

Australasian Journal of Natural Medicine

VOLUME 31 | NUMBER 4 | 2025

THE OFFICAL JOURNAL OF THE AUSTRALIAN TRADITIONAL MEDICINE SOCIETY

In this issue

ADHD feature issue: Exploring risk factors, treatments and naturopathic practices

A primer on Telehealth

Work health and safety psychosocial hazards

ATMS White Paper: The National Code of Conduct for Health Care Workers



ATMS



Bioglan Medlab's Specialty Probiotic Range

Practitioner Formulated | Fridge Free | Scientifically Advanced

- ✓ Fridge-free stability across the range for ease of storage and dispensing
- ✓ Targeted formulations to support key health areas
- ✓ Practitioner-formulated using evidence-based probiotic and nutrient combinations to optimise clinical outcomes



Diarrhoea relief



Digestive discomfort/bloating



Skin & immune



Infants & Children



Rehydration

FOR PRACTITIONER DISPENSING.

www.bioglanmedlab.com.au

Always read the label and follow the directions for use.

BIOGLAN  medlab

The science of good health.

Contents

SUMMER 2025

196

EDITORIAL

S. GRACE & B. McEWEN

ARTICLES



198

NUTRIENT DEFICIENCIES AND
PSYCHOSTIMULANT TREATMENT IN
ADHD: EXPLORING THE OVERLOOKED
CLINICAL INTERFACE

R. LANG



204

EXPLORING THE DYNAMIC,
MULTIDIMENSIONAL RISK FACTORS
OF ADHD

B. McEWEN

212

ADHD & AUTISM SPECTRUM
DISORDERS: THE RISING PREVALENCE
IN FEMALES

G. CAMPBELL



216

EVALUATING PRIMITIVE REFLEXES
IN EARLY CHILDHOOD AS A
POTENTIAL BIOMARKER FOR
DEVELOPMENTAL DISABILITIES

G. LEISMAN & R. MELILLO



222

ADHD AND NARRATIVES OF ILLNESS

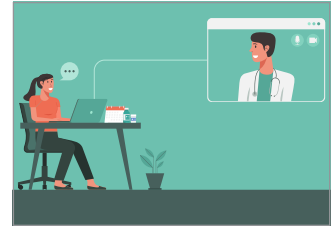
A. GRANT



224

UNCHARTED TERRITORY:
UNDERSTANDING CURRENT
NATUROPATHIC PRACTICES IN
THE CARE OF CHILDREN AND
ADOLESCENTS WITH ADHD

F. MACKENZIE & J. BAYES



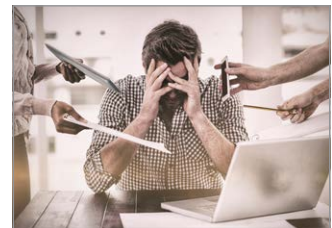
227

A PRIMER ON TELEHEALTH

R. MEDHURST

234

ATMS WHITE PAPER
THE NATIONAL CODE OF CONDUCT FOR
HEALTH CARE WORKERS



236

LAW REPORT
WORK HEALTH AND SAFETY:
PSYCHOSOCIAL HAZARDS

I. PAGURA

NEWS & UPDATES

238

RECENT RESEARCH

249

CONTINUING PROFESSIONAL
EDUCATION

250

PRODUCTS & SERVICES GUIDE



Editorial

Sandra Grace | Editor
Brad McEwen | Member Editorial Board

This special issue of the *Australasian Journal of Natural Medicine* (AJNM), the official journal of the Australian Traditional Medicine Society (ATMS), brings together a collection of articles to enhance and deepen our understanding of Attention Deficit Hyperactivity Disorder (ADHD). This focus is timely, with increasing diagnosis of the condition, especially in females and adults, who were previously overlooked because of different symptom presentations.

Our articles bring together research on prevalence, causes, risk factors, and treatment strategies for ADHD. Gerry Leisman and Robert Melillo's article focuses on the effect of retained primitive reflexes in children, adolescents, and adults and their relationship to autism spectrum disorder, ADHD, and other neurodevelopmental conditions, thereby examining a basis for future treatment alternatives. Retained primitive reflexes throughout early development and adulthood are linked to brain injury and neurobehavioural disorders. The authors posit that cortical maturational delay within specific networks may lead to enhanced growth and maturation in other networks, resulting in asynchronous development and inconsistency in functional skills. They also report the overconnectivity of short-range, more immature connections and underconnectivity of long-range, more mature connectivities and review the relationship between motor and cognitive impairments and retained primitive reflexes. The authors propose inhibiting retained primitive reflexes as a treatment alternative.

A comprehensive overview of the prevalence, symptoms, and risk factors of ADHD is presented by Brad McEwen. These risk factors include genetics, thyroid dysfunction, physical trauma, asthma, the microbiome, gut-brain axis, lead exposure, tobacco smoke, alcohol, preterm birth, family adversity, and exposure to organochlorines, polychlorinated biphenyls, mercury, and organophosphate pesticides. Gabriella Campbell's article focuses on gender differences in diagnoses of ADHD and ASD. The author discusses the different symptom presentations, with females often exhibiting less obvious symptoms, and how females with ADHD and ASD often mask their symptoms, leading to underdiagnosis or misdiagnosis. The author raises the awareness of the need for more nuanced diagnostic criteria that account for gender differences in symptom presentation.

This special issue includes three articles that focus on treatment approaches. Fin McKenzie and Jessica Bayes' article discusses the rising diagnoses in children and adolescents and highlights concerns about reliance on stimulant medication, including potential side effects, stigma, financial strain, and the broader impact on families. The authors draw our attention to the support in the literature for non-pharmacological, multidisciplinary, and holistic care. They argue that naturopathic and complementary medicine approaches may offer cost-effective, safe, patient-centred strategies that could support children and adolescents with ADHD. Airdre Grant also reminds us of the holistic nature of natural medicine practice and the importance of understanding the client's illness narrative when treating clients with ADHD. Not only do we

need to use all the tools available for physical symptoms, such as nervines, exercise recommendations, and bodywork, but also for the emotional support of clients, including a strong referral network to ensure clients receive the best available care. Rebecca Lang's article presents clinical tips for practitioners who are treating clients with ADHD. She highlights the potential metabolic and nutritional implications of psychostimulant medication, including suboptimal levels of iron, zinc, magnesium, and vitamin D, and the emerging research on stimulant-induced appetite suppression, altered gut microbiota, and inflammation along the gut-brain axis and its potential influence on nutrient absorption and utilisation.

Also included in this issue, although not related to its special theme, is a comprehensive review by Robert Medhurst of the functioning, benefits and risks to practitioners and their clients of telehealth as they apply both in general across the health system and specifically to natural medicine practitioners.

The Recent Research section summarises articles involving traditional, integrative, and complementary medicine in the treatment of ADHD that have been published in 2025. We hope you enjoy this special issue of the *Australasian Journal of Natural Medicine* and welcome any comments and feedback on the included articles.

Sandra Grace,
Editor

Brad McEwen,
Member Editorial Board

LETTERS



Dear Editor

Thanks for publishing the white paper on the The National Code of Conduct for Health Care Workers.

It may be of benefit to Members to make an addition to Section 10 (Compliance Checklist) laid out in the article, specifically that Members ensure that the advertising of any therapeutic goods (including things as seemingly innocuous as herbal teas) complies with the Therapeutic Goods Act.

It's quite common for members of our profession to operate a shop on a website that's advertising therapeutic goods that are neither listed or registered with the TGA. To do this is a breach of the Act and penalties apply.

Robert Medhurst
Adelaide Hills Naturopath
PO Box 1477 Victor Harbor SA 5211
0435 487 400
medhurstr@yahoo.com
www.adelaidehillsnaturopath.com.au



The Australian Traditional-Medicine Society Limited (ATMS) was incorporated in 1984 as a company limited by guarantee ABN 46 002 844 233.

ATMS HAS FIVE CATEGORIES OF MEMBERSHIP

Accredited member
Associate member
Student member (free)
Fellow
Life member

MEMBERSHIP AND GENERAL ENQUIRIES

ATMS, PO Box 1027 Meadowbank NSW 2114
Tel: 1800 456 855 Fax: (02) 9809 7570
info@atms.com.au
www.atms.com.au

PRESIDENT

Rebecca Lang | rebecca.lang@atms.com.au

VICE-PRESIDENT

Donna Eddy | donna.eddy@atms.com.au
Chantel Ryan | chantel.ryan@atms.com.au

TREASURER

Cassandra Duffill | cass.duffill@atms.com.au

DIRECTORS

Kathleen Daniel | kathleen.daniel@atms.com.au
Coby du Preez | coby.dupreez@atms.com.au
Sandra Grace | sandra.grace@atms.com.au
Geraldine Headley | geraldine.headley@atms.com.au

ATMS JOURNAL EDITORS

Editor: Sandra Grace
Assistant Editor: Stephen Clarke

ADVERTISING SALES

Michele Short
ATMS Education and Partnerships Manager
T: 1800 456 855
E: michele.short@atms.com.au

Brad McEwen | brad.mcewen@atms.com.au

LIFE MEMBERS

Catherine McEwan - bestowed 09/12/1994
Phillip Turner - bestowed 16/06/1995
Nancy Evelyn - bestowed 20/09/1997
Leonie Cains - bestowed 20/09/1997
Sandi Rogers - bestowed 09/04/1999
Maggie Sands - bestowed 09/04/1999
Freida Bielik - bestowed 09/04/1999
Marie Fawcett - bestowed 09/04/1999
Roma Turner - bestowed 18/09/1999
Bill Pearson - bestowed 07/08/2009
Sandra Grace - bestowed 18/11/2018
Denis Stewart - bestowed 18/11/2019
Christine Pope - bestowed 10/11/2024
Peter Berryman - bestowed 10/11/2024

HALL OF FAME

Dorothy Hall - inducted 17/09/2011
Marcus Blackmore - inducted 17/09/2011
Peter Derig - inducted 17/09/2011
Denis Stewart - inducted 23/09/2012
Garnet Skinner - inducted 22/09/2013
Simon Schot - inducted 10/12/2015

GRAPHIC DESIGN & PRODUCTION

Bubble Creative
T: 0416 087 412
E: design@bubblecreative.com.au

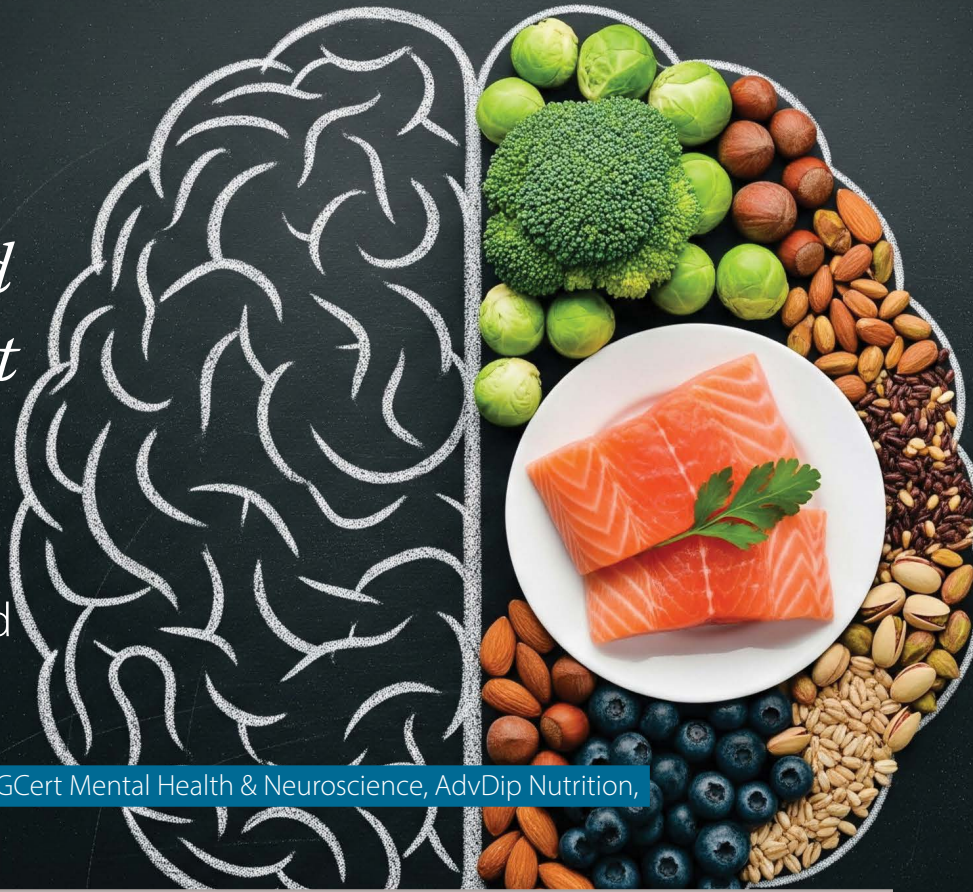
Copyright 2025. All rights reserved. The opinions expressed in this journal are those of each author. Advertisements are solely for general information and not necessarily endorsed by ATMS.



Nutrient Deficiencies and Psychostimulant Treatment in ADHD:

Exploring an Overlooked Clinical Interface

Rebecca Lang, BSc (Naturopathy) | PGCert Mental Health & Neuroscience, AdvDip Nutrition, AdvDip Western Herbal Medicine



Abstract

Although psychostimulant medications remain the gold standard for managing attention-deficit/hyperactivity disorder (ADHD), questions persist regarding their broader metabolic and nutritional implications. While there is limited evidence that these medications directly cause biochemical deficiencies, converging data indicate that individuals with ADHD frequently exhibit suboptimal levels of iron, zinc, magnesium, and vitamin D.¹⁻⁴ Emerging work also suggests that stimulant-induced appetite suppression, altered gut microbiota, and inflammation along the gut-brain axis may secondarily influence nutrient absorption and utilization.⁵⁻⁸ This paper synthesises current findings and highlights key areas for clinical vigilance and future research.

Introduction

ADHD is one of the most common neurodevelopmental disorders worldwide, affecting approximately 5–7% of children and 2–3% of adults.⁹ Its pathophysiology involves complex interactions between genetics, neurotransmitter regulation, and environmental influences.¹⁰ The mainstay of pharmacological treatment—psychostimulant agents such as methylphenidate and amphetamine derivatives—has demonstrated robust efficacy in improving attention, impulsivity, and executive function.^{11,12}

However, beyond behavioural symptom management, clinicians increasingly recognise that ADHD is often accompanied by nutritional and metabolic irregularities.^{13,14} Parents

and practitioners alike observe reduced appetite and weight loss in children receiving stimulants, prompting concerns about micronutrient status.¹⁵ At the same time, independent of medication, individuals with ADHD appear predisposed to deficiencies in key nutrients vital to dopamine and norepinephrine synthesis.¹⁻⁴ Distinguishing medication effects from underlying nutritional vulnerabilities remains an important yet under-explored area in integrative neuropsychiatric care.

Baseline Nutrient Patterns in ADHD

A consistent body of research reports lower serum levels of ferritin (iron stores), zinc, magnesium, and vitamin D among those diagnosed with ADHD compared with neurotypical controls.^{1-4,16}

Iron: Ferritin depletion may impair dopamine synthesis via reduced activity of tyrosine hydroxylase¹⁷. Studies show that lower ferritin correlates with higher ADHD symptom severity.^{18, 19}

Zinc: Zinc is essential for dopaminergic transmission and melatonin metabolism.²⁰ Meta-analyses suggest zinc supplementation can modestly improve hyperactivity and impulsivity.^{21,22}

Magnesium: Low magnesium status is linked to irritability, poor concentration, and sleep disturbance.²³ Several studies report lower erythrocyte magnesium levels in ADHD,^{24,25} and supplementation may improve behaviour.²⁶



Vitamin D: Beyond skeletal health, vitamin D modulates neuroinflammation and neurotransmitter synthesis.²⁷ Deficiency has been associated with increased ADHD risk in observational data.^{28,29}

While causality cannot be established, these findings indicate that nutritional vulnerabilities may contribute to both the pathogenesis and the expression of ADHD symptoms.³⁰

Do ADHD Medications Directly Cause Deficiencies?

Contrary to popular concern, most studies have not found strong evidence that psychostimulant medications themselves directly cause measurable nutrient deficiencies.^{31,32} Controlled trials examining serum micronutrient levels before and after methylphenidate therapy generally show no significant depletion of iron, zinc, or magnesium over six to twelve months.³³

What these medications do affect is appetite regulation. Through dopaminergic and noradrenergic stimulation of hypothalamic satiety centres, methylphenidate and amphetamine derivatives suppress hunger.³⁴ This often results in lower caloric intake, slower growth velocity, and mild weight loss, particularly in the first months of treatment.³⁵ Long-term data indicate partial catch-up growth as tolerance to appetite suppression develops.³⁶

The potential nutritional consequence lies not in direct metabolic interference but in reduced dietary intake—especially of protein- and mineral-rich foods that children naturally avoid when appetite wanes.³⁷ Thus, any observed deficiency may be an indirect medication effect rather than a pharmacological depletion per se.³⁸

Appetite, Growth, and Nutrient Intake

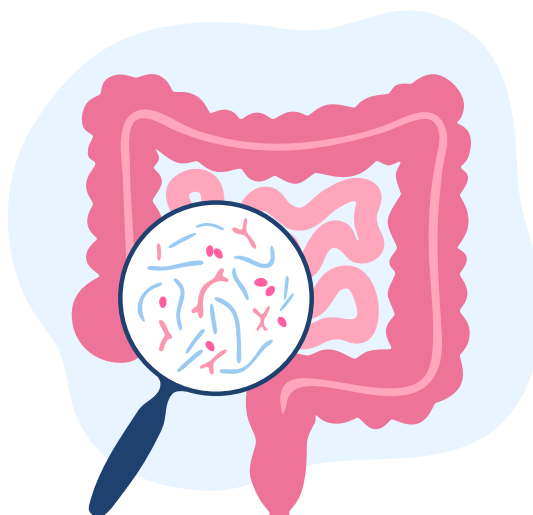
Growth monitoring is a key recommendation in all paediatric ADHD guidelines.³⁹ Studies such as

Al Eid et al. (2024) confirm an initial reduction in weight and BMI during early methylphenidate therapy, often stabilising within twelve months.⁴⁰ While this short-term effect rarely leads to clinically significant malnutrition, ongoing surveillance is prudent for children with restricted eating patterns or pre-existing nutritional compromise.⁴¹

The quality of dietary intake is as important as quantity. A child who skips lunch under the influence of medication may compensate later with carbohydrate-dense snacks rather than balanced meals, inadvertently exacerbating micronutrient insufficiency.⁴² Educating families about nutrient-dense options, timing of medication with meals, and integrating structured supplementation plans can mitigate these risks.^{43,44}

The Gut–Brain Axis and Nutrient Absorption

A more nuanced mechanism linking ADHD medication to nutritional status involves the gut microbiota. Recent metagenomic studies have demonstrated that children with ADHD have distinct microbial profiles even before medication exposure.^{45–47} Reduced diversity and lower abundance of beneficial taxa such as *Bacteroides stercoris* and *Faecalibacterium prausnitzii* are frequently reported.⁴⁸



Psychostimulant use appears to further modulate this microbial environment. Boonchooduang et al. (2025) found that methylphenidate treatment was associated with decreased short-chain fatty acid (SCFA) production—particularly acetate and propionate—key metabolites that maintain mucosal integrity and facilitate mineral absorption.⁵ Similarly, Stiernborg et al. (2023) observed lower microbial evenness in medicated children, with potential downstream effects on vitamin B₁₂ synthesis pathways.⁶ These findings align with research demonstrating that altered SCFA production may impair mucosal health, nutrient absorption, and inflammatory regulation.^{7,8}

Bone Mineral Density and Micronutrient Utilisation

A 2023 systematic review by Burns et al. in *Bone* raised concerns that long-term psychostimulant exposure may reduce bone mineral density (BMD) in children with ADHD.⁹ Although confounding factors such as reduced appetite, lower weight, and physical inactivity complicate interpretation,¹⁰ this observation underscores the interconnectedness of nutrient status, endocrine regulation, and medication effects.¹¹

Reduced BMD could reflect subtle calcium–vitamin D–magnesium imbalances or changes in bone turnover linked to dopaminergic modulation.^{12–14} While causality remains unproven, clinicians should consider periodic assessment of vitamin D and bone markers in children undergoing multi-year stimulant therapy.¹⁵

Integrating Neurobiology and Nutrient Metabolism

The dopaminergic hypothesis of ADHD provides an elegant bridge between neurotransmitter pharmacology and nutrient biochemistry.¹⁶ Dopamine synthesis requires adequate levels of iron (a cofactor for tyrosine hydroxylase),¹⁷ zinc (involved in dopamine transport and receptor modulation),¹⁸ and vitamin B₆ (required for the decarboxylation of L-DOPA).¹⁹



Preliminary evidence suggests that children with higher baseline ferritin or zinc levels may respond better to stimulant treatment,^{20,21} highlighting the importance of nutritional optimisation during pharmacotherapy.²²

The Emerging Role of Vitamin D and Inflammation

Vitamin D deficiency is consistently overrepresented in ADHD cohorts^{23,24}. Beyond its immunomodulatory role, vitamin D interacts with dopaminergic neurons through regulation of tyrosine hydroxylase expression²⁵. Low vitamin D levels have been linked with elevated pro-inflammatory cytokines^{26,27}, potentially exacerbating neuroinflammation—a proposed contributor to ADHD pathophysiology²⁸.

Psychostimulant-related microbiota shifts that reduce SCFA production could indirectly amplify inflammation and compromise vitamin D metabolism via hepatic pathways.^{29,31} Addressing vitamin D insufficiency—through safe sunlight exposure, diet, and monitored supplementation—may therefore support bone and immune health as well as mood, cognition, and attention regulation.³²

Gut Microbiota, Metabolomics, and Future Directions

Advances in metabolomic profiling are beginning to clarify how medications and microbiota interact to influence nutrient handling. Tang et al. demonstrated that modulation of gut microbiota in ADHD animal models normalised peripheral metabolite profiles and improved behavioural outcomes.³³ Additional metabolomic studies support the role of microbiota-derived metabolites in influencing nutrient absorption, neurotransmitter synthesis, and inflammatory pathways relevant to ADHD.^{34,35}

Similarly, studies investigating combined methylphenidate and French maritime pine bark extract interventions suggest that antioxidant and prebiotic effects may stabilise microbial composition and improve behavioural outcomes.³⁶⁻³⁸

Clinical Implications

Baseline nutritional assessment: Evaluate ferritin, zinc, magnesium, and vitamin D before commencing stimulant therapy.

Growth and appetite monitoring: Track height, weight, BMI, and appetite regularly.

Dietary support: Encourage nutrient-dense meals and align medication timing with main meals.

Microbiota consideration: Address dysbiosis through diet and probiotics when indicated.

Individualised supplementation: Prescribe nutrients only where deficiencies are confirmed.

Holistic care: Integrate sleep, exercise, and stress regulation to support neurochemical balance.

Research Gaps

Significant gaps persist. Large-scale longitudinal studies are required to clarify causality between medication use and nutritional changes. Mechanistic links between psychostimulant-induced microbiota shifts and micronutrient absorption remain speculative. Adult ADHD cohorts remain underrepresented, and few interventional trials test whether correcting deficiencies enhances treatment response.

Conclusion

Current evidence indicates that ADHD medications do not directly deplete nutrients but, through appetite suppression, microbiome alterations, and inflammatory influences, can create conditions conducive to deficiency. Integrative management—grounded in nutritional assessment, microbiome awareness, and personalised supplementation—offers a more complete therapeutic model, utilising nutritionists and naturopaths as part of a holistic support team.

Understanding ADHD through a nutritional-neurobiological lens

reframes medication not as an isolated intervention but as part of a broader metabolic ecosystem. As research deepens into gut–brain interactions and nutrient–neurotransmitter dynamics, future paradigms may move toward truly multidisciplinary care—where stimulants, nutrients, and lifestyle interventions work synergistically to optimise brain function and wellbeing.

REFERENCES

1. Skalny AV, Skalnaya MG, Grabeklis AR, et al. Serum zinc, copper, and magnesium levels in children and adolescents with attention deficit hyperactivity disorder (ADHD). *Nutrients*. 2020;12(7):198.
2. Cortese S, Azoulay R, Castellanos FX, et al. Brain imaging of attention-deficit/hyperactivity disorder: a systematic review. *J Atten Disord*. 2012;16(8):279–288.
3. Wang Y, Huang L, Zhang L, et al. Vitamin D deficiency and risk of attention deficit hyperactivity disorder: a meta-analysis. *PLoS One*. 2017;12(2):e0172682.
4. Arnold LE, DiSilvestro RA. Zinc in attention-deficit/hyperactivity disorder. *Nutr Rev*. 2018;76(6):471–490.
5. Boonchooduang N, Louthrenoo O, Chattipakorn N, et al. Impact of psychostimulants on gut microbiota and short-chain fatty acids in children with ADHD. *Sci Rep*. 2025;15:4452.
6. Stiernborg M, Westrin Å, Holmer RH, et al. Gut microbiota composition in medicated and unmedicated children with attention-deficit/hyperactivity disorder. *Brain Behav Immun*. 2023;115:134–145.
7. Morrison DJ, Preston T. Formation of short-chain fatty acids by the gut microbiota and their impact on human metabolism. *J Nutr*. 2016;146(1):1–9.
8. Sukmajaya AC, Wibowo A, Prabowo A, et al. Gut microbiota and attention-deficit/hyperactivity disorder: a systematic review. *Ann Gen Psychiatry*. 2021;20:22.
9. Polanczyk GV, Salum GA, Sugaya LS, Caye A, Rohde LA. Annual research review: A meta-analysis of the worldwide prevalence of mental disorders in children and adolescents. *World Psychiatry*. 2015;14(3):372–381.
10. Faraone SV, Biederman J. Neurobiology of attention-deficit/hyperactivity disorder. *Neurosci Biobehav Rev*. 2016;87:255–270.

This advertisement is available only to
ATMS Accredited Members in accordance with the
Therapeutic Goods Advertising Code.



11. Pan N, Wu Y, Chen R, et al. Neuroimaging markers of stimulant and non-stimulant treatment in ADHD: a comparative analysis. *Psychol Med*. 2024;54:1889–1902.
12. De Crescenzo F, Cortese S, Adamo N, et al. Pharmacological and non-pharmacological treatment of adults with ADHD: a meta-review. *Evid Based Ment Health*. 2016;19(4):164–171.
13. Stevens L, Zhang W, Peck L, et al. Nutritional interventions in ADHD: a review of current evidence. *J Altern Complement Med*. 2019;25(2):112–118.
14. Howard AL, Robinson M, Smith GJ, Ambrosini JL, Piek JP, Oddy WH. ADHD is associated with a 'western' dietary pattern in adolescents. *J Pediatr Psychol*. 2010;35(7):758–768.
15. Safer DJ. Growth effects of stimulant medication for ADHD. *Pediatrics*. 1992;89(4):784–789.
16. Juneja M, Jain R, Singh V, Mallika V. Evaluation of serum ferritin in children with attention deficit hyperactivity disorder. *Indian Pediatr*. 2010;47(11):871–876.
17. Beard JL, Connor JR. Iron status and neural functioning. *Am J Clin Nutr*. 2003;77(4):964–970.
18. Cortese S, Konofal E, Bernardina BD, Mouren MC. Sleep disturbances in ADHD: associations with ferritin levels. *Prog Neuropsychopharmacol Biol Psychiatry*. 2009;33(4):684–692.
19. Akhondzadeh S, Mohammadi MR, Khademi M. Zinc sulfate as an adjunct to methylphenidate for the treatment of attention-deficit/hyperactivity disorder in children: a randomized clinical trial. *BMC Psychiatry*. 2004;4:9.
20. Starobrat-Hermelin B, Kozielec T. The role of magnesium in children with ADHD. *Magnes Res*. 1997;10(2):149–156.
21. Nogovitsina OR, Levitina EV. Magnesium deficiency in children with ADHD and the efficacy of magnesium supplementation. *Magnes Res*. 2005;18(3):327–334.
22. Kozielec T, Starobrat-Hermelin B. Assessment of magnesium and zinc in children with ADHD. *Acta Med Pol*. 1997;38(4):289–295.
23. Cortese S, Moreira-Maia CR, Fleur D, et al. Association between ADHD and obesity: a systematic review and meta-analysis. *J Atten Disord*. 2016;20(3):239–248.
24. Mohammadpour N, Jazayeri S, Tehrani-Doost M, et al. Vitamin D status in children with attention deficit hyperactivity disorder. *Prog Neuropsychopharmacol Biol Psychiatry*. 2018;84(Pt A):84–90.
25. Eyles DW, Burne TH, McGrath JJ. Vitamin D, brain development and schizophrenia. *Front Neuroanat*. 2013;7:18.
26. Rucklidge JJ, Kaplan BJ. Broad-spectrum micronutrient treatment for ADHD: a systematic review. *BMC Psychiatry*. 2015;15:107.
27. Wang Y, Huang L, et al. Vitamin D deficiency and ADHD risk: a review. *PLoS One*. 2017;12:e0172682.
28. Mohammadpour N, Jazayeri S, et al. Vitamin D and ADHD symptom severity. *Prog Neuropsychopharmacol Biol Psychiatry*. 2018;84:84–90.
29. Fernandes de Abreu DA, Eyles D, Féron F. Vitamin D, hormone regulation and immune-brain interactions. *Front Neuroendocrinol*. 2009;30(2):263–291.
30. Cusotto S, Clarke G, Dinan TG, Cryan JF. Psychotropic drugs and the gut microbiome: implications for psychiatry. *Psychopharmacology*. 2018;235(5):1519–1534.
31. Shirvani-Rad S, Gandomkar M, et al. Gut-brain axis in ADHD: a systematic review. *J Atten Disord*. 2022;26(13):1558–1572.
32. Garcion E, Wion-Barbot N, Montero-Menei CN, et al. New clues about vitamin D functions in the nervous system. *J Steroid Biochem Mol Biol*. 2002;83(1–5):77–85.
33. Tang K, Wang Y, et al. Effect of Dimu Ningshen on gut microbiota and serum metabolomics in ADHD. *BMC Complement Med Ther*. 2022;22:233.
34. Shirvani-Rad S, Gandomkar M, et al. Gut microbiota alterations in ADHD: mechanistic insights. *J Atten Disord*. 2022;26:1558–1572.
35. Cusotto S, et al. Psychotropic-microbiota interactions and metabolic consequences. *Psychopharmacology*. 2018;235:1519–1534.
36. Weyns A-S, et al. Combined pine bark extract and methylphenidate effects on gut microbiota in ADHD. *Front Nutr*. 2024;11:225.
37. Trebatická J, Kopasová S, et al. Treatment of ADHD with French maritime pine bark extract (Pycnogenol): a randomized controlled trial. *Eur Child Adolesc Psychiatry*. 2006;15(6):329–335.
38. Rohdewald P. Review of clinical studies on Pycnogenol. *Int J Clin Pharmacol Ther*. 2002;40(4):158–168.
39. American Academy of Pediatrics. Clinical practice guidelines for the diagnosis and management of ADHD. *AAP Guidelines*. 2019.
40. Swanson JM, Elliott GR, Greenhill LL, et al. Effects of stimulant medication on growth rates across 3 years in the MTA follow-up. *Pediatrics*. 2007;120(2):e1102–e1112.
41. Keil MF, Briody JN, Dakin C, et al. Growth and bone density in children receiving stimulant medication for attention-deficit/hyperactivity disorder. *Horm Res Paediatr*. 2019;91(2):109–121.
42. Oner O, Oner P, Cop E, et al. Ferritin levels and their relationship to symptoms of attention-deficit/hyperactivity disorder in children with and without learning disability. *Prog Neuropsychopharmacol Biol Psychiatry*. 2010;34(3):500–505.
43. Aarts E, Ederveen THA, Naaijen J, et al. Gut microbiome in attention-deficit/hyperactivity disorder and its relation to neural reward anticipation. *PLoS One*. 2017;12(9):e0176573.
44. Faraone SV, Buitelaar J, Saylor K, et al. Treatment adherence and persistence in patients with ADHD receiving medication management: a meta-analysis. *J Am Acad Child Adolesc Psychiatry*. 2008;47(10):994–1002.
45. Pomeroy SL, Thompson N, Miller S, et al. Bone mineral density in children with ADHD: the influence of stimulant treatment. *Bone Res*. 2020;8:29.
46. Weaver CM, Peacock M, Huey J, et al. Interactions of vitamin D, magnesium, and calcium in nutritional regulation of bone health. *J Steroid Biochem Mol Biol*. 2019;198:105558.
47. Motyl KJ, Rosen CJ. The unexpected skeletal effects of psychotropic medications. *Bone*. 2020;130:115126.
48. Feuer AJ, Demmer RT, Thai JL, et al. Association between stimulant medication use and bone mass in children and adolescents with ADHD. *J Pediatr*. 2016;178:260–

This advertisement is available only to
ATMS Accredited Members in accordance with the
Therapeutic Goods Advertising Code.



Exploring the Dynamic, Multidimensional Risk Factors of ADHD



Bradley McEwen | PhD, MHSc (Hum Nutr), MPH, BHSc, AdvDipNat, DBM, DNutr, DSM, Fellow ATMS, Naturopath Nutritionist, and Mentor. Adjunct Senior Lecturer, Faculty of Health, Southern Cross University.

Abstract

Attention-Deficit/Hyperactivity Disorder (ADHD) is not a fixed childhood disorder. It is a dynamic, lifelong, multifactorial condition. The hallmarks of ADHD are inattention, impulsivity, and hyperactivity. This article provides a brief overview of the prevalence and symptoms of ADHD and explores the various risk factors of ADHD, including genetics, thyroid dysfunction, physical trauma, asthma, microbiome, gut-brain axis, lead exposure, tobacco smoke, alcohol, and other risk factors linked with ADHD (such as preterm birth, family adversity, and exposure to organochlorines, polychlorinated biphenyls, mercury, and organophosphate pesticides).

Introduction

Attention-deficit hyperactivity disorder (ADHD) is not a new condition.¹ The signs and symptoms of ADHD have been described in medical literature since the 1770s.¹ ADHD is a common neurodevelopmental disorder that is widely observed across the globe.² ADHD is one of the most common childhood disorders³ and represents one of the most common disorders in individuals observed from childhood through to adulthood.^{2,4,5}

The hallmarks of ADHD are inattention,^{2,4,5} impulsivity,^{2,4,5} and hyperactivity,^{2,4,5} which significantly affect the cognitive,² behavioural,² and emotional² aspects of individuals. Inattention, hyperactivity, and impulsivity of ADHD can be described as actions that are premature and lacking in thought (impulsivity), excessive and restless movement (hyperactivity),

and a disorganised approach that hinders sustained effort (inattention).⁵ Inattention refers to difficulty maintaining focus on tasks and activities requiring organisational skills, often due to challenges in understanding and processing information.⁴ Hyperactivity involves excessive movement or restlessness, such as fidgeting or inappropriate physical activity.⁴ Impulsivity is characterised by actions or speech that occur without thought.⁴ The characterisations of ADHD highlight difficulties and challenges with self-control and self-regulation, along with a tendency to act without considering potential consequences.⁴

There are numerous risk factors for ADHD, some of which include genetics,⁶ thyroid dysfunction,⁷ physical trauma,⁸ asthma,⁹ microbiome,⁵ gut-brain axis, lead exposure,^{10,11} tobacco smoke,¹²⁻¹⁴ alcohol consumption,^{14,15} preterm

birth,¹⁶ family adversity,¹⁷ and exposure to organochlorines,¹⁸ polychlorinated biphenyls,^{10,11} mercury,¹⁰ and organophosphate pesticides.^{10,19}

The economic and wellbeing costs of ADHD in Australia are estimated to be \$20 billion annually.²⁰ It is timely for Australia to move towards a more ethical, evidence-informed, and equitable approach to care for people with ADHD.²¹ This article briefly covers the prevalence and symptoms of ADHD and explores the risk factors linked with it.

Prevalence and incidence of ADHD

ADHD affects 7.2% of children worldwide, with symptoms that may persist for 40% to 60% of a child's life.² The prevalence among adults is around 2.6%.^{1,2} ADHD is present in roughly 6-10% of children and adolescents in Australia, as well as 2-6% of the adult



population.²⁰ Based on these rates and current demographic data, it is estimated that at least 800,000 individuals in Australia are living with ADHD.²⁰ ADHD occurs more frequently in boys than in girls,^{3,4,22} with the prevalence in boys almost twice that of girls, recorded at 10% for boys and 5% for girls.⁴ ADHD represents one of the most common disorders in individuals that progress from childhood through adulthood.^{2,4,5} Something to note is that between 2013 and 2020, the incidence of ADHD diagnoses among Australians more than doubled.²¹

A retrospective cohort study in the United States examined the rates of new ADHD diagnoses among adolescents and adults in clinical settings from 2016 to 2023.²³ The study involved 144,103 patients. Among them, 16% were adolescents and 84.0% were adults. The average age of participants was 33.8

years (SD = 12.0). A large portion of the participants were female (68.8%) and identified as white (82.2%). The total incidence of new ADHD diagnoses during the observation period was 7.2%, equivalent to 10,434 new diagnoses.²³ Overall, the study's findings highlight variations in ADHD incidence rates in recent years, with clear trends for both adolescents and adults. A decline in ADHD diagnoses was observed among adults from 2016 to 2020 and among adolescents from 2016 to 2018. The incidence rate for adolescents remained steady in the following years, while it increased for adults between 2020 and 2023.²³ By 2022-2023, around 470,000 individuals had been prescribed medications for ADHD, reflecting an increase of nearly 300% over the span of a decade.²¹ This significant rise, especially notable among adults, is ascribed to heightened public awareness, intensified by social media platforms.²¹

Symptoms of ADHD

The symptoms of ADHD lead to clinically meaningful challenges related to attention, hyperactivity, and impulsivity which do not align with an individual's chronological or developmental age.²⁰ Some of the symptoms of ADHD include inattention,^{2,4,5,22} impulsivity,^{2,4,5,22} and hyperactivity,^{2,4,5,22} along with emotional dysregulation,^{6,24} anxiety,^{2,20} depression,²⁰ bipolar disorder,^{2,20} learning difficulties,^{2,20} difficulties in reading, written expression or mathematics,²⁰ language disorders,²⁰ autism spectrum,^{2,20} oppositional defiant disorder,²⁰ Tourette's syndrome,² conduct disorder,³ personality disorders,² schizophrenia,² substance use,²⁰ antisocial behaviour,³ and epilepsy.²⁰

The symptoms of ADHD impair various areas of functioning in people with the condition, such as academic

This advertisement is available only to
ATMS Accredited Members in accordance with the
Therapeutic Goods Advertising Code.



performance,^{20,22} occupational performance,²⁰ family relationships,²⁰ intimate relationships,²⁰ social relationships,^{20,22} psychological wellbeing,²⁰ self-perception,²⁰ self-worth or self-esteem,²⁰ capacity to perform daily living tasks,²⁰ and engagement in recreational activities.²⁰

Changes in motivation and reinforcement processing, which may contribute to certain symptoms of emotional dysregulation, have also been observed in individuals with ADHD.⁶ Children diagnosed with ADHD frequently prefer immediate rewards over delayed ones and tend to show reduced sensitivity to reinforcement, and their reaction to a reward may diminish more quickly than that of their unaffected counterparts.⁶ Children diagnosed with ADHD often experience considerable deficiencies in both learning and social abilities, potentially leading to long-lasting difficulties in personality growth and development, communication with others, and adaptation to social environments.²

Risk factors of ADHD

ADHD is a dynamic, complex, and multidimensional condition, with multifactorial causes. ADHD is rarely caused by a single genetic or environmental risk factor; instead, most cases result from the combined and cumulative effect of multiple genetic and environmental influences, each playing its part,¹ like the pieces of a puzzle. After reviewing the literature, many risk factors for ADHD have been identified. This section focuses on the following risk factors: genetics,⁶ thyroid dysfunction,⁷ physical trauma,⁸ asthma,⁹ microbiome,⁵ gut-brain axis, lead exposure,^{10,11} tobacco smoke,¹²⁻¹⁴ alcohol,^{14,15} preterm birth,¹⁶ family adversity,¹⁷ and exposure to organochlorines,¹⁸ polychlorinated biphenyls,^{10,11} mercury,¹⁰ and organophosphate pesticides.^{10,19}

Genetics and ADHD

ADHD has a strong genetic component. Research involving twins, families, and adopted children or siblings shows



that heritability of ADHD ranges from 60% to 90%.⁶ Family studies have consistently revealed that the rates of ADHD are significantly higher (ranging from twofold to eightfold increased risk) in parents and siblings of affected individuals than those of relatives of unaffected individuals. Additionally, twin studies indicate that monozygotic twin pairs exhibit considerably greater concordance rates for ADHD than their dizygotic counterparts.²⁵ Furthermore, adoption studies have demonstrated elevated rates of ADHD among the biological parents of adoptees with ADHD, compared to both the adoptive parents of these individuals and the parents of those without ADHD.²⁵ Genes can influence sensitivity to environmental risks (gene-environment interaction).²⁵

Thyroid dysfunction and ADHD

Maternal thyroid dysfunction may damage foetal brain development.²⁶ Research shows a link between maternal hypothyroidism and the likelihood of ADHD in children.⁷ A comprehensive nationwide cohort study included 1,260 children under the age of 12 years with a confirmed diagnosis of congenital hypothyroidism and no previous diagnosis of any neurodevelopmental disorders. The findings revealed that children diagnosed with congenital hypothyroidism exhibited nearly a two-fold increased risk of ADHD.⁷ A population-based cohort study examined 857,014 singletons who were alive and living in Denmark at the age of 3 years.²⁷ Among these, 30,295 singletons (3.5%) were born to mothers experiencing thyroid dysfunction. The diagnosis and

treatment of maternal hyperthyroidism for the first time after the child's birth showed an increased risk of ADHD in the child (adjusted HR 1.23; 95% CI 1.05-1.44). Children whose mothers were diagnosed and treated for thyroid dysfunction for the first time post-birth may have been subjected to abnormal levels of maternal thyroid hormone that were already present during pregnancy.²⁷ A case-cohort study was conducted within the Danish National Birth Cohort (1997-2003). The prevalence of abnormal maternal thyroid function in the sub-cohort was 12.5%. In girls, isolated low free thyroxine levels were linked to ADHD (aHR = 2.3 [CI 1.2-4.3]), whereas no association was observed in boys.²⁶

Physical trauma and ADHD

The combination of high levels of physical activity, impulsivity, and inattention increases the risk of falls and other accidents.⁸ Additionally, children diagnosed with ADHD often act without sufficient awareness or consideration of their surroundings, which makes them more susceptible to unintentional injuries and traumas than in the general population.⁸ A research study investigated the prevalence of ADHD symptoms and the related risk factors among children (aged 3-16 years) who were admitted to the Emergency Department as a result of trauma.⁸ The trauma patients were categorised into two groups: those who had been diagnosed with ADHD and those who had not. The factors that heightened the risk of ADHD included admission due to extremity traumas ($P < 0.001$), prior Emergency Department admissions for traumas ($P < 0.001$), and having a



family member who had previously been diagnosed with ADHD ($P < 0.001$).

A Taiwanese study investigated the link between traumatic brain injury in early childhood and the subsequent development of ADHD.²⁸ The analysis utilised data from the National Health Insurance Research Database, which contains health care records of over 99% of the Taiwanese population. Children who experienced traumatic brain injury during early childhood were selected from 1998 to 2008, and their ADHD status was assessed and compared to a group without traumatic brain injury. The group of children with traumatic brain injury showed a significantly higher rate of ADHD than the control group ($P < 0.001$). Additionally, ADHD diagnoses in the traumatic brain injury group were made at an earlier age than in the control group. Cox regression analysis showed that the highest hazard

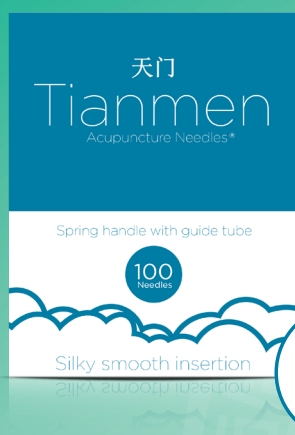
ratios for ADHD were linked to multiple traumatic brain injury incidents, severe traumatic brain injury, and occurrences of traumatic brain injury before the age of 1 year.²⁸

Asthma and ADHD

Children diagnosed with asthma face an increased risk of experiencing depression and anxiety,²⁹ and emerging evidence indicates they may also be susceptible to ADHD.^{9,29} A systematic review and meta-analysis was conducted to explore the relationship between asthma and ADHD. This review encompassed 25 studies focusing on the asthma-ADHD connection, of which 17 revealed significant positive correlations, while one indicated a negative correlation: 17 out of 25 studies were based on population data, 19 out of 25 were either cross-sectional or cohort studies, and 7 out of 25 exhibited a low risk of bias. A meta-analysis of 23 of these studies

demonstrated a significant association between asthma and ADHD, with an odds ratio (OR) of 1.52 (1.42-1.63), $P < 0.001$.²⁹ Another systematic review and meta-analysis identified datasets comprising a total of 210,363 individuals diagnosed with ADHD and 3,115,168 individuals without ADHD.⁹ The pooled unadjusted odds ratio was calculated to be 1.66 (95% confidence interval [CI] 1.22-2.26), while the pooled adjusted OR was found to be 1.53 (1.41-1.65). These findings suggest a significant correlation between asthma and ADHD.⁹ A population-based research study included 1,575,377 individuals who were born from 1 January 1992 to 31 December 2006.⁹ Among these, 259,253 individuals (16.5%) were diagnosed with asthma, while 57,957 individuals (3.7%) had ADHD. A significant association was found between asthma and ADHD, with an odds ratio of 1.60 (95% CI: 1.57-1.63).⁹

天门 Tianmen Acupuncture Needles®



Spring Handle

- Key Features:
- Extra-long spring handle
- Greater control & manoeuvrability
- Elegant sleek shaft
- Super sharp tip



J-Type **NEW**

- Key Features:
- Lightweight plastic handle
- Tabless, one-click release for effortless one-hand insertion
- Super smooth glide
- Ultra-fine tip for precision



ACUPUNCTURE SUPPLIES & EQUIPMENT

Shipping Australia Wide • Free Needle Samples • Always In Stock • Sourced By Practitioners

www.sanacupuncture.com.au

Subscribe to our mailing list for discounts, offers & updates.



Microbiome, gut-brain axis and ADHD

Recent findings suggest that gut microbiota may play a critical role in the pathophysiology of ADHD.^{5,30} The gut microbiota is recognised for its role in influencing brain function and behaviour through a bidirectional communication system, known as the microbiota-gut-brain axis.^{5,30,31} This axis affects brain function and behaviour via neural, immune, and endocrine pathways.⁵ In children and adolescents diagnosed with ADHD, the microbiome-gut-brain axis plays a significant role in the pathophysiological processes of neuroinflammation and oxidative stress, which contribute not only to underpinning the primary symptoms of ADHD but also to related comorbid conditions.³¹ A multitude of studies have demonstrated that changes in microbial abundance, richness, and diversity correlate with various conditions, such as ADHD, anxiety, depression, and autism spectrum disorder.⁵ Evidence indicates that individuals with ADHD frequently display a lower diversity of gut microbiota in comparison to healthy individuals, implying a connection between diminished microbial diversity and ADHD.⁵ A study found notable differences in gut microbiota composition and short-chain fatty acid (SCFA) profiles between children aged 6 to 18 years with ADHD and healthy control subjects. In particular, individuals with ADHD showed reduced alpha diversity and lower concentrations of essential SCFAs, including acetic, propionic, isobutyric, isovaleric, and valeric acids. These changes in gut microbiota and SCFA concentrations indicate a unique microbial and metabolic profile associated with individuals diagnosed with ADHD.⁵ The impact of SCFAs on ADHD may also involve the regulation of neurotransmitters, particularly serotonin (5-HT), which is primarily generated in the gastrointestinal tract. Roughly 90% of serotonin is produced within the intestinal epithelium, and this process is influenced by metabolites derived from gut microbiota.⁵

Lead exposure and ADHD

Lead exposure through water, soil, and other sources remains a global health concern.³² Exposure to lead has been linked to ADHD.^{10,11} Blood lead levels exceeding 10 µg/dL have consistently been associated with ADHD and associated behaviours. Furthermore, lead exposure, even at lower concentrations (< 10 µg/dL), has been linked to decreased cognitive abilities.³² A population survey conducted in the United States found that children with blood lead levels over 2 µg/dL were more likely to exhibit ADHD symptoms than those with blood lead levels below 0.7 µg/dL.³ The study found a significant dose–response relationship between lead exposure and ADHD, with the highest quintile of blood lead concentration showing a significantly higher risk of ADHD.³

Tobacco smoke, alcohol, and ADHD

Prenatal exposure to tobacco^{12,14} and alcohol^{14,15} are common risk factors linked to ADHD in both human and animal models.¹⁴ Numerous studies have identified a significant correlation between exposure to environmental tobacco smoke during the prenatal period and the occurrence of ADHD or behaviours associated with ADHD.³ Prenatal tobacco exposure was significantly associated with ADHD (OR = 2.5; 95% CI, 1.2–5.2).³ One study examined the combined effects of genetic factors and prenatal substance exposure on various ADHD subtypes.¹⁴ Significant interactions were identified between prenatal smoking exposure and genetic variations at the Dopamine Transporter 1 (DAT1) gene and dopamine D4 receptor gene (DRD4) loci in children diagnosed with either the DSM-IV combined subtype or the population-defined ADHD combined subtypes. The likelihood of receiving a DSM-IV combined subtype diagnosis was 2.9 times higher in twins who inherited the DAT1 440 allele and were exposed to prenatal smoking, than in their unexposed peers without the risk allele. For the population-defined subtype the odds ratio was 2.6. Moreover, the odds

ratios for the DRD4 seven-repeat allele were reported as 3.0 for the population-defined subtype and 2.8 for the DSM-IV combined ADHD subtypes. In children exposed to both alleles, the odds ratio was 9.0 (with a 95% CI of 2.0–41.5) for the population-defined combined subtypes.¹⁴

A retrospective, hospital-based, case-control study was conducted involving 280 ADHD cases and 242 non-ADHD controls across both genders.³³ The ADHD cases showed a 2.1-fold increase (95% confidence interval = 1.1–4.1; P = 0.02) in the likelihood of having been exposed to cigarette smoke, and a 2.5-fold increase (95% confidence interval = 1.1–5.5; P = 0.03) in the likelihood of having been exposed to alcohol in utero compared to the non-ADHD control subjects.³³

An Australian study investigated how maternal alcohol use disorder influences the prevalence of ADHD in offspring, using a children-of-twins methodology.³⁴ The analysis utilised diagnostic telephone interview data from high-risk families, specifically female monozygotic and dizygotic twins who were either concordant or discordant for alcohol use disorder as parents, alongside control families selected from a large Australian twin cohort. Logistic regression models were applied to the data. The results showed that children of twins with a history of alcohol use disorder, as well as those from non-alcohol use disorder monozygotic twins whose co-twin had alcohol use disorder, had a significantly higher likelihood of developing ADHD than children from control families.³⁴ Additionally, people with foetal alcohol spectrum disorder are at greater risk of ADHD.²⁰

Other risk factors for ADHD

Other risk factors for ADHD have been noted in the literature, including pre-term birth,¹⁶ extremely preterm birth,²⁰ extremely low birth weight,²⁰ and people with foetal alcohol spectrum disorder,²⁰ family adversity,¹⁷ and children in out-of-home care²⁰ to be associated with an increased risk of ADHD. Additionally,



people with autism,²⁰ intermittent explosive disorder,²⁰ oppositional defiant disorders,²⁰ anxiety,²⁰ epilepsy,²⁰ intellectual disability,²⁰ substance use disorder,²⁰ disordered eating,²⁰ problem gambling,²⁰ internet addiction,²⁰ tic disorders,²⁰ sleep disorders,²⁰ and atopic dermatitis³⁵ have been associated with an increased risk of ADHD.

Environmental factors, such as prenatal exposure to organochlorines¹⁸ and prenatal polychlorinated biphenyls (PCBs),³⁶ exposure to PCBs,^{10,11} exposure to mercury,¹⁰ and childhood exposure to organophosphate pesticides^{10,19} have also been noted as risk factors for ADHD.

Conclusion

In summary, ADHD is a complex, lifelong condition influenced by multiple factors, characterised by inattention, impulsivity, and hyperactivity. A variety

of risk factors has been associated with ADHD, including genetic predispositions, thyroid dysfunction, physical trauma, asthma, the microbiome, exposure to lead, tobacco smoke, alcohol, and additional factors such as preterm birth, familial adversity, and contact with organochlorines, polychlorinated biphenyls, mercury, and organophosphate pesticides. It is recommended that further research be conducted to investigate the risk factors contributing to the development of ADHD.

REFERENCES

1. Faraone SV, Banaschewski T, Coghill D, et al. The World Federation of ADHD International Consensus Statement: 208 Evidence-based conclusions about the disorder. *Neurosci Biobehav Rev* 2021; 128: 789-818.
2. Su W, Jia H, Yang L, et al. The etiology of attention deficit disorder with hyperactivity: A protocol for an umbrella review. *PLoS One* 2025; 20(1): e0318141.
3. Braun JM, Kahn RS, Froehlich T, et al. Exposures to environmental toxicants and attention deficit hyperactivity disorder in U.S. children. *Environ Health Perspect* 2006; 114(12): 1904-9.
4. Du C, Zhao DZ, Ganti L. Prevalence of Undiagnosed Attention Deficit Hyperactivity Disorder. *Health Psychol Res* 2025; 13: 128096.
5. Steckler R, Magzal F, Kokot M, et al. Disrupted gut harmony in attention-deficit/hyperactivity disorder: Dysbiosis and decreased short-chain fatty acids. *Brain, behavior, & immunity - health* 2024; 40: 100829.
6. Gallo EF, Posner J. Moving towards causality in attention-deficit hyperactivity disorder: overview of neural and genetic mechanisms. *Lancet Psychiatry* 2016; 3(6): 555-67.
7. Lin HY, Liang CS, Tsai SJ, et al. Congenital hypothyroidism and risk of subsequent autism spectrum disorder and attention-

Rener Health

PRODUCTS

Now delivering nationwide - Experience the Rener Difference!

Rener Health Products is a proudly Australian, family-owned distributor specialising in premium natural, complementary, and practitioner-only healthcare products. For 25+ years, we've supported thousands of clinics, pharmacies and wholefood stores across Western Australia. Now, we're bringing our trusted service, extensive range, and expert support to practitioners throughout Australia.

Why Choose Rener Health Products?



1300 883 716



ORDERS@RENERHEALTH.COM



WWW.MYRENER.COM.AU



- deficit/hyperactivity disorder in Taiwan. *Psychiatry Clin Neurosci* 2024; 78(11): 721-5.
8. Yazici R, Mutlu H, Kilicaslan C, et al. Prevalence and risk factors of attention deficit hyperactivity disorder in children admitted to the emergency department due to traumas. *Ulus Travma Acil Cerrahi Derg* 2024; 30(9): 664-70.
 9. Cortese S, Sun S, Zhang J, et al. Association between attention deficit hyperactivity disorder and asthma: a systematic review and meta-analysis and a Swedish population-based study. *Lancet Psychiatry* 2018; 5(9): 717-26.
 10. Polańska K, Jurewicz J, Hanke W. Review of current evidence on the impact of pesticides, polychlorinated biphenyls and selected metals on attention deficit / hyperactivity disorder in children. *International journal of occupational medicine and environmental health* 2013; 26(1): 16-38.
 11. Eubig PA, Aguiar A, Schantz SL. Lead and PCBs as risk factors for attention deficit/ hyperactivity disorder. *Environ Health Perspect* 2010; 118(12): 1654-67.
 12. Milberger S, Biederman J, Faraone SV, et al. Further evidence of an association between maternal smoking during pregnancy and attention deficit hyperactivity disorder: findings from a high-risk sample of siblings. *J Clin Child Psychol* 1998; 27(3): 352-8.
 13. Milberger S, Biederman J, Faraone SV, et al. Is maternal smoking during pregnancy a risk factor for attention deficit hyperactivity disorder in children? *Am J Psychiatry* 1996; 153(9): 1138-42.
 14. Neuman RJ, Lobos E, Reich W, et al. Prenatal smoking exposure and dopaminergic genotypes interact to cause a severe ADHD subtype. *Biol Psychiatry* 2007; 61(12): 1320-8.
 15. Jacob T, Waterman B, Heath A, et al. Genetic and environmental effects on offspring alcoholism: new insights using an offspring-of-twins design. *Arch Gen Psychiatry* 2003; 60(12): 1265-72.
 16. Bhutta AT, Cleves MA, Casey PH, et al. Cognitive and behavioral outcomes of school-aged children who were born preterm: a meta-analysis. *Jama* 2002; 288(6): 728-37.
 17. Counts CA, Nigg JT, Stawicki JA, et al. Family adversity in DSM-IV ADHD combined and inattentive subtypes and associated disruptive behavior problems. *J Am Acad Child Adolesc Psychiatry* 2005; 44(7): 690-8.
 18. Sagiv SK, Thurston SW, Bellinger DC, et al. Prenatal organochlorine exposure and behaviors associated with attention deficit hyperactivity disorder in school-aged children. *Am J Epidemiol* 2010; 171(5): 593-601.
 19. Kuehn BM. Increased risk of ADHD associated with early exposure to pesticides, PCBs. *Jama* 2010; 304(1): 27-8.
 20. May T, Birch E, Chaves K, et al. The Australian evidence-based clinical practice guideline for attention deficit hyperactivity disorder. *The Australian and New Zealand journal of psychiatry* 2023; 57(8): 1101-16.
 21. Bradlow RC, Armstrong F, Ogden E. Adult attention deficit hyperactivity disorder in Australia: how its current commercial model for diagnosis and treatment is encouraging misdiagnosis. *Medical Journal of Australia* 2025; 223(8): 384-6.
 22. Davies W. Sex differences in attention Deficit Hyperactivity Disorder: candidate genetic and endocrine mechanisms. *Front Neuroendocrinol* 2014; 35(3): 331-46.
 23. Paul ML, Sheth P, Davis R, et al. Incidence of Attention-Deficit/Hyperactivity Disorder Between 2016 and 2023: A Retrospective Cohort. *Psychiatr Res Clin Pract* 2025; 7(1): 18-24.
 24. Shaw P, Stringaris A, Nigg J, et al. Emotion dysregulation in attention deficit hyperactivity disorder. *Am J Psychiatry* 2014; 171(3): 276-93.
 25. Thapar A, Cooper M, Jefferies R, et al. What causes attention deficit hyperactivity disorder? *Arch Dis Child* 2012; 97(3): 260-5.
 26. Andersen SL, Andersen S, Vestergaard P, et al. Maternal Thyroid Function in Early Pregnancy and Child Neurodevelopmental Disorders: A Danish Nationwide Case-Cohort Study. *Thyroid* 2018; 28(4): 537-46.
 27. Andersen SL, Laurberg P, Wu CS, et al. Attention deficit hyperactivity disorder and autism spectrum disorder in children born to mothers with thyroid dysfunction: a Danish nationwide cohort study. *Bjog* 2014; 121(11): 1365-74.
 28. Chang HK, Hsu JW, Wu JC, et al. Traumatic Brain Injury in Early Childhood and Risk of Attention-Deficit/Hyperactivity Disorder and Autism Spectrum Disorder: A Nationwide Longitudinal Study. *J Clin Psychiatry* 2018; 79(6).
 29. Kaas TH, Vinding RK, Stokholm J, et al. Association between childhood asthma and attention deficit hyperactivity or autism spectrum disorders: A systematic review with meta-analysis. *Clin Exp Allergy* 2021; 51(2): 228-52.
 30. Cickovski T, Mathee K, Aguirre G, et al. Attention Deficit Hyperactivity Disorder (ADHD) and the gut microbiome: An ecological perspective. *PLoS One* 2023; 18(8): e0273890.
 31. Checa-Ros A, Jeréz-Calero A, Molina-Carballo A, et al. Current Evidence on the Role of the Gut Microbiome in ADHD Pathophysiology and Therapeutic Implications. *Nutrients* 2021; 13(1).
 32. Nigg JT, Nikolas M, Mark Knottnerus G, et al. Confirmation and extension of association of blood lead with attention-deficit/ hyperactivity disorder (ADHD) and ADHD symptom domains at population-typical exposure levels. *J Child Psychol Psychiatry* 2010; 51(1): 58-65.
 33. Mick E, Biederman J, Faraone SV, et al. Case-control study of attention-deficit hyperactivity disorder and maternal smoking, alcohol use, and drug use during pregnancy. *J Am Acad Child Adolesc Psychiatry* 2002; 41(4): 378-85.
 34. Knopik VS, Heath AC, Jacob T, et al. Maternal alcohol use disorder and offspring ADHD: disentangling genetic and environmental effects using a children-of-twins design. *Psychol Med* 2006; 36(10): 1461-71.
 35. Xu YC, Wang JP, Zhu WJ, et al. Childhood atopic dermatitis as a precursor for developing attention deficit/hyperactivity disorder. *Int J Immunopathol Pharmacol* 2020; 34: 2058738420962902.
 36. Verner MA, Hart JE, Sagiv SK, et al. Measured Prenatal and Estimated Postnatal Levels of Polychlorinated Biphenyls (PCBs) and ADHD-Related Behaviors in 8-Year-Old Children. *Environ Health Perspect* 2015; 123(9): 888-94.



BUSINESS SUCCESS WEEKEND

Two highly popular events – *Transition to Practice* and *Optimise Your Business* – are touring Australia in 2026!

Whether you're just starting out or ready to expand your clinic, the ATMS Business Success Weekend is designed to support your growth.

Across two dynamic and practical days, you'll discover expert strategies, real-world insights, and meaningful connections to help you build, grow, and scale your natural medicine practice with confidence.

Plan your Business Success Weekend to suit you, by attending one day or both, plus practitioners can join our **FREE** networking event for a chance to connect with your local peers.

EARLY BIRD TICKETS ARE ON SALE NOW!

Secure your spot in your city:

7-8 FEBRUARY
SYDNEY | REGISTER NOW

7-8 MARCH
GOLD COAST | REGISTER NOW

11-12 APRIL
HOBART | REGISTER NOW

23-24 MAY
PERTH | REGISTER NOW

25-26 JULY
BRISBANE | REGISTER NOW

29-30 AUGUST
ADELAIDE | REGISTER NOW

10-11 OCTOBER
MELBOURNE | REGISTER NOW

SPEAKERS INCLUDE:

REBECCA LANG,
ATMS PRESIDENT



ANNIE GIBBINS,
ATMS CEO



PAST ATTENDEES:

“This seminar changed my mindset on business growth! I now have clear strategies to increase revenue and improve client retention.”

OPTIMISE YOUR BUSINESS
ATTENDEE

“All presenters were experts in their natural health and business modalities to help transition students into their future businesses. Such a caring, passionate, and fun group of experts for ATMS.”

TRANSITION TO PRACTICE
ATTENDEE



FIND OUT MORE
at atms.com.au/events

1800 456 855





ADHD & Autism *Spectrum Disorders:*

The rising prevalence in females

Gabriella Campbell | bioceuticals.com.au

This article is reproduced here with the kind permission of BioCeuticals.



Abstract

ADHD is characterised by presentations of inattention and/or impulsivity-hyperactivity. ASD is defined by social interaction and communication challenges and restrictive-repetitive behaviours with sensory sensitivity and interest differences. ADHD and ASD are diagnosed more often in males due to different symptom presentations, with females often exhibiting less obvious symptoms. Females with ADHD and ASD often mask their symptoms, leading to underdiagnosis or misdiagnosis.

Attention-deficit hyperactivity disorder (ADHD) and autism spectrum disorder (ASD) are two neurodevelopmental disorders that typically commence in childhood.(1,2) ADHD is characterised by presentations of inattention and/or impulsivity-hyperactivity.(3) ASD is defined by social interaction and communication challenges and restrictive-repetitive behaviours with sensory sensitivity and interest differences, but there may also be attention difficulties and hyperactivity.(3,4)

Research suggests two-thirds of those with ADHD demonstrate symptoms of ASD and that approximately 30-50% of those with ASD also demonstrate symptoms of ADHD, making these conditions strongly intertwined.(5) Both ADHD and ASD frequently coexist in families with no primary cause being noted. Interestingly, numerous environmental and genetic factors are believed to contribute, including genes involved in the transportation and metabolism of the neurotransmitters, serotonin, dopamine, and noradrenaline.(3,6,7) Additionally, risk factors during pregnancy have been noted for ADHD and include low birth weight, maternal

smoking, allergies, bacterial or viral infections, and certain autoimmune diseases.(6)

ADHD and ASD in males and females

To date, a higher prevalence of ADHD has been seen in boys, who are up to nine-times more likely to be diagnosed than girls,(8) and in ASD boys are three times more likely to receive a diagnosis than girls. These figures highlight a significant bias in overall diagnosis between genders.(9) It is now known that females tend to camouflage or compensate for symptoms of ADHD and ASD.

Both ADHD and ASD are linked to genetic and environmental factors, causing issues like gastrointestinal problems, oxidative stress, and nutrient deficiencies. Nutritional support and herbal remedies (e.g., Bacopa monnieri, Panax ginseng, Ginkgo biloba) can help manage symptoms. ADHD and ASD often run in families with risk factors that include genetic variations, low birth weight, maternal smoking, and infections during pregnancy. Emerging research shows that the disparity in the ratio of diagnoses between males and females is likely to be due to their differing

presentations.(10) This is because the diagnostic criteria for both ADHD and ASD have historically been based on the symptom profile in boys: an oversight that has meant symptom expression in females has remained largely neglected, and awareness, along with education as to the differences, continues to be inadequate. As a result, females are often misdiagnosed or not diagnosed until well into adulthood – if at all.(9,11) The extent of these deficits is such that adult females may not even recognise they are neurodivergent, meaning no diagnosis is sought.(4,12,13)

Additionally, females often present with different characteristics from those of their male counterparts. For example, in ASD, females tend to engage in imaginative play, may have a fully developed vocabulary that can express emotions, have higher cognitive abilities and are often far more sociable.(14,15) Additionally, they tend to internalise their emotionally troubling symptoms such as depression, anxiety, and sensory processing problems. Perfectionist tendencies and eating disorders are also common,(14) with insomnia or general sleep disturbances linked to both ADHD and ASD.(16,17)



Symptom masking is very common among females with ADHD and/or ASD, as they tend to have a better understanding than males of social etiquette, so may be more able to adapt their behaviour to conform to its norms. Examples of this from ASD research include mimicking the behaviour of those around them, learning to hold eye contact (which they might otherwise avoid), as well as developing adaptive strategies to help with focus and attention. The constant need for a social façade, and the associated cognitive effort, can take its toll, so females are much more likely than males to experience chronic high stress, anxiety and fatigue.(10,12)

Common issues and deficiencies

The interplay between genetic and environmental factors in ADHD and ASD can affect several processes within the body, including the formation of glutathione within the methylation cycle.(3,6,18) Moreover, it is thought that one potential mechanism contributing to the psychiatric symptoms of ADHD is hereditary metabolic dysfunction, which restricts the availability of several important cofactors, thereby diminishing metabolic activity.(19) Increased oxidative stress and mitochondrial dysfunction may also be common contributors to these conditions.(18,20,21)

Gastrointestinal (GIT) inflammation and problems, such as constipation, diarrhoea, and abdominal pain are common in ASD, with functional GIT disorders (irritable bowel syndrome, constipation, and dyspepsia) also prevalent in those with ADHD, especially in females. These conditions may be due to food sensitivities, altered gut microbiome, and/or decreased nutritional intake.(18,22)

In Australia, diagnosis of ADHD and ASD should be done by a diagnostic clinician who understands the screening tools and has experience or training in neurodevelopmental and behavioural conditions, such as psychiatrists or clinical psychologists. These appointments can be complex, involving multiple assessments with inputs from different aspects of the person's life,(4,23,24) so many adults may choose not to pursue a formal diagnosis.

Medical management of ADHD and ASD

Medical management of adult ADHD includes educational and behavioural treatments and, if indicated, psychostimulant medications to help improve attention and reduce impulsiveness and hyperactivity.(6) However, the side-effects associated with these medications can be intolerable and individuals may look for ways in

which they can create everyday coping strategies before being medicated.(4,25) Behavioural strategies are first-line interventions for ASD.(4)

Holistic management of ADHD and ASD

Many women present to complementary health practitioners for assistance with any combination of symptoms outlined above. Based on this symptom picture, they may be treated for various conditions; however, it is important to consider if ADHD and/or ASD may be present, particularly if symptoms have been present for the last 10-20 years or can be traced back to childhood.(26) In these cases referral for a diagnosis via a GP should be discussed. If neurodivergent individuals are looking for ways to manage their symptoms without medication, there are several nutrients and herbal medicines that could assist.

Nutritional support for the neurodiverse

The nutritional goals in the management of ADHD and ASD may include addressing nutrient deficiencies, improving the diet and helping to support the systems of the body, such as the nervous and digestive systems. Major nutrient deficiencies that would benefit from screening include vitamin D, zinc, magnesium and iron,(7) as well as vitamins

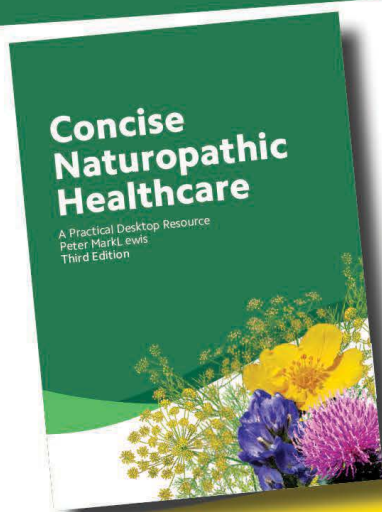
CONCISE NATUROPATHIC HEALTHCARE Third Edition

Extensive Herbalism Knowledge

Realistic Nutritional Strategies

Broad Ranging Practical Body Work Skills

Psychotherapy Approaches to Support Wellbeing



Aims to:

- Support sound clinical judgement and clearly provide logical course of action for optimal functional wellness.

Peter Mark Lewis carries 44 years Healthcare Knowledge in Western Herbal Medicine and Naturopathy. GDHSc. (Herbal Medicine). HMD. N.D. Nut.D. RMD. SMD. Irid.D.

447 Pages

MATMS - 00178
MNHAA - 152354
MARONAH - 37

To order: 0424 638 888
peterlewis55@icloud.com



A, B6, B12, K and essential fatty acids. (7,27) Often dietary adjustments are not possible or sufficient to address these deficiencies, and supplementation may be considered. Evidence also suggests that supplementing with coenzyme Q10 and L-carnitine, in combination with the vitamins and minerals shown to be deficient, can be helpful in supporting and improving mitochondrial function in ASD. (18) Curcumin, luteolin, resveratrol, and quercetin may provide neuroprotective effects in both conditions, while targeted probiotics may support the presenting gut concerns. (28,29)

Herbal medicines for ADHD Herbal medicines for ASD

There is a paucity of evidence regarding the effectiveness of herbal medicine in ADHD. However, this evidence is growing. The following herbal medicines could be considered, depending on presenting symptoms. (29,30)

- *Bacopa monnieri* improves memory and learning along with restlessness, impulsivity, and overall symptom picture.
- *Panax ginseng* provides antioxidant and neuroprotective effects. Alongside its capacity to produce increases in dopamine and norepinephrine, it can help to improve attention and hyperactivity.
- *Ginkgo biloba* improves core ADHD symptoms and overall quality of life. Additionally, it was found that combining it with *Panax ginseng* considerably improved ADHD symptoms.
- *Passiflora incarnata* was shown in one study to have no significant difference to the clinical effect of methylphenidate, a common ADHD medication.

Other herbs that may have potential benefits or have been studied for use in ADHD include *Hypericum perforatum*, *Valeriana officinalis*, *Scutellaria baicalensis*, *Paeonia lactiflora*, *Withania*

somnifera, *Centella asiatica* and *Melissa officinalis*. (29,30)

Similarly, robust supporting evidence for the effectiveness of herbal medicine in adults with ASD is scarce and largely based on children, with preclinical studies failing to effectively study all ASD behavioural changes. However, herbal medicines with properties that support the individual such as those with anxiolytic, antioxidant, neuroprotective, cognition-enhancing, serotonin modulating, and carminative actions may be considered. (31)

Using nature as a therapy

Several studies show that being exposed to nature - through walks, gardening, listening to the sound of a stream, or living somewhere with exposure to greenery - improves physical and psychological wellbeing, with research also highlighting benefits in those with ASD and ADHD. (32,33) With this in mind, neurodivergent individuals should be encouraged to spend time in nature as often as possible.

Summary

The rising awareness of ADHD and ASD in females underscores the need for more nuanced diagnostic criteria that account for gender differences in symptom presentation. Females often camouflage their symptoms, leading to significant underdiagnosis. Understanding the genetic, environmental, and nutritional factors that contribute to these conditions can enhance management strategies. Recognising and addressing these disparities will improve diagnosis and treatment outcomes for females with ADHD and ASD.

REFERENCES

1. Khalil R, Khoury E, Richa S. The comorbidity of fibromyalgia syndrome and attention deficit and hyperactivity disorder from a pathogenic perspective. *Pain Medicine* 2018;9(9):1705-1709.
2. Kreiser N, White S. ASD in females: Are we overstating the gender difference in diagnosis? *Clinical Child and Family Psychology Review* 2014;17(1):67-84.

3. Young S, Hollingdale J, Absoud M, et al. Guidance for identification and treatment of individuals with attention deficit/hyperactivity disorder and autism spectrum disorder based upon expert consensus. *BMC Medicine* 2020;18(146):1-29.
4. Hatch B, Kadlaskar G, Miller M. Diagnosis and treatment of children and adolescents with autism and ADHD. *Psychol Sch*. 2023;60(2):295-311.
5. Leitner Y. The co-occurrence of autism and attention deficit hyperactivity disorder in children - what do we know? *Frontiers in Human Neuroscience* 2014; 8:1-8.
6. Verlaet A, Maasackers C, Hermans N, et al. Rationale for dietary antioxidant treatment of ADHD. *Nutrients* 2018;10(4):1-38
7. Villagomez A, Ramtekkar U. Iron, magnesium, vitamin D, and zinc deficiencies in children presenting with symptoms of attention-deficit/hyperactivity disorder. *Children* 2014;1(3):261-279.
8. Quinn P, Madhoo M. A review of attention-deficit/hyperactivity disorder in women and girls: Uncovering this hidden diagnosis. *The Primary Care Companion for CNS Disorders* 2014;16(3):1-19.
9. Loomes R, Hull L, Mandy W. What is the male-to-female ratio in autism spectrum disorder? A systematic review and meta analysis. *J Am Academy of Child Adolesc Psych* 2017;56(6):466-474.
10. Young S, Adamo N, Ásgeirsdóttir B, et al. Females with ADHD: An expert consensus statement taking a lifespan approach providing guidance for the identification and treatment of attention-deficit/hyperactivity disorder in girls and women. *BMC Psychiatry* 2020;20(1):1-27.
11. Holthe M, Langvik E. The strives, struggles, and successes of women diagnosed with ADHD as adults. *Sage Open* 2017;7(1):1-12.
12. Milner V, McIntosh H, Colvert E, et al. A qualitative exploration of the female experience of autism spectrum disorder (ASD). *Journal of Autism and Developmental Disorders* 2019;9(6):2389-2402.
13. McQuaid GA, Lee NR, Wallace GL. Camouflaging in autism spectrum disorder: Examining the roles of sex, gender identity, and diagnostic timing. *Autism*. 2022;26(2):552-9.



14. Green R, Travers A, Howe Y, et al. Women and autism spectrum disorder: Diagnosis and implications for treatment of adolescents and adults. *Current Psychiatry Reports* 2019;21(4):1-8.
15. Lane S, Reynolds S. Sensory over-responsivity as an added dimension in ADHD. *Frontiers in Integrative Neuroscience* 2019;13(40):1-12.
16. Kautzmann J, Goldschmied J, Miller K, et al. 0691 Examining the associations between insomnia and adult-ADHD diagnosis in army soldiers. *Sleep*. 2022;45(Supplement_1):A302-3.
17. Reynaud E, Pottelette J, Rabot J, et al. Differential effects of COVID-related lockdown on sleep-wake rhythms in adults with autism spectrum disorder compared to the general population. *Autism Research*. 2022;15(5):945-56.
18. Adams J, Audhya T, Geis E, et al. Comprehensive nutritional and dietary intervention for autism spectrum disorder—A randomized, controlled 12-month trial. *Nutrients* 2018;10(3):1-48.
19. Rucklidge J, Kaplan B. Broad-spectrum micronutrient treatment for attention-deficit/hyperactivity disorder: Rationale and evidence to date. *CNS Drugs* 2014;28(9):775-785.
20. Chang X, Liu Y, Mentch F, et al. Mitochondrial DNA haplogroups and risk of attention deficit and hyperactivity disorder in European Americans. *Translational Psychiatry* 2020;10(370):1-6.
21. Griffiths K, Levy R. Evidence of mitochondrial dysfunction in autism: Biochemical links, genetic-based associations, and non energy related mechanisms. *Oxidative Medicine and Cellular Longevity* 2017: 1-13.
22. Kedem S, Yust-Katz S, Carter D, et al. Attention deficit hyperactivity disorder and gastrointestinal morbidity in a large cohort of young adults. *World J Gastroenter* 2020;26(42):6626-6638.
23. May T, Birch E, Chaves K, Cranswick N, Culnane E, Delaney J, et al. The Australian evidence-based clinical practice guideline for attention deficit hyperactivity disorder. *Aust N Z J Psychiatry*. 2023;57(8):1101-16.
24. National Guideline. For the assessment and diagnosis of autism in Australia. Published 2018 – Updated 2023. Draft updated guideline for public consultation. Autism CRC. Viewed 23 February 2024, <https://www.autismcrc.com.au/access/national-guideline/2023-update>
25. Canela C, Buadze A, Dube A, et al. Skills and compensation strategies in adult ADHD – A qualitative study. *PLoS One* 2017;12(9):1-16.
26. Katzman M, Bilkey T, Chokka P, et al. Adult ADHD and comorbid disorders: clinical implications of a dimensional approach. *BMC Psychiatry* 2017;17(1):1-15.
27. Ribeiro R, Nicolli J, Santos G, et al. Impact of vitamin deficiency on microbiota composition and immunomodulation: relevance to autistic spectrum disorders. *An International Journal on Nutrition, Diet and Nervous System* 2019;1-13.
28. Hollander E, Uzunova G. Are there new advances in the pharmacotherapy of autism spectrum disorders? *World Psychiatry* 2017;16(1):101-102.
29. Grosso C, Santos M, Barroso MF. From Plants to Psycho-Neurology: Unravelling the Therapeutic Benefits of Bioactive Compounds in Brain Disorders. *Antioxidants (Basel)*. 2023;12(8):1603.
30. Ahn J, Ahn H, Cheong J, et al. Natural product-derived treatments for attention-deficit/hyperactivity disorder:
31. Safety, efficacy, and therapeutic potential of combination therapy. *Neural Plasticity* 2016:1-18.
32. Gasparotto FM, dos Reis Livero FA, Tolouei Menegati SE, et al. Herbal medicine as an alternative treatment in autism spectrum disorder: a systematic review. *Current Drug Metabolism*. 2018;19(5):454-9.
33. Barakat H, Bakr A, El-Sayad, Z. Nature as a healer for autistic children. *Alexandria Eng J* 2019;58(1):353-366.
34. Jimenez MP, DeVille NV, Elliott EG, Schiff JE, Wilt GE, Hart JE, et al. Associations between Nature Exposure and Health: A Review of the Evidence. *Int J Environ Res Public Health*. 2021;18(9):4790. 072024 Attention-deficit hyperactivity and autism spectrum disorder the rising presentation in females

TRANSDERMAL

The original and best loved Australian brand of
MAGNESIUM SKIN & MUSCLE CARE (est 2008).



Elektra[®] MAGNESIUM

Packed full of nutrition with premium food grade certified magnesium chloride salt infused in natural and organic plant oils and extracts. (Chem-free).
Potent skin-friendly formulas to suit all skin types.

Ph: 07 55020865 www.elektramagnesium.com.au

RELAX~RECHARGE~RECOVER



Evaluating Primitive Reflexes in Early Childhood as a Potential Biomarker for Developmental Disabilities

Gerry Leisman and Robert Melillo

This article was originally published in the *Journal of Paediatrics and Child Health*. It is published here under a Creative Commons license and with the kind permission of the authors.

Abstract

We aim to understand better the significance of retained primitive reflexes (RPRs) and examine the effect of RPRs in children, adolescents, and adults, focusing on autism spectrum disorder (ASD) and other neurodevelopmental conditions, as well as examine a basis for future treatment alternatives. We included a history section to better recognise the way that the scientific and medical communities have studied and understood the importance of RPRs. We review findings indicating that aspects of these disorders are related to the presence of functional disconnectivities related to a cortical maturational effect on neuronal networks. Cortical maturational delay within specific networks may lead to enhanced growth and maturation in other networks, resulting in asynchronous development and inconsistency in functional skills. There has been reported an overconnectivity of short-range, more immature connections and an underconnectivity of long-range, more mature connectivities. We review the relationship between motor and cognitive impairments and RPRs. A crucial conclusion will be that inhibiting these RPRs is representative of treatment targets.

1. Primitive Reflexes: What Are They, and What Is the Controversy?

Primitive reflexes (PR) are neonatal motor and sensory reflexes. Many are present in utero [1] to assist the infant in “birthing itself” [2]. The major role of PRs is to enable the neonate and infant to move and respond to its surroundings before maturation of the motor cortex. The infant needs to feed, move, obtain nourishment, receive protection, and orient to people and objects to stimulate its senses and muscles, thereby generating motor and sensory feedback to activate genes at a foundational level essential for bottom-up brain development [3]. The regulation of PRs originates from several brainstem areas [2, 3]. The medulla's lower reflexes are thought to be the first to activate, succeeded by reflex regulation linked to the mesencephalon and pons [4].



As higher brainstem regions activate, lower brainstem-controlled reflexes are suppressed [2, 3], ultimately extending into the brain and neocortex. Numerous investigators have indicated that frontal lobe development facilitates top-down regulation and suppression of PRs [5]. Degeneration, a frontal lobe lesion, or damage to the corticospinal tract at a more advanced age might result in the re-emergence of reflexes, termed “frontal release signs” [2, 6], thereby connecting cognition with reflex and motor functions [3, 6]. The debate around retained primitive reflexes (RPRs) pertains not to their existence. PR testing has been a component of standard paediatric neurology assessment for decades. They are a well-recognized component of assessing child development [7, 8]. The controversy pertains to the integration of these reflexes.

In conventional paediatric practice, it is presumed that PRs are largely integrated by the conclusion of the first year [9, 10]. Nonetheless, numerous studies have demonstrated that significant numbers of individuals do not inhibit PRs during the first year of life, with those reflexes present throughout middle childhood and adulthood [2, 3, 11–18]. It has been shown that neuro-behavioral problems or learning difficulties coexist in children, adolescents, and adults with RPRs [2, 3, 16, 17]. Individuals with autism, dyslexia, ADHD, Tourette's syndrome, and other neurobehavioral disorders frequently exhibit RPRs thought to be associated with maturational delays [3, 19]. We assert that if PRs are not integrated within the first year postpartum, they may remain throughout an individual's lifetime, adversely impacting neurobehavioral function. We additionally hypothesise that RPRs

are strongly correlated with autism spectrum disorders (ASD) [19, 20] and are significantly linked to motor cortical maturation as well as to movement and cognition [3].

1.1 Retained Primitive Reflexes Versus Returned Primitive Reflexes

It is essential to distinguish between “retained PRs” and “returned PRs” (RtPR). RtPRs have been documented in dementia and Parkinson's disease [21, 22]. RPRs suggest dysfunction of the cortico-subcortical neural network or potentially a delay in neuronal development. Some investigators have asserted that these reflexes are present in neurotypical populations. The palmomental reflex was observed in 6%–27% of young adults aged 20–50 years [23], and in 28%–60% of individuals over 60 years of age [23]; snouting in 13% of individuals between the ages of



ATMS SPECIAL EVENT

Integrative Pain Science Symposium

BOOK NOW
atms.com.au/events



20 | SATURDAY
26 | 21 MARCH
SYDNEY

SAVE with an Early Bird Ticket
when booking **before 8 February**.

IN PERSON



LIVE STREAM





40–57 years [11, 24] and in 22%–33% of those above 60 years [11, 25]; the sucking reflex, linked to “frontal lobe disease,” was found in more than 6% of normal individuals aged 73–93 years [11, 26]. Consequently, there exists contention on the pathogenic importance of these reflexes related to ageing.

1.2 The Development of Brain Function in Infancy and Early Childhood Related to Retained Primitive Reflexes

PRs facilitate primary movements, enabling basic engagement with the environment and establishing the foundation for early motor activity [27]. These movements enable newborns to engage with their environment and stimulate receptors and sensory organs. Increased stimulation and sensory feedback is understood to induce gene expression associated with the formation of brain functional connectivities [28]. As neurones increase in size, density, and connectivity, propriospinal projections will ultimately inhibit more primitive lower regions of the brain while stimulating the activation and growth of higher rostral areas of the brainstem and cortex [29]. PRs are ultimately integrated but never eradicated. Ultimately, all reflexes appear to be regulated by the frontal lobe [30, 31].

The existence of these reflexes is a prevalent characteristic among children with ASD and other neurobehavioral problems [20, 32]. In the majority of instances, there exists no discernible damage, injury, lesion, or degeneration. We have considered and discovered support for RPRs signifying a maturational delay in brain regions that normally suppress PRs, particularly reflexes interacting with the frontal lobes [3].

However, frontal lobe maturational delays can be reflected by the RPRs and additional delays in postural reflex development, which could lead to delays of various sensory-motor milestones like crawling and walking [33]. Maturational delay can also be related to the lack of



Children with autism frequently struggle with executing skillful movements and exhibit a limited repertoire of gestures

development of executive functions, a hallmark of neurodevelopmental disorders [34, 35]. The reduction, lack, or absence of environmental factors that typically foster development, growth, and neuroplasticity in higher brain regions generally results in the lack of integration of PRs and the manifestation of postural reflexes [33]. RPRs may indicate a developmental delay [33], and asymmetric persistence will signify a maturational delay in the developing brain and may imply, contingent upon the timing, aberrant asymmetrical cortical hemispheric development [36, 37].

1.3 Bottom-Up Versus Top-Down Regulation and Retained Primitive Reflexes

Since the motor cortex is still immature and underdeveloped, there is no volitional motor control present in the neonate. The infant needs to be able to move to survive, and motor activity activates the senses, sending feedback to the brainstem, in turn promoting neuroplasticity [38]. This promotes

growth in higher levels of the brainstem, such as the pons, which, through proprioceptive connections, will descend into the medulla inhibiting PRs from that level [38, 39]. This will also release more sophisticated PRs, allowing for more complex interaction with the environment and more activation of senses, which will provide feedback and promote neuroplasticity at higher levels, such as the mesencephalon [38]. This will progress through the brainstem and ultimately into the neocortex, where sensory feedback promotes growth of sensory areas and ultimately the temporal–parietal–occipital cortex [38], a major association area promoting sensory integration [40].

Sensory and motor activity feedback will also promote the growth of the frontal and prefrontal cortex [41], growing out of the motor cortex. The neocortex, especially the prefrontal cortex, projects fibres to the brainstem to achieve “top-down” control of the nervous system and its bodily functions [42]. It is also thought that the frontal lobe, through top-down integration, inhibits the PRs [19]. Later in life, if there is damage, injury, or degeneration of the frontal lobes, one can observe “frontal release signs” exhibited as the return of PRs such as the Babinski reflex [43]. We think that if the PRs are not inhibited, they will continue to promote bottom-up interference, prevent maturational completion, and ultimately prevent appropriate top-down regulation [2, 3]. This can lead to RPRs and a global dysregulation of nervous, immune, endocrine, and autonomic systems [44].

2. The Effect of Retained Primitive Reflexes on Motor and Cognitive Development in ASD

ASD is presently defined by deficits in social interaction, communication, and behavioural flexibility. ASD is characterised as a neurodevelopmental disorder marked by impairments in language, executive function, social interaction, and emotional regulation



[45]. While there is agreement on the disorders constituting ASD, including autistic disorder, Asperger's disorder, and Pervasive Developmental Disorder-Not Otherwise Specified (PDD-NOS) as the most prevalent examples, as well as the associations with Rett's syndrome and disintegrative disorder, significant controversies persist concerning the definitions of ASD and the delineation from other manifestations of these disorders. We are increasingly acknowledging the impact of motor skills on other developmental domains, including language and social cognition.

RPRs can hinder normal growth and are associated with impediments in children's educational and social experiences. Psychomotor development can also be affected. Mature responses in psychomotor development in childhood can only occur once the central nervous system (CNS) has reached

an appropriate level of maturity. The process entails a change from reflexive brainstem responses to cortically-based responses. PRs are highly associated with both social (e.g., communicative gestures) and object interaction (i.e., actions) in infancy. This indicates that reduced scores in the primitive reflex evaluation, signifying increased reflex persistence, correlate with lower motor repertoire scores, irrespective of the infant's age. Postural reflexes are sophisticated response mechanisms that govern balance, coordination, and sensory-motor maturation. RPRs are correlated with developmental delays related to ADHD, autism, learning disabilities, and sensory processing disorders.

Children with autism frequently struggle with executing skillful movements and exhibit a limited repertoire of gestures [46]. Motor deficits in early childhood

have been proposed as predictors of the fundamental impairments associated with ASD. Motor function development is associated with automated processes whereby newborns progressively mature by suppressing more rudimentary motor behaviours. These findings imply that motor deficits in early childhood are predictive of the primary impairments associated with ASD. This concept has been examined in infant siblings of children diagnosed with ASD, who possess an elevated probability of developing the disorder. Research on motor development in high-risk infants aged between 3 and 6 months indicated that 67%–73% of autistic infants with early motor deficits later displayed communicative problems. Progress in motor development is associated with an automated process whereby the newborn eventually matures by suppressing more basic motor patterns [47].

Harvey Norman
TECHNOLOGY FOR BUSINESS

Claim Your Free Cyber Security Risk Assessment Today!

Discover the risks that could impact your practice and learn the simple steps to safeguard your patients' sensitive health data.





Movement disturbances in infancy were considered by Teitelbaum and colleagues [48] to be “reflexes gone astray” serving as potential early indications of ASD. Their study indicated that some children exhibited RPRs beyond infancy, whereas others displayed the emergence of some RPRs significantly later than expected throughout infancy. They noted that the asymmetric tonic neck reflex may persist in individuals with ASD. Another reflex, head verticalization in response to body tilt, was found to be absent in a subgroup of infants identified as “autistic-to-be.” They proposed that these reflexes may serve as ASD indicators and might be utilised by paediatricians to assess neurological impairment. Teitelbaum and associates [49] also demonstrated that infants who would later develop ASD exhibited a distinct set of movement pattern differences as early as 4–6 months of age.

Among the postnatal PRs that decrease as development progresses are the Galant and Moro reflexes. Konicova and Bob [50] examined school-aged children with ADHD (ages 8–11) presenting with Galant and Moro reflexes evaluated against a control group of the same age. Children with ADHD manifested a markedly greater prevalence of Moro and Galant responses in comparison to the control group.

Callcott [51] indicated that learning and cognitive difficulties in childhood are related to movement skills, including early academic preparedness. Callcott examined the prevalence of the Asymmetrical Tonic Neck Reflex (ATNR) and assessed the motor skills of pre-primary school Western Australian Indigenous children. She reported that 65% of the Indigenous children studied exhibited moderate to high levels of ATNR, which correlated with academic achievement.

The United Kingdom's Millennium Cohort Study [52] found a correlation between delayed motor milestones at 9 months and significantly diminished cognitive function in five-year-olds. The

Australian Early Development Index [53] revealed that approximately 25% of school-aged children are at ‘risk’ in their cognitive and physical development. A relationship was found by Williams and Holley [54] between cognition and motor development. They investigated how infant motor experiences in early life influence cognitive abilities essential for academic achievement. The standard progression of motor skills and gestures requires effective inhibition of PRs, particularly those associated with the mouth and hand.

Chinello and colleagues [20] explored the correlation between RPRs, motor repertoire, and autistic-like characteristics in parents of infants aged 12–17 months. Regardless of age, RPRs influenced the motor skills of infants and evidenced a strong correlation with autistic behaviours of the parents. A study conducted in Egypt [55] examined 206 students aged 9–10 years for dyslexia. The study employed comprehensive history-taking and neurological examinations, focusing on cerebellar indications, PRs, dyslexia, and apraxia assessments. Findings revealed that 22 students (10.67%) were identified as dyslexic. Dysdiadochokinesia, asymmetric tonic neck reflex, neck retraction, palmar reflexes, and apraxia were markedly elevated in individuals with dyslexia. The reversal of letters, the persistence of the ATNR, apraxia, and neck retraction were found to be strong predictors of dyslexia.

Numerous investigators have observed a correlation between incoordination and clumsiness, particularly in posture and gait, and ADD/ADHD, ASD, and other neurobehavioral disorders [56, 57]. Gait and motor disturbances were principally compared to those cerebellum-related [58]. The most frequent childhood neuro-behavioral disorder comorbidities are developmental coordination disorder (DCD), “clumsiness,” or motor incoordination [59]. Incoordination typically pertains to the muscles responsible for posture, locomotion, or gross motor functions. Not infrequently,

fine motor skills are also compromised [60]. Wisdom and associates [61] noted both distinctions and commonalities between ASD and DCD, indicating that the DCD cohort had superior emotion detection, theory of mind, and gross and fine motor coordination compared to the ASD cohort while demonstrating similar response inhibition capabilities. Wisdom and colleagues [61] observed that when categorised by symptom intensity, children with ASD deemed “more able” exhibited no significant differences in any measures compared to children with DCD, in contrast to those classified as “less able.”

3. Discussion

PRs provide a developmental function, enabling neonates to counteract gravity and facilitate voluntary movement through the integration of motor activity in the early months of life. Mature responses in a child's psychomotor development can only manifest when maturity has been obtained in the CNS. The process involves shifting from brainstem-based reflexes to cortically regulated responsivity. With impairment in the process of the development of integrated movement, the child may exhibit immature motor skills, evidenced by difficulties in maintaining balance, running, and cycling, oftentimes resulting in clumsiness. The child may experience difficulties with throwing and catching. Psychomotor abnormalities, sometimes referred to as minimal brain dysfunction can alter and impede a child's natural developmental trajectory. Initial indicators may manifest in early childhood; however, several signs become apparent later, such as learning and behavioural challenges during the preschool years. RPRs and the cognitive or behavioural challenges encountered by children upon reaching school age are correlated.

As a child develops, these PRs are supplanted by more advanced reflexes. The PRs that were once essential become inhibitory or redundant. The grasping reflex enables an infant's small hands to grasp objects as required; nevertheless, as the hands and fingers expand, this



reflex must diminish for the proper development of fine motor abilities. Children who maintain the clutching reflex throughout toddlerhood rather than progressing to the “precision grip” may encounter difficulties in holding a crayon, turning a page, or self-feeding at the appropriate developmental stage.

RPRs may be maintained for several reasons. Studies have found associations between traumatic delivery [62], adverse neonatal conditions [62], and recurrent ear infections in early childhood [46] with potential changes in a child's developmental trajectory. Infants that bypass developmental milestones, such as walking before crawling, may be more prone to RPRs, similar to infants not receiving sufficient “tummy time.” Consequently, PRs can serve as an early and effective instrument for evaluating the integrity of the CNS of full-term neonates. Later in the first year of life, as the CNS matures, these responses become increasingly difficult to elicit, coinciding with the emergence of voluntary motor activity. RPRs are frequently observed in children with ADHD, autism, and cerebral palsy and may serve as early indicators of developmental delays or nervous system dysfunction. PRs are critical in neonatal and infant neurological assessment. A

sucking reflex that is absent or impaired serves as an indirect sign of neonatal neurological maturity. An aberrant sucking reflex, when accompanied by further symptoms of CNS involvement, indicates a potential malfunction of the basal ganglia or brainstem.

4. Conclusion

RPRs throughout early development and adulthood are linked to brain injury and neurobehavioral disorders. Their existence has also been noted in many childhood functional neurological disorders without identifiable neurological injury or pathology. We think that the manifestation of RPRs indicates the existence of a maturational delay, also evidenced by structural and functional nervous system, behavioural, and cognitive differences when compared to otherwise neurotypical children.

The preservation of PRs may serve as an early indicator of ASD, which, in conjunction with initial attentional indicators, could aid in delineating the developmental trajectory of the larger autism phenotype in infancy. This approach posits that minor deviations in the initial phases of development, such as with RPRs, may have detrimental cascading effects on subsequent motor function as well as various

other functions, including social and communicative behaviour and object exploration.

With RPRs persisting longer than the typical developmental timeframe, they may impede maturation and diminish the brain's capacity to interpret sensory information efficiently. The continuation of PRs beyond the typical duration of 12 months disrupts further development.

In conclusion, we propose that ASDs are partially linked to delays in maturation rather than structural pathology or damage. We think that the existence of RPRs and the potential delays in or absence of developmental milestones may serve as the earliest indicators of developmental delays in children, especially those with ASD. Therefore, given the relative simplicity of examining basic reflexes by both parents and paediatricians, we propose that the persistence of these reflexes could serve as a potentially valuable indicator for advancing more effective early identification and screening methods.

REFERENCES

For a full list of references, please email the Editor: editor@atms.com.au

SMARTER SYSTEMS.
STRONGER CLINICS.
GREATER IMPACT.

Impact 2026

Join us in
BRISBANE

for our annual conference

6th March 2026



ADHD *and narratives of illness*

Airdre Grant | PhD

One of my most beloved books is *The Illness Narratives: Suffering, Healing & the Human Condition*. Although first published in 1988, much that it offers still stands. In it, Arthur Kleinman, a Harvard psychiatrist and anthropologist, interrogates the art of diagnosis, the subtle and complex role of the healer and how illness presents in various and shifting ways. He writes about the narratives patients bring and how vital it is to listen these stories, with all their nuances.

One of the significant features of holistic treatment is that the practitioner offers a treatment that is built around deep listening, and the taking of time. In this space, a holistic practitioner deals with the subtleties of illness, knows that what is unsaid is as important as what is said. There is always a hidden narrative running alongside the overt consultation. The story that a patient brings to clinic will manifest in different ways and they will be transmitting signals the whole time: from the clothes they wear, the way they sit, their attentiveness, punctuality and more, much more.

These signals inform your treatment.

Which brings us to ADHD and the neurodivergent client. One in 20 Australians is diagnosed with ADHD. That's a lot and the number have increased with late adult diagnosis. Diagnosis often requires a psychiatrist, although there is a lot of self-diagnoses, and dealing with ADHD in a professional setting requires informed understanding. There is significant media chatter about ADHD, plenty of wellness advertisements spruiking the efficacy of different strategies and supplements (including mushrooms and other psychotropics) and lots of commentary and trivialisation of what neurodivergence means. It's complicated. Treatment for ADHD can be tricky as the person may have a history of masking, mirroring and rapidly working out what is wanted, then giving it. These learned behaviours can be the survival strategies of the neurodivergent built up over years of being misunderstood and frequently criticised for not being 'normal' or 'right.' These defences and coping mechanisms can present in a consultation and blur the real issues.

There are relatable issues in ADHD treatment that resemble working with chronic illness. Here is a long-term, embedded ailment that has shaped life and health. Attention to narratives, patience and being informed about the complexity of the condition are important to effectiveness of practice.

Consider this story from a young woman in her twenties, who came to my office and slumped in the chair.

'I went to the naturopath,' she said, 'to see if there were any supplements or stuff I could take to help with my grasshopper brain. I explained I had a diagnosis of ADHD and was taking Ritalin daily. The therapist told me that ADHD is a fad and that there is a lot of over-diagnosing and reliance on meds when in fact it is a body-mind alignment thing. She said that if I do yoga and eat lots of mineral-rich foods, I will be able to manage my skittishness naturally. I felt very confused and guilty. I wished I hadn't mentioned it.'

Descriptions of neurodivergence as a fad, or the latest thing to have, are troubling,



hurtful and miss the point that there is a real issue which has lasting impact on health and wellbeing. It invites shame, which is another presenting factor in ADHD and can increase distrust, which will slow down diagnosis and treatment efficacy. ADHD diagnoses in older women have increased dramatically. With this comes grief as the realisation of the stress of coping strategies, the impact on relationships and the consequent disturbance in life, can mean that along with neurodivergence, there might be depression.

The Australian Psychological Society reported a 450% upswing in adults taking ADHD medication over the last 5 years, and more than 50% were women. This upsurge in the population can mean more patients will be presenting with ADHD and other forms of neurodivergence in the mix. Medications will need to be factored into health prescriptions.

ADHD is complex, with many layers which inform the narrative a patient carries. Rejection Sensitive Dysphoria (RSD) may be present, along with other factors. A patient who has been criticised a great deal for being 'different' is likely to be highly sensitive. The three types of ADHD - hyperactive, impulsive, and inattentive - may present in combined or different ways. ADHD is not always a deficit model; it is also about quirky brilliance and sideways thinking, that can offer up great insights, interesting angles on understanding, along with strong creative problem-solving skills, good intuitions, and deep empathy.

So where does the holistic practitioner sit with a client who has neurodivergence? What tools do they have? It is important to support the ADHD client with all the tools available including nervines, exercise recommendation, bodywork and more. The earthly level of body practicality is an excellent place to start. It is the most achievable and accessible path, to begin to build trust with a patient.

It is important to support the ADHD client with all the tools available including nervines, exercise recommendation, bodywork and more. The earthly level of body practicality is an excellent place to start.

To add to the complexity, the holistic practitioner might be working in less obvious areas of health. For example, if a patient expresses emotions such as doubt, shame, and fear, how do you factor them into your treatment plan? While the patient needs sympathy and support, the practitioner will need to be upskilled with a good knowledge of professional boundaries and a reliable support network. As with chronic illness, the complexity of a long-term condition adds challenges to treatment strategies. More than ever, the need for a supportive professional network is strong. It would serve practitioners to ensure that training on ADHD and all its ramifications is in the professional development calendar.

Experience with illness narratives can be of great assistance in practice. The holistic model is heart-centred and, as one that supports mind, body, and spirit, it seems to be well placed to provide excellent body physical supports, good listening skills, and practical encouragements.

Most important of all is the building of trust.

My young friend came back to see me.

'I felt so awful after my last visit to a naturopath I gave up for a while. I felt rejected and then I got annoyed and thought, I'm not going to be silenced by somebody! I went to see another practitioner and they were just great. They listened so carefully to me and asked sensitive questions that didn't make me feel shame. At times I even told them the truth!' She laughed. 'After years of being asked why I couldn't be normal, it was just great to be with somebody who wasn't judging and offered me some useful strategies and some herbs and stuff. I'm going to keep going to see them. I really felt encouraged and accepted.'

Holistic practice is uniquely placed to support patients who are working to create good health and wellbeing, while living with a complex diagnosis. The principles of holism, including Tolle Totum (treat the whole person), are a signifying feature of the profession and one that differentiates the practice model. These principles are often why people become holistic practitioners - as part of a commitment to seeing people as mind body and spirit, and listening to the narratives they bring. ADHD brings challenges to the layers of practice. The first steps are to get informed, use the tools at hand and always, always embrace and work with the narratives. Remember the famous quote from Dr. Ibrahim Yasin, '*Comforting and reassuring words are sometimes more powerful than the medicines.*'

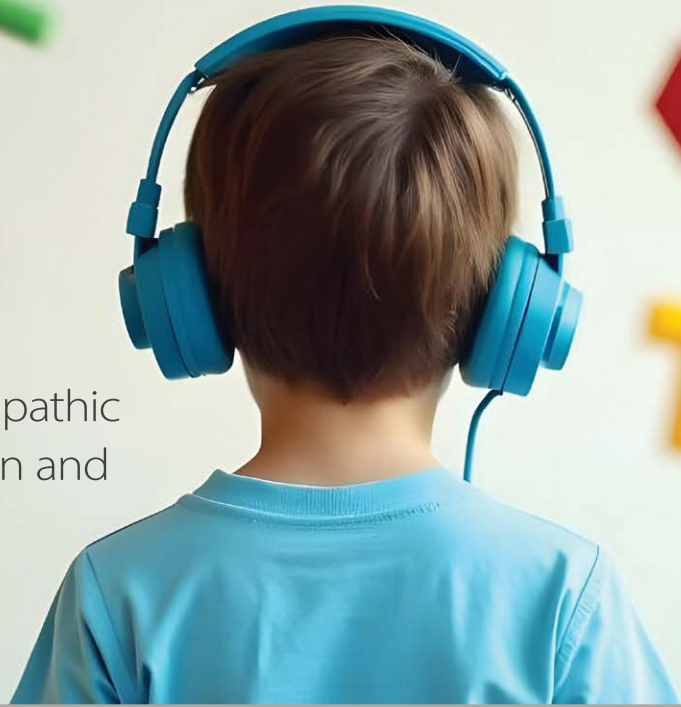
Dr Airdre Grant (PhD) is an experienced academic, author and columnist with over 30 years' experience in teaching and learning. She worked in the Centre for Teaching and Learning (CTL) at Southern Cross University (SCU) and at that time, she served on many school boards, assessment, and accreditation committees. She served on the Reconciliation Action Program (RAP) committee. She worked on the Learning Innovations team at Deakin University and is also on the TEQSA Register of Experts with complementary medicine education as a nominated area of expertise. Airdre may be contacted on Airdre.grant@gmail.com



Uncharted Territory:

Understanding Current Naturopathic Practices in the Care of Children and Adolescents with ADHD

Fin Mackenzie | BSc(CM), ADNat, DNut, CRM
Dr Jessica Bayes | PhD (Public Health)



Abstract

Attention-deficit/hyperactivity disorder (ADHD) is a common neurodevelopmental condition characterised by inattention, disorganisation, and hyperactivity-impulsivity, often continuing into adulthood and significantly affecting daily life. In Australia, prevalence is high among children and adolescents, with concerns about rising diagnoses and heavy reliance on medication. This has raised issues of side effects, stigma, financial strain, and the broader impact on families.

While stimulant medications may show short-term benefits, people experiencing ADHD receive limited guidance on lifestyle and dietary approaches. Although non-pharmacological interventions are well-supported in the literature, their integration into routine care remains inadequately established. Current clinical practice continues to prioritise medication, yet many practitioners recognise the value of multidisciplinary and holistic care. Naturopathic and complementary approaches may offer cost-effective, safe, patient-centred strategies, but their role in ADHD management is not well integrated into mainstream practice, highlighting the need for further investigations. Specifically, understanding naturopathic treatment approaches, appointment structures, clinical accommodations, clinical testing practises, and referrals and collaborations undertaken by naturopaths in the support of children and adolescence with ADHD is needed to promote integration.

Introduction

Attention-deficit/hyperactivity disorder (ADHD) is a neurodevelopmental disorder characterised by inattention, disorganisation, and hyperactivity-impulsivity, often persisting into adulthood and impairing daily functioning (1). Globally, ADHD prevalence is rising (2) and in Australia is said to affect approximately 7.6% of children aged 3-12 and 5.6% of adolescents (3).

Concerns about over-diagnosis and over-treatment are widespread (4, 5). The National Collaborating Centre for Mental Health (NICE) guidelines (2009/2018) (6) recommend medicating

only in severe cases or when non-pharmacological interventions fail. However, despite 87% of diagnoses being mild to moderate, two-thirds of children receive medication (7), in contradiction of these recommendations. This over-prescription raises concerns about adverse effects, stigma, and financial strain, with ADHD-related costs in Australia estimated at \$20 billion (8). Unnecessary medication can harm children through side effects and psychosocial impacts, while families bear emotional and financial burdens (9-11).

The Australasian ADHD Professionals Association (ADPPA) guidelines

prioritise pharmacological treatments yet emphasise the need for research into non-drug alternatives (12). Although stimulant medications show short-term benefits, more evidence is needed for non-drug interventions, highlighting a research gap and the absence of consistent guidance on lifestyle or dietary approaches (13-15).

Current shortages of pharmacological ADHD medications further underscore the urgency of identifying and implementing alternative strategies to support children and adolescents with ADHD (16-18). This issue is particularly urgent given legislative changes in New South Wales. From



September 2025, medical practitioners have been authorised to prescribe ADHD medication, with children being prioritised in the initial rollout (19). By the end of 2025, general practitioners (GPs) will be able to undertake training to become ‘endorsed prescribers,’ permitting them to diagnose ADHD and initiate pharmacological treatment. While these reforms are expected to reduce current wait times—which are typically 3 months in metropolitan areas and up to 18–24 months in regional settings—for children and adolescents to access paediatric or psychiatric care and commence therapy, they may also result in an overall increase in prescription rates.

Research highlights that GPs have knowledge gaps about ADHD (20) and are concerned about overmedication and prefer multidisciplinary care (21). However, despite evidence supporting the effectiveness of naturopathic care, referrals for behavioural or lifestyle support remain low, and hesitancy toward naturopathy persists (22–25).

Naturopathic care may offer a cost-effective, lifestyle-focused adjunct to ADHD management (23) emphasising the need for more individualised, holistic approaches beyond current clinical guidelines. Complementary and alternative medicine (CAM) use in Australia is widespread for its integrative and patient-centred care (26–28), however evidence regarding whole systems naturopathic management of ADHD is limited.

The Knowledge Gap

A notable gap persists in the literature regarding the specific role of naturopaths in managing ADHD in paediatric populations. Studies have found that patients turn to complementary and alternative medicine (CAM) due to the significant side effects of conventional treatments for ADHD, including anorexia, weight loss, abdominal pain, sleep disturbances, headaches, irritability, anxiety, depression, appetite suppression, and rare cases of stimulant-induced psychosis and sudden death (29).

A systematic review identified 16 high-quality trials exploring CAM efficacy in ADHD, with up to 50% of children using CAM, although parents rarely disclosed this use to their paediatrician (29, 30). However, this review did not examine CAM within the broader context of naturopathic care, such as treatment approaches, consultation structures, functional testing, collaboration, or clinical accommodations.

Extensive research has identified effective CAM interventions for ADHD, including zinc and iron (29, 31), L-theanine (32), omega-3 PUFAs (33, 34), green-lipped mussel extract (35) and MENTAT (36). Herbal therapies like *Bacopa monnieri*, *Ginkgo biloba*, *Pycnogenol*, *Passiflora incarnata* (Passionflower), *Prunus dulcis* and *Crocus sativus* (Saffron) have also been evaluated (32, 37–40). A meta-analysis (39) reported fewer adverse effects in CAM medicine treatments than in controls, highlighting the potential safety advantages of natural approaches and underscoring the need to further evaluate the overall effectiveness of naturopathy as a whole.

Dietary interventions such as the Mediterranean diet have also shown symptom improvement in ADHD (41) as has the elimination of certain foods (42). Micronutrient supplementation has also been associated with improved overall function, attention, emotional regulation, and aggression control in children with ADHD, with minimal adverse events (43). The Micronutrients for ADHD in Youth (MADDDY) study reported that higher fruit and vegetable intake correlated with reduced inattention symptoms (44). However, there is limited evidence on how naturopaths implement these strategies and dietary modifications in children within clinical practice.

Nutritional deficiencies in omega-3s, vitamins, and minerals are prevalent among children with ADHD (44, 45). Additionally, micronutrient

supplementation appears to improve microbial diversity and may benefit ADHD symptomatology (43, 46). With stimulant medications shown to alter the gut microbiome (47), this area presents a promising avenue for naturopathic clinical application. Naturopaths frequently use functional tests like stool microbiota and blood analysis (48, 49), but understanding which tests are used for ADHD remains unclear and represents a notable gap in the literature.

Naturopathy centres on holistic, individualised care and recognition of neurodivergent traits beyond traditional diagnostic models. Arentz (22) argues that naturopaths and herbalists support patient-centred care by addressing individual contexts and leveraging strengths rather than pathologising neurodivergence. However, empirical data on how this translates into clinical practice remains limited.

What is Whole Systems Research?

Whole systems research (WSR) is an approach that studies complex healthcare practices in their entirety—examining not just individual treatments, but the interactions between modalities, practitioner–patient relationships, and the broader context in which care is delivered.

WSR aligns with naturopathic philosophy, which emphasises individualised, integrative, and preventive healthcare and explores multi-variable health interventions (50, 51). Increasingly, research is shifting towards integrative approaches that empower patients (52), and this is reflected in naturopathic principles such as *Tolle Totum* (Treat the whole person), *Docere* (Doctor as Teacher) and *Preventare* (Prevention) (53). Despite being underutilised (54), naturopaths are well positioned to meet rising patient demand for integrated care (55).

WSR has demonstrated efficacy in researching complex conditions, including cardiovascular disease, diabetes, PCOS,



musculoskeletal pain, depression, and anxiety (52, 56). Recent WSR applications have explored naturopathy for endometriosis (57) and diminished ovarian reserve (58). A Delphi study confirmed naturopathy as a complex intervention, with participants valuing the therapeutic relationship, holistic approach, and individualised support (58). The therapeutic relationship vital to naturopathic practice is crucial to behaviour change (59) and may similarly benefit ADHD outcomes. Additionally, studies have identified notable gaps in understanding how naturopaths manage cases, report adverse events, seek evidence, and measure treatment outcomes (58, 60).

Given the unmet needs of families within conventional ADHD care, Whole Systems Research offers a robust, systems-based method to evaluate naturopathy's role (61). Naturopathic interventions are associated with improved outcomes and quality of life in chronic conditions (62, 63), warranting their evaluation in ADHD through the Whole Systems lens.

There is a significant research gap in naturopaths' roles in managing ADHD in children and adolescents; addressing this could inform clinical guidelines, policy, and education for diverse healthcare stakeholders. Evaluating how Naturopaths manage ADHD may enhance safety, inform practice, and clarify their role within multidisciplinary care (60). It has the potential to strengthen partnerships between naturopathic practitioners and conventional healthcare providers.

By examining how these elements function together in real-world clinical settings, WSR can provide valuable insight into how naturopathic care facilitates healing, supports self-regulation, and promotes long-term wellness, particularly in chronic and multifactorial conditions like ADHD. Further, it is important to examine whether naturopaths are engaging with and applying the evidence for complementary and alternative medicine

(CAM) approaches in the management of ADHD. What presenting complaints are commonly seen and addressed in clinical practice? What treatment strategies are being implemented? How do naturopaths approach referral pathways, and to whom are these referrals directed? What kinds of testing, both biomedical and functional, are performed in this group and how are they then used in treatment planning? In addition, how are children and adolescents accommodated within naturopathic care, and in what ways are appointments structured to meet their needs?

Researchers at Southern Cross University are currently aiming to answer these questions and have developed a comprehensive survey to address each of these areas. By examining both the current and potential role of naturopaths in supporting individuals with ADHD, a complex condition that often requires multifaceted approaches, the research aims to inform future research, clinical practice guidelines, and public health policy by providing a clearer understanding of the approaches naturopaths use in this context. Given the breadth of evidence available for non-pharmacological interventions in ADHD, naturopaths are uniquely positioned to assimilate this knowledge and translate it into clinical practice. It is timely to highlight and articulate the valuable contribution our profession can make in this field.

Specifically, this study aims to identify the clinical approaches used by Naturopaths in the management of ADHD in children and adolescents by:

- Exploring clinical accommodations: child-friendly spaces and sensory environments
- Understanding naturopathic appointment structures: length, note-taking and follow-up.
- Investigating naturopathic treatment approaches: modality, interventions and shared decision-making.
- Exploring integration across healthcare modalities: referrals and collaborations

- Understanding naturopathic clinical testing practices: functional and biomedical

If you are a Degree Qualified or Advanced Diploma Naturopath residing in Australia, who treats children/adolescents with ADHD, and have been working in clinical practice for at least 1 year, you may be eligible to contribute to this research and help answer these important questions. Follow this link for more information: <https://redcap.link/60t1bek4>

Conclusion

This research has the potential to contribute valuable knowledge regarding the naturopathic management of children and adolescents with ADHD. The findings may inform future research, clinical practice guidelines, and public health policy which may support the development of evidence-informed recommendations and contribute to discussions of appropriate funding and service delivery for ADHD-related care, particularly within integrative and complementary healthcare frameworks. Additionally, the research will examine how practitioners' source and apply evidence to inform their clinical decisions, including the use of traditional knowledge, clinical experience, patient preferences, and contemporary scientific literature. It will also investigate how communication with patients is conducted to support adherence, understanding, and shared decision-making. The findings will contribute important foundational data to inform the development of future targeted interventions and clinical trials. These future studies may evaluate the effectiveness of specific naturopathic dietary and lifestyle interventions aimed at improving physical and mental health outcomes in children and adolescents with ADHD. Addressing these health needs through integrative approaches represents a recognised and timely research priority.

REFERENCES

For a full list of references, please email the Editor: editor@atms.com.au



A Primer on Telehealth

Robert Medhurst | BNat ND DNutr DRM DBM DHom

There's little doubt that telehealth has become a popular option for healthcare providers and their clients, particularly in the wake of the COVID-19 pandemic, and it's becoming more popular as time goes on. Medicare data from 2022¹ showed that approximately 20% of GP consultations were conducted using telehealth, and data provided by Professor Sandra Grace and Annie Gibbins in the Spring 2025 edition of the *ATMS Journal*² indicates that of the ATMS-accredited members surveyed, 21.2% describe their typical practice setting as online or telehealth. If your primary modality is something other than acupuncture or bodywork, for which telehealth treatment may be unsuitable, and if you've been considering offering telehealth as an option to clients or you're already providing it and want to dig a little deeper into it, what follows may give you some food for thought. It should be noted that what we currently know about telehealth as used by complementary and alternative medicine (CAM) providers is quite slim and as such this paper is informed by material associated with orthodox medicine as well as the author's own telehealth experiences with overseas clients.

What is telehealth?

Telehealth, also known as telemedicine, is essentially healthcare at a distance facilitated by telecommunications technology involving the transmission of images, voice or data between two or more sites. Phone or video are the most commonly used media here and

both media types have their advantages and disadvantages, but in most cases the preference is for video, and a recent article published by the Royal Australian College of General Practitioners (RACGP)³ refers to government policy that indicates a preference for video over phone, primarily as a means of minimising some of the risks associated with telehealth, which are enlarged upon below.

Who are telehealth consults for?

While it may seem that every client is a suitable telehealth candidate, there are limitations that need to be considered.

The RACGP³ advises its members to restrict telehealth consultations to clients who are already in an established clinical relationship with the provider, and have generally been the recipient of a face-to-face healthcare service with the provider or within the provider's clinic, in the previous 12 months. But they suggest exemptions to this restriction for certain client categories such as children under the age of 12 months, homeless people, those isolating because of a potentially infectious disease, those in urgent need of care or those affected by a natural disaster.

The prominent Australian medical professional indemnity insurance provider, the Australian Medical Indemnity Protection Society (MIPS)⁴, echoes the RACGP's guidance, suggesting that telehealth must only be offered if measures are in place for

clients to have a face-to-face consultation when this is clinically necessary. It goes on to say that providers are encouraged to exercise clinical judgement to assess the risks of not conducting face-to-face consultations where clients may have high-risk potentially serious conditions, who are unable to self-monitor appropriately, where a physical/direct examination is pivotal to support clinical decision-making, where a client's ability to communicate effectively over the phone or through video is compromised, or where a support person is unavailable.

Before engaging with a client in a telehealth consultation, asking the following questions may be useful:

- Is it logical and safe to conduct the consultation for diagnosis and/or treatment without the client's physical presence?
- Will issues such as the client's age, impairment or disability limit the effectiveness of diagnosis or treatment?
- Is it possible to determine the severity or progress of the client's disease or disability without a physical examination?
- Is the provider literate enough with the technology inherent in the telehealth platform to be able to effectively deal with a technology issue or failure should it arise?
- Does the client have access to a space from which to engage in telehealth where privacy and security are not at risk?



- Does the client possess the digital literacy, abilities or access to the necessary technology, connectivity and equipment required to participate in an audiovisual consultation?

If a provider can't confidently answer yes to all of the above it may be wise to reconsider the choice of telehealth as a means of conducting the consultation.

Is it appropriate to treat a client via telehealth if they're located outside Australia?

MIPS⁴ advises that in telehealth consultations, the healthcare service that's provided via this method is considered to be located in the country where the client is located, not where the healthcare provider is located. Therefore, if conducting telehealth consultations for overseas clients, it's useful, at least from an insurance perspective, for a provider to be aware of issues such as professional indemnity (PI) insurance coverage and whether it exists in those areas where an overseas client resides. For an ATMS accredited member with PI insurance hosted by GSA, discussions between the author and GSA held on September 24 of this year indicate that their PI insurance policies will cover telehealth consults for overseas clients, but not if clients are located in Canada or the USA. In any case, PI insurance coverage should be confirmed with the PI insurance provider in writing to ensure that this can be relied upon, before conducting a telehealth consultation with a client overseas.

Telehealth benefits

There are obvious benefits for both healthcare providers and clients that can be gained here. For the provider, these include:

- reduced travel, expense and time away from home
- reduced environmental impact of transportation
- improved client reach, due to fewer location and travel barriers
- a reduction in client 'no-shows'
- the opportunity for administrative staff to work remotely

- where an audiovisual platform is used, these consultations offer the opportunity to see the client in context, by being able to observe the client's living or working situation and how they interact with their environment
- improved business growth opportunities
- improved clinical workflows and increased practice efficiency
- an improvement in the cost-effectiveness of service delivery
- the ability to operate from a remote or mobile location where this more effectively serves the needs of the provider

For clients, benefits include:

- improved access to healthcare, particularly for those in rural or remote locations
- reduced travel time and associated expenses
- reduced environmental impact of transportation
- reduced time away from home
- reduced waiting times, potentially supporting a faster diagnosis and treatment
- improved continuity of care due to the appropriateness of the use of telehealth for follow-up consultations and the ongoing treatment of chronic health conditions
- many clients also report improved quality of communication with providers

Are the clinical outcomes from telehealth consultations comparable to those from face-to-face consultations?

All things being equal, that is, given that telehealth consultations are delivered to the same quality standards as those applied to face-to-face consultations, the outcomes should be similar. In a recent 136 page study published by Bond University⁵ authors carried out a very comprehensive review commissioned by the federal government's Department of Health and Aged Care, looking at the effectiveness, safety and economic impacts of the provision of primary and allied healthcare delivery via

telehealth (an analysis of CAM delivery via telehealth was not included in the study). What the authors found was that telehealth and face-to-face consultations were equally effective in consultations concerning weight loss, cardiovascular disease monitoring, post-surgical rehabilitation, back pain rehabilitation, PTSD, depression, insomnia, asthma, diabetes education, acute and chronic pain, and ante- and post-natal care.

Are clients satisfied with telehealth?

Australian Bureau of Statistics (ABS) data from the 2023-2024 financial year⁶ showed that in the previous 12 months:

- 80.5% of those who'd experienced a telehealth consultation said that they were always listened to carefully
- 83.2% said that they were always shown respect in telehealth consultations
- 78.6% said that they always had enough time spent with them in telehealth consultations
- people with a long-term health condition reported more positive experiences with telehealth practitioners than those without a long-term health condition (81.7% v 78.4%)
- 89.2% of those who had had a telehealth consultation said that they'd use telehealth for a consultation again if it was offered
- 91.4% of people aged 35-44 years would use telehealth for a consultation again if it was offered
- 83.4% of people aged 75-84 years would use telehealth for a consultation again if it was offered
- the data also showed that only 65.3% of those aged 15-24 years reported more positive experiences with telehealth practitioners

With some exceptions, independent research tends to validate most of this ABS data. In a 2022 US study Hays *et al*⁷ found that client experiences with telehealth consultations were as positive as, or more positive than, consultations using a face-to-face format. A 2024 US study by Genrich *et al*⁸ showed that



clients had a positive experience with telehealth primary care visits and that, when comparing telehealth to in-person visits, clients reported less wait time, easier convenience, and similar quality between virtual and in-person visits, and they rated both their likelihood of using telehealth again and their likelihood of recommending telehealth to others as an 8.68 out of 10, on average.

In a 2023 systematic review, Kodjebacheva *et al*⁹ found that in most studies, telehealth services received more favourable or comparable satisfaction ratings than in-person visits, but that improvements were needed in telehealth-related technological challenges and the quality of rapport between clients, caregivers, and medical providers. A 2025 systematic review by Mehta *et al*¹⁰ looking at the state of teledermatology (dermatology delivered via telehealth) with specific reference to acne vulgaris, showed that when compared to in-person care, teledermatology resulted in similar outcomes on several acne-grading scales, client satisfaction was comparable, and a large proportion of clients preferred virtual care to traditional in-person visits, although treatment compliance was found to be lower for telehealth. In another 2025 systematic review, Ibrahim *et al*¹¹ found that telemedicine demonstrated non-inferior efficacy to in-person therapy for generalised anxiety disorder.

In contrast, Osman *et al*¹², in a 2024 Australian systematic review, found that 87% of the studies reviewed reported unintended consequences of telehealth. These related to continuity of care, interpersonal exchange and therapeutic relationship-building. Specifically, in 86% of studies, telehealth was viewed as hindering effective communication and client engagement, largely due to the lack of non-verbal information and, to a lesser extent, due to the increase in distractions during telehealth consultations compared to in-person consultations, particularly in the case of children or young clients. They also found that 63% of studies reporting unintended consequences from telehealth related to issues with continuity of care, and telehealth interactions were noted as impersonal, thus undermining rapport-building, which affected the therapeutic client-provider relationship.

In a survey funded by the Australian Government's Department of Health, Disability and Ageing and conducted in late 2024 with over 5,000 adult participants (Speaking Up for Health: Findings from the 2024 National Consumer Sentiment Survey¹³), when rating the overall quality of telehealth, 62% of respondents regarded it as similar to an in-person appointment, but 27.7% thought the overall quality of their experience was worse than an

in-person appointment. While telehealth appointments were rated as being about the same as in-person appointments by most respondents on almost all measures, only 51.7% felt their ability to build rapport with their provider via telehealth was similar to an in-person appointment. It was notable that in this survey 38.9% of respondents found the ability to develop a connection with their healthcare provider was not as good as it may have been at an in-person appointment.

Risks associated with telehealth

A total of 32% of the studies identified by Osman *et al*¹² showed that client safety was impaired by telehealth in a number of areas. Telehealth risks can generally be categorised as those that relate to clinical, security and legal issues.

Clinical Risks

Largely because of the lack of any direct capacity to physically examine a client during a telehealth consultation, clinical risk, particularly with new clients, is elevated relative to face-to-face consultations and can have serious consequences. Issues that may arise here include such things as client misidentification, medication errors, failure to diagnose, late diagnosis, misdiagnosis or delayed treatment as well as difficulties in evaluating, identifying,



NEW RELEASE

Where Clinical Expertise Meets Innovation

Discover formulations that meet your standards and your patients' needs.

www.biopractica.com.au



Always read the label and follow the directions for use. For practitioner dispensing only.

CurcuZOOM | ImmunoSHIELD | Probiome PING | Shroom ADAPT | BerbeZOOM



and addressing client health risk, inadequate reassurance about symptoms or advice about potential treatment side effects, failure to follow up or to properly refer to another practitioner. These problems may be due to:

- no capacity to check reflexes
- no capacity to accurately check pulse rate or pulse character
- no capacity to physically palpate the client
- no auscultation capacity
- no capacity to assess breath characteristics such as aroma
- limited capacity to accurately assess blood pressure (while some clients may have sphygmomanometers, the practitioner may not be able to rely on their accuracy or correct use)
- limited capacity to check a client's ambulatory capacity
- limited capacity to perform an iridology assessment, depending on which communication platform is being used
- limited capacity to observe body language, depending on which communication platform is being used
- limited capacity to assess the skin for issues such as pallor, jaundice or carotenaemia, etc
- limited capacity to assess the characteristics of areas such as nails and sclera
- limited capacity to assess musculoskeletal functions
- limited capacity for non-verbal communication

These and potentially other limitations inherent in telehealth may also contribute to the difficulties in evaluating, identifying, and addressing client health risk noted by Osman *et al*¹². Ultimately, because of the physical separation of clients and providers in a telehealth setting, clients may be put at clinical risk, and/or experience clinical mistreatment, and the practitioner's therapeutic capacity may be seriously compromised.



Security Risks

Telehealth usually occurs via phone or video, which poses security risks in comparison to face-to-face consultations because it increases the possibility of unauthorised access by others to a client's personal information: particularly, where communication is occurring in an uncontrolled or unsecured physical or electronic environment-sensitive setting, personal information may be overheard by others in the vicinity, and video transmission of that same information transmitted over the internet may be intercepted and captured.

Legal Risks

There are several issues here. The first and most important of these relates to PI insurance. As mentioned above, a lack of effective PI insurance exposes a provider to significant risk and, unless this insurance is in place, in most cases it's not worth the risk of engaging in telehealth.

It's important that clients provide informed consent to telehealth consultations before they start, that is, consent that's informed by a thorough understanding of the associated risks. Without that consent, should an adverse event arise from a telehealth session, the healthcare provider may be exposed to some or all of the liability for damages that arise from a legal claim related to the adverse event.

Healthcare providers owe a duty of care to clients. Regardless of what form a consultation takes, the same duty of care obligation remains. Unless a provider has reasonable defences in place against the development of adverse telehealth-associated security or clinical events, it could be argued that the provider has failed in their duty of care, and a failure in this area leaves providers open to legal risk.

Similarly, all clients, whether they be telehealth or face-to-face, are owed the same standard of care. Because of some of the limitations inherent in telehealth, if an adverse event occurred and the standard of care applied in a telehealth consultation was shown to be deficient, it could be argued that negligence occurred. This exposes a provider to significant legal risk should a claim for damages arising from the adverse event be upheld.

Mitigating risks

Most activities involved in healthcare carry some element of risk and it's clear that face-to-face consultations carry less risk than those conducted via telehealth. But there are means by which telehealth-associated risk can be mitigated. If at all possible, limiting telehealth operations to follow-up consultations, rather than both follow-up and initial consultations, will reduce telehealth-associated forms of risk to some degree.

Clinical risk will be diminished if new clients have been examined in person by a qualified and competent practitioner and these findings relayed to the telehealth before the telehealth consultation. Where musculoskeletal issues are involved, asking the client, as objectively as possible, to conduct a functional assessment of movement and having them grade each element of it can help. The proper use of accurate home-based diagnostic tools such as sphygmomanometers, glucometers, pulse oximeters and urinalysis dipsticks can also be very useful. If treating a client with a skin disorder, having the client provide good quality photographs of the areas in question, taken in natural light, will be valuable. Clinical risk will also be eased if high quality audiovisual rather than phone communication is used.



Allowances should be made for the limitations imposed by telehealth media, particularly phones, on communication quality, which can suffer because of these limitations, degrade a provider's diagnostic capacity, quality of rapport and capacity for client engagement. They can also decrease the capacity to ensure that treatment plans are effectively communicated. For this reason, providers should carefully assess the purpose of any telehealth consultation, before and during the consultation, to ensure the selected mode of delivery is appropriate, is safe and meets the needs of the client. In addition, treatment plans and medication directions should be conveyed to the client in writing as well as verbally.

Because of the potentially significant clinical risk posed here, providers should be prepared to cease any telehealth consultation if or when it becomes obvious that a face-to-face consultation is necessary, and processes should be in place to facilitate this in a timely manner.

Security risks primarily involve unauthorised access to a client's personal information. Some of the steps that can be taken to mitigate risk here include ensuring that:

- only authorised persons (usually just the provider and the client) are within hearing/viewing distance of

the consultation. To facilitate this it's useful to ask the client to confirm who's present at the other end of the conversation, and make a note of this in the client's file

- communication at both ends is only to be made from within private, secure and controlled spaces
- clients aren't recording the consultation without the provider's approval, or if the provider is recording the consultation, that this is only done after receiving the client's informed consent for this to occur
- audiovisual platforms are secure, noting that some are more secure than others- Microsoft Teams, for example, appears to have good security and appears to be the preferred platform for many Australian state and federal government agencies
- where audiovisual communication is used, the selected platform is secure and compliant with Australian privacy laws. Where these factors can't be confirmed, communication by phone may be preferable
- the audiovisual platform used has end-to-end encryption, file encryption for any files that may need to be shared, is one where the platform doesn't have access to client conversations, and has a free version that can be used by clients
- the platform that's used only stores its data in Australia. Where data is stored will normally be set out in

the telecommunications platform's privacy policy, and if data is stored overseas it may not comply with Australian privacy laws

- where audiovisual communication is used, that access at both ends is protected by usernames and passwords at a minimum, but preferably with multi-factor authentication
- a data breach action plan is in place and that those who need to be are competent in its use
- where telehealth is used, the privacy practices that relate to this are clearly outlined in the clinic privacy policy on the provider's clinic website

For more on this see:

- The Australian government's Guide to Securing Personal Information at <https://www.oaic.gov.au/privacy/guidance-and-advice/guide-to-securing-personal-information/> and the Medical Benefit Scheme's telehealth Privacy Checklist at <https://www.mbsonline.gov.au/internet/mbsonline/publishing.nsf/Content/Factsheet-TelehealthPrivChecklist>
- The Australian Medical Indemnity Protection Society's telehealth guide at <https://support.mips.com.au/home/telehealth-and-practice-risks-guide>

This advertisement is available only to ATMS Accredited Members in accordance with the Therapeutic Goods Advertising Code.



As far as Legal risk is concerned, any clinical, security or other issue that has a negative impact on a client can have legal implications for a healthcare provider because they all impinge on responsibilities such as duty of care to clients, and they need to be fully understood and managed appropriately. Actions that may mitigate risk here include:

- creating a contingency plan for use if a client's clinical situation deteriorates further than that which can be managed remotely by the provider
- securing informed consent from the client to the telehealth consultation before it occurs and noting this in the client's file
- ensuring that adequate PI insurance cover for the provision of the telehealth service is in place before the consultation occurs
- ensuring that the ATMS Code of Conduct and all other applicable codes are fully understood and complied with
- conducting the telehealth consultation to the same standard as if it were occurring in person (acquiring and documenting informed consent, producing and maintaining complete and contemporaneous records of the consultation and treatment as well as appropriate dispensing records, protecting client privacy, etc)
- ensuring that allowances are made for the recognised limitations of the telehealth consultation
- recording in the client's file any observations related to communication difficulties with the client, difficulties imposed by the communications platform, as well as client body language, appearance, temperament and anything else that may be clinically relevant

Supplying medicines

If providers are dispensing their own medicines to clients, these will obviously need to be sent to clients, but this should only occur after the client has been made fully aware of the costs involved and has agreed to them beforehand. When sending medicines, clear and

detailed records should be kept of the client's consent to receive and pay for the medicines, noting what was sent, when it was sent, the address to which it was sent, how it was sent and any related item tracking numbers. Where clients are given the option of ordering medicines directly from a practitioner-only medicine wholesaler such as Integria (<https://patient.integria.com/MyPatients.aspx>), Osborne Health Supplies (www.osbornehealth.com.au), Natural Script (<https://naturalscript.com.au>), Vital.ly (<https://www.vital.ly>), or Ariya health (www.ariyahealth.com.au), etc, similar details should be recorded.

Payment

One other thing to consider is payment for the consultation. It has been the experience of some practitioners providing these services that clients are occasionally resistant to requests for payment for a telehealth service where the request is made after the service has been provided. This may occur because the client isn't physically present in the clinic and feels somewhat detached from what's occurred but for whatever reason, these interactions with some clients can prove to be challenging. This may be overcome by ensuring that payment occurs before the consultation, via whichever payment method that is preferred by the provider and is convenient for the client. In most cases the best option here is a secure stand-alone payment system that's hosted on the provider's clinic website.

Conducting a telehealth consultation

There are a number of things that are worth considering that may help to maximise the effectiveness of a telehealth consultation:

- to improve a client's capacity to provide informed consent to engage in the consultation, the transmission of a simple fact sheet explaining the telehealth process (including potential risks, technology requirements and security details, etc) to the client in

advance of the telehealth consultation, may aid the client in providing informed consent

- if the technology used employs a visual component, the area that's visible behind the practitioner should be clean, uncluttered and won't cause distractions, and the sun or some other overly bright light source shouldn't be shining forward towards the client
- if the technology used employs a visual component the practitioner's attire and appearance should be as if the consultation were occurring face-to-face
- the consultation must be conducted in a private and secure area
- both the practitioner and the client must be familiar with the technology that's to be used to communicate during the consultation and it should be confirmed that both are comfortable using it, and the practitioner should be confident in dealing with any problem that may arise with the technology, before the telehealth session occurs
- a backup communication platform (the default here is usually the phone) should be available in case the primary telehealth platform fails
- both the practitioner and the client must have access to a stable and fast internet connection. Without this, consultations may suffer from audio dropouts, audiovisual synchronisation problems, pixelation, frozen frames, video but no audio, audio but no video or total session disruption
- note that if a telehealth consultation is to be recorded by a practitioner, the client will need to consent to this before the consultation occurs, and an explanation as to how the recording may be used or disclosed needs to be provided, as well as how and where the recording will be stored, and the recording must be stored with the same level of security as any other sensitive client information

It's also important to note that receipts for payment for the consultation should be clearly marked to show that it was conducted via telehealth. Where



healthcare rebates are available through a client's private healthcare insurance, a telehealth consultation format may not be rebatable from all insurance providers.

There are a number of options to choose from when it comes to potential telehealth platforms. The phone is probably the most obvious one but far more effective communication can be had via audiovisual media. Some of the more commonly selected choices here include:

- Microsoft Teams (<https://www.microsoft.com/en-au/microsoft-teams/group-chat-software>)
- Zoom (<https://zoom.us>)
- Goto Meeting (<https://www.goto.com/meeting>)
- Coviui (<https://www.coviui.com/en-au>)
- Doxy.me (<https://doxy.me>)
- Skype (<https://www.skype.com>)

The RACGP hosts a useful guide on setting up for telehealth which can be viewed at <https://www.racgp.org.au/running-a-practice/technology/clinical-technology/telehealth/guide-to-providing-telephone-and-video-consultation/introduction>

REFERENCES

1. Australian Government, Department of Health and Aged Care, *Statistics under Medicare 2022*- https://www.health.gov.au/topics/medicare/data-statistics-reporting?utm_source=health.gov.au&utm_medium=callout-auto-custom&utm_campaign=digital_transformation
2. Gibbins A, et al. *ATMS Survey: Perspectives on the reinstatement of health fund rebates for naturopathy and Western Herbal Medicine*. *ATMS Journal*. 2025;31(3):130-6.
3. *RACGP telehealth position statement*- <https://www.racgp.org.au/advocacy/position-statements/view-all-position-statements/clinical-and-practice-management/racgp-position-telehealth-general-practice>
4. *The Australian Medical Indemnity Protection Society telehealth guidance*- (<https://support.mips.com.au/home/telehealth-practices-faq-guide>)
5. Scott AM, et al. *Final Report: Telehealth Work Package A*. June 2023. Institute for Evidence-Based Healthcare, Bond University, Faculty of Health Sciences & Medicine- <https://research.bond.edu.au/en/publications/final-report-telehealth-work-package-a>
6. Australian Bureau of Statistics *Patient Experiences, Experience of telehealth services*- <https://www.digitalhealth.gov.au/healthcare-providers/initiatives-and-programs/telehealth>
7. Hayes RD, et al. *Patient Experience with In-Person and Telehealth Visits Before and During the COVID-19 Pandemic at a Large Integrated Health System in the United States*. *J Gen Intern Med*. 2022;37(4):847-52. <https://pubmed.ncbi.nlm.nih.gov/34982370/>
8. Genrich CM, et al. *Telemedicine and Its Perceptions in a Border Community: A Review of How Health Care Technology Has Helped Increase Access*. *Telemed J E Health*. 2024;30(4):987-93. <https://pubmed.ncbi.nlm.nih.gov/34982370/>
9. Kodjebacheva GD, et al. *Satisfaction With Telehealth Services Compared With Nontelehealth Services Among Pediatric Patients and Their Caregivers: Systematic Review of the Literature*. *JMIR Pediatr Parent*. 2023;6:e41554. <https://pediatrics.jmir.org/2023/1/e41554/>
10. Mehta S, et al. *Teledermatology and Virtual Visits for Acne Management: A Review*. *J Cutan Med Surg*. 2025;29(1):63-8. <https://pubmed.ncbi.nlm.nih.gov/39487591/>
11. Ibrahim ME, et al. *Comparing Telemedicine and In-Person Psychological Interventions for Anxiety: A Systematic Review*. *Cureus*. 2025;17(8):e89594. <https://pubmed.ncbi.nlm.nih.gov/40926917/>
12. Osman S, et al. *The Unintended Consequences of Telehealth in Australia: Critical Interpretive Synthesis*. *J Med Internet Res*. 2024;26:e57848. <https://pubmed.ncbi.nlm.nih.gov/39190446/>
13. *Speaking Up for Health: Findings from the 2024 National Consumer Sentiment Survey*- <https://www.datocms-assets.com/144433/1761612001-consumer-sentiment-survey-2024.pdf>

This advertisement is available only to
ATMS Accredited Members in accordance with the
Therapeutic Goods Advertising Code.



WHITE PAPER

The National Code of Conduct for Health Care Workers

1. Introduction

The Australian healthcare system has two categories of regulation:

- Registered practitioners: Those regulated by the Australian Health Practitioner Regulation Agency (AHPRA) under the Health Practitioner Regulation National Law (e.g. acupuncturists).
- Non-registered practitioners: Those practising in self-regulated professions (e.g. naturopaths, massage therapists, nutritionists, homoeopaths).

Non-registered practitioners are regulated through the National Code of Conduct for Health Care Workers. The Code sets out the minimum standards of professional and ethical behaviour expected of practitioners and provides a framework for complaints, investigations, and prohibition orders where public safety is at risk.

All ATMS members, whether practising in regulated or unregulated professions, must also comply with the ATMS Members' Code of Conduct, which aligns with these standards and ensures consistency across our diverse membership.

2. Historical Background

In 2011, the Australian Health Ministers' Advisory Council (AHMAC)

recommended a single national code to address risks posed by non-registered practitioners.

In 2015, the Council of Australian Governments (COAG) Health Council endorsed a nationally consistent model law to regulate non-registered health practitioners. This became the National Code of Conduct for Health Care Workers (the National Code).

Each state and territory is responsible for implementing the Code through local health complaints bodies.

3. Key Features of the Code

3.1 Standards of Practice

The Code requires non-registered practitioners to:

- Provide services safely, competently, and ethically. Obtain informed consent before treatment.
- Maintain appropriate professional boundaries.
- Keep accurate clinical records.
- Hold suitable professional indemnity insurance.

3.2 Prohibited Conduct

The Code prohibits non-registered practitioners from:

- Engaging in sexual or exploitative relationships with clients.

- Making false, misleading, or deceptive claims about treatment or outcomes.
- Financially exploiting clients.
- Breaching client confidentiality.
- Practising while intoxicated or under the influence of drugs.

3.3 Display Requirements

Non-registered practitioners must display a copy of the National Code in their clinic and provide clients with information about how to lodge a complaint.

4. Regulated Practitioners

If you are an AHPRA-registered practitioner (e.g. acupuncturist):

- Your legal obligations come from the Health Practitioner Regulation National Law.
- You must comply with your Board's codes and guidelines, such as the Code of Conduct for Chinese Medicine Practitioners.
- The National Code of Conduct does not apply, but ATMS holds you accountable to its Members' Code of Conduct, which mirrors the same ethical principles.

This ensures consistent expectations across all ATMS members, regardless of registration status.

5. Implementation

Jurisdiction	Regulator	Status	Prohibition Orders
NSW	Health Care Complaints Commission (HCCC)	In force since 2008 (aligned 2016)	HCCC Decisions
Victoria	Health Complaints Commissioner	In force since 2017	HCC Prohibition Orders
Queensland	Office of the Health Ombudsman (OHO)	In force since 2015	OHO Prohibition Orders
South Australia	Health and Community Services Complaints Commissioner	In force since 2015	SA Prohibition Orders
ACT	Human Rights Commission	In force since 2016	ACT HRC Prohibition Orders
Tasmania	Health Complaints Commissioner	Commenced 31 Dec 2024	Tasmania Code
Western Australia	Health and Disability Services Complaints Office (HaDSCO)	Legislation passed 2021, commencement pending (Code not yet in force)	HaDSCO
Northern Territory	Health and Community Services Complaints Commission	Adopted 2016. Not confirmed fully in force	NT HCSCC

6. Complaints Pathway

Complaints about non-registered practitioners are handled under the National Code by state or territory health complaints entities. The process typically involves:

1. Receiving the complaint – lodged by a client, carer, or another practitioner.
2. Assessment – the regulator decides whether the complaint falls within its jurisdiction.
3. Investigation – gathering evidence, interviewing parties, and assessing compliance with the Code.
4. Decision – outcomes may include conciliation, recommendations for improvement, or prohibition orders.

For AHPRA-registered practitioners, complaints go to AHPRA and the relevant National Board.

For ATMS members, complaints may follow two pathways:

- **Professional/ethical concerns:** handled through the ATMS Complaints Committee, applying the ATMS Code of Conduct.
- **Public safety concerns (e.g. boundary breaches, fraud, risk of harm):** referred to the relevant state/territory health complaints entity or AHPRA.

This dual system ensures both professional accountability within ATMS and statutory accountability under law.

7. Case Studies

Case Study 1 – NSW HCCC Prohibition Order

A massage therapist in NSW was permanently prohibited from practice after repeatedly breaching professional boundaries with clients. The HCCC found this behaviour posed a serious risk to public safety and issued a public prohibition order.

HCCC Decisions

Learning for members: Even relatively “low-level” boundary breaches can result in permanent prohibition from practice.

Case Study 2 – QLD OHO Misleading Claims

A practitioner was prohibited from providing health services in Queensland after advertising unproven “cancer cure” treatments. The OHO determined the advertising was false, misleading, and dangerous.

OHO Prohibition Orders

Learning for members: Making unsubstantiated claims about treatment outcomes breaches both the National Code and Australian Consumer Law.

8. ATMS Code of Conduct

The ATMS Members’ Code of Conduct applies to all members, regardless of whether they are in regulated or unregulated professions. It:

- Reflects the principles of the National Code.

- Emphasises professional boundaries, truth in advertising, client consent, and ethical practice.
- Provides additional guidance tailored to natural medicine practice.
- Ensures consistent professional standards across 20+ modalities.

9. Implications for Members

Non-registered practitioners: Must comply with the National Code where implemented and ATMS standards nationally.

Registered practitioners: Must comply with AHPRA requirements and ATMS standards.

All ATMS members: Are accountable to the ATMS Code of Conduct and must maintain professional indemnity insurance.

Failure to comply can result in:

- Loss of ATMS membership.
- Loss of health fund recognition.
- Legal penalties, including prohibition orders.

10. Compliance Checklist

Display the National Code of Conduct in your clinic if practising in a state/territory where it is in force.

Ensure your advertising is accurate, evidence-based, and not misleading.

Maintain clear professional boundaries.

Keep accurate, secure clinical records.

Hold current professional indemnity insurance.

Cooperate fully with any complaints investigation.

Check whether you fall under AHPRA regulation and comply with those obligations if registered.

Always represent your qualifications honestly and correctly.



Work Health and Safety: *Psychosocial Hazards*

Ingrid Pagura | BA, LIB

Under Work Health and Safety legislation, a PCBU (Person Conducting Business or Undertaking) is responsible for providing a safe workplace for all workers and visitors. All states and territories in Australia, except for Victoria, are covered by the Model Work Health and Safety Act and associated legislation as adopted in their state or territory. Victoria is outside this model legislation and is covered by the Occupational Health and Safety Act 2004 and associated legislation, but many of the requirements are much the same.

A recent change to controlling psychosocial hazards in Victoria made me think it might be time to review this topic.

Most of us are familiar with the common workplace hazards:

- Biological: infection risks such as bacteria, viruses, yeasts, fungi, etc
- Physical: manual handling such as lifting weight incorrectly, poor posture, exposure to noise, temperature, long hours on your feet
- Safety: slipping/tripping hazards, falls from heights and cuts
- Ergonomic: working environment such as repetitive movements, improper set up of workstation, lifting heavy and awkward items.

You may remember that as part of your responsibilities you must identify these hazards, assess how serious they are, control them and then review your chosen control measure to ensure it is working. This is relatively easy for the hazards I've listed, the ones we can easily see.

Since late 2022, however, psychosocial hazards have been in the spotlight and are recognised in the same way as all the others. Since 2022, PCBUs or employers are required to eliminate psychosocial hazards in the same way as they would physical hazards.

Psychosocial hazards are those that may cause psychological and/or physical harm and arise from or relate to, the way jobs and tasks are managed, organised, or supervised, the working environment or equipment at a workplace, and social factors such as social interactions and workplace relationships. These are the sorts of workplace issues that lead to chronic stress and its physical manifestations, such as anxiety, depression, insomnia, musculoskeletal injuries and chronic diseases.

According to SafeWork Australia, in 2024 mental health and related psychosocial injuries were the fourth largest category of claims. So, to summarise, psychosocial injuries arise from or relate to the way jobs and tasks

are managed, organised, or supervised, the working environment or equipment at a workplace, and social factors such as social interactions and workplace relationships. Some examples could be bullying, discrimination, stress, fatigue, violence, time constraints, insufficient training etc.

What are examples of psychosocial hazards?

- job demands too high or too low (e.g., working long hours without enough breaks, not having the right skills to complete the job);
- low job control (e.g., little say or control over how you do your job, or being required to ask permission for routine tasks);
- poor support (e.g., not getting enough information or not having equipment you need to do the job safely or in an appropriate way);
- lack of role clarity (e.g., not being provided clarity on your role and responsibilities or expectations, or conflicting or changing work expectations, such as contradictory instructions);
- poor organisational change management (e.g., changes that are poorly planned, or insufficient thought being given to how a change could affect WHS risks);
- inadequate reward and recognition (e.g., not enough feedback or some



- people getting rewarded and not others);
- poor organisational justice (e.g., being inconsistent, unfair, or discriminatory in decisions, or directing unjustified blame at workers);
 - traumatic events (e.g., workers being exposed to a traumatic event such as a workplace incident or fatality, an assault, a natural disaster such as a bushfire, or situations of extreme risk);
 - poor physical environment (e.g., working in uncomfortable conditions which make it hard to concentrate due to noise or temperature, having to wear poorly fitting PPE, or being provided with malfunctioning equipment);
 - harmful behaviours (e.g., being exposed to violence, aggression, bullying or sexual harassment; discrimination based on race, culture, disability or age; or conflict in workplace relationships).

As I mentioned earlier, the identified risk must then be controlled so that it doesn't happen. Risk control means your taking action to eliminate health and safety risks so far as is reasonable and practicable, and, if that is not possible, minimising the risks so far as is reasonable and practicable.

The various ways of controlling risks are ranked by effectiveness and reliability. The Hierarchy of Controls provides different control measures that can be used to minimise the risk created by a hazard. If one control can't be implemented, move onto the next one. A PCBU must do what is reasonably practicable in the circumstances to manage risks and maintain a safe workplace.

The steps of the Hierarchy of Controls are: eliminate the hazard; substitute the hazard; isolate the hazard; reduce the hazard through engineering methods; reduce the risk through administrative measures; and use PPE. A PCBU must always start with eliminating the risks and must not jump straight to providing PPE as a solution. PPE is the last resort.

For controlling risks from psychosocial hazards, use the Hierarchy of Controls in the same order. Aim to eliminate, but if that is not reasonably practicable then minimise risk by substituting, isolating, reducing the hazard through engineering methods, reducing the risk through administrative measures and using PPE. More than one control measure can be used at one time.

For Victoria, from 1 December 2025, there is a different way of controlling psychological hazards. Identifying

hazards and assessing the risks are done in the same way, but when controlling risks, the employer must first consider if it is reasonably practicable to eliminate the risk. If it's not, then the employer must reduce the risk so far as is reasonably practicable, by:

- 'altering the:
 - i. management of work
 - ii. plant
 - iii. systems of work
 - iv. work design
 - v. workplace environment, or
- using information, instruction or training, or
- using a combination of the above controls.'

It is no longer enough to use information, instruction or training as these must no longer be the predominant controls.

For more information, see SafeWork Australia [Managing Psychosocial Hazards in the Workplace Code of Practice](#) Appendix A in particular, which has lots of examples of how to control hazards. For Victoria, please see [Compliance Code Psychological Health 2025](#), in force from 1 December 2025, particularly Appendix C, which also has a lot of practical examples of how to apply control measures to different psychosocial hazards.

nk institute
NUTRITIONAL KINESIOLOGY

SPECIALISED KINESIOLOGY TRAINING
FOR NATUROPATHS AND NUTRITIONISTS



Apply powerful and advanced Kinesiology techniques to elevate and expand your practice!

www.nkinstitute.com.au

nk institute
RTO: 31750
NEUROENERGETIC KINESIOLOGY

- LIVE
- ONLINE
- SELF PACED

nk institute
NATUROPATHIC KINESIOLOGY



ADVANCED PROFESSIONAL
CERTIFICATE TRAINING IN
NATUROPATHIC
KINESIOLOGY

PROFESSIONAL
CERTIFICATE TRAINING IN
NUTRITIONAL
KINESIOLOGY



Acupuncture and Traditional Chinese Medicine

Lee J, Sung HK. East Asian traditional medicine for attention-deficit hyperactivity disorder in children and adolescents: a scoping review. *BMC Complement Med Ther.* 2025 Oct 24;25(1):399. doi: 10.1186/s12906-025-05119-y. PMID: 41137076; PMCID: PMC12553229.

Background: East Asian Traditional Medicine (EATM) offers various modalities—such as herbal medicine, acupuncture, and manual therapy—for managing attention-deficit hyperactivity disorder (ADHD) in children and adolescents. This scoping review aimed to identify the overall status and characteristics of EATM treatments for children and adolescents with ADHD.

Methods: Following the Arksey and O'Malley framework, we searched 13 databases in English, Korean, Chinese, and Japanese. Articles evaluating the effectiveness and safety of EATM treatments for ADHD in children and adolescents aged < 18 years were included. EATM treatments were categorized into herbal medicine, acupuncture, manual therapy, miscellaneous modalities, and combined treatments.

Results: A total of 198 studies were ultimately included in the review. When categorized by treatment method, most studies focused on herbal medicine ($n = 104$), followed by miscellaneous modalities ($n = 41$), acupuncture ($n = 26$), combined treatments ($n = 20$), and manual therapy ($n = 7$). Most studies were conducted in China (78.3%) and published in Chinese (74.7%). Among these, 169 were randomised controlled trials, 19 were controlled clinical trials, and 10 were systematic reviews and/or meta-analyses. Among controlled trials, most studies reported positive effects in the experimental group ($n = 101$, 53.7%); however, > 50% of the studies did not report adverse events ($n = 107$, 56.9%).

Conclusions: This comprehensive review provides an unprecedented overview of diverse EATM treatments for paediatric patients with ADHD, including herbal medicine, acupuncture, manual therapy,

and miscellaneous modalities. Further studies should focus on methodological improvements, such as the use of standardised diagnostic criteria and systematic reporting of adverse reactions. This study provides foundational data for future research and clinical practice, including the development of research protocols and treatment guidelines.

Zhao FY, Xu Y, Kennedy GA, Conduit R, Zhang WJ, Jiang T, Xu P, Ho YS, Fu QQ, Chow CM. Is integrating acupuncture into the management of attention-deficit/hyperactivity disorder among children and adolescents now opportune and evidence-based? A systematic review with meta-analysis and trial sequential analysis. *Complement Ther Med.* 2025 Jun;90:103163. doi: 10.1016/j.ctim.2025.103163. Epub 2025 Mar 12. PMID: 40086639.

Background and aim: The use of acupuncture is becoming increasingly popular in the management of attention-deficit/hyperactivity disorder (ADHD). This systematic review consolidates evidence on acupuncture's efficacy and safety for treating ADHD in children and adolescents.

Methods: Controlled clinical trials assessing acupuncture against waitlist-control, placebo or active controls, or as an adjunct treatment were systematically searched across seven databases from inception to November 2024. Cochrane criteria were adhered to.

Results: We reviewed 25 studies with 1758 participants. None compared acupuncture to placebo or behavioral therapy. Subdomain analysis of the Conners' Parent Rating Scale indicated that acupuncture and Methylphenidate had comparable effects on Conduct Problems [SMD = 0.03, 95 %CI (-0.93, 0.99), $p = 0.95$] and Learning Problems [SMD = 0.29, 95 %CI (-0.38, 0.97), $p = 0.39$], but acupuncture was more effective in controlling Impulsive/Hyperactive symptoms [SMD = -1.71, 95 %CI (-2.08, -1.35), $p < 0.01$]. Insufficient sample size prevented confirmation of potential false positives. Acupuncture was safer and reduced Methylphenidate-related side-effects, including appetite loss, sleep

disturbances, dry mouth, abdominal pain, and constipation. Acupuncture combined with behavioral therapy outperformed behavioral therapy alone in improving Psychosomatic symptoms [SMD = -0.88, 95 %CI (-1.54, -0.23), $p < 0.01$]. In the Integrated Visual and Auditory Continuous Performance Test, ADHD patients receiving acupuncture alongside conventional care performed better than those receiving conventional care alone. Nevertheless, the methodological quality of the included trials was very low to low, with significant bias risk, and 88 % lacked follow-up.

Conclusions: Acupuncture may offer an alternative for children and adolescents with ADHD who are intolerant to medication (primarily Methylphenidate). When combined with medication or behavioral therapy, it appeared more effective in ameliorating hyperactivity/impulsivity, inattention and conduct problems than standard treatments alone. It is also safe and well-tolerated. However, the supporting evidence is of low quality, and well-designed randomized controlled trials are needed. Thus, it is premature to recommend acupuncture as an alternative or adjunctive therapy for ADHD management.

Snow A, Ralston-Wilson J, Milley R. Acupuncture in Pediatrics: A Scoping Review. *J Integr Complement Med.* 2025 Apr;31(4):335-349. doi: 10.1089/jicm.2024.0150. Epub 2025 Feb 5. PMID: 39910032.

Background: The use of acupuncture for common pediatric conditions continues to grow in the United States. Six previous reviews have summarized the research; however, approximately 8 years have accumulated adding to this growing body of literature.

Objectives: The aim of this article is to provide a scoping review of acupuncture research in pediatric conditions and a summary of the effectiveness of acupuncture in the pediatric population.

Methods: A systematic search was performed to identify clinical trials and reviews published between August 2015



and October 2023. Trials and reviews were excluded if they were not: (1) acupuncture specific, (2) data limited to pediatric patients, and (3) published in English. The literature was assessed and synthesized into a scoping review and commentary.

Results: Seventy-one publications were identified (42 clinical trials and 29 reviews) that represented 17 conditions and 10 countries; the top 2 were China and the United States. The top five areas of new research (based on numbers of clinical trials) are pain, cerebral palsy (CP), attention-deficit hyperactivity disorder, autism spectrum disorder, and nausea and vomiting.

Conclusions: Clinical trials in pediatric acupuncture represent a small but important subset of acupuncture literature. Data are positive for postoperative nausea and vomiting and promising for CP, nocturnal enuresis, perioperative pain, procedural pain, and tic disorders. Several factors preclude additional firm conclusions from being drawn, including a limited number of trials, small sample size ($n < 100$) of the majority of randomized controlled trials (78.6%), and heterogeneity of treatment approaches. Continued research on the use of acupuncture for pediatric conditions is warranted, particularly in conditions demonstrating recent promising evidence.

Mohammadi L, Tagharrobi Z, Sharifi K, Sooki Z, Zare M, Zare Jashaghani F. The Effect of auriculotherapy on sleep quality in children with attention deficit hyperactivity disorder: a randomized clinical trial. *BMC Pediatr.* 2025 Jan 20;25(1):48. doi: 10.1186/s12887-024-05371-0. PMID: 39833716; PMCID: PMC11744890.

Introduction: Considering the importance of sleep disorders in children with attention-deficit/hyperactivity disorder (ADHD) and effective therapeutic strategies, the present study aimed to investigate the effects of auriculotherapy on sleep quality in children with ADHD.

Materials and methods: This clinical trial was conducted in children with ADHD in Kashan, Iran, 2021-2022. Fifty-two eligible samples were selected using convenience sampling and randomly assigned to intervention and sham groups. The intervention group used Vacaria seeds to apply ear acupressure to Shenmen, Sympathetic, Subcortex, Heart, and Endocrine points for four weeks, while the sham group received adhesives without seeds and pressure. Sleep quality was assessed using children's sleep habits questionnaire at the beginning (T0), at the end of the intervention (T1), and one month later (T2). Data from 45 children (23 and 22 children in the intervention and sham groups, respectively) were analyzed using the

per-protocol and intention-to-treat designs using repeated measures analysis of variance.

Results: The background variables did not significantly differ between two groups. The between-group analysis revealed a significant interaction effect of time and intervention on sleep quality (Effect Size = 0.545, $p < 0.0001$). The sleep quality score in the intervention group was significantly greater than in the sham group at T1 and T2 ($p < 0.0001$). The within-group analysis of the intervention group revealed a significant difference in sleep quality scores at three time points (Effect Size = 0.672, $p < 0.05$). In the sham group, sleep quality score increased significantly over time (Effect Size = 0.511, $p < 0.05$).

Conclusions: The findings suggest that auriculotherapy may be a beneficial complementary treatment for improving sleep quality in children with ADHD.

Complementary medicine

Szychta LF, Sombra SEL, Lima GA, Ventura MWS, Oliveira BSB, Lima FET. Complementary therapies for the management of attention deficit hyperactivity disorder in children: a scoping review. *Rev Lat Am Enfermagem.* 2025 Nov 3;33:e4701. doi: 10.1590/1518-8345.7915.4701. PMID: 41191698; PMCID: PMC12587758.

This advertisement is available only to
ATMS Accredited Members in accordance with the
Therapeutic Goods Advertising Code.



The aim was to map the scientific literature regarding complementary therapies used by health professionals for children with Attention Deficit Hyperactivity Disorder. This scoping review was based on the recommendations proposed by the Joanna Briggs Institute. Five data sources were searched. Inclusion criteria comprised articles published in English, Spanish, or Portuguese; children aged one to nine years diagnosed with Attention Deficit Hyperactivity Disorder, regardless of additional age ranges covered; and no restrictions on publication date, study design, or bibliographic type. Therapies were grouped into four categories: mind-body therapies, supplementation, herbal therapy, and dietary therapy.

A total of 1,444 publications were identified, with 133 peer-reviewed articles selected for analysis. Sixty-five complementary therapies were identified, with neurofeedback ($n=38$) being the most frequently cited mind-body therapy. Other interventions included a prevalence of polyunsaturated fatty acid supplementation ($n=14$), Ginkgo biloba use ($n=6$) in phytotherapy, and oligo-antigenic diet ($n=5$) in dietary therapy.

Complementary therapies show potential for alleviating symptoms of Attention Deficit Hyperactivity Disorder in childhood. However, some therapies still lack scientific validation, highlighting the need for targeted experimental studies to ensure safe and effective use.

Livio Francisco S C, Fabio Borges P, Pedro Henrique Resende M. Myths and facts in the treatment of neurodevelopmental disorders - other therapies. *J Pediatr (Rio J)*. 2025 Oct 29;102 Suppl 1(Suppl 1):101452. doi: 10.1016/j.jpmed.2025.101452. Epub ahead of print. PMID: 41022135; PMCID: PMC12603951.

Objective: To critically examine the effectiveness of complementary and alternative therapies (CATs) in the treatment of neurodevelopmental disorders, distinguishing myths from

evidence-based practices and supporting informed therapeutic decision-making for healthcare professionals, educators, and families.

Data sources: Evidence was collected from PubMed, Scopus, and Web of Science up to August 2025. Systematic reviews, meta-analyses, and international consensus statements addressing attention-deficit/hyperactivity disorder (ADHD), autism spectrum disorder (ASD), specific learning disorders, communication and language disorders, intellectual disability, and developmental coordination disorder were included.

Summary of findings: Interest in interventions such as neurofeedback, transcranial direct current stimulation, music therapy, equine-assisted therapy, virtual reality, and gamification has grown substantially. However, most of these approaches lack methodological standardization and robust evidence to justify their use as primary treatments. Some demonstrate modest benefits as adjunctive strategies, especially when integrated into structured programs and supervised by multidisciplinary teams. Conversely, therapies including acupuncture, ozone therapy, and hyperbaric oxygen therapy present insufficient scientific support and should not be considered substitutes for validated methods.

Conclusion: Complementary and alternative therapies remain a topic of significant debate in the management of neurodevelopmental disorders. While certain approaches may offer limited adjunctive benefits, their clinical use should be carefully evaluated within evidence-based frameworks. The development of rigorous evaluations, standardized protocols, and the safe integration of innovative technologies is essential to optimize therapeutic outcomes without compromising access to scientifically validated interventions.

Exercise Therapy

Liu C, Wong SH, Arbour-Nicotopoulos K, Ho RT, Yang Y, Liang X, Leung A, Cheung

JS, Dastamooz S, Sit CH. Effects of physical activity on suicidal ideation and sleep disturbances in adolescents with attention-deficit hyperactivity disorder: A randomized controlled trial. *J Affect Disord*. 2026 Jan 15;393(Pt B):120369. doi: 10.1016/j.jad.2025.120369. Epub 2025 Oct 9. PMID: 41067651.

Background: The current study aimed to investigate whether aerobic exercise-based physical activity (PA) intervention can reduce suicidal ideation (SI) and alleviate sleep disturbances in adolescents with attention-deficit hyperactivity disorder (ADHD).

Methods: In this assessor-masked, multicenter, two-group randomized controlled trial, 72 adolescents with ADHD (Meanage = 14.71 ± 1.64 years) were randomly assigned to either the exercise group or the control group. Participants in the exercise group attended a 12-week aerobic exercise-based PA consisting of a 60-min session per week. SI was assessed using a self-report questionnaire, and sleep disturbances were evaluated with a parent-report questionnaire. Assessments were conducted at baseline and at the immediate end of the intervention.

Results: Repeated analyses of variance with a 2 (time: Time 0 vs. Time 1) x 2 (group: Exercise group vs. Control group) mixed-model design revealed that participants in the exercise group reported significantly reduced SI ($F = 5.68, p = .02, \eta^2 = 0.09$) and sleep disturbances ($F = 7.11, p = .01, \eta^2 = 0.11$). Further analysis suggested that four subdomains of sleep disturbances were significantly decreased, including bedtime resistance ($F = 14.61, p < .001, \eta^2 = 0.21$), sleep anxiety ($F = 6.41, p = .01, \eta^2 = 0.10$), night awakenings ($F = 6.31, p = .02, \eta^2 = 0.10$), and sleep disordered breathing ($F = 6.44, p = .01, \eta^2 = 0.10$).

Conclusion: The findings suggest that aerobic exercise-based PA may serve as an alternative or complementary approach to alleviate SI and sleep disturbances in adolescents with ADHD.



Martín-Rodríguez A, Herrero-Roldán S, Clemente-Suárez VJ. The Role of Physical Activity in ADHD Management: Diagnostic, Digital and Non-Digital Interventions, and Lifespan Considerations. *Children (Basel)*. 2025 Mar 7;12(3):338. doi: 10.3390/children12030338. PMID: 40150619; PMCID: PMC11941119.

Background: Attention Deficit Hyperactivity Disorder (ADHD) has been described as a neurodevelopmental disorder characterized by inattention, hyperactivity, and impulsivity affecting cognitive, emotional, and social functioning. While pharmacological and behavioral treatments remain primary, physical activity (PA) (digital and non-digital versions) has emerged as a great complementary intervention due to its potential impact on executive functions, emotional regulation, and neurobiological markers.

Objectives: This study aimed to assess the effects of PA on ADHD symptoms, executive function, and emotional regulation, exploring its potential impact and new practical applications in digital and non-digital treatment.

Methods: This narrative review assessed 132 studies published between 1 January 2010 and January 2025, ensuring the inclusion of the most recent and relevant findings. The review was conducted in Scopus, PubMed, and Web of Science, using a predefined combination of terms related to ADHD, physical activity, executive function, neuroplasticity, and emotional regulation.

Results: Regular PA improves executive functions, attention, inhibitory control, and cognitive flexibility in ADHD. Aerobic exercise enhances sustained attention, high-intensity training improves impulse control, and coordinative activities boost cognitive flexibility. Non-digital and digital innovations, such as exergaming and wearable fitness trackers, offer promising solutions to improve adherence to PA regimens, reinforcing their role as a key intervention in ADHD management.

Conclusions: PA could be a valuable complementary intervention for ADHD through a hybrid approach that may improve cognitive and emotional functioning while addressing comorbidities.

Li Y, He YC, Wang Y, He JW, Li MY, Wang WQ, Wu ZH, Xu YJ, He WN, Dou YL, Wang DL, Yan WL, Zhu DQ. Effects of Qigong vs. routine physical exercise in school-aged children with attention-deficit hyperactivity disorder: a randomized controlled trial. *World J Pediatr*. 2025 Jul;21(7):720-730. doi: 10.1007/s12519-025-00890-x. Epub 2025 Mar 10. PMID: 40064759.

Background: Increased understanding of the etiology of attention-deficit hyperactivity disorder (ADHD) emphasizes the importance of non-pharmaceutical treatments. This study compares the effects of Baduanjin exercise, a Qigong-based body therapy from traditional Chinese medicine (TCM), with routine physical exercise

on school-aged children diagnosed with ADHD.

Methods: In this two-arm, single-blind, randomized controlled trial, eligible school-aged children with ADHD were randomly assigned (1:1) to Baduanjin exercise or regular physical exercise using a permuted block randomization procedure. Both groups performed the designated exercise for at least 30 minutes a day and were monitored for exercise quality at least 5 days a week for 3 months. The primary outcome was a doctor-assessed hyperactivity/impulsivity score change, using the Swanson, Nolan, and Pelham rating scale (DSNAP_HYP) at the end of the third month since intervention initiation.

Results: Between October 2020 and January 2023, 120 eligible children were randomly allocated to two exercise interventions. After 3 months, the DSNAP_HYP decreased by 3.67 ± 4.81 and 4.68 ± 4.44 of Baduanjin exercise and regular physical exercise, respectively, with no significant between-group difference [mean difference = 1.52; 95% confidence interval (CI) = -0.08 to 3.13; $P = 0.06$]. No adverse events were reported during the whole study period.

Conclusions: This study did not demonstrate the expected superiority of 3-month Baduanjin exercise in improving ADHD symptoms compared with routine physical exercise.

This advertisement is available only to ATMS Accredited Members in accordance with the Therapeutic Goods Advertising Code.



However, the results suggest that both types of exercise may improve core symptom scores, providing preliminary evidence for Baduanjin as a potential supplementary intervention for children with ADHD.

Zhou J, Jiang W, Wang J, Dou J. Network meta-analysis of the effects of long-term non-pharmacologic treatment on inhibitory control in children and adolescents with attention deficit hyperactivity disorder.

J Psychiatr Res. 2025 Jul;187:261-276. doi: 10.1016/j.jpsychires.2025.05.028. Epub 2025 May 13. PMID: 40398202.

Objective: To conduct a network meta-analysis comparing the effects of various long-term non-pharmacological treatments on inhibitory control in children and adolescents with Attention-Deficit/Hyperactivity Disorder (ADHD) to provide theoretical support for non-pharmacological interventions in ADHD management.

Methods: Randomized controlled trials (RCTs) on the effects of long-term non-pharmacological treatments on inhibitory control in children and adolescents with ADHD published up to November 11, 2024, were searched in databases such as CNKI, Web of Science, APA PsycInfo, Embase, PubMed and Cochrane Library.

Results: A total of 42 studies, including seven non-pharmacological types, were included, involving 1981 children and adolescents with ADHD, with a mean age of 10.04 ± 1.82 years. Both traditional and network meta-analyses based on post-test data revealed that physical exercise, cognitive training, behavior therapy, and neurofeedback significantly improved inhibitory control ($P < 0.05$), with physical exercise showing the best improvement (SUCRA: 85.9%). At the same time, board games, EMG feedback, and meditation had no significant effect ($P > 0.05$). Follow-up analysis showed that behavior therapy and cognitive training had a good maintenance effect ($P < 0.05$), with behavior therapy demonstrating the best sustained

effect (SUCRA: 95.1%). In contrast, physical exercise, board games, and neurofeedback showed diminishing effects over time and had no significant long-term effect ($P > 0.05$).

Conclusion: Existing evidence shows that physical exercise, cognitive training, behavior therapy, and neurofeedback all have a positive effect on improving inhibitory control in children and adolescents with ADHD, with physical exercise showing the best effect, though with poor maintenance, while cognitive training and behavior therapy had a slightly lower effect, but their maintenance was better.

Lifestyle medicine

Arnold LE, Hendrix K, Pan X, Vollebregt MA, Yu M, Kerson C, Arns M, Hatsu IE, DeBeus R, Hollway J, Roley-Roberts ME. Lifestyle Effects in a Randomized Controlled Trial of Neurofeedback for Attention-Deficit/Hyperactivity Disorder.

J Child Adolesc Psychopharmacol. 2025 Nov;35(9):491-499. doi: 10.1089/cap.2025.0019. Epub 2025 May 16. PMID: 40376739.

Objectives/Background: Multiple factors influence symptom severity in Attention Deficit/Hyperactivity Disorder (ADHD). We examined four of these: diet, sleep hygiene, exercise, and lighting, in the International Collaborative ADHD Neurofeedback (ICAN) randomized clinical trial, which found large significant improvement with both active neurofeedback and control condition without treatment difference.

Methods: A total of 142 participants aged 7-10 had breakfast and lunch intake and exercise recorded at each neurofeedback session. Parents completed the Children's Sleep Habits Questionnaire (CSHQ). Parents and teachers rated inattention on Conners3. Lifestyle changes were correlated with inattention changes.

Results: At baseline, CSHQ correlated with parent-rated inattention ($r = 0.17$, $p = 0.04$), and length of sleep correlated with teacher-rated inattention ($r = 0.20$,

$p = 0.03$). From baseline to treatment end food group variety ($p = 0.029$, $d = 0.22$) and sleep problems ($p < 0.0001$, $d = -0.49$) improved significantly, exercise time and protein intake marginally ($p = 0.06 - 0.08$). Parent-rated inattention improvement correlated with CSHQ improvement ($Rho = 0.26$, $p = 0.002$) and marginally with protein intake increase ($Rho = 0.18$, $p = 0.06$). The three components of the light-emitting-diode (LED)-induced circadian pathway hypothesis were significant.

Conclusions: Most measures improved, but few significantly. How much they impact classroom attention remains unclear. Although parent ratings of inattention improvement correlated with sleep problems improvement, composited parent/teacher ratings (primary outcome) did not. The circadian pathway hypothesis associated with LED lighting was supported. These findings warrant further studies examining the role sleep hygiene can play in improving ADHD symptoms. Meanwhile, attention to sleep hygiene seems appropriate in any treatment plan for ADHD.

Western herbal medicine

Golsorkhi H, Montazerlotfelahi H, Abniki E, Vafae-Shahi M, Kamalinejad M, Qorbani M, Bahrami M, Dadmehr M. Efficacy and Safety of Rosa canina L. and a Traditional Polyherbal Formulation Syrup in Children and Adolescents with Attention-Deficit/Hyperactivity Disorder: A Factorial Randomized Double-Blind Placebo-Controlled Clinical Trial.

Phytother Res. 2025 Sep;39(9):4116-4125. doi: 10.1002/ptr.70061. Epub 2025 Aug 2. PMID: 40751509.

Attention-deficit/hyperactivity disorder (ADHD) is a neuropsychiatric disorder in children and adolescents. A number of patients do not respond adequately to psychostimulant medications or sometimes experience intolerable side effects. The present study was conducted to determine the efficacy and safety of Rosa canina L. and a traditional polyherbal formulation (PHF) syrup on ADHD as a complementary treatment. Ninety ADHD patients aged 5-14 years based on DSM-5 diagnostic criteria



were randomly divided into three groups to receive (1) R. canina syrup + methylphenidate (MPH), (2) PHF syrup + MPH, and (3) placebo syrup + MPH for 8 weeks. The Conners' Teacher Rating Scale (CTRS) and Conners' Parent Rating Scale (CPRS) as well as the Child Symptom Inventory-4 (CSI-4) questionnaires were completed before the intervention and then every 4 weeks for 2 months. The results showed that the decreasing trend of intra-group changes in the sum of CTRS, CPRS, and CSI-4 was statistically significant in three groups ($p < 0.0001$, $p < 0.0001$, $p < 0.001$, respectively). The study of intergroup changes in the CTRS ($p = 0.02$) and CSI-4 ($p = 0.04$) was significant and the CPRS was not significant ($p = 0.15$). Also, a significant increase in the total quality of life scores was reported in the three groups ($p < 0.0001$), but no significant difference was observed between them ($p = 0.27$). Therefore, R. canina and PHF syrups in combination with standard medical treatment could provide more clinical benefits for ADHD patients.

.....
Gościński A, Stasiłowicz-Krzemień A, Szeląg M, Pawlak J, Skiera I, Kwiatkowska H, Nowak N, Bernady K, Trzaskoma P, Zimak-Krótkopad O, Cielecka-Piontek J. Bacopa monnieri: Preclinical and Clinical Evidence of Neuroactive Effects, Safety of Use and the Search for Improved Bioavailability.

Nutrients. 2025 Jun 5;17(11):1939. doi: 10.3390/nu17111939. PMID: 40507208; PMCID: PMC12158153.

Bacopa monnieri, also known as Brahmi or Waterhyssop, is a plant used in Ayurveda for its memory-enhancing properties and control of blood sugar levels. It contains active compounds such as alkaloids, saponins, and cucurbitacins, which have various biological activities. The plant has been studied for its potential in treating Alzheimer's disease, Parkinson's disease, attention deficit hyperactivity disorder (ADHD), and depression. Animal studies have shown promising results in reducing symptoms and protecting against neurodegeneration. Concerning safety, Bacopa monnieri has been found to be generally non-toxic, with no serious side effects reported. However, interactions with certain medications and contraindications in conditions like hyperthyroidism should be considered. Further research is needed to determine optimal dosages and ensure safety, especially for pregnant and breastfeeding women.

Manual therapies

.....
Chen SC, Lo KC, Li H, Wong PM, Pang LY, Qin J, Yeung WF. Parental Experiences of Administering Pediatric Tuina for Sleep and Appetite in Early School-Aged Children With Attention-Deficit/Hyperactivity Disorder: Qualitative Study in Hong Kong. JMIR Pediatr Parent. 2025 Jan 30;8:e65471. doi: 10.2196/65471. PMID: 39883941; PMCID: PMC11801773.

Background: Previous research suggested that parent-administered

pediatric tuina could improve symptoms of attention-deficit/hyperactivity disorder (ADHD), such as sleep quality and appetite.

Objective: This study aimed to explore the experiences and perceptions of parents administering pediatric tuina to school-aged children with ADHD in Hong Kong.

Methods: This qualitative study was embedded in a pilot randomized controlled trial on parent-administered pediatric tuina for improving sleep and appetite in school-aged children diagnosed with ADHD. Purposive sampling was used to invite 12 parents who attended a pediatric tuina training program and delivered the intervention to their children at home for at least 8 weeks. Data were collected through semistructured focus group interviews and individual interviews, which were audio-recorded, transcribed verbatim, and analyzed using thematic analysis.

Results: Two main themes emerged: (1) effects of parent-administered pediatric tuina and (2) parents' experience of administering pediatric tuina. Parents reported significant improvements in children's sleep quality, appetite, behavior, mental state, and academic performance. Facilitators provided professional guidance and applied a user-friendly course design. Challenges included difficulties in mastering techniques, locating acupuncture points, and time management. Participants

This advertisement is available only to
 ATMS Accredited Members in accordance with the
 Therapeutic Goods Advertising Code.



suggested the need for more traditional Chinese medicine pattern diagnostic sessions, real-time supervision methods, and extended follow-up to better observe long-term effects.

Conclusions: Parent-administered pediatric tuina was perceived to improve children's sleep quality and appetite significantly, along with other aspects of well-being. Professional guidance and a structured training program facilitated implementation, and challenges highlighted the need for more frequent diagnostic sessions, real-time supervision, and extended follow-up.

Mindfulness and

Kim HH, Jung NH. Mindfulness-based interventions for adults with ADHD:

A systematic review and meta-analysis. *Medicine* (Baltimore). 2025 Sep 12;104(37):e44308. doi: 10.1097/MD.00000000000044308. PMID: 40958241; PMCID: PMC12440486.

Background: Attention-deficit/hyperactivity disorder (ADHD) frequently persists into adulthood and is associated with impairments in attention, emotional regulation, executive functioning, and quality of life. Although mindfulness-based interventions (MBIs) have been proposed as promising non-pharmacological treatments, the evidence regarding their efficacy in adults with ADHD remains inconsistent.

Methods: A systematic search was conducted using the MEDLINE, CINAHL, and PsycINFO databases to identify controlled trials published up to 2023. Studies were included if they evaluated the effects of MBIs in adults with ADHD using a control group, regardless of randomization. Only studies in which mindfulness was the primary therapeutic modality were included, even if limited psychoeducational or behavioral components were present. Ten studies met the inclusion criteria. Outcomes were categorized into 6 domains: self-

reported and observer-rated ADHD symptoms, negative and positive affect, mindfulness skills, and functional outcomes. Meta-analyses were performed using standardized mean differences (SMDs) or mean differences with 95% confidence intervals (CIs). Risk of bias and publication bias were assessed using Cochrane tools and funnel plots, respectively.

Results: Statistically significant improvements were observed in self-reported ADHD symptoms (SMD = 0.48, 95% CI [0.19, 0.76]), observer-rated ADHD symptoms (SMD = 0.32, 95% CI [0.09, 0.56]), and functional outcomes (SMD = 0.56, 95% CI [0.22, 0.90]). However, there were no significant effects on mindfulness skills (SMD = -0.20, 95% CI [-0.47, 0.08]), negative affect (SMD = 0.31, 95% CI [-0.06, 0.67]), or positive affect (SMD = -0.21, 95% CI [-0.58, 0.16]).

Conclusion: MBIs may be effective in improving core ADHD symptoms and overall functioning in adults with ADHD. However, their effects on emotional well-being and mindfulness skills remain inconclusive. These findings support the utility of MBIs as complementary interventions for ADHD while highlighting the need for further high-quality studies to clarify their long-term effects and mechanisms of action.

Zhong X, Yuan X, Dai Y, Zhang X, Jiang C. Neurofeedback training for executive function in ADHD children: a systematic review and meta-analysis. *Sci Rep*. 2025 Aug 1;15(1):28148. doi: 10.1038/s41598-025-94242-4. PMID: 40750997; PMCID: PMC12316938.

Executive function deficits are commonly observed in children diagnosed with attention deficit hyperactivity disorder (ADHD). This research investigates the effectiveness of neurofeedback training (NFT) in improving executive functions among this group. Studies were meticulously selected following stringent inclusion and exclusion criteria. The quality of these studies was assessed using

the PEDro scale. Seventeen RCT studies were identified, totaling 939 participants. We observed significant improvements in global executive function ($p < 0.055$), inhibitory control ($p < 0.0001$) and working memory ($p < 0.05$) following NFT. Notably, NFT exceeding 1,260 min was more effective in enhancing inhibitory control ($p < 0.01$) and working memory ($p < 0.01$). Additionally, the effects of NFT on inhibitory control ($p = 0.05$) and working memory ($p < 0.01$) were found to be enduring. NFT is an effective intervention for improving inhibitory control and working memory in children with ADHD. Working memory exhibits a more significant enhancement when the duration exceeds 1260 min, while inhibitory control follows closely behind. Moreover, it has a more sustained effect on working memory, alongside a notable albeit secondary effect on inhibitory control.

Westwood SJ, Aggensteiner PM, Kaiser A, Nagy P, Donno F, Merkl D, Balia C, Goujon A, Bousquet E, Capodiferro AM, Derks L, Purper-Ouakil D, Carucci S, Holtmann M, Brandeis D, Cortese S, Sonuga-Barke EJS; European ADHD Guidelines Group (EAGG). Neurofeedback for Attention-Deficit/Hyperactivity Disorder: A Systematic Review and Meta-Analysis. *JAMA Psychiatry*. 2025 Feb 1;82(2):118-129. doi: 10.1001/jamapsychiatry.2024.3702. PMID: 39661381; PMCID: PMC11800020.

Importance: Neurofeedback has been proposed for the treatment of attention-deficit/hyperactivity disorder (ADHD) but the efficacy of this intervention remains unclear.

Objective: To conduct a meta-analysis of randomized clinical trials (RCTs) using probably blinded (ie, rated by individuals probably or certainly unaware of treatment allocation) or neuropsychological outcomes to test the efficacy of neurofeedback as a treatment for ADHD in terms of core symptom reduction and improved neuropsychological outcomes.

Data sources: PubMed (MEDLINE),



Ovid (PsycInfo, MEDLINE, Embase + Embase Classic), and Web of Science, as well as the reference lists of eligible records and relevant systematic reviews, were searched until July 25, 2023, with no language limits.

Study selection: Parallel-arm RCTs investigating neurofeedback in participants of any age with a clinical ADHD or hyperkinetic syndrome diagnosis were included.

Data extraction and synthesis:

Standardized mean differences (SMDs) with Hedges *g* correction were pooled in random effects meta-analyses for all eligible outcomes.

Main outcomes and measures: The primary outcome was ADHD total symptom severity assessed at the first postintervention time point, focusing on reports by individuals judged probably or certainly unaware of treatment allocation (probably blinded). Secondary outcomes were inattention and/or hyperactivity-impulsivity symptoms and neuropsychological outcomes postintervention and at a longer-term follow-up (ie, after the last follow-up time point). RCTs were assessed with the Cochrane risk of bias tool version 2.0.

Results: A total of 38 RCTs (2472 participants aged 5 to 40 years) were included. Probably blinded reports of ADHD total symptoms showed no significant improvement with neurofeedback ($k = 20$; $n = 1214$; SMD, 0.04; 95% CI, -0.10 to 0.18). A small significant improvement was seen when analyses were restricted to RCTs using established standard protocols ($k = 9$; $n = 681$; SMD, 0.21; 95% CI, 0.02 to 0.40). Results remained similar with adults excluded or when analyses were restricted to RCTs where cortical learning or self-regulation was established. Of the 5 neuropsychological outcomes analyzed, a significant but small improvement was observed only for processing speed ($k = 15$; $n = 909$; SMD, 0.35; 95% CI, 0.01 to 0.69). Heterogeneity was generally low to moderate.

Conclusions and relevance:

Overall, neurofeedback did not appear to meaningfully benefit individuals with ADHD, clinically or neuropsychologically, at the group level. Future studies seeking to identify individuals with ADHD who may benefit from neurofeedback could focus on using standard neurofeedback protocols, measuring processing speed, and leveraging advances in precision medicine, including neuroimaging technology.

Kopańska M, Trojnik J. From Aberrant Brainwaves to Altered Plasticity: A Review of QEEG Biomarkers and Neurofeedback in the Neurobiological Landscape of ADHD.

Cells. 2025 Aug 29;14(17):1339. doi: 10.3390/cells14171339. PMID: 40940749; PMCID: PMC12428149.

This critical review synthesizes findings from quantitative electroencephalography (QEEG) to bridge the gap between systems-level neurophysiology and the underlying cellular pathology of Attention-Deficit/Hyperactivity Disorder (ADHD). As a prevalent neurodevelopmental disorder, ADHD diagnosis is challenged by symptomatic heterogeneity, creating an urgent need for objective biological indicators. Analysis of QEEG data reveals consistent neurophysiological patterns in ADHD, primarily an excess of Theta-band activity and a deficit in Beta-band activity. These findings have led to the proposal of specific biomarkers, such as the Theta/Beta Ratio (TBR), and serve as the basis for neurofeedback interventions aimed at modulating brainwave activity. While not a standalone diagnostic tool, this review posits that QEEG-based biomarkers and Neurofeedback responses are systems-level manifestations of putative cellular and synaptic dysfunctions. By outlining these robust macro-scale patterns, this work provides a conceptual framework intended to guide future molecular and cellular research into the fundamental biology of ADHD.

Music therapy

Situmorang DDB. Enhancing music therapy for developmental psychopathology: The role of technology in advancing therapeutic outcomes. Psychiatry Res. 2025 Jul;349:116511. doi: 10.1016/j.psychres.2025.116511. Epub 2025 Apr 24. PMID: 40328098.

Music therapy is increasingly recognized as a valuable intervention for individuals with developmental psychopathology. Therefore, this review aimed to examine the empirical evidence supporting the effectiveness of music therapy and explore the enhancement of therapeutic outcomes through technological advancements such as virtual reality (VR), interactive music applications, and telehealth. A total of 67 peer-reviewed studies were analyzed using Preferred Reporting Items for Systematic Reviews and Meta-Analyses extension for Scoping Reviews (PRISMA-ScR) method to assess the effect of music therapy on emotional regulation, social skills, and cognitive development in individuals with conditions such as autism spectrum disorder (ASD) and attention-deficit/hyperactivity disorder (ADHD). Meta-analytical evidence showed that music therapy produced moderate-to-large effect sizes in improving psychological and social functioning. The integration of digital tools in music therapy presented new opportunities for accessibility and engagement, although challenges including cost, ethical considerations, and the need for standardized protocols remained. This review found study gaps and offered recommendations for future investigations on optimizing technology-enhanced music therapy intervention.

Luo Z, Zhang DW. Rhythms of relief: perspectives on neurocognitive mechanisms of music interventions in ADHD. Front Psychol. 2025 Mar 3;16:1476928. doi: 10.3389/fpsyg.2025.1476928. PMID: 40099022; PMCID: PMC11911488.

Attention-deficit/hyperactivity disorder (ADHD) is a prevalent neurodevelopmental disorder



characterized by multiple neurocognitive deficits. Research suggests that music interventions, both active and passive, may be an effective complementary method of addressing ADHD challenges. This narrative review discusses seven potential neurocognitive mechanisms through which music interventions may help mitigate or alleviate ADHD symptoms, including executive function enhancement, timing improvement, arousal regulation, default mode network modulation, neural entrainment, affective management, and social bonding facilitation. Our study synthesized evidence from ADHD-specific studies and examined parallels to other populations to identify possible pathways through which music therapy could exert its effect. The paper also discusses the implications of individualized music interventions tailored to specific neurocognitive profiles in ADHD, advocating additional research to refine and optimize these approaches. Overall, music therapy has substantial potential as a complementary treatment for ADHD, offering new avenues for addressing the psychosocial and cognitive aspects of this condition.

Nutrition

Lowance M, Wang E, Graybow M, Milanaik RL. Aisles of health? A pediatrician's guide to vitamins and dietary supplements in pharmacies and supermarkets. *Curr Opin Pediatr.* 2025 Aug 1;37(4):408-417. doi: 10.1097/MOP.0000000000001475. Epub 2025 May 21. PMID: 40439702.

Purpose of review: In recent years, there have been increased discussions among parents about the use of Complementary and Alternative Medicine for kids, specifically dietary supplements and vitamins. While these were originally marketed to supplement nutrient needs, many families have begun to raise questions about the efficacy of vitamins and minerals to treat developmental conditions such as attention-hyperactivity deficit disorder, mood disorders, or sleep disturbances.

Recent findings: Research investigating the use of vitamin supplements generally

concludes that supplementation may be necessary in cases of deficiency; additional benefits are minimal. Some hormonal and mineral supplements like melatonin, fish oil, and magnesium have been found to reduce symptoms of hyperactivity, sleep disturbance, and conduct disorders in combination with other interventions. However, none of these therapies rival the efficacy of first-line treatment plans for these conditions. Additionally, overuse may lead to toxicity and adverse effects.

Summary: While many parents may have concerns about their child's nutrient intake, much is still unknown about the dosing, safety, and efficacy of dietary supplements. For deficient children or patients resistant to eating certain food groups, mineral and vitamin supplements may be an effective way to meet nutritional needs. It is important to note that there is little evidence supporting the efficacy of dietary supplement use to treat other conditions nor any benefit for healthy children with a balanced diet.

Al Shahab S, Al Balushi R, Qambar A, Abdulla R, Qader M, Abdulla S, Jahrami H. Efficiency of Different Supplements in Alleviating Symptoms of ADHD with or Without the Use of Stimulants: A Systematic Review. *Nutrients.* 2025 Apr 28;17(9):1482. doi: 10.3390/nu17091482. PMID: 40362791; PMCID: PMC12073678.

Objective: This review aims to assess the efficacy and safety of different supplements, such as L-theanine, caffeine, Ginkgo biloba L., and Bacopa monnieri for improving ADHD symptoms, to determine the most effective supplement and provide insight for medical practice.

Methods: International databases (PubMed/MEDLINE and Scopus) were searched for English-language RCTs, open-label studies, and cross-sectional studies.

Results: Studies on L-theanine, caffeine, Ginkgo biloba L., and Bacopa monnieri have shown various effects on ADHD

symptoms. L-theanine improved sleep efficiency but not other sleep parameters. Caffeine showed no significant benefits, although its combination with L-theanine may enhance attention. Bacopa monnieri consistently improved inattention, hyperactivity, and memory, whereas Ginkgo biloba L. reduced ADHD symptoms, particularly inattention, but was less effective than methylphenidate.

Conclusions: The evidence revealed the potential use of supplements as complementary ADHD treatments under clinical guidance. The limited effect of supplements cannot replace the well-documented efficacy of stimulants for ADHD treatment. Additional studies are needed to ascertain the most effective dosages and the safety of these supplements as adjunctive treatments for ADHD.

Other non-pharmacological therapies

Yu S, Xue H, Xie Y, Shao G, Hao Y, Fan L, Du W. Review: Animal-assisted intervention for children with attention-deficit/hyperactivity disorder - a systematic review and meta-analysis. *Child Adolesc Ment Health.* 2025 Feb;30(1):34-52. doi: 10.1111/camh.12744. Epub 2025 Jan 10. PMID: 39791320.

Background: Animal-assisted interventions (AAIs) have emerged as a promising nonpharmacological intervention option for children diagnosed with attention-deficit/hyperactivity disorder (ADHD). However, recent systematic reviews have been primarily narrative. Additionally, the pooled effectiveness of AAIs was absent from these systematic reviews.

Methods: We conducted a comprehensive systematic review and meta-analysis, searching multiple databases, including Web of Science, MEDLINE, CINAHL, Scopus, PsycINFO, EMBASE and Cochrane, from inception of the databases to March 2024. We retrieved 17 randomised controlled trials or quasi-experimental studies and used Review Manager 5.4.1 software to perform a



meta-analysis of the effects of AAIs in treating children with ADHD. We conducted a set of random-effects meta-analyses to estimate standardised mean differences (SMD) with 95% confidence intervals (CI) using subgroup data by different outcome domains extracted from eight randomised controlled trials, in relation to changes in behavioural, mental and physical functioning in a total of 307 children with ADHD before and after the intervention.

Results: In comparison with non-AAI groups, AAIs significantly improved attention problems in children with ADHD (SMD = -0.42, 95% CI = -0.71 to -0.13), self-esteem (0.46, 0.14 to 0.78), learning and cognition problems (-0.69, -0.98 to -0.39) and motor proficiency (0.77, 0.11 to 1.42). The pooled effect of AAIs on the severity of ADHD symptoms in the experimental group was not significantly different from the effect of conventional treatments in the control group (0.10, -0.31 to 0.52). Similarly, AAIs had no significant positive effects on social interaction (-0.22, -0.51 to 0.06), social skills (-0.32, -0.87 to 0.24), problematic behaviours (-0.10, -0.54 to 0.35) or emotional problems, including depression and anxiety (-0.13, -0.51 to 0.24).

Conclusions: As an ADHD management strategy complementary to gold-standard approaches, such as medication or multimodal interventions, AAIs did not appear to be more effective in improving the majority of core

ADHD outcomes in children. Future studies should incorporate rigorous study designs with large sample sizes and a standard protocol to achieve more valid and reliable conclusion.

.....
Martin-Moratinos M, Bella-Fernández M, Rodrigo-Yanguas M, González-Tardón C, Li C, Wang P, Royuela A, Lopez-García P, Blasco-Fontecilla H. Effectiveness of a Virtual Reality Serious Video Game (The Secret Trail of Moon) for Emotional Regulation in Children With Attention-Deficit/Hyperactivity Disorder: Randomized Clinical Trial. JMIR Serious Games. 2025 Jan 8;13:e59124. doi: 10.2196/59124. PMID: 39773848; PMCID: PMC11754979.

Background: Difficulties in emotional regulation are often observed in children and adolescents with attention-deficit/hyperactivity disorder (ADHD). Innovative complementary treatments, such as video games and virtual reality, have become increasingly appealing to patients. The Secret Trail of Moon (MOON) is a serious video game developed by a multidisciplinary team featuring cognitive training exercises. In this second randomized clinical trial, we evaluated the impact of a 20-session treatment with MOON on emotional regulation, as measured by the Strengths and Difficulties Questionnaire.

Objective: We hypothesize that patients with ADHD using MOON will show improvements in (1) emotional regulation, (2) core ADHD symptoms, (3) cognitive functioning, and (4)

academic performance, compared to a control group; additionally, we anticipate that (5) changing the platform (from face-to-face using virtual reality to the web) will not affect emotional regulation scores; and (6) the video game will not cause any clinically significant side effects.

Methods: This was a prospective, unicentric, randomized, unblinded, pre- and postintervention study with block-randomized sequence masking. Participants included individuals aged between 7 and 18 years who had a clinical diagnosis of ADHD and were receiving pharmacological treatment. They were randomized into 2 groups using an electronic case report form: the MOON group, receiving standard pharmacological treatment plus personalized cognitive training via a serious video game, and the control group, receiving standard pharmacological treatment. We provided both the groups with psychoeducational support on ADHD. Analysis was conducted using the Student 2-tailed t test and 2-factor ANOVA. An independent monitor supervised the study.

Results: A total of 76 patients with ADHD participated in the trial, with an equal randomization (MOON: n=38, 50% and control: n=38, 50%) and a total dropout rate of 7. The primary hypothesis, a 3- or 4-point reduction in the global Strengths and Difficulties Questionnaire score, was not met.

*"I have been taught other methods of taping, but so not like this one...
 ... it was amazing to see the effects it produced on the body..."*

NEUROMUSCULAR TAPING INSTITUTE NMT INSTITUTE
 Research | Concept | Technique | Protocol | Education

**INNOVATIVE TAPING METHODS
 INSTANT RESULTS**

Find an NMT Practitioner

Lymphatic Rehabilitation
 Wollongong: Feb 28 & March 1
 Adelaide: March 23 & 24
 Hobart: April 11 & 12
 2-day certificate (16 CPE Hours)
 \$1095 exc GST/NMT fee

Skeletal Muscular Rehabilitation
 Melbourne: Feb 16 - 19
 Perth: March 18 - 21
 4-day Certificate (32 CPE Hours)
 \$1905 exc GST/NMT Fee

10% OFF for ATMS Members
 Enrol and pay by Jan 9, 2026

Scan for course prospectus →

← Scan for course prospectus



However, significant improvements were observed in material organization ($P=.03$), working memory ($P=.04$), and inhibition ($P=.05$), particularly among patients more engaged with the MOON treatment.

Conclusions: Serious video games, when integrated into a multimodal treatment plan, can enhance outcomes for symptoms associated with ADHD.

Risk factors

Mohammadian M, Khachatryan LG, Vadiyan FV, Maleki M, Fatahian F, Mohammadian-Hafshejani A. The association between maternal tobacco smoking during pregnancy and the risk of attention-deficit/hyperactivity disorder (ADHD) in offspring: A systematic review and meta-analysis. *PLoS One*. 2025 Feb 7;20(2):e0317112. doi: 10.1371/journal.pone.0317112. PMID: 39919144; PMCID: PMC11805386.

Introduction: Maternal tobacco smoking during pregnancy is a significant public health concern with potential long-lasting effects on child development. ADHD, a neurodevelopmental disorder characterized by inattention, hyperactivity, and impulsivity, may be influenced by prenatal nicotine exposure. This systematic review and meta-analysis examine the association between maternal tobacco smoking during pregnancy and the risk of ADHD in offspring.

Methods: Following PRISMA guidelines, we searched databases including PubMed, Web of Science, Cochrane Central, Embase, Scopus, CINAHL, LILACS, SciELO, Allied and Complementary Medicine Database (AMED), ERIC, CNKI, HTA Database, Dialnet, EBSCO, LENS, and Google Scholar for studies up to November 1, 2024. We included peer-reviewed studies reporting quantitative effect size estimates for the association between maternal tobacco smoking and ADHD. Study quality was assessed using the Newcastle-Ottawa Scale (NOS).

Results: We identified 2,981 articles and included 55 studies (4,016,522 participants) in the analysis. The meta-analysis showed a significant association between maternal tobacco smoking during pregnancy and increased risk of ADHD in offspring (pooled Odds Ratio (OR) = 1.71, 95% CI: 1.55-1.88; $P < 0.001$). Egger's test indicated no publication bias ($p = 0.204$), but Begg's test did ($p = 0.042$). By employing the trim and fill method, the revised OR was estimated to be 1.54 (95% CI: 1.40-1.70; $P < 0.001$). The OR were 2.37 (95% CI: 1.72-3.28; $P < 0.001$) in cross-sectional studies, 1.72 (95% CI: 1.49-2.00; $P < 0.001$) in case-control studies, and 1.53 (95% CI: 1.34-1.74; $P < 0.001$) in cohort studies. Meta-regression showed study design and study region significantly influenced heterogeneity ($P < 0.10$). Sensitivity and subgroup analyses confirmed the robustness of these findings.

Conclusion: This systematic review and meta-analysis demonstrate a significant association between maternal tobacco smoking during pregnancy and increased odds of ADHD in offspring. These findings highlight the need for prenatal care guidelines and tobacco smoking cessation programs for pregnant women to reduce ADHD risk and promote optimal neurodevelopmental outcomes. Future research should explore underlying mechanisms and potential confounders further.

Chen CY, Shih PY, Su CT, Cheng CF, Lee MC, Lane HY. Association between infant feeding and ADHD development in childhood: a birth cohort study in Taiwan. *J Child Psychol Psychiatry*. 2025 Jun;66(6):881-891. doi: 10.1111/jcpp.14100. Epub 2024 Dec 21. PMID: 39707757; PMCID: PMC12062847.

Background: Infant feeding plays a vital role in neurodevelopment, and a lack of breastfeeding and complementary feeding may increase the risk of developing attention-deficit/hyperactivity disorder (ADHD). However, empirical evidence on this relationship remains uncertain, as most studies are based on cross-sectional

designs. Therefore, this study aimed to examine this temporal relationship using longitudinal data from a birth cohort.

Methods: A retrospective cohort study was conducted using data from Wave I (starting at 6 months old, 2005-2006) to Wave IV (up to 5 years old, 2010-2011) of the Taiwan Birth Cohort Study. A total of 19,721 pairs completed the four-wave interviews and provided information on infant feeding, medical history, ADHD occurrence, and sociodemographic characteristics. An extended Cox model with time-dependent covariates was used to examine this association.

Results: In total, 207 infants developed ADHD during the 54-month observational period, with an estimated cumulative incidence of 5.56 per 1,000 person-years. The average breastfeeding duration was approximately 2 months. With complementary feeding, rice solid food (HR = 0.73) was found to be a protective factor against developing ADHD. Significantly associated factors for increasing ADHD risk included males, lower family income, low birth weight, maternal weight, advanced maternal age, child gastrointestinal disease, child seizures, maternal heart disease, and paternal diabetes mellitus.

Conclusions: Complementary feeding within 6 months is important to protect infants from developing ADHD. The beneficial effect of breastfeeding within 6 months was not observed while controlling for other risk factors. However, owing to the limitation of a smaller number of ADHD cases, further studies should rely on larger observational periods.



Continuing Professional Education

Continuing Professional Education (CPE) is a structured program of further education for practitioners in their professional occupations.

The ATMS CPE policy is designed to ensure its practitioners regularly update their clinical skills and professional knowledge. One of the main aims of CPE is to keep members abreast of current research and new developments which inform contemporary clinical practice.

The ATMS CPE policy is based on the following principles:

- Easily accessible to all members, regardless of geographic location
- Members should not be given broad latitude in the selection and design of their individual learning programs
- Applicable to not only the disciplines in which a member has ATMS accreditation, but also to other practices that are relevant to clinical practice which ATMS does not accredit (e.g. Ayurveda, yoga)
- Applicable to not only clinical practice, but also to all activities associated with managing a small business (e.g. book-keeping, advertising)
- Seminars, workshops and conferences that qualify for CPE points must be of a high standard and encompass both broad based topics as well as discipline-specific topics
- Financially viable, so that costs will not inhibit participation by members, especially those in remote areas
- Relevant to the learning needs of practitioners, taking into account different learning styles and needs

- Collaborative processes between professional complementary medicine associations, teaching institutions, suppliers of therapeutic goods and devices and government agencies to offer members the widest possible choice in CPE activities
- Emphasis on consultation and co-operation with ATMS members in the development and implementation of the CPE program

ATMS members can gain CPE points through a wide range of professional activities in accordance with the ATMS CPE policy. CPE activities are described in the CPE policy document as well as the CPE Record. These documents can be obtained from the ATMS office (telephone 1800 456 855, fax (02) 9809 7570, or email info@atms.com.au) or downloaded from the ATMS website at www.atms.com.au.

It is a mandatory requirement of ATMS membership that members accumulate 20 CPE points per financial year. CPE points can be gained by selecting any of the following articles, reading them carefully and critically reflecting on how the information in the article may influence your own practice and/or understanding of complementary medicine practice. You can gain one (1) CPE point per article to a maximum of three (3) CPE points per journal from this activity:

- **Lang R. Nutrient deficiencies and psychostimulant treatment in ADHD: Exploring the overlooked clinical interface**
- **McEwen B. Exploring the dynamic, multidimensional risk factors of attention-deficit hyperactivity disorder (ADHD)**

- **Campbell G. ADHD & autism spectrum disorders: The rising prevalence in females**
- **Leisman G and Melillo R. Evaluating primitive reflexes in early childhood as a potential biomarker for developmental disabilities**
- **Grant A. ADHD and narratives of illness**
- **Mackenzie F and Bayes J. Uncharted Territory: Understanding Current Naturopathic Practices in the Care of Children and Adolescents with ADHD**
- **Medhurst R. A primer on telehealth**

As part of your critical reflection and analysis, answer in approximately 100 words the following questions for each of the three articles:

- 1 What new information did I learn from this article?
- 2 In what ways will this information affect my clinical prescribing/ techniques and/or my understanding of complementary medicine practice?
- 3 In what ways has my attitude to this topic changed?

Record your answers clearly on paper for each article. Date and sign the sheets and attach to your ATMS CPE Record. As a condition of membership, the CPE Record must be kept in a safe place, and be produced on request from ATMS.



PRODUCTS & SERVICES

Bioglan Medlab



<https://bioglanmedlab.com.au/>

Trusted by Practitioners, Loved by Families.

At Bioglan Medlab, we're dedicated to enhancing patient outcomes and improving quality of life. Through cutting-edge innovation, progressive products, and a commitment to educating healthcare professionals, we lead the way in creating a healthier future. Visit the Bioglan Medlab website for more information.

BioMedica Nutraceuticals



info@biomedica.com.au | www.biomedica.com.au | 1300 884 702

BioMedica is an Australian owned company dedicated to the research, development and production of high quality, low excipient and efficacious practitioner formulations. Our products are developed by practitioners for practitioners. As a 'Strictly Practitioner Only' company, BioMedica is strongly dedicated to preserving and enhancing the role of the holistic practitioner.

Our products are only sold to practitioners in a clinical setting, this has been our long standing policy since our inception in 1998, and remains firmly in place to this day.

We also aim to provide highly relevant technical education materials and seminars, with practical research and insights that can be immediately integrated into clinical practice.

Hair Tissue Mineral Analysis By InterClinical Laboratories



info@interclinical.com.au | <https://interclinical.com.au/htma-pathology> | 02 9693 2888

Proudly recognised as Australia's leader in HTMA for nearly 30 years, we set the standard in nutrient and heavy metal assessment. Our laboratory has specialized in testing human and animal hair for over 40 years, utilising advanced analytical technology, including the ICP Mass Spectrometer. The HTMA Report measures up to 38 minerals in parts per million with the highest level of accuracy and reproducibility in the industry. The analysis includes 27 key mineral ratios and comprehensive and informative recommendations based on expertise gained from testing over 1.8 million hair samples. Only 0.125 grams of hair (1 teaspoon) is required.

InterClinical practitioners are supported with valuable resources and educational materials, free mentoring, and a free practitioner advisory service. These services ensure that practitioners are equipped with the knowledge and skills required to achieve the best possible patient outcomes. InterClinical is an Australian-owned company that has been serving healthcare professionals since 1996.

InterClinical Professional



lab@interclinical.com.au | www.interclinical.com.au | 02 9693 2888

InterClinical Laboratories is one of Australia's leading practitioner-aligned nutritional medicine and health screening companies. Our vegan-friendly practitioner-only range of nutritional supplements, InterClinical Professional, supports practitioners to better treat and manage patient health. Our acclaimed, evidenced-based nutritional, herbal and natural medicines are developed by a team of local and international researchers, skilled experts, and practitioners. All formulations are evidence-based, synergistic, highly bioavailable and have minimal excipients and allergens. Offering personalised health programs is convenient through layered therapy, optimal dosing, and elemental minerals. We are committed to providing practitioners with the highest quality Australian-made nutritional supplements. InterClinical has been serving Australian health care professionals since 1996 and is proudly Australian-Made and Australian-Owned.

Nuchev



www.biopractica.com.au | info@biopractica.com.au | 1300 551 077

The new home of the trusted practitioner-only brands that you know and love – including BioPractica, Basica, Magnesium Diasporal, Heel and Medicine Tree.

Unlock Your Patient's True Wellbeing Potential with Our Exclusive Practitioner-Only Brands!

- ✓ **BioPractica** – Naturopathic formulations that are grounded in tradition, inspired by science. www.biopractica.com.au
- ✓ **Magnesium Diasporal & Basica** – German-made mineral formulations with over 100 years of use
- ✓ **Heel Medicines** – Highly researched, scientifically validated homeopathic products
- ✓ **Medicine Tree** – Homeopathic preparations designed to empower health through Mind-Body Medicine

Nutriscript



<https://nutriscript.co.nz> | info@nutriscript.co.nz | AU: 1800-177-959

Nutriscript has been a trusted partner for healthcare practitioners in Australia and New Zealand since 2006. Our platform simplifies patient scripting, offering access to 80+ practitioner-only brands and thousands of products across both countries. We provide expert technical support, including guidance on protocol design, product selection, and business strategy. Practitioners can also access hundreds of hours of free education.

- Seamless service across Australia & New Zealand.
- 80+ practitioner brands and quality retail ranges.
- Script in seconds, same-day dispatch (order before 4pm on a weekday).
- Free technical support and business advice.
- Often described as the fastest, most reliable supplier by practitioners.

The Pharmaceutical Plant Company



sales@ppcherbs.com.au | www.ppcherbs.com.au | 03 9762 3777

Where nature, science and health come together. PPC offers healthcare professionals a choice of either traditionally made herbal extracts from dried plant materials; or fresh plant tinctures that are all grown in Tasmania and processed within hours of harvest. PPC uses Organically certified herb where possible, with the entire Fresh Plant Tincture range being Australian Certified Organic. The Pharmaceutical Plant Company has 25 years experience in manufacturing and distributing traditional herbal extracts, fresh plant tinctures and listed medicines in Australia.



NEW DIRECTIONS

A U S T R A L I A

Shop the range.
newdirections.com.au

Instagram Facebook YouTube LinkedIn



Australian Essential Oils. Australian Owned.

For over 30 years, New Directions Australia has operated from Sydney, offering the finest essential oils to aromatherapists. Our collection features iconic Australian oils like Lemon Myrtle, Eucalyptus Australian (radiata), Tea Tree, Lavender Tasmanian, and so many more. Our dedication to excellence ensures you receive the best nature has to offer.



1800 637 697
nda@newdirections.com.au
New Directions Australia,
47 Carrington Rd, Marrickville NSW 2204



Biz Club

Grow your business naturally

Join the **ATMS Biz Club** anytime to kickstart your path to networking, growth, and success

The ATMS Biz Club is more than just a course—it's your roadmap to success. With fortnightly webinars designed to guide you through every aspect of building and scaling your practice, this program offers the perfect blend of expert insights and practical application. We're all about real-world strategies you can implement immediately to see results!

Each quarter zooms in on a key area of business development. Whether it's practice building, marketing success, client growth, or operational excellence, we've got you covered with webinars featuring expert teachings that combine both theoretical knowledge and actionable advice.

Key Features:

- **Program Duration:** Quarterly or annually, but join anytime and access recordings
- **Webinars:** Watch any time + fortnightly interactive zoom meetings
- **Session Length:** 1 hour
- **Expert Guests:** Each session will feature a guest Natural Medicine Practitioner or Business Owner who's been there, done that, and is eager to share their experience and insights.
- **+ Earn 4 CPE points per quarter**



REGISTER NOW!
at atms.com.au/biz-club