age
   Onset: 1.5 years
   Resolution: 4.5 years
   Worst symptoms: 3.0 years

Conclusions

 Auditory sensitivity occurs frequently among children with ASD.
 Auditory sensitivity is associated with:
   safety concerns,
   challenging behaviors, and
   loss of opportunities at home, in school, and in the community.
 Auditory hypersensitivity is associated with more severe ASD symptoms.
 Auditory hypersensitivity may be associated with seizure activity.
 Improved understanding of auditory sensitivity may lead to improved treatments aimed at improving social participation, decreasing behavioral difficulties, decreasing family and community stressors, and decreasing child injury.

Support

This study was funded by the National Autism Association.
IAN is a partnership project of the Kennedy Krieger Institute and the Simons Foundation.
IAN is also partially funded through a Patient-Centered Outcomes Research Institute (PCORI) Award for development of the National Patient-Centered Clinical Research Network, known as PCORNet.
Thank you to IAN Families for making this study possible. To learn more about the Interactive Autism Network (IAN), visit www.IANproject.org