

Associations between maternal and cord n-3 polyunsaturated fatty acid status with the incidence of asthma at 7 years of age in the Seychelles child development study, nutrition cohort 2 (SCDS NC2): preliminary results

C.O. Henry¹, P.J. Allsopp¹, A.J. Yeates¹, M.S. Mulhern¹, E. Shroff², E.V. Wijngaarden³, J.J. Strain¹ and E.M. McSorley¹

¹The Nutrition Innovation Centre for Food and Health, School of Biomedical Sciences, Ulster University, Coleraine, Northern Ireland,

²Ministry of Health, Mahé Island, Republic of Seychelles and

³The School of Medicine and Dentistry, University of Rochester, NY, United States

Asthma is a chronic inflammatory disorder affecting over 300 million people worldwide¹, and the importance of diet and lifestyle on chronic diseases², research is focused on understanding the link between immunomodulatory nutrients present in diet with asthma risk². The n-3 polyunsaturated fatty acids (PUFAs), commonly found in fish, are well known for their anti-inflammatory properties⁴ and previous observational studies have shown mothers taking n-3 PUFAs supplements during pregnancy had reduced likelihood of their children developing asthma^{3, 4}. There is limited research studying the habitual intake of n-3 PUFAs during pregnancy and asthma rates; therefore, this present study aims to investigate the associations between n-3 PUFAs consumed as part of the habitual diet during pregnancy with incidence of asthma at 7 years of age in a high fish-eating population. Pregnant women were recruited between 2008–2011 in the high fish-eating population of the Republic of Seychelles. Blood samples were collected from mothers at 28-week gestation and cord samples were collected at delivery. Maternal and cord PUFAs were measured using gas chromatography-mass spectrometry. In 2015, when children (N = 1098) were approximately 7 years of age (mean 7.36 years), the parent(s) were asked to complete a questionnaire, validated by the International Study of Asthma and Allergies in Childhood Questionnaires (ISAAC) which determined asthma-related outcomes. Logistic regression models investigated the associations between maternal and cord PUFAs with a reported asthma outcome. From the completed questionnaires (N = 1098), 1 in 10 children (63 males; 48 females) were found to be asthmatic. In quartile analysis (lowest quartile vs highest quartile), alpha-linolenic acid (ALA; C18:3n-3) during pregnancy was significantly associated with decreased incidence of asthma in children [OR 2.771 (95% CI 1.464–5.245) p < 0.01]. There were no significant associations between any of the other maternal or cord PUFAs (linoleic acid [LA], arachidonic acid [AA], eicosapentaenoic acid [EPA], docosahexaenoic acid [DHA]) and incidence of asthma. Maternal status of alpha-linolenic acid, an n-3 PUFA, during pregnancy may decrease the incidence of asthma. This highlights the importance of intake of n-3 PUFAs during pregnancy and the potential risks associated with chronic disease; however, future analysis is needed to understand the benefits of n-3 PUFAs from fish during pregnancy, as well as eicosanoid production, n-3 PUFAs derived compounds.

References

1. Asher MI, *et al.* (2020) *Eur Resp J* **56**, 2002094.
2. Kim JH, *et al.* (2009) *Resp Research* **10**.
3. Bisgaard H, *et al.* (2016) *New Eng J of Med* **375**, 2530–2539.
4. Dunstan JA, *et al.* (2003) *Clin Exp Allergy* **33**, 442–448.