

Prolonged breastfeeding and protective effects against the development of allergic rhinitis: a systematic review and meta-analysis

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Introduction

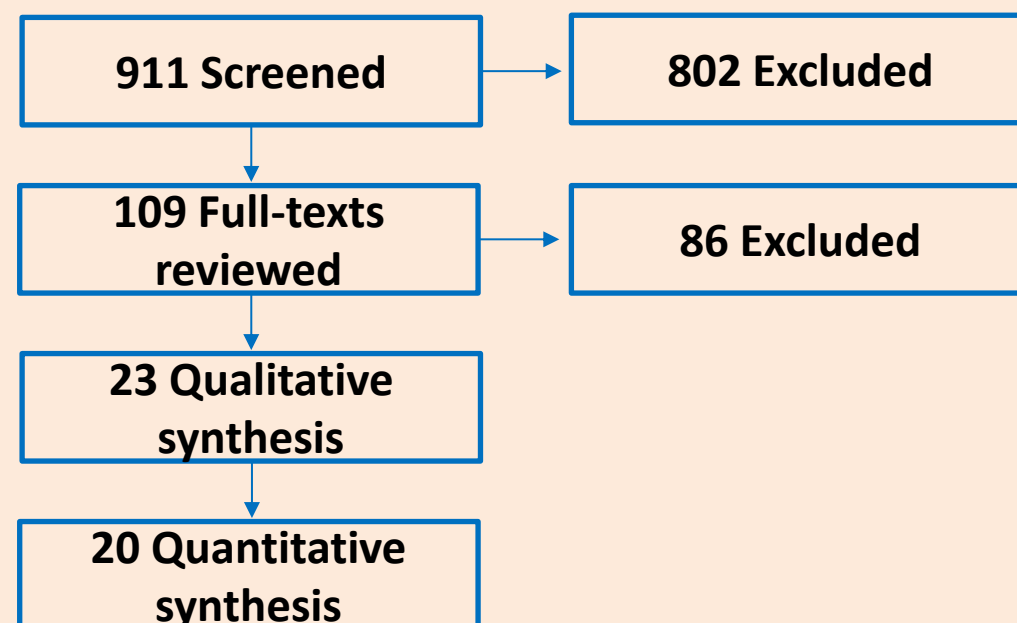
Genetic and environmental factors during early infancy, especially infant nutrition, impact the development of **Allergic rhinitis (AR)**. **Breast milk** provides unique immunological components and supports immune and microbiome maturation. WHO recommends exclusive breastfeeding for the first 6 months of life, while EAACI recommends 4–6 months as natural preventive medicine. However, evidence of its protective effect on AR remains inconsistent

Objective

- To assess the associations between the **prolonged breastfeeding**, for **at least six months**, and **AR development** later in life.
- To assess whether **long-term breastfeeding (≥12 months)** bring benefits of preventing the development of AR

Materials and Methods

- Electronic searches were conducted on PubMed, EMBASE, Web of Science, CENTRAL, ClinicalTrials.gov and WHO ICTRP up to 8th May 2021.



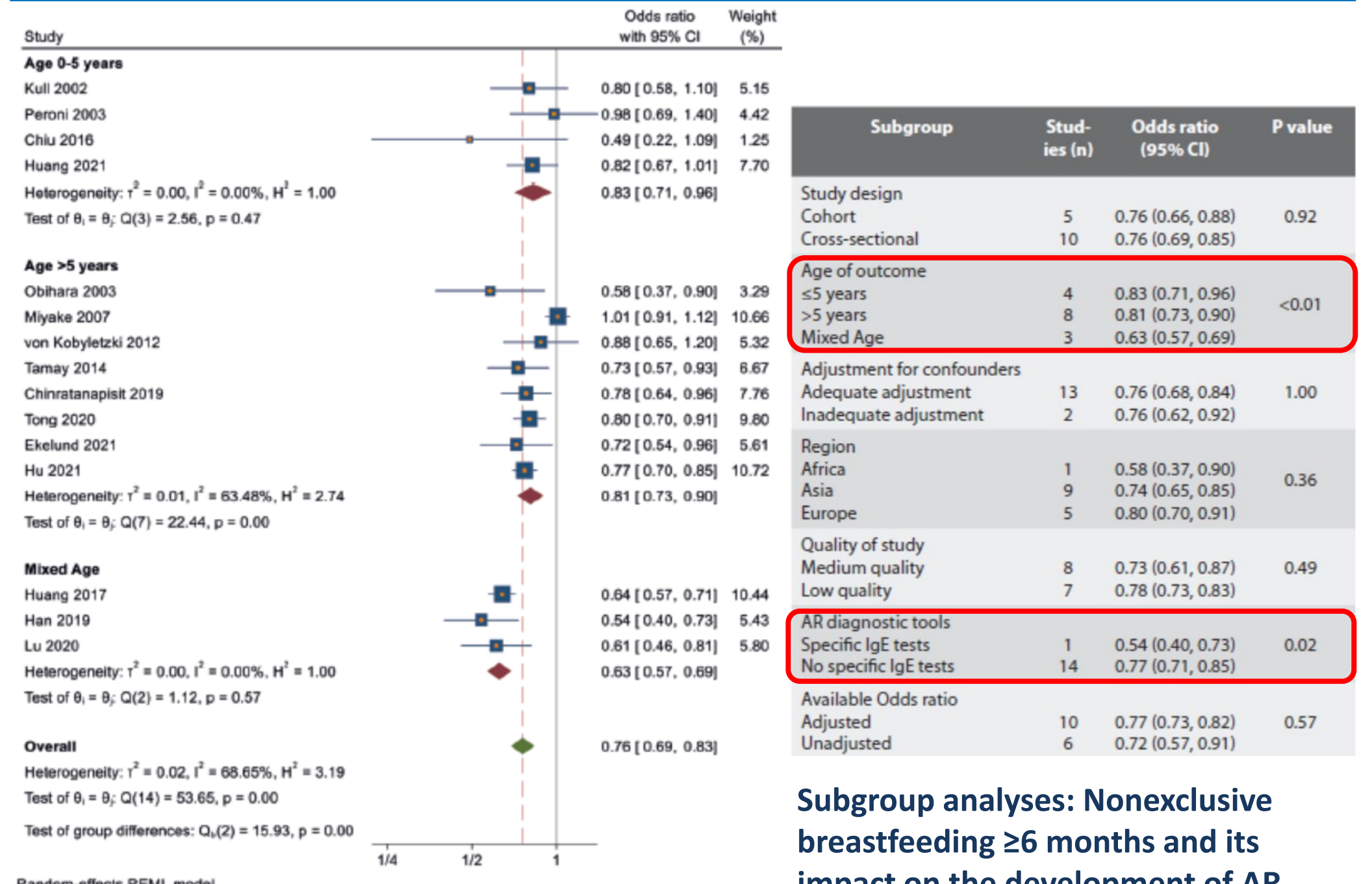
- Breastfeeding (BF) duration was categorized as **short-term (<6 months)**, **prolonged (≥6 months)**, and **long-term (≥12 months)**, with two types of BF defined: **exclusive** and **non-exclusive**.
- Outcomes were assessed as **risks of developing AR** using **odds ratios (OR)** from four comparisons: prolonged (≥6 vs <6 months) and long-term (≥12 vs <12 months) breastfeeding, each evaluated for nonexclusive and exclusive types.
- Study quality was assessed using NOS for individual studies and GRADE approach for overall evidence.
- Data were synthesized using meta-analysis with OR and 95% CI; heterogeneity (I^2) determined fixed- or random-effects models
- Subgroup analyses explored heterogeneity by study design, age of AR outcome, adjustment for confounders, region, study quality, AR diagnostic method, and type of OR.

Outcomes AR ≤18 years	Studies (n)	Risk of bias	Inconsistency	Indirectness	Imprecision	Publication bias	Sample size	Effect size OR (95% CI)	Quality
Nonexclusive breastfeeding									
≥6 vs <6 months	15	Certain	Serious inconsistency	No serious indirectness	No serious imprecision	Uncertain	126,708	0.76 (0.69, 0.83)	+++ Very low
≥12 vs <12 months	3	Uncertain	Serious inconsistency	No serious indirectness	Serious imprecision	Uncertain	26,312	0.63 (0.41, 0.97)	+++ Very low
Exclusive breastfeeding									
≥6 vs <6 months	6	Uncertain	No serious inconsistency	No serious indirectness	No serious imprecision	Uncertain	33,272	0.60 (0.50, 0.85)	++- Low
≥12 vs <12 months	1	Certain	No serious inconsistency	No serious indirectness	No serious imprecision	Uncertain	11,916	0.89 (0.77, 1.04)	+++ Very low

Certainty of the evidence (GRADE)

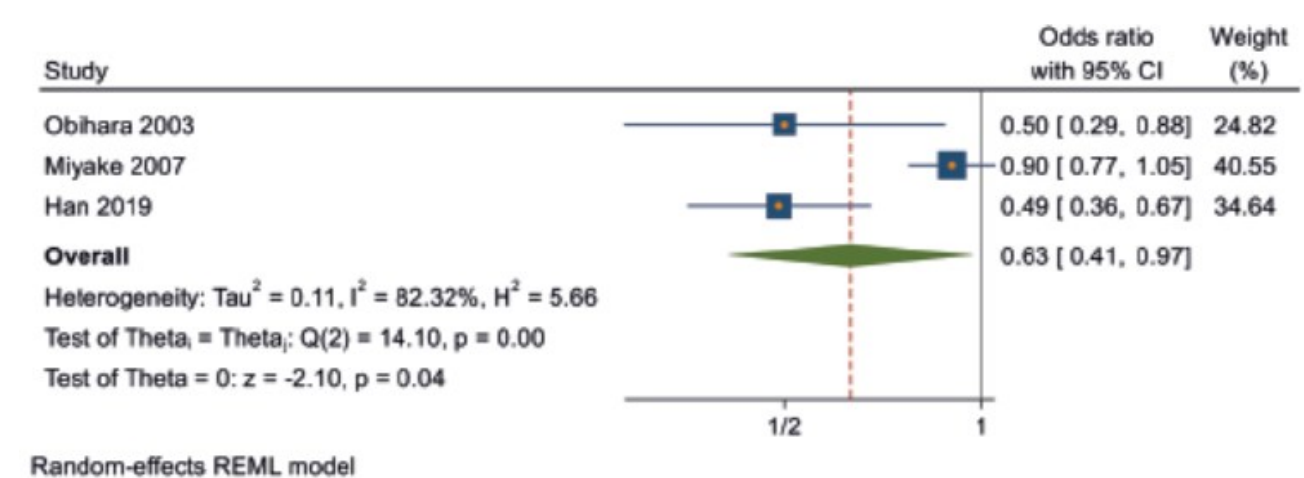
Results

- 161,611 children (2–18 yrs, 51.5% male) were analyzed from studies across Asia (106,693), Europe (54,057), and Africa (861).
- Nonexclusive breastfeeding ≥6 months** (OR 0.76, 95% CI 0.69–0.83; $p < 0.01$) and **≥12 months** (OR 0.63, 95% CI 0.41–0.97; $p < 0.01$) were both associated with **reduced AR risk**, though with very low-quality evidence due to high heterogeneity. **Exclusive breastfeeding ≥6 months** significantly **reduced AR risk** (OR 0.58, 95% CI 0.50–0.66; $p < 0.01$; $I^2 = 0\%$) with low-quality evidence, while **≥12 months showed no significant protection** (OR 0.89, 95% CI 0.77–1.04; $p = 0.14$) and very low-quality evidence.
- Subgroup analysis showed stronger protection with AR with evidence of IgE-mediated inflammation and age effects, but no differences by the types of study design, confounding factors, study quality, or Odds ratio.

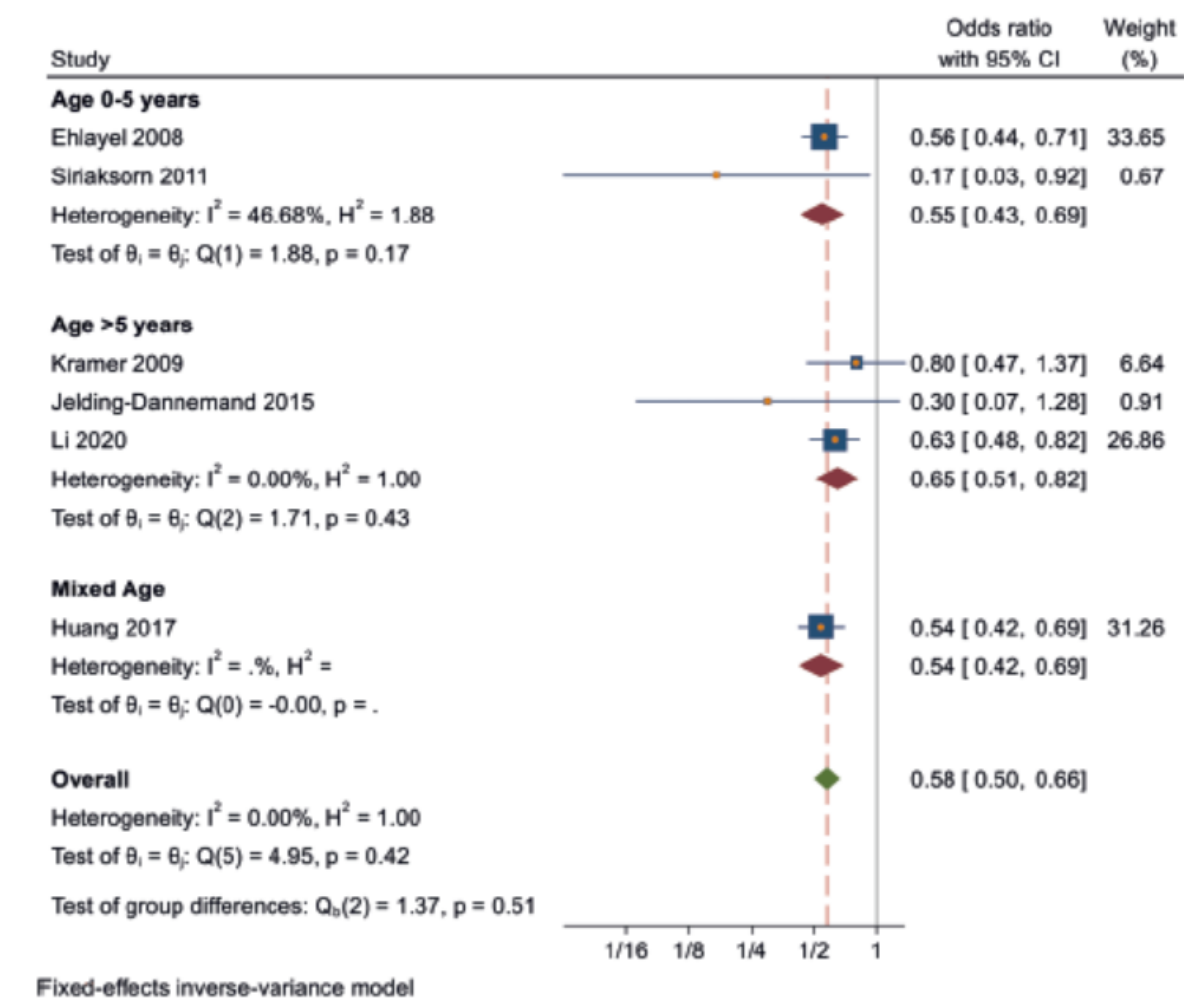


Subgroup analyses: Nonexclusive breastfeeding ≥6 months and its impact on the development of AR

Nonexclusive breastfeeding ≥6 months and its impact on the development of AR



The risk of allergic rhinitis: Nonexclusive breastfeeding ≥12 months vs <12 months



The risk of allergic rhinitis and subgroup analysis by the age of outcome: Exclusive breastfeeding ≥6 months vs <6 months

Conclusion

- Prolonged breastfeeding for at least six months may decrease the risk of developing allergic rhinitis later in life.**
- Exclusive breastfeeding** seems to provide greater protective effects compared to nonexclusive breastfeeding.

References

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