

# Counting Sheep: Sleep Disorders in Children With Autism Spectrum Disorders

Shoshana Herrmann, MSN, BSN, CPNP

## ABSTRACT

**Introduction:** This article will discuss the prevalence and types of sleep disorders experienced by children with autism spectrum disorders (ASDs), the risk factors for the development of sleep disorders among children with ASDs, the impact of sleep disorders on children with ASDs, and the role of the primary care provider (PCP) in diagnosing and treating sleep disorders among children with ASDs.

**Method:** Review of published literature on the topic.

**Results:** Children with ASDs are at risk for the development of chronic sleep disorders, which can have a negative impact on behavior. Both behavioral and pharmacological interventions exist for the treatment of sleep disorders among children with ASDs, with supplemental melatonin being the most widely studied and proven treatment.

**Discussion:** PCPs will care for children with ASDs. Therefore, it is vital for PCPs to be knowledgeable about this topic and to promptly assess for and manage sleep disorders among children with ASDs. *J Pediatr Health Care.* (2016) 30, 143-154.

## KEY WORDS

Autism spectrum disorder, sleep, insomnia, melatonin

## CASE STUDY

A 4-year-old boy with severe autism presents to the primary care office for a sick visit. The presenting problem

Shoshana Herrmann, Pediatric Nurse Practitioner, Pediatric Associates, Plantation, FL.

Conflicts of interest: None to report.

Correspondence: Shoshana Herrmann, MSN, BSN, CPNP, Pediatric Associates, 900 S. Pine Island Road, Suite 800, Plantation, FL 33324; e-mail: [sherrmann@pediatricassociates.com](mailto:sherrmann@pediatricassociates.com).

0891-5245/\$36.00

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Published online August 22, 2015.

<http://dx.doi.org/10.1016/j.pedhc.2015.07.003>

as told by the mother is that the boy has tremendous difficulty both falling and staying asleep. She explains that the child takes at least 60 minutes to fall asleep and that he wakes up at least twice in the middle of the night. The mother states that she is extremely overwhelmed by her son's disorder of autism in general and that his sleep problems specifically cause her significant stress. Each time her son wakes up in middle of the night, he screams, thus awakening her and her other two children. She says she does not understand how her son functions on so little sleep. She has also received several calls from his teacher stating that he is behaving aggressively toward other children in the class and that he sometimes falls asleep on the classroom floor when playing.

## INTRODUCTION

The prevalence of the diagnosis of children with an autism spectrum disorder (ASD) has increased by 78% from 2007 to 2013. The Centers for Disease Control and Prevention (CDC) now estimates that 1 in every 88 children has an ASD and has found that ASDs are reported among children of all racial, ethnic, and socio-economic groups (CDC, 2014). Primary care providers, including physicians and nurse practitioners, will care for children affected with ASDs, regardless of the type of practice at which they work. It is therefore vital that primary care providers become experts at assessing and treating comorbid disorders among children with ASDs, such as sleep problems.

This article will (a) discuss the prevalence and types of sleep disorders experienced by children with ASDs, (b) discuss the impact of sleep disorders on children with ASDs and their families, (c) review risk factors for sleep disorders among children with ASDs, (d) review behavioral and pharmacological treatments for sleep disorders among children with ASDs, and (e) discuss the role of the primary care provider in diagnosing and treating sleep disorders among children with ASDs.

## OVERVIEW

ASD is a developmental disorder that causes significant deficits in the areas of social communication and restricted or repetitive interests beginning in an early developmental period. Asperger syndrome, pervasive developmental disorder not otherwise specified, childhood disintegrative disorder, and autistic disorder all fall under the umbrella term of ASDs in the new *Diagnostic and Statistical Manual of Mental Disorders*, 5th edition (American Psychiatric Association, 2013). Along with experiencing impairments in the core diagnostic areas of social interaction and restricted interests, many children with ASDs also experience comorbid psychological, behavioral, and physical conditions that are not part of the diagnostic criteria. These additional problems include sleep problems, toileting problems, hyperactive periods, temper tantrums, aggression, self-injury, separation anxiety, anxiety, eating problems, and sensory issues (Maskey, Warnell, Parr, Le Couteur, & McConachie, 2013).

## PREVALENCE OF COMORBID SLEEP DISORDERS

Children with ASDs experience a significantly higher prevalence of sleep disorders than do typically developing children (Allik, Larsson, & Smedje, 2006; Giannotti et al., 2008). The prevalence of sleep disorders among children with ASDs is estimated to range from 45% to 86% (Liu, Hubbard, Fabes, & Adam, 2006; Maskey et al., 2013), with the majority of studies reporting that more than half of children with ASDs have at least one sleep problem (Allik et al., 2006; Giannotti et al., 2008; Hodge, Carollo, Lewin, Hoffman, & Sweeney, 2014; Krakowiak, Goodlin-Jones, Hertz-Picciotto, Croen, & Hansen, 2008; Liu et al., 2006; Mayes & Calhoun, 2009; Patzold, Richdale, & Tonge, 1998; Polimeni, Richdale, & Francis, 2005). Sleep disorders among children with ASDs are also more chronic in nature than in children without ASDs. Sivertsen, Posserud, Gillberg, Lundervold, & Hysing (2012) reported the remission rate for sleep problems among children with ASDs at only 8.3% compared with 52.4% for children without ASDs. Barnevik Olsson, Carlsson, Westerlund, Gillberg, & Fernell (2013) reported that children with ASDs were found to have significantly more consultations regarding sleep problems with their primary care provider prior to their diagnosis of an ASD. Therefore, sleep problems are considered to be a co-existing symptom of ASDs that is not significantly influenced by race, gender, age, or the intelligence quotient of the

**Sleep disorders among children with ASDs are more chronic in nature than in children without ASDs.**

child, but rather something that is inherently included in the diagnosis of an ASD (Mayes & Calhoun, 2009). Table 1 provides a summary of the studies reviewed on the prevalence of sleep disorders among children with ASDs.

## TYPES OF SLEEP PROBLEMS AND ASDs

Children with ASDs have been found to experience many different types of sleep problems (Miano et al., 2007). These problems can be divided into three main categories of sleep disorders: insomnia, reduced sleep duration, and parasomnias. Table 2 provides a summary of the studies reviewed on the different types of sleep problems experienced by children with ASDs.

### Insomnia

Two of the most prevalent sleep problems among children with ASDs are difficulty initiating and maintaining sleep (Miano et al., 2007). It is estimated that as many as 60% of children with ASDs experience difficulty falling asleep (Mayes & Calhoun, 2009), and multiple studies have found that children with ASDs experience significantly longer sleep latencies than do typically developing children (Allik et al., 2006; Limoges, Mottron, Bolduc, Berthiaume, & Godbout, 2005; Miano et al., 2007; Patzold et al., 1998). Miano et al. (2007) reported that 25.8% of children with ASDs require more than 30 minutes to fall asleep compared with only 6.6% of typically developing children matched for age.

Children with ASDs are also reported to have an increased number of nighttime awakenings (Hodge et al., 2014), as well as nighttime awakenings of significantly longer duration than typically developing children (Giannotti, Cortesi, Cerquiglini, & Bernabei, 2006; Limoges et al., 2005). Children with ASDs are reported to wake earlier than do typically developing peers (DeVincent, Gadow, Delosh, & Geller, 2007), with one study finding that as many as 45% of children with an ASD experience early morning waking (Mayes & Calhoun, 2009).

### Reduced Sleep Duration

Prolonged sleep latency, nighttime awakenings, and early morning waking lead to overall reduced sleep duration among children with ASDs (Patzold et al., 1998). In one study, investigators found that 22.6% of children with ASDs slept for fewer than 8 hours a night compared with only 9.6% of typically developing children (Miano et al., 2007). Children with ASDs were found to have significantly shorter 24-hour sleep durations compared with both typically developing children and children who had developmental delays other than ASDs (Goodlin-Jones, Tang, Liu, & Anders, 2008). This phenomenon may cause the high rates of daytime somnolence experienced by children with ASDs (Giannotti et al., 2008; Liu et al., 2006).

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