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Longitudinal trajectories of plasma polyunsaturated fatty acids and associations with psychosis-spectrum outcomes in early adulthood

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There is evidence for associations between polyunsaturated fatty acids (PUFAs) such as docosahexaenoic acid (DHA) and psychosis risk[1–3]. However, the existing literature has focused on PUFA measurements at single timepoints[4,5], which may overlook dynamic patterns of variability over time. The aims of this study were: 1) To describe longitudinal trajectories of plasma omega6:omega-3 ratio and DHA in a large general population sample; and 2) To evaluate associations between trajectories and psychosis-spectrum outcomes in early adulthood.

We performed a cohort study within the Avon Longitudinal Study of Parents and Children. 3635 participants completed psychiatric assessments at age 24 years (2247 [61.8%] female). Participants provided plasma samples at four timepoints when aged 7, 15, 17 and 24. Plasma omega-6:omega-3 ratio and DHA levels (% total fatty acids) were measured using nuclear magnetic spectroscopy, then standardised by sex.

Psychosis-spectrum outcomes were assessed at age 24. Psychotic experiences (PEs) and psychotic disorder were assessed using the Psychosis-Like Symptoms interview (PLIKSi), as was the total number of PEs (range 0 to 11). Negative symptoms score (range 0 to 10) was measured using the Community Assessment of Psychic Experiences.

Curvilinear growth mixture modelling was used to derive longitudinal trajectories of plasma omega-6:omega-3 ratio and DHA levels over time. Trajectories were adjusted contemporaneously for body mass index at each timepoint. Associations between trajectory membership and outcomes were adjusted for sex, ethnicity, parental socioeconomic class, smoking and alcohol use.

A three-trajectory solution was optimal for omega-6:omega-3 ratio (stable average, n = 3282 [90.3%]; slightly above average, n = 61 [1.7%]; and persistently high, n = 292 [8.0%]) and DHA (stable average, n = 2739 [75.4%]; persistently high, n = 245 [6.7%]; and persistently low, n = 651 [17.9%]).

Relative to stable average, trajectories characterised by persistently high omega-6:omega-3 ratio and persistently low DHA were associated with increased odds of PEs and psychotic disorder in unadjusted analyses, but these associations attenuated on adjustment for covariates. Conversely, the persistently high omega-6:omega-3 ratio trajectory was associated with increased number of PEs (adjusted β 0.41, 95% confidence interval [CI] 0.05–0.78, p = 0.026) and negative symptoms (adjusted β 0.43, 95%CI 0.14–0.72, p = 0.004). Similarly, the persistently low DHA trajectory was also significantly associated with increased number of PEs (adjusted β 0.45, 95%CI 0.14–0.76, p = 0.004) and negative symptoms (adjusted β 0.35, 95%CI 0.12–0.58, p = 0.003).

Persistently high plasma omega-6:omega-3 ratio and persistently low plasma DHA were associated with increased PEs and negative symptoms of psychosis at age 24. Optimisation of PUFA status during development warrants further investigation in relation to psychosis-spectrum outcomes in early adulthood. Limitations include that causality cannot be inferred and residual confounding is possible. Attrition occurred along a socioeconomic gradient, although we used multiple imputation to avoid complete-case biases. Strengths include the use of a wellcharacterised cohort, and the use of biomarker measurement of plasma PUFAs.

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References

1. Adan RAH, van der Beek EM, Buitelaar JK *et al.* (2019) *Eur Neuropsychopharmacol* **29**(12), 13211332.
2. Jones HJ, Borges MC, Carnegie R *et al.* (2021) *Lancet Psychiatry* **8**(12), 1062–1070.
3. Hoen WP, Lijmer JG, Duran M *et al.* (2013) *Psychiatry Res* **207**(1-2), 1–12.
4. Mongan D, Healy C, Jones HJ *et al.* (2021) *Translational Psychiatry* **11**(1), 321.
5. Thompson AD, Jones HJ, Heron J *et al.* (2020) *Schizophrenia Res* **224**, 108–115.
6. Boyd A, Golding J, Macleod J *et al.* (2013) *Int J Epidemiol* **42**(1), 111–127.
7. Fraser A, Macdonald-Wallis C, Tilling K *et al.* (2013) *Int J Epidemiol* **42**(1), 97–110.
8. Horwood J, Salvi G, Thomas K *et al.* (2008) *Br J Psychiatry* **193**(3), 185–91.
9. Stefanis NC, Hanssen M, Smirnis NK *et al.* (2002) *Psychol Med* **32**(2), 347–58.