

Effect of Magnesium Supplementation on Hyperactivity in Pediatric Patients with Attention Deficit Hyperactivity Disorder (ADHD)

Thesis

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Summary

Attention deficit hyperactivity disorder (ADHD) is a common neuropsychiatric disorder (*Wang et al., 2011*).

Reports on the prevalence of ADHD/HKD have varied from 0.5% to 16%. It accounts for most mental health referrals of children (*Aguilar et al., 2010*) (*Bange, 2011*).

Traits of inattention, impulsivity, and motor hyperactivity characterize children diagnosed with attention-deficit/hyperactivity disorder (ADHD), whose inhibitory control is reduced (*Adriani et al., 2011*).

There is a high level of comorbidity with developmental and learning problems as well as with a variety of psychiatric disorders. ADHD is highly heritable, although there is no single causal risk factor and non-inherited factors also contribute to its aetiology. The genetic and environmental risk factors that have been implicated appear to be associated with a range of neurodevelopmental and neuropsychiatric outcomes, not just ADHD (*Thapar et al., 2011*).

Attention deficit and hyperactivity disorder (ADHD) is not restricted to children. Abundant evidence from follow-up studies accumulated since the 1970s supports the concept of ADHD in adulthood. Genetic research points to a heritability of 76%, and neuroimaging studies have reported structural and functional brain abnormalities in patients with ADHD. Contrary to popular belief, ADHD is not a culturally bound disorder and has been described worldwide (*Bolea et al., 2011*).

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List of Abbreviations

5-HIAA	5-hydroxyindole acetic acid
AACAP,	American academy of child and adolescent psychiatry
ACC	Anterior cingulate cortex
ACTeRS	ADHD comprehensive teacher rating scale
ADDES	Attention deficit disorders evaluation scale
ADHD	Attention deficit hyperactivity disorder
AMP	Adenosine monophosphate
ATP	Adenosine triphosphate
BASC	Behavior assessment system for children
BPD	Bipolar disorders
CAM	Complementary and alternative medicine
cAMP	Cyclic adenosine monophosphate
CBCL	Child behavior checklist
CD	Conduct disorder
COMT	Catechol-o-methyltransferase
CPT	Continuous-performance test
DA	Dopamine
DAT1	Dopamine transporter gene
DAT-KO	Dat1 knock-out mice
DBH	Dopamine-beta-hydroxylase
DHA	Docosa-hexaenoic acid
DISC	Diagnostic Interview Schedule for Children
dIPFC, vIPFC	Dorsolateral or ventrolateral prefrontal cortex
DOPA	Dihydroxy-phenylalanine

List of Abbreviations

Dopa	Dopa decarboxylase
DRC	Daily Report Cards
DRD2 gene	Dopamine receptor D2 gene
DZ	Dizygotic
EEG	Electro encephalogram
EF	Executive Function
EFAs	Essential fatty acids
EPA	Eicosa-pentaenoic acid
EVT	Expressive Vocabulary Test
FAS	Fetal alcohol \$
FDA	Food and drug administration
F MRI	Functional magnetic resonance imaging
GABA	Gamma amino butyric
HCN	Hyperpolarization-activated cyclic nucleotide-gated
HD	Hyperactive disorder
HTMA	Hair tissue mineral analysis
ICD-10	International Classification of Diseases
ICP-MS	Inductively Coupled Mass Spectroscopy
IH	Intermittent hypoxia
IQs	Intelligence quotient
KABC-II	Kaufman Assessment Battery for Children
KBIT	Kaufman Brief Intelligence Test
KMS	Kansas Marital Satisfaction Scale
KSADS- PL,	Kiddie Schedule for Affective Disorders and Schizophrenia for School Age Children-Present and Lifetime Version

List of Abbreviations

LBW	low birth
LD	Learning Disabilities
LMAT	Locke-Wallace Marital Adjustment Scale
LPHN3	Latrophilin 3
MAO-A and MAO-B	Monoamine oxidase A and B
MBD	Minimal Brain Dysfunction
Mg	Magnesium
Mn	Manganese
MPR	Membrane potential ratio
MSCS	Multi-dimensions Self-Concept Scale
MVPT-R	Motor Free Visual Perception Test Revised
MZ	Monozygotic
NAcc	Nucleus accumbens
NET	Noradrenergic transporter
NMDA	N-methyl D-aspartate
ODD	Oppositional Defiant Disorder
OFC	Orbitofrontal cortex
OSA	Obstructive sleep apnea
PANDAS	Pediatric Autoimmune Diseases Associated with Streptococcal infections
Pb	Lead
PCBS	Polychlorinated Biphenyls
PDICs	Pregnancy, delivery and infancy complications

List of Abbreviations

PET	Positron emission topography
PFC	Prefrontal cortex
PKU	Phenylketonuria
PNMT	Phenylethanolamine N-Methyltransferase
PPVT-III	The Peabody Picture Vocabulary Test-III, Third Edition
PSI	parenting stress index
PTSD	Post-Traumatic Stress Disorder
QEEG	Quantitative EEG
QoL	Quality of life
RD	Reading Disability
RDA	Recommended daily allowance
redox	Reduction oxidation
REM	Rapid eye movement
ROC Curve ()	Receiver Operating Characteristics
ROS	Reactive oxygen species
RTH	Resistance to thyroid hormones
RWD	Reading writing disorder
S.C.T	Sluggish Cognitive Tempo
SCL-	Symptom checklist 90-revised
SCL-90-R	Symptom checklist 90-revised
SDB	Sleep disordered breathing
SEG	Socio-economic groups
SES	Socioeconomic status

List of Abbreviations

SIGN	Scottish Intercollegiate Guidelines Network
SPECT	Single photon emission computed tomography
SSRI	Selective serotonin reuptake inhibit
SUD	Substance use disorder
TCAs	Tricyclic antidepressants
TCPs	Trichlorophenols
TH	Tyrosine hydroxylase
TOLD-P	Test of Language Development-Primary
TOMAL	Test of Memory and Learning
TRPM6	Transient receptor potential melastatin 6
TS	Tourette syndrome
US FDA	United states food and drug administration
VNTR	Variable number of tandem repeats
VTA	Ventral tegmental area
WIAT	Wechsler Individual Achievement Test
WISC	Wechsler intelligence scale for children
WRAML	Wide Range Assessment of Memory and Learning
Zn	Zinc

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قَالُوا سُبْحَانَكَ
لَا عِلْمَ لَنَا
إِلَّا مَا عَلَّمْتَنَا
إِنَّكَ أَنْتَ
الْعَلِيمُ الْحَكِيمُ

صدق الله العظيم
الآية (٣٢) سورة البقرة