

A Systematic Survey of Sleep-Related in Children with Autism Spectrum Disorder



Ghasem Sadeghi Bajestani*, Zahra Karimnezhad and Elyas Irankhah

Department of Biomedical Engineering, Imam Reza International University, Iran

Submission: November 18, 2018; Published: January 18, 2019

*Corresponding author: Ghasem Sadeghi Bajestani, Center for Computational Neuroscience Research, Department of Biomedical Engineering, Imam Reza International University, Razavi Khorasan, Asrar St., Daneshgah St., Mashhad, Islamic Republic of Iran

Keywords: Brain sections; Signals processing; Delta Band

Abbreviations: ASD: Autism Spectrum Disorder; PSG: Polysomnographic Machine; ADOS: Autism Diagnosis Programming; CBCL: Depression Scale Epidemiologic Studies; CSHQ: Child Scale Health Cure; GARS: Grading Autism Range Scale; GARS: Gordon Diagnostic System; PBS: Child Behavior Scale; PSG: Polysomnography; PSQ: Parental Sleep Questionnaire; RBS-R: Repeated Behavioral Scale – Modified; WISC: Intelligence Scale for Children; WPPSI: Wexler Primary School Elemental Scale

Mini Review

Autism Spectrum Disorder (ASD) is a software problem in interactions between different brain sections, which causes problems in social interactions. One of the main problems in this disorder is the issue of diagnosis. So, for the diagnosis disorder the golden age is before 18 months. But the age of which clinical signs of autism are recognizable is between 2 and 3 years [1]. On the one hand, one of the most unpleasant complaints among parents of children with autism is sleeping problems of more than 40-80% in these children while this problem is growing by 25-40% in normal children [2]. So if we can diagnosis of child with autism by brain signals processing, we've taken a big step toward achieving a diagnosis of golden age.

We know that recording brain signals from children in awakening state is difficult, because we cannot attention of child to the subject matter and execute the signaling protocol

perfectly, so we go to the children's record of brain at during a normal sleep (sleep without medication and external symptoms), because in sleep mode, we take them from consciousness state to subconscious state. By doing this, we create the same conditions for comparing child with autistic and normal child [3].

Studies during sleep, in addition to leading to the detection of autism, can also help in during of treatment of these children. For example, it can be seen that during the activity of the Delta Band of brain signals, especially at sleep stage 2, suddenly decreases from the forehead to the posterior part. This topic indicates the unusual Thalamocortical function, which also shows an abnormal relationship between the forehead area and the procedural sensory-motor memory encoding [4]. Typically, these signals are recorded by a polysomnographic machine (PSG). Several studies have been conducted in this regard that examined the relationship between sleep and challenging symptoms of ASD (Table 1) [2].

Table 1: Studies that examined the relationship between sleep and challenging symptoms of ASD.

Significant Findings	Measurements	Ref.
Forecast less sleep hours per night, ASD severity rating, Shortage of social skills and stereotypical behaviors.	GARS, PSQ	[5]
Increased sensitivity to stimuli, Younger age, having low sleep, taking medication, Epilepsy diagnosis, History of sleep problems	ADOS, CHSQ, PSQ	[6]
Increased sleep problems with severity of ASD symptoms, Predict the opposite behaviors, the change of mood and sleep disorder in ASD	CARS, PBS, PSQ, WISC, WPPSI, GDS	[7]
Weak sleep in ASD and limited and repetitive behaviors	PCQ, CSHQ, RBS-R, BCL, PSG	[8]
Improve daily behaviors for 2/3 of ASD patients after severe sleep cure	SD, CSHQ, CBCL, PSQ	[9]
Poor sleep efficiency, More sleep time and frequent overnight waking (up to 2-3 hours)	PSG, CSHQ	[10]
More sleep resistance, the time of Latency in sleep is longer	PSG, CSHQ	[11]
Sleep problems in more than 10% of children with ASD, which varied in different seasons due to volatility in periods of light and dark	PSG, CSHQ	[12]

ADOS: Autism Diagnosis Programming
CBCL: Depression Scale Epidemiologic Studies
CSHQ: Child Scale Health cure
GARS: Grading Autism Range Scale
GARS: Gordon Diagnostic System
PBS: Child Behavior Scale
PSG: Polysomnography
PSQ: Parental Sleep Questionnaire
RBS-R: Repeated Behavioral Scale – Modified
WISC: Intelligence Scale for Children
WPPSI: Wexler Primary School Elemental Scale

References

1. Bajestani GS, Sheikhan A, Golpayegani MRH, Ashrafzadeh F, Hebrani P (2016) Cybernetic approach in identification of brain pattern variations in autism spectrum disorder. *Biomedical Engineering: Applications, Basis and Communications* 28(1): 1650006.
2. Cohen S, Conduit R, Lockley SW, Rajaratnam SMW, Cornish KM (2014) The relationship between sleep and behavior in autism spectrum disorder (ASD): a review. *J Neurodev Disorders* 6(1): 44.
3. Sadeghi Bajestani G, Hashemi Golpayegani MR, Sheikhan A, Ashrafzadeh F (2017) Poincaré section analysis of the electroencephalogram in autism spectrum disorder using complement plots. *Kybernetes* 46(2): 364-382.
4. Rochette AC, Soulières I, Berthiaume C, Godbout R (2018) NREM sleep EEG activity and procedural memory: A comparison between young neurotypical and autistic adults without sleep complaints. *Autism Res* 11(4): 613-623.
5. Schreck KA, Mulick JA, Smith AF (2004) Sleep problems as possible predictors of intensified symptoms of autism. *Res Dev Disabil* 25(1): 57-66.
6. Liu X, Hubbard JA, Fabes RA, Adam JB (2006) Sleep disturbances and correlates of children with autism spectrum disorders. *Child psychiatry Hum Dev* 37(2): 179-191.
7. Mayes SD, Calhoun SL (2009) Variables related to sleep problems in children with autism. *Research in Autism Spectrum Disorders* 3(4): 931-941.
8. Goldman SE, Surdyka K, Cuevas R, Adkins K, Wang L, et al. (2009) Defining the sleep phenotype in children with autism. *Dev Neuropsychol* 34(5): 560-573.
9. Moon CE, Corkum P, Smith IM (2010) Case study: a case-series evaluation of a behavioral sleep intervention for three children with autism and primary insomnia. *J Pediatr Psychol* 36(1): 47-54.
10. Malow BA, Marzec ML, McGrew SG, Wang L, Henderson LM, et al. (2006) Characterizing sleep in children with autism spectrum disorders: a multidimensional approach. *Sleep* 29(12): 1563-1571.
11. Giannotti F, Cortesi F, Cerquiglini A, Miraglia D, Vagnoni C, et al. (2008) An investigation of sleep characteristics, EEG abnormalities and epilepsy in developmentally regressed and non-regressed children with autism. *J Autism Dev Disord* 38(10): 1888-1897.
12. Giannotti F, Cortesi F, Cerquiglini A, Vagnoni C, Valente D (2011) Sleep in children with autism with and without autistic regression. *J sleep res* 20(2): 338-347.



This work is licensed under Creative Commons Attribution 4.0 License
DOI: [10.19080/CTBEB.2019.17.555974](https://doi.org/10.19080/CTBEB.2019.17.555974)

Your next submission with Juniper Publishers

will reach you the below assets

- Quality Editorial service
- Swift Peer Review
- Reprints availability
- E-prints Service
- Manuscript Podcast for convenient understanding
- Global attainment for your research
- Manuscript accessibility in different formats
(Pdf, E-pub, Full Text, Audio)
- Unceasing customer service

Track the below URL for one-step submission

<https://juniperpublishers.com/online-submission.php>