Cognitive Function Assessment in School Aged Children with Chronic Lung Diseases Using Event Related Potential (P300) Versus Stanford - Binet Test

Thesis

Submitted for partial fulfillment of the master degree of ***in Pediatrics***

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2015

سورة البقرة الآية: ٣٢

Acknowledgement

First of all, all gratitude is due to ***God*** *almighty for blessing this work, until it has reached its end, as a part of his generous help, throughout my life.*

Really I can hardly find the words to express my gratitude to ***Prof. Dr/Mahmod Tarek Abd Elmonem****, Professor of Pediatrics, faculty of medicine, Ain Shams University, for his supervision, continuous help, encouragement throughout this work and tremendous effort he has done in the meticulous revision of the whole work. It is a great honor to work under his guidance and supervision.*

I would like also to express my sincere appreciation and gratitude to ***Dr. Terez Boshra Kamel****, Assistant professor of Pediatrics, faculty of medicine , Ain Shams University, for her continuous directions and support throughout the whole work.*

I owe much to ***Dr. Lobna Hamed Khalel*** *Assistant professor of Audiology faculty of medicine, Ain Shams University, for her continues help, valuable suggestions and final revision of the manuscript.*

Last but not least, I dedicate this work to my family, whom without their sincere emotional support, pushing me forward this work would not have ever been completed.

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Contents

List of Abbreviations

ADHD	Attention Deficit and Hyperactivity Disorder
APD	Auditory processing disorder
APD	Auditory Processing Disorder
ARAS	Ascending reticular activating systems
BAL	Bronchoalveolar lavage
BPD	Bronchopulmonary dysplasia
BPD	Bronchopulmonary dysplasia
cAMP	Cyclic adenosine monophosphate
CANS	Central auditory nervous system
CF	Cystic fibrosis
CFTR	Codes for transmembrane regulator
chILD	Children's interstitial lung disease
CLDs	Chronic lung diseases
CMV	Cytomegalovirus
Crs	Compliance of the respiratory system
CT	Computed tomography
DHSV	Digital high-speed video
DIP	Desquarnative interstitial pneumonia
EBV	Epstein-Barr virus
ECM	Extracellular matrix
EEC	Electroencephalography
EREPs	Event-related evoked potentials
ERP	Event-related potential
FEV1	Forced expiratory volume in I s
FOT	Forced oscillation technique
FRC	Functional residual capacity
FVC	Forced vital capacity
HRCT	High-resolution computed tomography
HRCT	High-resolution CT
ICS	Immotile cilia syndrome
IgG	Immunoglobulin G
ILD	Interstitial lung disease
IOS	Impulse oscillometry system

List of Abbreviations (Cont.)

IQ	Intelligence quotient
LCH	Langerhans cell histiocytosis
LIP	Lymphocytic interstitial pneumonitis
MUAC	Mid upper arm circumference
MIX	Methotrexate
MRC	Medical Research Council dyspnoea score
PaO2	Pressure of oxygen
PAP	Pulmonary alveolar proteinosis
PAS	Periodic acid-Schiff
PCD	Primary ciliary dyskinesia
QPIT	Quantitative pilocarpine iontophoresis test
RV	Residual volume
SDB	Sleep Disordered Breathing
TLC	Total lung capacity
TNF	Inhibitor of tumor necrosis factor
VIG	Intravenous immunoglobulin
WPPSI-R	Wechsler Preschool and Primary Scale of Intelligence-Revised

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Introduction

One conditioning factor that greatly influences developmental outcomes and quality of life is chronic illness ***(Jackson and Vessey, 2000).*** The ***American Academy of Pediatrics (1993)*** defines pediatric chronic diseases as illnesses that affect a person for an extended period of time, often for life, and that require medical care and attention above and beyond the normal requirements for a child or an adolescent.

Children are predisposed to a variety of prenatal, natal, or postnatal risk factors which may lead to the development of chronic lung diseases. The terminology of pediatric "chronic lung diseases" include abnormalities in airways, lung parenchyma, blood vessels, or pleura. These pathologies may result from congenital parenchymal lung defects (such as congenital lobar emphysema, congenital cystic lung, sequestrated lobes, etc), airway disease (such as bronchiectasis, primary ciliary dyskinesia, cystic fibrosis, etc), or acquired interstitial lung diseases***.(Abdel Khalik et al.,2008)***

Chronic chest troubles are the most common cause of chronic illnesses. They include bronchial asthma, tuberculosis, bronchiectasis, cystic fibrosis, ciliary dyskinesia and immune deficiency. They can affect the cognitive functions and psychosocial behavior of children. They may also affect the school performanceand academic achievement of these children ***(Salem et al., 2012).***

Chronic hypoxic-hypercapnic states occur in many pulmonary diseases. These states affect the central nervous system causing well-described non-specific clinical manifestations including headache, dullness of mentation and drowsiness, confusion On the other hand, mild chronic hypoxic conditions cause subtle or subclinical changes including inattention, reduction in psychomotor activity, forgetfulness,

slight decrease of intelligence, slowing of reaction time, and abnormalities in constructional drawings ***(Tahan et al., 2010).***

Adverse impacts of chronic or intermittent hypoxia on development, behavior, and academic achievement have been reported in many well-designed and controlled studies in children with chronic lung diseases. This should be taken into account in any situation that may expose children to hypoxia. Because adverse effects have been noted at even mild levels of oxygen desaturation ***(Bass et al., 2004).***

One of the leading causes of school failure among children is lack of attention. This problem can be the manifestation of a number of diseases, Inattention is a problem that causes a person to lose or not record the information in their working memory for later processing. This disorder causes the need for more time in performing work or school tasks (***Willcutt , 2012).***

Auditory attention. This is made by the ability to stay focused, alert towards an auditory stimulus5 and can be analyzed by the P300 - an objective and physiological test capable of showing changes not yet observable in the functioning of the individual. Event-related potentials (ERP) have been investigated as a biologic marker of information processing in the human central nervous system. The later component of ERP named P300 has been thought to reflect a cognition process and an attentional resource allocation when working memory is engaged.***(Boucher et al., 2010).***