Resolving the Tension Between Traditional Diet and Exercise Recommendations and the Developmental Origins of Multiple Dysregulations in Neurodevelopmental and Psychiatric Disorders

Traditional Lifestyle Advice vs. Developmental Origins in Neurodevelopmental & Psychiatric Disorders

Research supports diet and physical activity as important for mental health, but also shows that many risks are biologically "programmed" early in life through nutrition, stress, and adversity. This can create tension between simple "eat better and exercise" advice and the complex, early-rooted dysregulations seen in neurodevelopmental and psychiatric disorders.

Limits of Traditional Diet & Exercise Recommendations

- Children and youth with neurodevelopmental/mental health disorders often have **poor diet, low activity, poor sleep, and high screen time**, driving obesity and cardiometabolic risk (Bowling et al., 2019).
- Parents report child dysregulation, depleted resources, medication side effects, and lack of adapted programs as major barriers to implementing healthy habits (Bowling et al., 2019).
- Broad nutritional interventions (e.g., restrictive diets, supplements) show **inconsistent or modest effects** on core childhood neuropsychiatric symptoms, and generalized prescriptions are not supported; interventions should be individualized and deficiency-driven (Kostenko et al., 2025).

Lifestyle Interventions: Benefits and Gaps

Population	Findings on lifestyle change	Citations
Children with NDDs	Physical activity improves cognitive function, well-being, and internalizing/externalizing problems (Liu et al., 2024; Tao et al., 2025; Liu et al., 2024)	(Liu et al., 2024; Tao et al., 2025; Liu et al., 2024)
Schizophrenia / psychosis	Diet + exercise RCTs improve weight, symptoms, cognition, functioning; limited impact on metabolic labs (Fernández-Abascal et al., 2021)	(Fernández-Abascal et al., 2021)
General psychiatry	Strongest causal evidence for physical activity; diet evidence promising but less causal; sleep and smoking also key (Firth et al., 2020; Zubrzycka et al., 2025)	(Firth et al., 2020; Zubrzycka et al., 2025)

FIGURE 1 Lifestyle interventions improve outcomes but incompletely.

Developmental Origins & Multi-System Dysregulation

- Early-life is a **sensitive period** where maternal diet and psychosocial stress can epigenetically program brain and metabolic pathways, influencing lifetime risk of depression, schizophrenia, autism, ADHD and obesity (Bale et al., 2010; Agorastos et al., 2019; Cernigliaro et al., 2024; Horner et al., 2025; Alyamani & Murgatroyd, 2018; Malave et al., 2022; Kundakovic & Champagne, 2014; McLaughlin et al., 2020).
- Maternal obesity and high-fat diet are linked to offspring cognitive impairment, autism, ADHD, anxiety, depression and others, via neuroinflammation, oxidative stress, hormonal and neurotransmitter dysregulation (Edlow, 2017).
- Western diet in pregnancy is associated with higher ADHD and autism risk, partly mediated by specific maternal and fetal metabolites affecting oxidative stress, lipid metabolism and gut–brain pathways (Horner et al., 2025).
- Early life stress programs HPA axis, autonomic, immune, metabolic, circadian, and brain circuits, contributing to **transdiagnostic psychopathology and physical disease** (Agorastos et al., 2019; Jopling & Nelson, 2025; Malave et al., 2022; VanTieghem & Tottenham, 2017; Wade et al., 2022; Kundakovic & Champagne, 2014; McLaughlin et al., 2020).

Reconciling the Tension

- Lifestyle psychiatry meta-reviews stress that while activity, diet, and sleep **matter for prevention and treatment**, causal impacts vary by factor and disorder, and effects are partial (Firth et al., 2020; Zubrzycka et al., 2025).
- Developmental programming work suggests that many dysregulations pre-date current behavior; thus, **guidelines must move beyond generic advice** to:
  - account for early-life exposures and built-in vulnerabilities (Bale et al., 2010; Agorastos et al., 2019; Horner et al., 2025; Jopling & Nelson, 2025; Edlow, 2017; Malave et al., 2022; Kundakovic & Champagne, 2014; McLaughlin et al., 2020)- tailor diet and exercise to neurocognitive, metabolic, and family constraints (Fernández-Abascal et al., 2021; Kostenko et al., 2025; Bowling et al., 2019; Liu et al., 2024)- integrate with trauma-informed, epigenetic, and multi-system models of risk (Agorastos et al., 2019; Jopling & Nelson, 2025; Alyamani & Murgatroyd, 2018; Malave et al., 2022; VanTieghem & Tottenham, 2017; Kundakovic & Champagne, 2014; McLaughlin et al., 2020).

Conclusion

Diet, physical activity and sleep can clearly improve symptoms and functioning in neurodevelopmental and psychiatric disorders, but they operate on a background of early-programmed, multi-system dysregulation driven by prenatal nutrition, maternal obesity, and early adversity. The literature argues for integrating lifestyle recommendations into a developmental, individualized framework rather than treating them as simple, one-size-fits-all solutions.

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