Association Between Autism Spectrum Disorder Severity and Adaptive Functioning in Children With Abnormal Electroencephalograms or Seizures

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Abstract:

This study aimed to investigate the association between the severity of autism spectrum disorder (ASD) in children presenting with abnormal electroencephalographic (EEG) findings or comorbid seizures and their adaptive behaviors. Secondary data were obtained from the research project entitled “Indication of Severity of Symptoms among Children with Autism Spectrum Disorders Related to EEG Abnormalities.” The study sample comprised 120 children aged 6–14 years.

Symptom severity was categorized into mild, moderate, and severe levels, with distinct characteristics and behavioral patterns observed across severity groups. Adaptive behavior was assessed using the Vineland Adaptive Behavior Scales (VABS). The findings indicated that the majority of participants were male, with a mean age of 9 years. The results demonstrated that children with mild symptoms achieved the highest adaptive behavior scores across all domains, whereas those with severe symptoms exhibited the lowest scores, particularly in the domain of daily living skills. In conclusion, the severity of autism accompanied by abnormal EEG findings or seizures is significantly associated with adaptive functioning in children. Increasing symptom severity is linked to greater impairments in adaptive behaviors, especially in communication skills.



Background:

Autism Spectrum Disorders (ASD) are neurodevelopmental conditions characterized by impairments in communication, social interaction, and the presence of restricted or repetitive behaviors. These conditions typically manifest in early childhood and are associated with long-term impacts on daily functioning.A subset of children with ASD also present with abnormal electroencephalographic (EEG) findings or comorbid seizures, which may further influence symptom severity and adaptive behaviors. This impact is particularly notable when seizures present with subtle or atypical clinical features that are difficult to detect.



In Thailand, the Rajanagarindra Institute of Child Development developed the **Thai Diagnostic Autism Scale (TDAS)** to facilitate early and culturally appropriate diagnosis of autism in Thai children.

Beyond diagnostic assessment, comprehensive monitoring of symptom severity and developmental functioning is essential. This is commonly achieved through the integration of standardized evaluation tools, including the Thai **Autism Treatment Evaluation Checklist (Thai-ATEC)** and the **Vineland Adaptive Behavior Scales (VABS)**, which provide systematic assessments of symptom progression and adaptive behaviors in daily life.

This study investigates the correlation between symptom severity and adaptive behavior in children with autism exhibiting abnormal EEG findings or comorbid seizures. By analyzing the relationship between the Thai-ATEC and VABS assessments, this research aims to facilitate the promotion of tailored adaptive behaviors based on the specific severity levels of each child.



Thai Diagnostic Autism Scale (TDAS)



Autism Treatment Evaluation Checklist (Thai-ATEC)



Vineland Adaptive Behavior Scales (VABS)

Objectives:

To examine the association between autism spectrum disorder severity and adaptive behaviors in children with autism who present with abnormal electroencephalographic findings or experience seizures.

Methodology:

1. To determine the correlation between clinical severity scores (from Thai-ATEC) and adaptive functional skills (from VABS).
2. Literature Review.
3. Data were collected from the Excellence Development Group at the Rajanagarindra Institute of Child Development under the project: " Indication of severity of symptoms among children with Autism Spectrum Disorders related to EEG abnormalities". The data consists of three main parts:

Part 1: General Information- Demographic data collected through parent interviews. → **Part 2**: Severity Levels - Clinical data measured by the Thai-ATEC. → **Part 3**: Adaptive Behaviors – Assessment scores from the VABS.

4. Data were checked for completeness and accuracy using Microsoft Excel. Statistical analysis, performed via SPSS, included: 1) descriptive statistics to summarize general information, and 2) the Kruskal-Wallis Test to analyze the relationship between autism severity scores and adaptive behavior scores.
5. The analyzed data were interpreted, and the final report was prepared.

Results:

120 children with autism



6.7 Male



13.3 Female

Body mass inde

BMI 1 .49 Mean

15.11-24.52 Inter quartile range (I R)

Symptom 1: Developmental regression / GDD

Symptom 2: Stereotyped

Symptom 3: Inflexible Transition

Symptom 4: Aggression

Symptom 5: Sensory modulation disorder

Symptom 6: Impulsivity Impulsivity

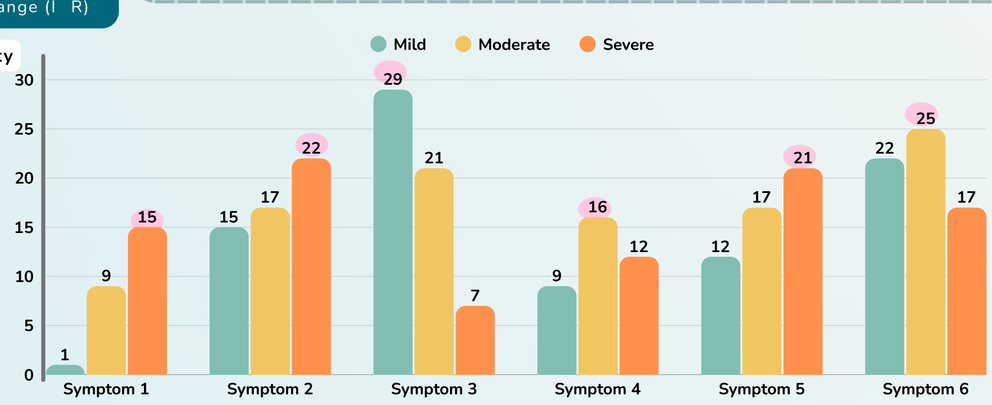


Table A Symptoms Presented in Autism Spectrum Disorder

From **Table A** autistic children with abnormal brainwave activity or coexisting seizures exhibit different symptoms depending on the severity level. Regression or developmental delays, repetitive behaviors, and sensory response abnormalities are most commonly found in the severe group, while aggressive behavior and impulsivity are more frequently observed in the moderate group. On the other hand, difficulties in adapting to change are most common in the mild group.

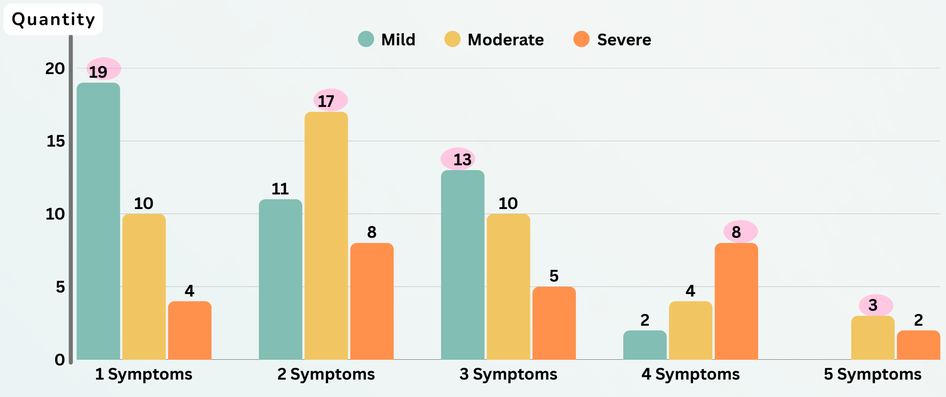


Table B Number of Symptoms Observed

From **Table B** the number of co-occurring symptoms in children with autism varies according to the severity of symptoms. Children with one co-occurring symptom are most commonly found in the mild symptom group. Two and five co-occurring symptoms are most frequent in the moderate symptom group, while four co-occurring symptoms are most commonly found in the severe symptom group.

Adaptive behavior	The degree of severity of autism	Median	Kruskal–Wallis Test
			X^2 (p-value)
Communication Domain	Mild	61.00	32.762 (<0.001)
	Moderate	47.50	
	Severe	34.00	
Daily Living Domain	Mild	71.00	40.424 (<0.001)
	Moderate	53.00	
	Severe	20.00	
Socialization Domain	Mild	77.00	35.921 (<0.001)
	Moderate	59.50	
	Severe	48.00	
Adaptive Behavior Composite	Mild	63.00	39.978 (<0.001)
	Moderate	50.00	
	Severe	32.00	

Analysis of adaptive behavior scores among children with autism who presented with abnormal electroencephalographic findings or comorbid seizures demonstrated consistent trends across severity groups. Children classified in the mild severity group exhibited the highest median adaptive behavior scores, whereas those in the severe group had the lowest scores. This pattern was observed consistently across all assessed domains, including communication, daily living skills, socialization, and overall adaptive functioning.

Nonparametric comparisons using the Kruskal–Wallis test indicated statistically significant differences in adaptive behavior scores across all four domains according to autism severity levels (mild, moderate, and severe) ($p < 0.001$ for all comparisons). These findings demonstrate a clear and graded association between increasing autism severity and decreasing adaptive functioning in children.

Discussion:

The findings of this study demonstrate a negative association between autism spectrum disorder severity and adaptive behaviors across all assessed domains among children with autism who presented with abnormal EEG findings or comorbid seizures. As symptom severity increased, adaptive functioning—particularly in the domains of communication and daily living skills—was progressively reduced. This pattern suggests that greater clinical severity of autism is associated with more pronounced limitations in everyday adaptive abilities.

These results are consistent with prior studies (Julian et al., 2019; Frontiers in Psychiatry, 2021; Onnak, 2021; Jutha, 2023), which similarly reported that increasing autism severity is associated with diminished adaptive behaviors in daily life. The concordance between the present findings and existing literature supports the robustness of the observed relationship, even within the subgroup of children with neurological comorbidities such as abnormal EEG findings or seizures.

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