



## Research summary

# The role of eggs in improving choline, DHA, and vitamin D intake during development

## About the study

Diet plays an important role in growth and development. Nutrients such as choline, docosahexaenoic acid (DHA, an omega-3 fatty acid) and vitamin D are essential during childhood. While eggs contain these nutrients, their possible role in the evolution of cardiometabolic risk from a young age is still not well understood.

Dr. Angela Devlin at the University of British Columbia set out to evaluate the effect of egg consumption on dietary nutrient intake and cardiometabolic disease risk in children under the age of 6. Additionally, the impact of the mother's egg consumption during lactation on the nutrient content of breast milk was measured to further investigate maternal nutrient transfer through breast milk.



## Methods

Data from three previously completed studies were used in the current study. From a first study, milk and blood samples from six lactating women at 3 to 5 months postpartum were analyzed to determine the effect of egg consumption on omega-3 fatty acids, docosahexaenoic acid (DHA) and eicosapentaenoic acid (EPA), and choline levels in the women and in the milk they produced. Samples were collected over four weeks, the initial two weeks when they did not consume any eggs (non-consumption stage) and the latter two weeks when each woman incorporated two eggs per day to their diet (consumption stage).

To understand the role eggs play in nutrient intake during child development, dietary information was collected in another study from 418 children (of which 133 children were 12 to 14 months in age and 285 children were 6 years old). Parents were instructed to record a detailed 3-day food record of all food and beverages the children consumed including information such as the amount, brand, recipe and method of preparation. Children were separated into two categories—egg consumers and non-consumers. Blood samples were collected from children at ages 1, 2 and 6 to determine eggs contribution to various nutrients' (choline, DHA, vitamin D) intake.



## Findings

Higher dietary choline intake was observed in children consuming eggs at all ages and higher DHA and EPA intakes at age 6. When compared to other foods, eggs remained the top food source of choline and DHA for children aged 1, 2 and 6 while dairy and fish were the main source of vitamin D. Compared to the current dietary recommendations for Canada and United States, a higher proportion of egg consumers met the dietary recommendations for choline in all age groups compared to those who did not consume eggs. The study demonstrated that children who consumed eggs had a greater prospect of meeting the dietary recommendations for DHA than those who did not consume eggs at age 6. Additionally, higher HDL cholesterol (good cholesterol) and lower triglycerides were found in egg consumers compared to non-consumers at age 6 years old. No differences were found for vitamin D by egg consumption category.

In lactating women, betaine levels in milk and circulation were higher during egg consumption stage compared to non-egg consumption stage. Betaine is a metabolite of choline that can be used by the liver and kidney. Although betaine levels were higher during egg consumption stage, the researcher found no differences in milk and circulating choline and DHA during the two stages. There was no relationship found between intake of eggs and factors associated with cardiometabolic risk in adults such as

the level of trimethylamine N-oxide (TMAO), a metabolite produced by gut bacteria and linked to a number of inflammatory conditions.

## Conclusions

The current research study demonstrated that egg consumption was lower at age 1 year and highest at age 6 years and egg consumption was associated with greater intakes of choline and DHA. These findings confirm that eggs are an excellent source of choline and DHA for young children, which is critical for their growth and development.

The higher HDL cholesterol (good cholesterol) and lower triglycerides found in egg consumers compared to non-consumers at age 6 years old suggests a negative relationship between egg consumption and cardiometabolic risk. While the children in the study are very young and unlikely to have cardiometabolic risk at that age, it is important to understand trajectories of these risks factors through development given that children are developing cardiometabolic risk factors at younger ages now.

## About the researcher

**Dr. Angela Devlin** is a Professor of Pediatrics in the Faculty of Medicine at the University of British Columbia and the Director of the Healthy Starts Research Theme at the BC Children's Hospital Research Institute.



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