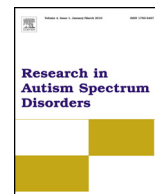


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Research in Autism Spectrum Disorders

journal homepage: <http://ees.elsevier.com/RASD/default.asp>

Brief report

Poor sleep quality is associated with discordant peer relationships among adolescents with Autism Spectrum Disorder



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ARTICLE INFO

Article history:

Received 26 August 2016

Received in revised form 26 October 2016

Accepted 22 November 2016

Available online xxx

Keywords:

ASD

Adolescents

Sleep quality

Daytime sleepiness

Peer relationships

ABSTRACT

Background: Individuals with Autism Spectrum Disorder (ASD) experience impairments in social communication, and these deficits often make it difficult to form and maintain friendships with peers. Poor sleep quality and daytime sleepiness are common among adolescents with ASD, and consequences of poor sleep may make social interactions difficult. Connections between sleep quality and social relationships in ASD samples have been understudied; the current study addresses this gap.

Method: Participants were community samples of 19 adolescents with ASD and 10 neurotypical (NT) adolescents. Adolescents completed questionnaires about closeness and discord in relationships with a same-gender peer, and they reported on sleep-wake problems, daytime sleepiness, and internalizing problems. Adolescents also wore an actigraph for 7-nights.

Results: Pearson correlations revealed significant associations between adolescents' reports of sleep problems and discordant peer relationships; more sleep-wake problems and more daytime sleepiness were associated with more discord with peers in the sample with ASD, but not in the NT sample. The closeness aspect of peer relationships was not significantly associated with sleep quality. Internalizing problems did not mediate between sleep quality and discordant relationships.

Conclusions: Adolescents' reports of more sleep problems and daytime sleepiness, but not actigraph indicators of sleep quality, were directly associated with discordant peer relationships. Adolescents who are already challenged in social interactions due to ASD may be especially vulnerable to intense negativity in peer relationships when they also experience poorer nighttime sleep and more daytime sleepiness. NT adolescents may be better able to regulate social interactions despite poor sleep and feeling tired.

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1. Introduction

Impairments in social interaction and social communication and the presence of restricted and repetitive behaviors (RRBs) are core deficits of Autism Spectrum Disorder (ASD). Social deficits span contexts and include difficulties in verbal and nonverbal communication, whereas RRBs refer to patterns of intense, fixated interests or activities ([Centers for Disease](http://www.cdc.gov/ncbddd/autism/)

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Control, 2016). These pervasive deficits limit individuals' ability to effectively engage in social exchanges with others, which has consequences for the development and daily maintenance of interpersonal relationships. Children with ASD who have deficient verbal abilities also have fewer social interactions and less satisfying relationships with peers (Hauck, Fein, Waterhouse, & Feinstein, 1995; Sigman et al., 1999). Even children with high functioning ASD appear to lack the social skills and opportunities to engage satisfactorily with peers, despite a reported desire to do so (Bauminger & Kasari, 2000); they report feeling lonelier with poorer quality friendships compared to neurotypical (NT) children. For example, whereas the preferred leisure activities of NT adolescents vary widely (Larson, 2001), adolescents with ASD spend a large amount of their leisure time alone, engaged in solo activities such as using a computer or watching television. The most infrequent activity was having a conversation, with less than 15% of adolescents with ASD choosing to do so during their free time (Orsmond & Kuo, 2011).

1.1. Peer relationships in adolescence

As NT children approach adolescence, the social environment with peers changes qualitatively to one that is more intimate and communicative compared to childhood (Buhrmester, 1990). The period of adolescence for NT individuals includes a quantitative shift to the majority of leisure time being spent with peers (Larson & Richards, 1991; Larson, 2001). For adolescents with ASD, this new social environment may be especially difficult to navigate, and the ability to form close friendships becomes increasingly challenging. Adolescents with ASD spend less time with peers compared to time spent with adults (e.g., parents) (Orsmond & Kuo, 2011). Social deficits associated with ASD may underlie the challenges in forming and maintaining good quality friendships.

1.2. Sleep in children and adolescents with ASD

For individuals with ASD, the consequences of social impairments and compromised relationships may be compounded by other challenges. One common corollary of ASD is poor sleep quality. According to a recent review, between 32% to 71.5% of children and adolescents with ASD experience sleep problems (Deliens, Leproult, Schmitz, Destrebecqz, & Peigneux, 2015). Sleep problems include difficulty falling asleep, inconsistent sleep schedules, insufficient nighttime sleep, as well as daytime sleepiness that impairs daytime functioning (Goldman, Richdale, Clemons, & Malow, 2012). These impairments include increased irritability, greater anxiety, higher sensory sensitivity, and more behavior problems (Katz, Malow, & Reynolds, 2016; Lambert et al., 2016; Malow et al., 2006; Mazurek & Petroski, 2015; Schreck, Mulick, & Smith, 2004; Sikora, Johnson, Clemons, & Katz, 2012). Poorer daytime functioning in turn may be linked to poorer quality social relationships.

In typical adolescent development, pubertal changes that occur during adolescence have been associated with an increase in daytime sleepiness (Colrain & Baker, 2011). The increase of daytime sleepiness seems to co-occur with the onset of puberty, and occurs even when nighttime sleep duration remains unchanged (Carskadon, 1990), suggesting that adolescents with ASD are at risk for even more sleep issues as a result of pubertal changes and ASD status together.

Types of sleep problems change from childhood to adolescence among individuals with ASD (Deliens et al., 2015). For example, children with ASD are reported by parents to have sleep problems such as waking during the night and sleep anxiety, whereas adolescents with ASD are reported by parents to experience difficulty with falling asleep and more daytime sleepiness (Goldman et al., 2012). Young adolescents with ASD tend to spend more time sleeping relative to older adolescents with ASD (i.e., those who have exited high school) (Orsmond & Kuo, 2011). Adolescents with ASD not only take longer to fall asleep than their NT peers, but their sleep latencies are also more variable (Baker, Richdale, Short, & Gradisar, 2013).

Poor sleep and poor social functioning often co-occur in children with ASD. For example, fewer hours of sleep per night predict deficient social skills among children with ASD (Schreck et al., 2004). Children with ASD reported to be poor sleepers by their parents showed poorer social interactions with an examiner during the ADOS, compared to good sleepers (Malow et al., 2006). Sleep issues spill over to affect the daily functioning of children and families, as reported by parents (Krakowiak, Goodlin-Jones, Hertz-Picciotto, Croen, & Hansen, 2008). To date, little research has been directed toward examination of sleep issues, as reported both by adolescents themselves and through actigraphy, in association with self-reported peer relationship quality among adolescents with ASD. The current study is aimed at addressing this gap.

1.3. Comorbid conditions with ASD

Anxiety and depression are frequent comorbidities among children with ASD (Shtayermman, 2007; van Steensel, Bögels, & Perrin, 2011), and these internalizing conditions could account for problems in both the sleep and social domains. For example, higher levels of anxiety were associated with many types of sleep problems in a study of children with ASD (Mazurek & Petroski, 2015); more symptoms of anxiety also have been linked to social problems such as less assertive social skills among adolescents with ASD (Bellini, 2004). Both higher anxiety and poorer sleep were linked to compromised daytime functioning in a sample of adolescents with ASD (Richdale, Baker, Short, & Gradisar, 2014). In addition, the presence of depressive symptoms that are common to individuals with ASD (e.g., social withdrawal, irritability) has been associated with poorer quality social relationships for adolescents on the ASD spectrum (Whitehouse, Durkin, Jaquet, & Ziatas, 2008).

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