Quantitative EEG Comparative Analysis between Autism Spectrum Disorder (ASD) and Attention Deficit Hyperactivity Disorder (ADHD)

Plamen D. Dimitrov, Petar Petrov, Ivan Aleksandrov, Ivan Dimitrov, Mariyana Mihailova, Galina Radkova, Raya Dimitrova

DOI: 10.5272/jimab.2017231.1441

ABSTRACT:

Background:
Autism is a mental developmental disorder, manifested in the early childhood. Attention deficit hyperactivity disorder is another psychiatric condition of the neurodevelopmental type. Both disorders affect information processing in the nervous system, altering the mechanisms which control how neurons and their synapses are connected and organised.

Purpose:
To examine if quantitative EEG assessment is sensitive and simple enough to differentiate autism from attention deficit hyperactivity disorder and neurologically typical children.

Material and methods:
Quantitative EEG is a type of electrophysiological assessment that uses computerised mathematical analysis to convert the raw waveform data into different frequency ranges. Each frequency range is averaged across a sample of data and quantified into mean amplitude (voltage in microvolts mV). We performed quantitative EEG analysis and compared 4 cohorts of children (aged from 3 to 7 years): with autism (high [n=27] and low [n=52] functioning), with attention deficit hyperactivity disorder [n=34], and with typical behaviour [n75].

Results:
Our preliminary results show that there are significant qEEG differences between the groups of patients and the control cohort. The changes affect the potential levels of delta-, theta-, alpha-, and beta- frequency spectrums.

Conclusion:
The present study shows some significant quantitative EEG findings in autistic patients. This is a step forward in our efforts, aimed at defining specific neurophysiologic changes, in order to develop and refine strategies for early diagnosis of autism spectrum disorders, differentiation from other development conditions in childhood, detection of specific biomarkers and early initiation of treatment.