



Unscrambling Egg Allergies: Examining the Impact of Introduction Timing of Egg Protein on the Development of Food Allergies

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Introduction

Egg allergies are one of the most common food allergies experienced by children in the United States. Strategic introduction timing of allergenic foods has been suggested as a mechanism to reduce the risk of developing serious food allergies, but advice surrounding this practice has been mixed and its efficacy unclear. The purpose of this review is to compare recent research regarding early egg introduction and determine if this strategy is a safe and effective approach for use in at-risk infants. To that end, we devised a PICO question to help focus our research.

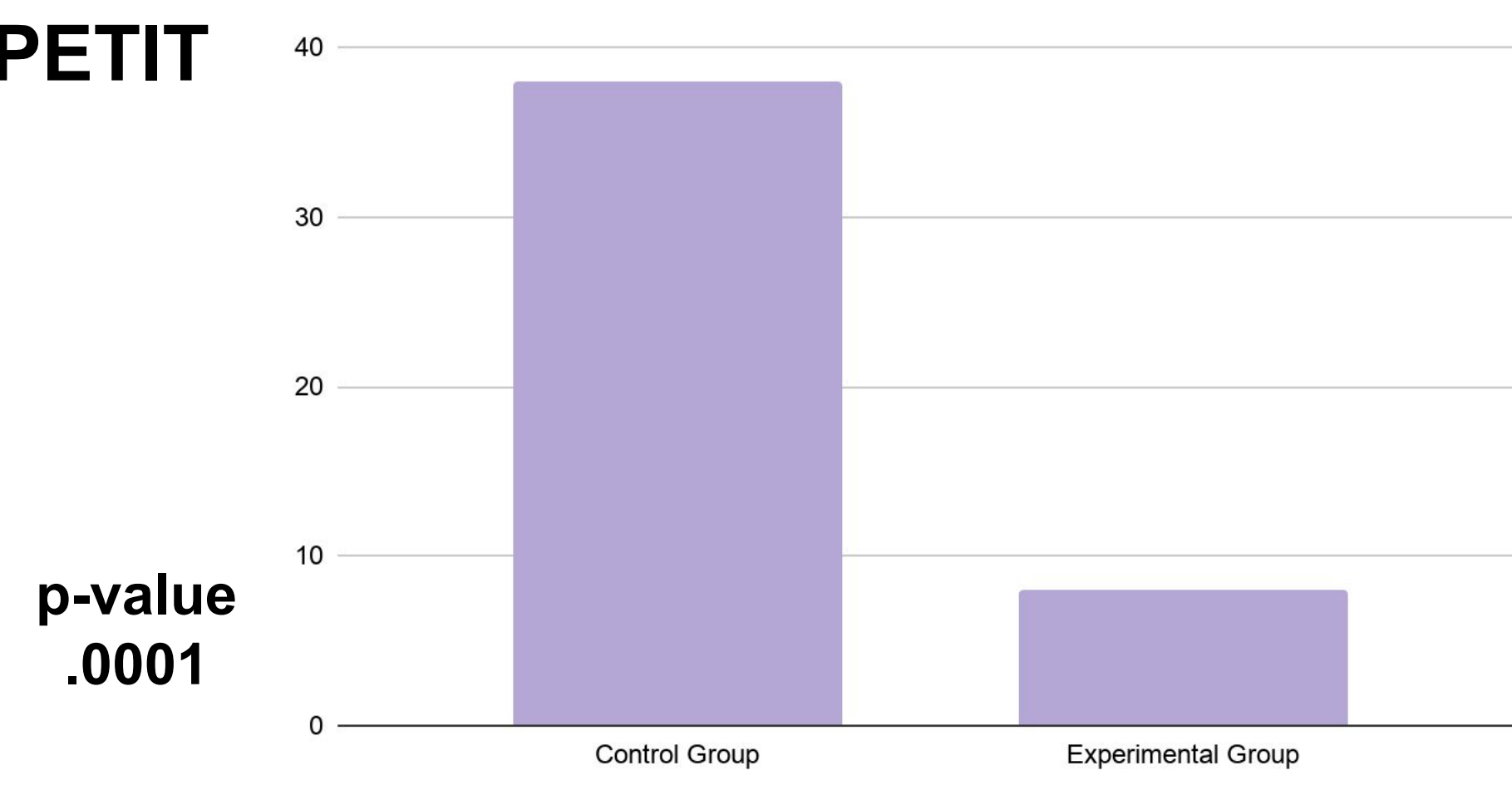
PICO

In children under 12 months, does early exposure to egg protein reduce the risk of development of severe egg allergies?

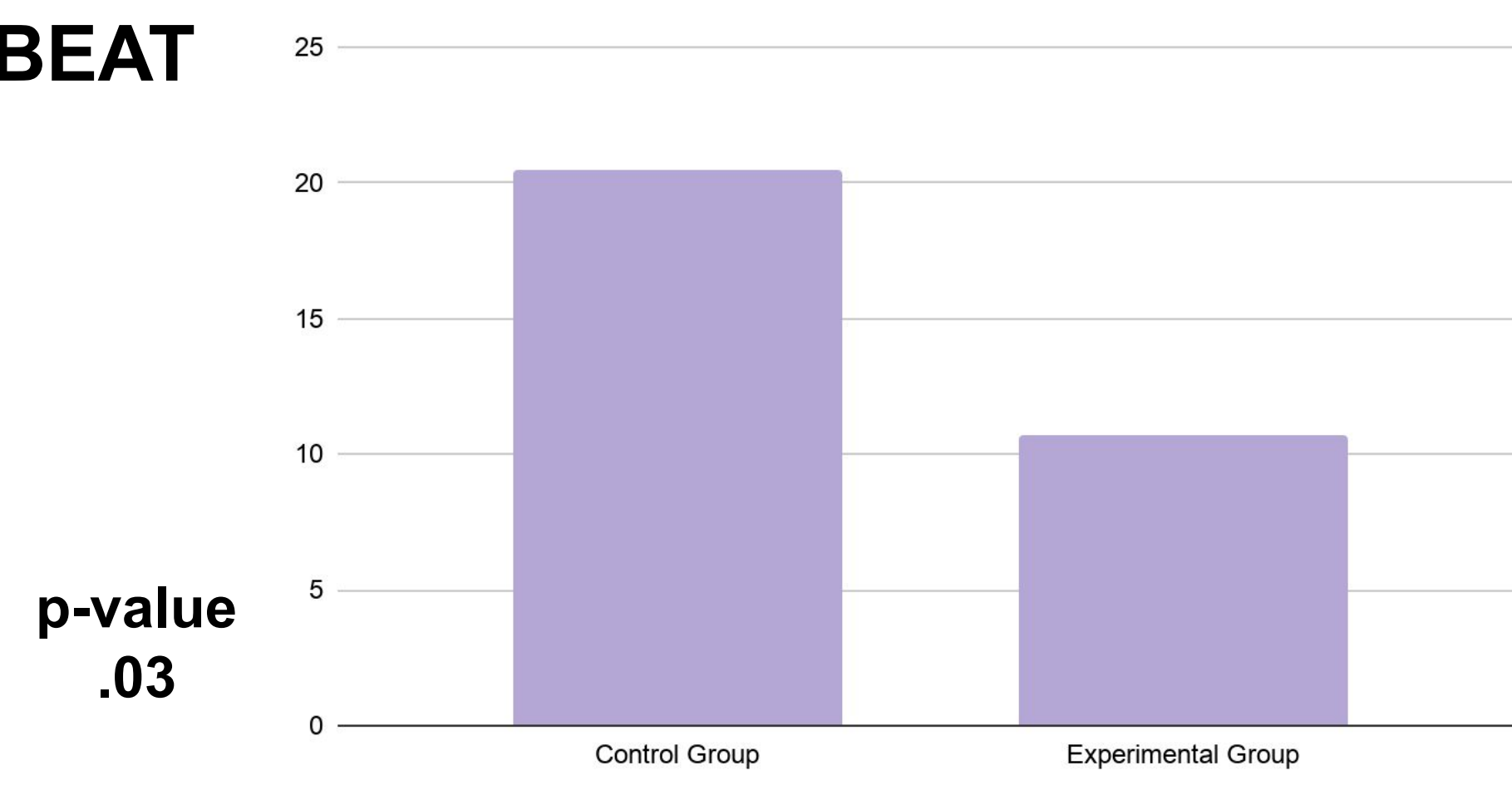
Results

	BEAT	STEP	PETIT
At-risk criteria	At least one 1 st degree relative with history of atopic disease (food allergy, asthma, eczema, allergic rhinitis)	Infants with atopic mothers, defined as a history of medically diagnosed allergic disease with sensitization to at least 1 common aeroallergen	Atopic dermatitis
Allergen Protocol	350mg(0.35g) egg protein daily (via pasteurized whole egg powder) until 12mos	400mg(0.4g) pasteurized raw whole egg protein daily until 12mos	(starting at 6 months of age) - from 6 months – 9 months old: 25mg(0.025g) heated egg protein - from 9 months – 12 months old: 125mg(0.125g) heated egg protein
Primary Outcome	Proportion of infants in each grp sensitized to egg white on skin prick test at 12 mos	Dx of IgE-mediated egg allergy at 12mos defined as allergic rxn to oral egg challenge <i>and</i> positive skin prick test	Proportion of participants w/ hen's egg allergy confirmed by oral food challenge at 12 mos

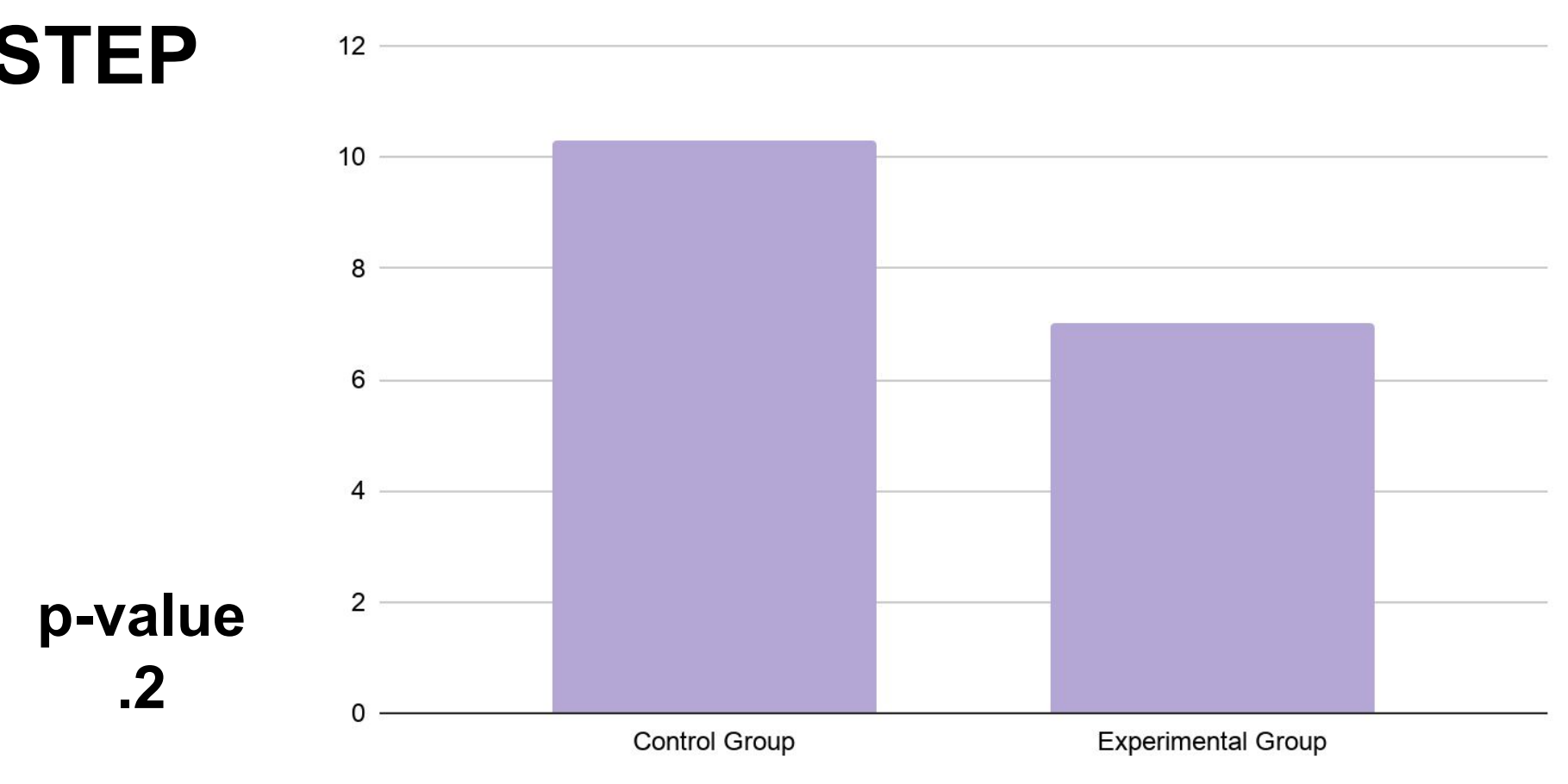
PETIT



BEAT



STEP

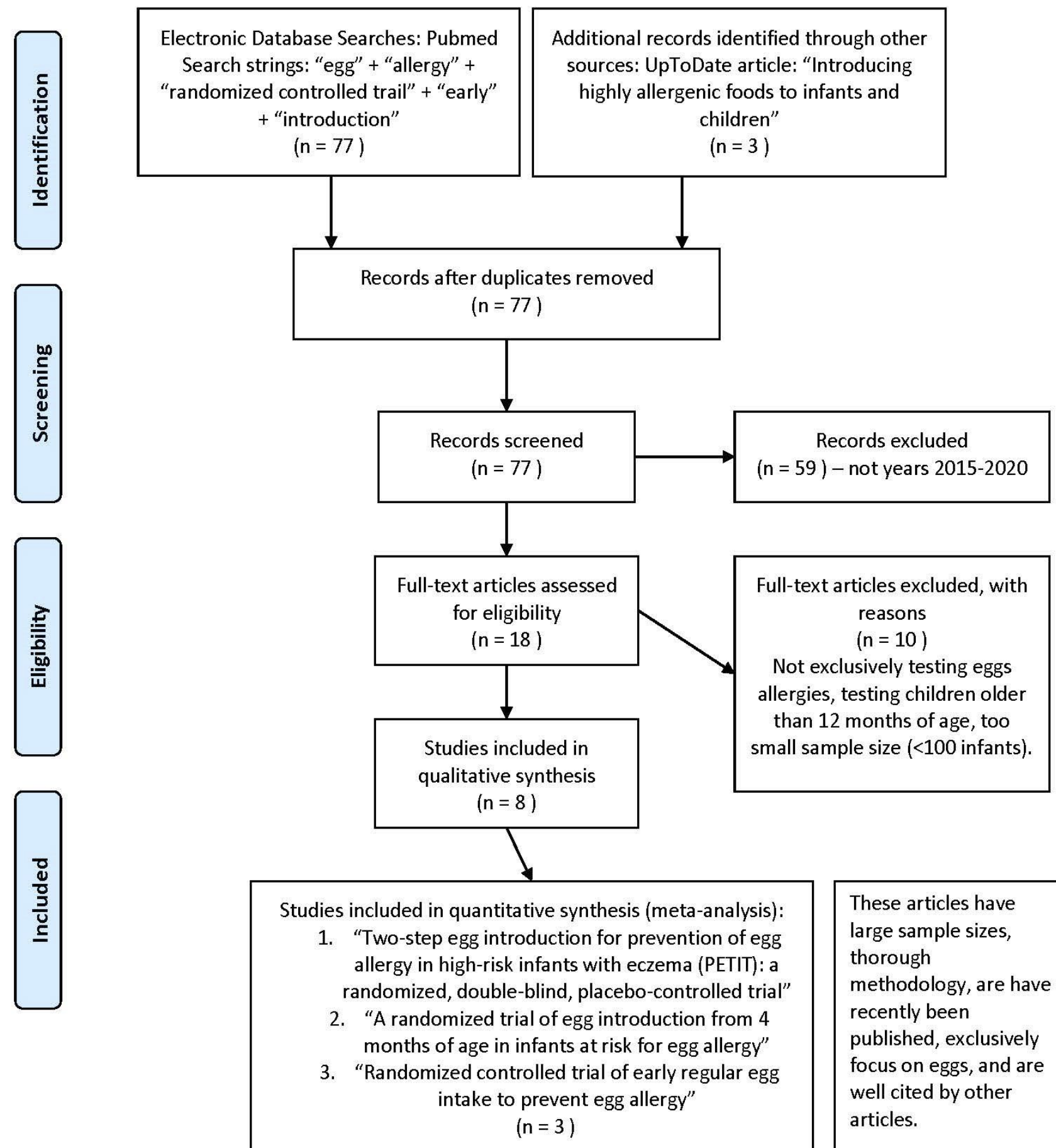


Discussion

Differences in PP vs ITT analysis show minor benefits in an early egg introduction strategy for reducing the development of severe egg allergy, but there remains plenty of room for further research. Each study had its own deficits that could be remedied in future research. PETIT was discontinued early as the success of the protocol was demonstrated. The BEAT study had a 20% loss of follow up. The STEP trial was unable to reach their sample size goal and was therefore unable to demonstrate statistical significance.

	Primary Outcome	p value	RR	ARR	OR	NNT
PETIT	Hen's egg allergy, with oral food challenge at 12 months	0.0001	0.22	29.4%	0.113	3.4
BEAT	Sensitization to egg via skin prick test at 12 months	0.03	0.55	9.8%	0.46	11
STEP	Allergic reaction to oral egg challenge <i>and</i> (+) skin prick test at 12 months	0.2	0.75	3.3%	0.65	30.3

Methods



Flowchart obtained From: Moher D, Liberati A, Tetzlaff J, Altman DG, The PRISMA Group (2009). Preferred Reporting Items for Systematic Reviews and Meta-Analyses: The PRISMA Statement. PLoS Med 6(6): e1000097. doi:10.1371/journal.pmed1000097

Conclusion

A meta analysis of current research indicates that there may be a minor benefit in the early introduction of egg protein to prevent egg allergy, but the results are hindered by some limits of statistical analysis and study follow through. The studies in our analysis all administered egg protein in tiny quantities and in a powdered form, which was easier to manage experimentally but that does not reflect the forms of eggs that are actually consumed by the general population, which may have impacted the results as well. Extensive research is necessary to tease out the complicated ways that food, environment, medications, and the immune system interact to cause the development of allergies. The benefits of understanding these systems thoroughly include an increased quality of life for children with food allergies and reduced medical expenses. The risks of such research are low and can be managed in research and clinical settings with proper participant education and follow up.

Acknowledgments

We would like to thank Dr. Abby Massey for her insightful advice and guidance throughout this project.

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