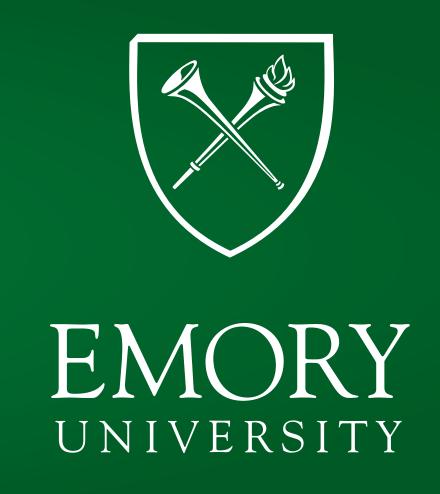


Dietary Avoidance in Children with Eosinophilic Esophagitis is Associated with Improved Growth Parameters



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ABSTRACT

Background: Eosinophilic Esophagitis (EoE) is an atopic inflammatory disorder of the esophagus that may present in children as failure to thrive. **Methods:** We conducted a retrospective chart review of children with EoE presenting at Emory Children's Center Allergy Clinic. All children had an esophageal biopsy with > 15 eosinophils/hpf. We collected information on biopsy results, anthropometric data, age, gender, and whether the child had been placed on an avoidance diet. Statistical analysis included means, standard deviations, frequency percent, t-tests, and a linear regression model.

Results: Thirty-three children were included. Sixty percent (20/33) were male and the mean age was 9.2 ± 4.6 years. Anthropometric findings were as follows: mean weight 33.4 ± 23.4 kg, mean weight percentile $36\% \pm 38\%$, mean height percentile $28 \pm 32\%$, and Body Mass Index percentile (BMIP) $55\% \pm 34\%$. Individuals on dietary avoidance treatment had a greater height percentile ($44\% \pm 34\%$ versus $19\% \pm 28\%$ p = 0.04) and a greater weight percentile ($54\% \pm 38\%$ versus $25\% \pm 35\%$ p = 0.003) with a trend toward a greater BMIP ($69\% \pm 32\%$ versus $48\% \pm 33\%$ p = 0.06) than children who had not yet started a dietary avoidance plan.

<u>Conclusions:</u> In this cohort of individuals with EoE, dietary avoidance may be associated with improved growth parameters. Careful monitoring of the growth of children with EoE is important.

BACKGROUND

Eosinophilic esophagitis (EoE) is an emerging disease with significant health impact both in children and adults. EoE a chronic relapsing and remitting esophageal disease that is immune/antigen-mediated. It is characterized by symptoms related to esophageal dysfunction, appearance of ringed esophagus [1, 2] on upper endoscopy, and histologically by eosinophil-predominant inflammation [3] that is not responsive to proton pump inhibitors (PPI) and/or a normal pH probe. Epidemiological and natural history studies of EoE reveal that both prevalence and incidence of EOE are on the rise. Caucasian male children are more affected, and children often also have other atopic diseases (allergic rhinoconjunctivitis, food allergies, and eczema), especially atopic asthma [4, 5] Seasonal variation in a subset of EoE population has been reported in some studies [6, 7].

The symptoms of EoE vary by age from feeding refusal, increased fussiness, gastro esophageal reflux (GERD) and failure to thrive in infancy [8-10] to solid food dysphagia, chest pain, vomiting, abdominal pain in older children and adolescents. All of which lead to either weight loss or poor weight gain. If untreated, EOE can lead to food impactions and esophageal strictures necessitating urgent endoscopic removals and dilatations.

Kelly et al., ([11] were the first to demonstrate the association between food allergy and EoE. In 1995 a landmark study was done in 10 children with persistent GERD symptoms and esophageal eosinophilia who failed treatment with a PPI and some continued to be symptomatic after reflux surgical procedures. A dietary trial consisting of an elemental formula resolved the persistent symptoms, and dramatically and significantly improved the esophageal eosinophilia and reactive inflammatory changes related to EoE. Similar studies [12-14] evaluating the role of food allergies have continued to demonstrate the relationship of food in inducing EoE.

As a chronic disease, removal of food alone appears to have the potential of treating without medication which limits side effects, and may induce remission. The most common foods that accounted for 2/3rds of food allergies identified by the skin prick test and atopy patch test were milk, egg, wheat, soy, corn, beef, chicken, and peanuts[15].

We routinely test and implement dietary changes in the treatment of children seen at Emory Children's Food Allergy Center of Excellence Eosinophilic Gastrointestinal Diseases Clinic. Since the hallmark paper regarding EoE was published in 1995 by Kelly et al. 375 publications to date have emerged in a PubMed survey using the term EoE and Children. Most of these papers focused on the symptomology, etiology and therapeutic options. We were unable to find any specific papers looking at the effect of dietary avoidance on growth –height, weight and BMI. So we began collecting growth data in our EoE population as a quality improvement measure to determine whether children on dietary avoidance in our clinic would have reduction in growth parameters.

OBJECTIVES

The objective of this analysis was to monitor the body mass index (BMI) percentile of children with EoE who were either on or not on an avoidance diet. We wished to determine whether those who were on an avoidance diet maintained adequate height, weight, and BMI percentiles.

METHODS

33 children with EoE, defined by an Esophageal biopsy with more than 15 eosinophils/hpf after taking a PPI for more than 6-8 weeks, were seen in the clinic during the observation period. As part of their clinical visit, we collected heights and weights using a calibrated scale and stadiometer and charts were reviewed for pertinent clinical information including biopsy results and current diet.

Frequency percents were calculated. Differences between those on a dietary avoidance and those not currently on a diet were evaluated using Chi-square (dichotomous data) or T-Test (continuous data). Statistical analysis was completed using SAS version 9.2

RESULTS

Table 1: Demographic Data *

	On dietary therapy	Not on dietary therapy	P
N	13	21	
Age (Years)	9.2 ± 4.4	7.5 ± 4.7	0.29
Gender (% Male)	46%	62%	0.08
Established Patients	77%	33%	0.01
Eosinophils/hpf on biopsy at diagnosis	24.7 ± 17.4	38.3 ± 25.5	0.13
% with diagnosis of atopic dermatitis	69	70	0.96
% with diagnosis of asthma	92	62	0.06
% with diagnosis of allergic rhinitis	100	95	0.43

^{*} Data represents mean ± SD or frequency percent

Table 2: Growth Parameters in those on and not on Dietary Therapy

	On dietary therapy	Not on dietary therapy	p	
N	13	21		
Weight (kg)	41.3 ± 28	29.0 ± 19.9	0.15	
Weight Percentile	54 ± 37	25 ± 9	0.04	
Height (cm)	131 ± 25.3	119.8 ± 29.3	0.29	
Height Percentile	44 ± 34	19 ± 5	0.03	
BMI	25.0 ± 12.1	17.7 ± 4.3	0.02	
BMI Percentile	69 ± 32	48 ± 34	0.10	

^{*} Data represents mean ± SD or frequency percent

Figure 1: Height, Weight, and BMI Percentiles in those on and not on dietary therapy

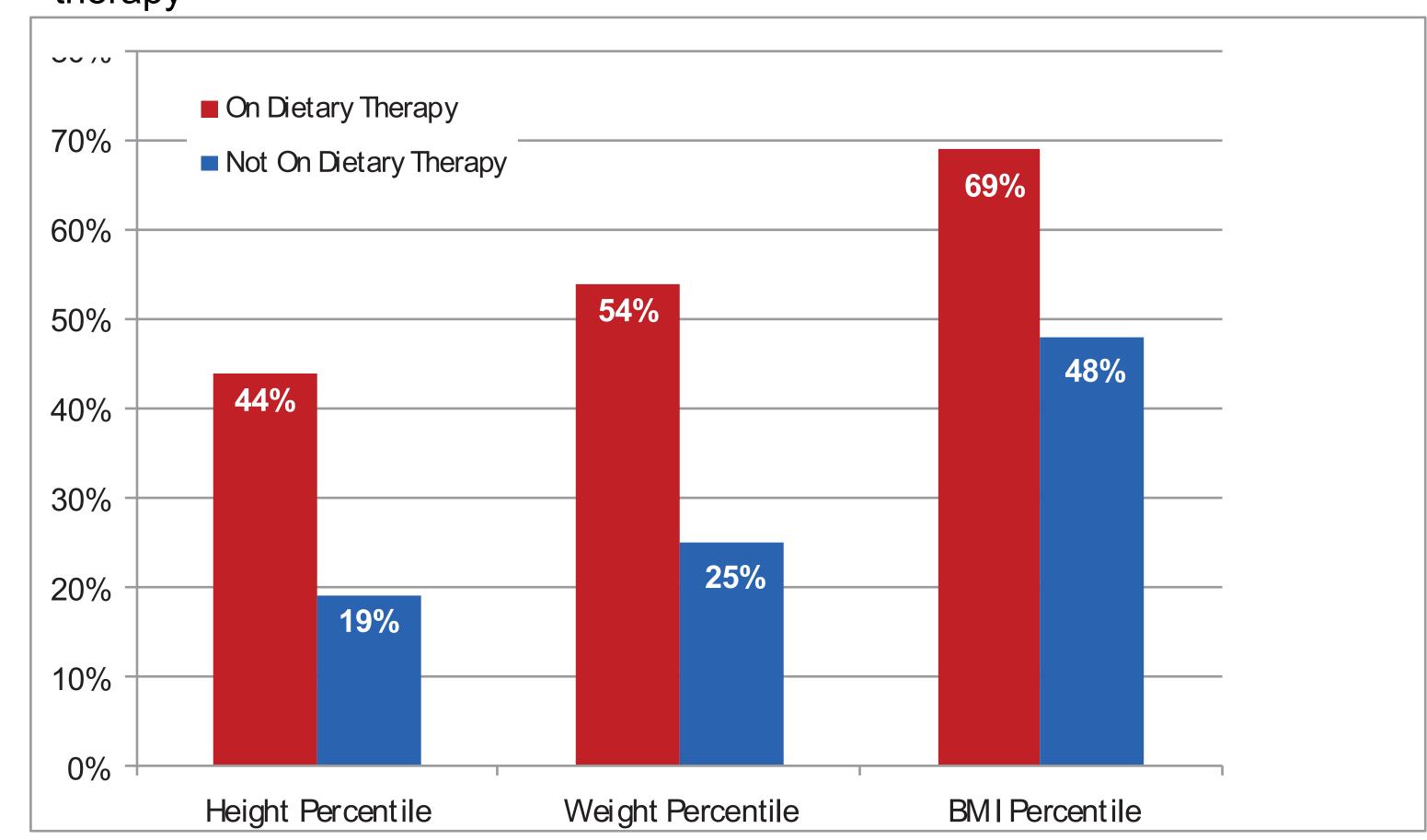


Figure 2: Height, Weight, and BMI Percentiles on and not on dietary therapy by gender

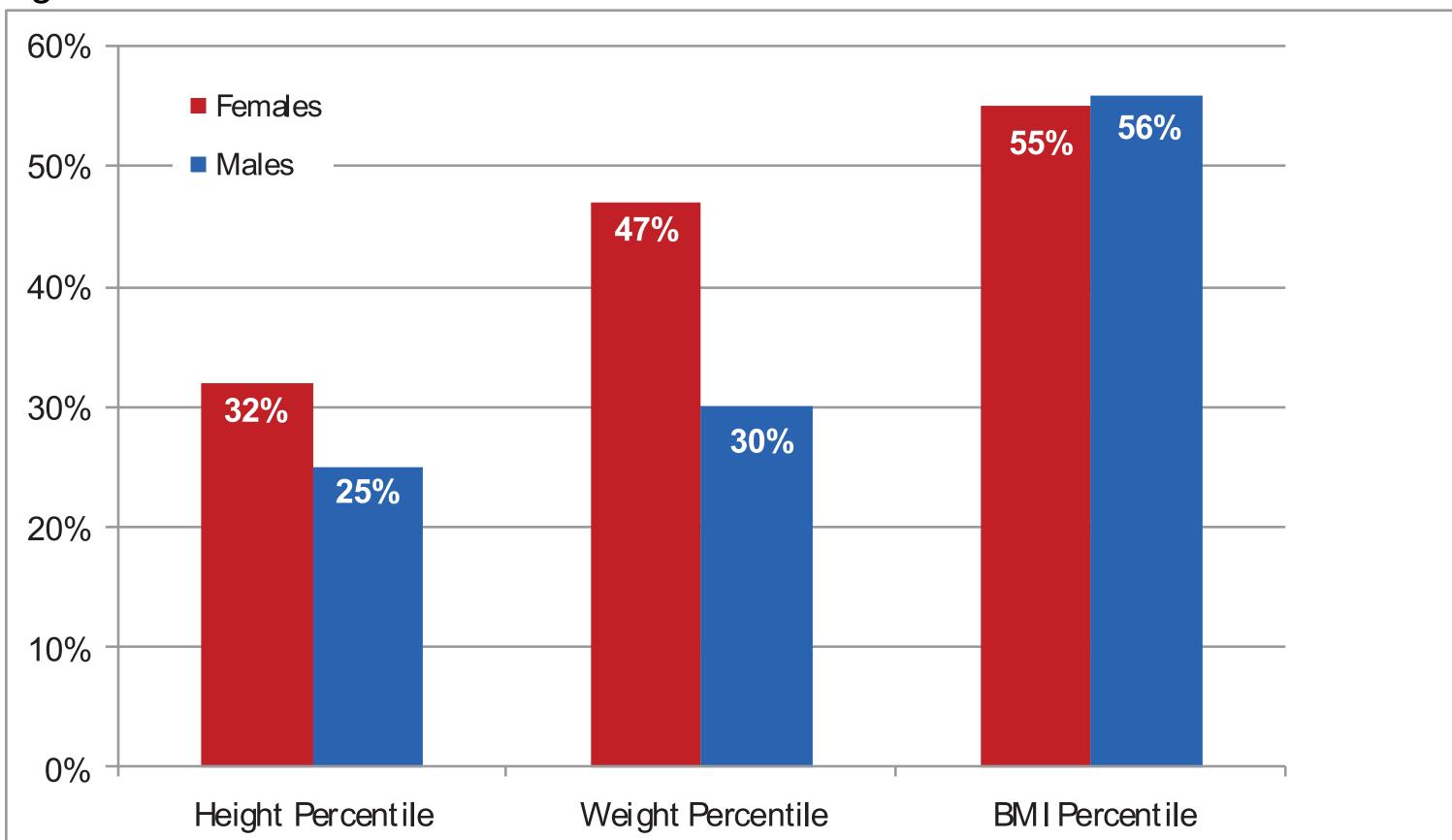
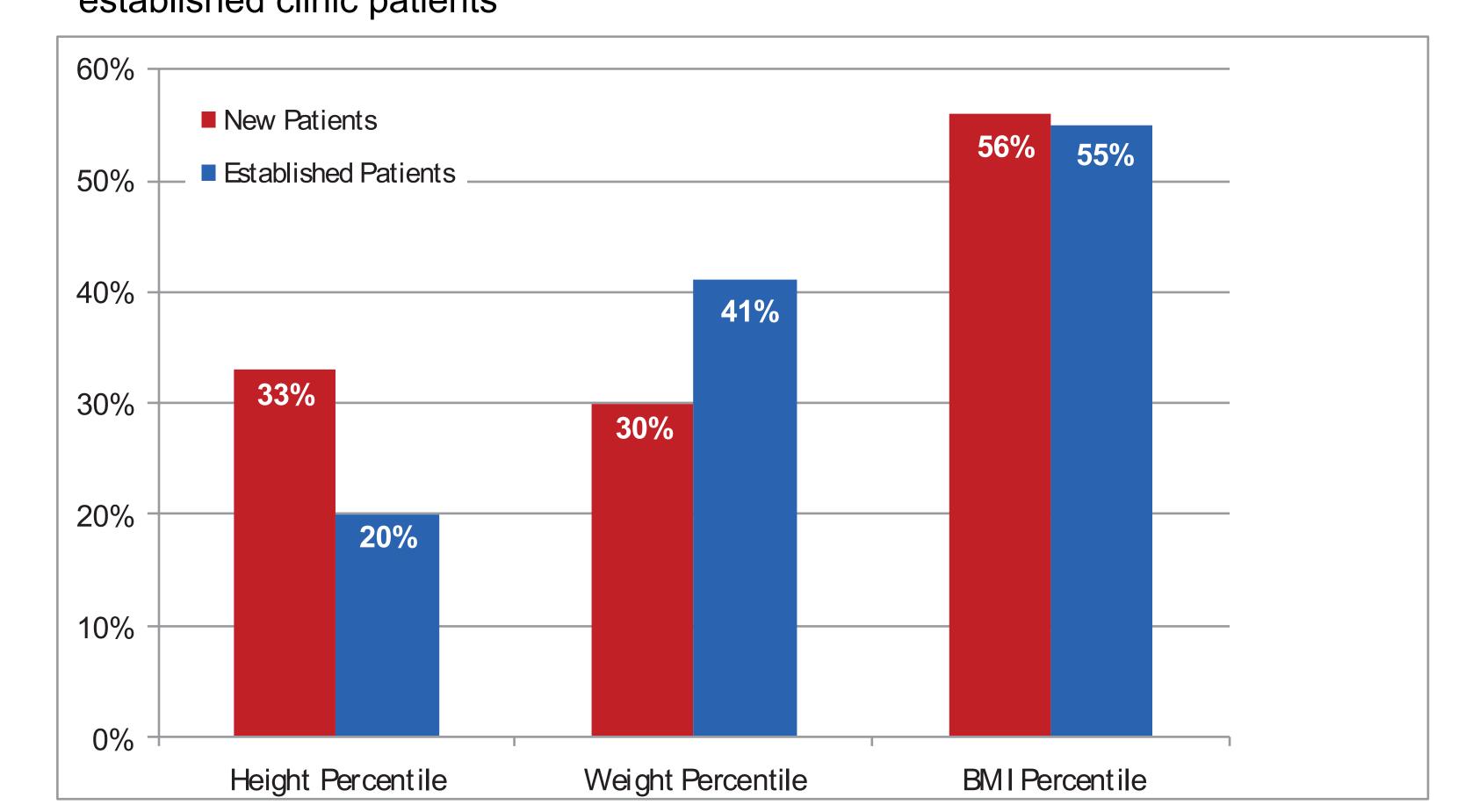


Figure 3: Height, Weight, and BMI Percentiles on and not on dietary therapy for established clinic patients



CONCLUSIONS

- 1. Patients on dietary avoidance were in a greater height and weight percentile and had a greater BMI than those not on a dietary avoidance.
- 2. There was no difference in weight (kg) or height (cm) between children on dietary avoidance and those not on dietary avoidance.
- 3. Established clinic patients were more likely to be on dietary avoidance.
- 4. Overall, children on dietary avoidance showed no decrease in growth parameters as compared to those not on dietary avoidance. Careful dietary avoidance therapy in a multidisciplinary clinic with nutritional support appears to be safe in children with EoE.

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