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Assessment of the Role of Orexin A and Some Clinical Parameters in Children with Autism Spectrum Disorder

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Abstract

Objective: Autism spectrum disorder [ASD] is characterized by impairments in emotional, social, and cognitive areas and is considered a neurodevelopmental disorder. These children often exhibit stereotypical and repetitive manners that may be inconsistent with their inner physiological cadence, leading to disturbances in the Wake-up and sleep cycle. This study aimed to investigate the serum Orexin A, 5-HT, glutamate, and oxidative stress status and compare the values with those of healthy controls. Methods: This study included 40 participants, 20 patients, and 20 controls. The samples of children with ASD were obtained from the AL-Shatra unit of Autism Care//Thi Qar. Children taking medication and those with neurological diseases were excluded from the study. Serum orexin A, 5-HT, glutamate, NO, and albumen levels were assessed in all participants. Results: The means of serum orexin A, 5-HT, glutamate, and NO levels of patients with ASD were significantly higher than those of the control group ($p < 0.05$). However, serum GSH and albumen levels were lower among the cases than the control group ($p < 0.05$). Conclusion: orexin A, 5-HT, and glutamate measurements taken together may even be utilized as markers for the development of sleep and eating disorders and insomnia. The rising levels of orexin A in uncontrolled autism spectrum disorder may be a cause of rising BMI. This assessment may be beneficial in developing an appropriate treatment plan for these children. This assessment may be instrumental in developing an appropriate treatment plan for these children and may form the basis for developing and directing targeted treatment in the future.

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Assessment of the Role of Orexin A and Some Clinical Parameters in Children with Autism Spectrum Disorder

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ABSTRACT

Objective: Autism spectrum disorder [ASD] is characterized by impairments in emotional, social, and cognitive areas and is considered a neurodevelopmental disorder. These children often exhibit stereotypical and repetitive manners that may be inconsistent with their inner physiological cadence, leading to disturbances in the Wake-up and sleep cycle. This study aimed to investigate the serum Orexin A, 5-HT, glutamate , and oxidative stress status and compare the values with those of healthy controls. Methods: This study included 40 participants , 20 patients , and 20 controls. The samples of children with ASD were obtained from the AL -Shatra unit of Autism Care//Thi Qar. Children taking medication and those with neurological diseases were excluded from the study. Serum orexin A, 5-HT, glutamate, NO , and albumen levels were assessed in all participants. Results: The means of serum orexin A, 5-HT, glutamate, and NO levels of patients with ASD were significantly higher than those of the control group (p <0.05). However, serum GSH and albumen level s w ere lower among the cases than the control group (p < 0.05). Conclusion: orexin A, 5-HT, and glutamate measurements taken together may even be utilized as markers for the development of sleep and eating disorders and insomnia. T he ris ing levels of orexin A in uncontrolled autism spectrum disorder may be a cause of ris ing BMI. This assessment may be beneficia l in developing an appropriate treatment plan for these children. This assessment may be instrumenta l in developing an appropriate treatment plan for these children and may form the basis for developing and directing targeted treatment in the future.

Keywords: ***Autism spectrum disorders, orexin A, 5- 5- hydroxytryptamine, glutamate , and BMI***

1. INTRODUCTION

Autism spectrum disorder[ASD] is characterized by impairments in emotional, social, and cognitive areas and is considered a neurodevelopmental disorder.It is diagnosed early in life, with 1 in 54 children diagnosed by the age of 8 years [1,2]. Symptoms of ASD appear during the first three years of life when the rapid formation and maturation of brain synapses occur [3]. Brain development processes such as synaptogenesis, arborization, migration, synaptic pruning, and plasticity aim to create a functional brain [4,5]. During growth (neurotransmitters and their receptors) play an important role.[3].Children with this disorder often suffer from a range of co-morbidities across multiple systems, with sleep disorders being specially mutual.[6]. There are some clinical features that children with [ASD] suffer from, including difficulty sleeping, light sleep, daytime sleepiness, and insomnia. All of these fall under the framework of what is called a sleep disorder[7]. Novel evidence suggests that sleep disturbances are correlating with a rise risk of cardiovascular diseases, like as obesity and insulin resistance [8]. The correlating between short sleep duration and obesity has been inspected in various studies, The main findings of these studies, mention that individuals with HSSD have a higher BMI compared to those with normal sleep duration [9]."During normal brain development, neuropeptides and neurotransmitters play a major role, and therefore any disturbance in them can cause impairment in brain development processes, which in turn can cause autism"[10,11]. There are many types of neurotransmitters produced in the brain, each with different functions. Some of these neurotransmitters influence sleep, wakefulness, and appetite control. We will focus on some of these types."Serotonin (5- hydroxytryptamine) [5-HT] is a local hormone and neurotransmitter with numerous physiological functions in the body[12], including regulating sleep, emotions, and appetite"[13]."Glutamate is a non- essential amino acid that plays an effective role in metabolic regulation. In addition, it stimulates approximately 70% synapses, making it the most important excitatory neurotransmitter in the central nervous"[14,15]."If we want to mention the brain processes that are regulated by this transmitter, they are numerous. We will mention some of them, which include (motor function, mood, learning and memory, pain perception, in addition to controlling the sleep-wake cycle)"[16–19].]."Orexin A, also known as hypocretin, is a lateral hypothalamic neuropeptide that has been linked to several physiological functions, including regulation of sleep, wakefulness, and appetite control"[20,21]."In addition, orexin plays an substantial function in neuroprotection by prevent oxidative stress stuteuse and the inflammatory response via its "type I and type II" receptors""[22]. Some studies have found that treatment with orexin A lower the secretion of some cytokines and also lower the production of reactive oxygen species [23]. The objective of this study is to evaluate the role of serum Orexin A, 5-HT,Glutamate and oxidant- antioxidant statues in patients with ASD. To assess sleep and appetite disorders, as well as anxiety, which are crucial for developing an appropriate treatment plan for these individuals.

2. MATERIALS AND METHODS

This study included 40 participants in this study 20 patients and 20 controls. The Stephen Thompson equation was used to get the sample size. the samples of children with ASD they were obtained AL-Shatra unit of Autism Care//Thi Qar. From 2024 to 2025. The age range of children with "ASD and controls" between [7-12] years. "The medical history of these

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children was taken, and their daily routine and the most important disorders they suffer from were identified, such as (sleep disorders, eating disorders, appetite disorders, walking on tiptoes, and facial expressions)." "Approximately five milliliters of blood was collected and allowed to clot at room temperature in empty disposable tubes,then centrifuged at 3000 xg for 10 minutes". "The serum samples were maintained and separated at [-20] degrees until use or used immediately to analyses biochemical parameters". This serum it was used to determine some [neurotransmission and biochemical] parameters in this study. "Serum glutamate, orexin A and 5-HT were estimated by enzyme linked immunoassay method by ELISA Reader. Using kits supplied by MyBioSource."" Serum Albumin was analyzed by colourimetric method by spectrophotometer, using kit supplied by (Biolabo ,france)". "Serum NO was measured depending on the method of Dervisevic et al.[24] . Serum GSH was measured depending on the method of Ellman[25]. SPSS version 23 was used for statistical analysis. Results were expressed using mean ± standard deviation (mean±SD)". A t-test was performed to compare parameters across the study group at a significance level (P≤0.05) to determine statistical significance."Pearson correlation coefficients (r) will be used to describe relationships among various parameters within each group.

3. RESULTS AND DISCUSSION

"Table 1 shows the clinical characteristics of the study groups"."The current study included 40 cases, divided into 20 children with autism spectrum disorder and 20 apparently Health,the mean ages of the two groups were similar".

"Table 1: Distribution of age and sex in groups of study"

Groups	"N"	"Age(years)"Mean±SD	"Sex(M/F)"
Controls	20	8.39±1.78	8/12
Patients	20	8.95±1.95	8/12
p-value			

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