شبكة المعلومات الجامعية

بسم اللّه الرحمن الرحيم

شبكة المعلومات الجامعية

التوثيق الالكتروني والميكروفيلم

شبكة المعلومات الجامعية

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شبكة المعلومات الجامعية

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لم ترد بالأصل

THE ROLE OF HEAVY METAL LEVELS IN THE DEVELOPMENT OF AUTISM IN CHILDREN AND PROPOSING A PREVENTIVE STRATEGY

Submitted By

Manal Mohamed Mohi El Din Mohamed Abd El Hack

M.B.B.Ch., Faculty of Medicine, Cairo University, 1984

Master in Clinical Pathology, Faculty of Medicine, Cairo University, 1994

A Thesis Submitted in Partial Fulfillment

Of

The Requirement for the Doctor of Philosophy Degree

In

Environmental Sciences

Department of Environmental Medical Sciences

Institute of Environmental Studies and Research

Ain Shams University

2020

APPROVAL SHEET

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ABSTRACT

Background: Autism is a developmental disability characterized by severe deficits in social interaction and communication. Although the exact cause of autism spectrum disorder (ASD) is still not known, it is believed that both genetic and environmental factors influence the onset and development of this disorder. **Aim of the study**: To assess the possible environmental risk factors and the levels of aluminum, mercury and lead in the hair of children with ASD. **Patients and methods:** A case control study was carried out. Thirty ASD children were studied in comparison to 30 age- and sex-matched controls. All participants were subjected to a questionnaire for data collection, clinical evaluation and hair sample for measurement of level of aluminum, mercury and lead which reflects past exposure. **Results:** The mean age of the studied autistic children was 6.5±2.4year compared to 5.4±1.8 year in the controls with no significant difference (P>0.05), 76.7% of the cases were boys. This study revealed a higher prevalence of natal and postnatal factors in children with ASD in comparison with unaffected controls. Natal factors studied included difficult labor (56.7% of cases), preterm delivery (20% of cases), caesarean section and diminished oxygen level during delivery (70% and 13 % respectively). Postnatal factors were low birth weight, neonatal jaundice, incubated baby or resuscitated baby. These factors were found in cases with significantly higher difference than in healthy children. Living near to traffic by a distance of (< 500m) between the house and traffic was a risk factor. The use of aluminum cooking utensils and spoons was significantly higher among families of cases than controls. The studied children had significantly higher levels of all the five studied heavy metals in their hair samples ($P < 0.05$) compared to the controls. When compared to the normal levels, cases had significantly higher levels of these heavy metals with the exception of lead level, which although being higher than in the controls, yet was within the normal level.

The mean level of aluminum was significantly higher in cases compared to the control . Mean level of mercury among cases was significantly higher than among controls. Cases also had significantly higher levels of lead compared to controls but they were within the normal levels.

Autistic children were found to have significantly higher hair levels of arsenic than their matched controls.

In the present study, the level of trace element Mg was significantly higher in autistic children and level of manganese was within normal level and with no significant difference when compared to the controls. **Conclusion**: Aluminum ,Mercury ,Arsenic ,Lead and Mg were significantly higher in cases compared to controls.

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LIST OF ABBREVIATIONS

AAP……American Academy of Pediatric
ADHD……Attention Deficit Hyperactivity Disorder
AL…….. Aluminum
Ars……..Arsenic
ASD……Autism Spectrum Disorder
CARS……Childhood Autism Rating Scale
CDC……Centers of Disease Control
CD……Cadmium
CMV……Cytomegalovirus
DSMV……Diagnostic And Statistical Manual fifth edition
GARS……Gilliam Autism Rating Scale
GDM……..Gestational Diabetes Mellitus
Hg…….Mercury
IPI…….Interpregnancy Interval
MCH……Maternal Child Health Care
MCHAT…….Modified Checklist of Autism in Toddlers
Mg……Magnesium
Mn……Manganese
MV……Multivitamin
Pb…….Lead
PM……..Particulate Matter
PUFA……..Polyunsaturated fatty acids