

# QUANTITATIVE ELECTROENCEPHALOGRAPH CHANGES IN CHILDREN AND ADOLESCENTS WITH ANXIETY DISORDERS

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## Introduction

Anxiety disorders are considered a major mental health problem affecting children, adolescents and adults.

Anxiety disorders represent the most common psychiatric illnesses affecting 10% - 30% of children and adolescents, with a higher prevalence in females. Although the age of onset varies depending on the specific disorder, the incidence of anxiety disorders is higher during childhood years compared to adolescent years (7% versus 4%).

Quantitative electroencephalogram (QEEG) is considered a promising new modality in objective diagnosis of anxiety disorders all over the world.

## Aim of the work

The aim of this study was:

- 1-To study the QEEG changes in children with anxiety disorders.
- 2-To compare the QEEG changes between children with anxiety disorders and normal children.
- 3-To assess the presence of QEEG diagnostic functions in children with anxiety disorders.
- 4-To estimate sensitivity and specificity of QEEG in identification of children with anxiety disorders.

## Subjects and Methods

### PATIENTS:

The study was a case - control study that was carried out on 40 children and adolescents among those attending the pediatric neuropsychiatry outpatient clinic at Alexandria University Children's Hospital & outpatient clinic (20 cases and 20 controls).

### METHODS:

Children and adolescents fulfilling study eligibility criteria according to data collected from parents were further subjected to the following:

A) Full neurological examination.

- B) Full comprehensive psychiatric evaluation.  
 C) Intelligence quotients using:  
 D) Arabic version of Conner rating scale to exclude cases with Attention Deficit Hyperactivity Disorder (ADHD).  
 E) Full comprehensive psychiatric evaluation.  
 F) Diagnosis of anxiety disorders according to:  
 -Diagnostic and Statistical Manual of Mental Disorders (DSM-5) criteria.  
 -Arabic version of Screen for Child Anxiety Related Disorders (SCARED).

## Results

Table 1: Comparison between the study groups regarding theta wave spectrum power.

		Mean	SD	Std. Error	95% Confidence Interval for Mean		Min.	Max.	T	P-value
					Lower Bound	Upper Bound				
Anger (A1-T4)	Cases	12.085	4.3310	.9684	10.058	14.112	1.7	19.9	2.854	.007
	Controls	16.810	6.0052	1.3428	13.999	19.621	9.5	30.7		
Irritability (A1-Fp1)	Cases	10.075	3.5337	.7902	8.421	11.729	1.2	16.2	1.419	.166
	Controls	12.270	5.9479	1.3300	9.486	15.054	3.2	32.1		
Emotion Content (A1-T6)	Cases	12.355	5.1581	1.1534	9.941	14.769	1.6	25.4	2.241	.032
	Controls	17.120	7.9863	1.7858	13.382	20.858	2.0	34.9		
Personality (A1-P4)	Cases	12.125	5.0128	1.1209	9.779	14.471	1.8	24.1	2.737	.010
	Controls	17.675	7.5557	1.6895	14.139	21.211	3.7	39.8		
Emotion inhibition (A1-FP2)	Cases	11.145	3.6947	.8262	9.416	12.874	1.7	18.6	1.675	.102
	Controls	13.480	5.0237	1.1233	11.129	15.831	3.7	21.8		

Table 2: Comparison between the study groups regarding HF beta wave spectrum power.

		Mean	SD	Std. Error	95% Confidence Interval for Mean		Min.	Max.	T	P-value
					Lower Bound	Upper Bound				
Anger (A1-T4)	Cases	8.005	9.0744	2.0291	3.758	12.252	.1	28.8	2.218	.037
	Controls	3.255	3.0604	.6843	1.823	4.687	.0	12.5		
Irritability (A1-Fp1)	Cases	5.410	7.4907	1.6750	1.904	8.916	.1	27.8	1.671	.103
	Controls	2.510	2.0285	.4536	1.561	3.459	.0	7.4		
Emotion Content (A1-T6)	Cases	5.670	6.5176	1.4574	2.620	8.720	.1	24.0	1.822	.080
	Controls	2.760	2.9183	.6525	1.394	4.126	.0	11.9		
Personality (A1-P4)	Cases	4.790	5.3262	1.1910	2.297	7.283	.1	21.9	2.208	.038
	Controls	2.065	1.4500	.3242	1.386	2.744	.0	4.9		
Emotion inhibition (A1-FP2)	Cases	5.370	7.9066	1.7680	1.670	9.070	.1	31.2	1.059	.296
	Controls	3.305	3.6709	.8208	1.587	5.023	.1	16.3		

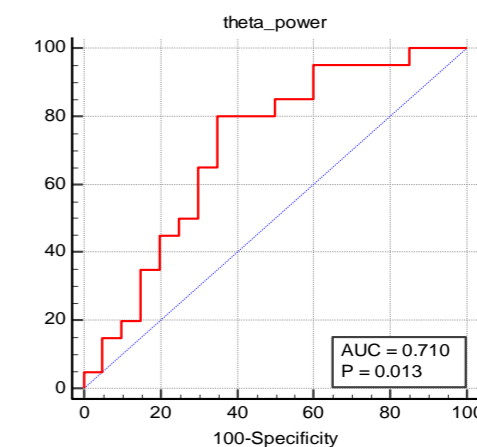


Figure 1: ROC curve of theta wave for detection of children and adolescents with anxiety disorders.

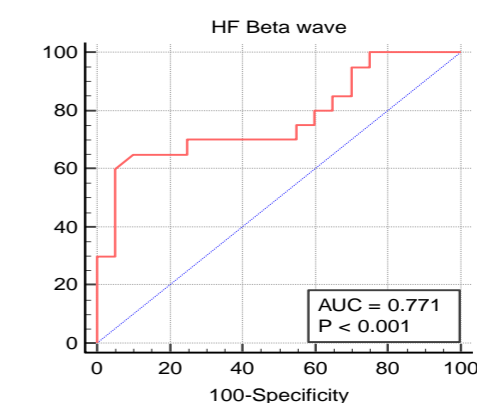


Figure 2: ROC curve of HF beta wave for detection of children and adolescents with anxiety disorders.

## Conclusion

From this study we concluded that:

1. QEEG testing encourages new diagnostic strategies based on QEEG assessment with advantages of being non-invasive, quantitative and not undergoing physicians differences (objective tool).
2. High spectrum power of HF beta wave and low spectrum power of theta wave can differentiate between children and adolescents with and without anxiety disorders.