

Characterization of ethnicity among children with eosinophilic esophagitis in British Columbia, Canada

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Clinical Implications

- In areas of North America with large South and East Asian minority groups, there is a lack of East Asian children with eosinophilic esophagitis. Additional studies are needed to explore factors contributing to this difference.

TO THE EDITOR:

Eosinophilic esophagitis (EoE) is an allergic condition resulting from esophageal infiltration by eosinophils, with subsequent inflammation and possible narrowing of the esophagus.¹ EoE is more common in whites, but a variable presentation has been recently documented in blacks in the United States.^{2,3} Canada's ethnic population varies significantly from that of the United States, and in particular South Asians (defined according to criteria used by Statistics Canada, and included the following ethnic origins: Bangladeshi, Bengali, East Indian, Goan, Gujarati, Kashmiri, Nepali, Pakistani, Punjabi, Sinhalese, Sri Lankan, and Tamil⁴) and East Asians (defined according to criteria used by Statistics Canada: people of Burmese, Cambodian, Chinese, Filipino, Indonesian, Japanese, Korean, Laotian, Malaysian, Mongolian, Singaporean, Taiwanese, Thai, Tibetan, and Vietnamese origins⁴) comprise the largest visible minority groups in the province of British Columbia (BC).⁴ There is a lack of data for EoE among Asians living in North America. This letter describes the unique ethnic distribution of children with EoE in BC.

The University of British Columbia Children's Research Ethics Board approved this study. We reviewed all patients younger than 18 years in the multidisciplinary EoE Clinic at BC Children's Hospital (BCCH) who prospectively consented to inclusion in our EoE registry over a 2-year period. BCCH is the only pediatric tertiary care facility in BC, making the EoE Clinic the only referral center for children with EoE in the province. Information was obtained by chart review, including variables examined in previous ethnic studies of EoE: age at diagnosis, sex, ethnicity, biopsy counts at diagnosis, history of atopy, symptoms, and treatment.^{2,3} Ethnicity was reported by the patient's parent/guardian.

All endoscopies were performed at the BCCH. Histological findings were identified from pathology reports containing eosinophil counts. All recruited patients were symptomatic with 15 or more eosinophils/hpf from at least 1 biopsy, despite a trial of proton pump inhibitors. Shapiro-Wilk tests for normality, 2-tailed Mann-Whitney *U* tests (continuous variables), and Pearson χ^2 analyses (noncontinuous variables) were performed (SPSS, version 22.0, IBM Corp, Armonk, NY). The registry was created using REDCap software.⁵

Two individuals out of 65 had mixed ancestries and were excluded, limiting our analysis to 63 patients. Our cohort's ethnic distribution was 71% (45) whites, 29% (18) South Asians, and no East Asians. Overall, 81% (51) were boys. South Asians were diagnosed at a significantly younger age than whites (mean age, South Asians vs whites = 4.1 vs. 6.5 years; $P = .005$).

Overall, differences in symptoms were not significant between ethnic groups. Vomiting was the most common symptom, experienced by 49% (31) of all patients, followed by dysphagia (37% [23]). Abdominal pain (22% [4]) was the least reported symptom. Children presented with vomiting at a mean age of 4.0 years (95% CI, 2.9-5.2), whereas dysphagia or odynophagia was experienced at a mean age of 9.4 years (95% CI, 7.4-11.4).¹ Thirty-nine percent (7) of South Asians and 47% (21) of whites were atopic. Asthma was the most common allergic condition in South Asians (28% [5]); in whites, this was allergic rhinitis (31% [14]). On diagnosis, South Asians and whites presented with similar mean counts of eosinophils (South Asians vs whites = 35.8 [95% CI, 26.8-44.8] vs 43.5 eosinophils/hpf [95% CI, 36.8-50.3]; $P = \text{nonsignificant}$).

Treatment preferences varied significantly between ethnic groups. Medical treatment was used more frequently by whites than by South Asians (whites vs South Asians = 51% [23] vs 22% [4]; $P < .05$). Conversely, dietary interventions were more favored by South Asians, including elimination and elemental diets (whites vs South Asians = 49% [22] vs 78% [14]; $P < .05$).

A similar study reporting a higher incidence of inflammatory bowel disease in South Asian pediatric patients led us to initially hypothesize a clustering of immune-based gastrointestinal disorders (eg, EoE) in South Asian children in BC.⁶ Instead, we observed a lack of East Asians in our registry (Figure 1). This is unexpected because there are more East Asian children than South Asian children in BC.⁴ Our findings contrast with other allergic conditions such as peanut allergy, which, for the BC population seen in our hospital, favors East Asian (41%) and white (52%) children compared with South Asians (7%) (E.S. Chan, unpublished raw data, 2015). It is worthwhile to note that despite a global distribution of EoE, there is a paucity of data on the prevalence of EoE in East Asians.^{2,3} There was also a lack of black Canadian children in our study; however, this is likely due to their small representation in the BC population (<1%). In comparison, East Asian children comprise 28% of BC's population.⁴

EoE's prevalence in BC was determined to be similar in whites (37 cases/100,000 children) and South Asians (34 cases/100,000 children).⁴ The observed proportions of South Asians (EoE clinic vs BC population = 29% vs 21%) and whites (71% vs 47%) are exaggerated because of the absence of East Asians in our registry.

South Asian patients were diagnosed more than 2 years earlier than whites, which emulates American findings in black children and raises the possibility of earlier onset in South Asians.² Although age of diagnosis differed, histology or symptom presentation did not, suggesting that genetic or household food/environmental risk factors unique to South Asians may preferentially influence the age of onset.

Patients with EoE and their families are typically given a choice in disease management between medical therapy

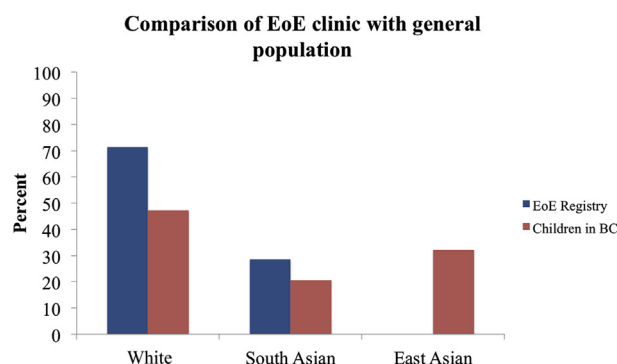


FIGURE 1. Ethnic distribution of children with EoE in our registry versus the ethnic distribution of children (<15 years) in the general population of BC. The sizes of populations in BC of children (<15 years) of single ethnic origin are as follows: 120,535 (white), 52,680 (South Asian), 82,135 (East Asian), and 255,350 (total after exclusion of any other minority ethnicity).⁴

(oral viscous budesonide or fluticasone) and dietary therapy (cow's milk elimination diet, 6-food elimination diet, directed elimination based on allergy testing, elemental diet). We observed a preference for nonmedical therapy in South Asians. A review of asthma management in South Asians reported dietary modification as a common approach among patients and family physicians in India.⁷ It is possible that a preference for dietary interventions could be a reflection of clinical practices in South Asia. Alternatively, counseling provided by health care providers might differ depending on the age of the patient. The choice of therapy was not physician dependent, as the same allergist and the same gastroenterologist saw all patients in this study, using a standardized care/management plan. Future studies may determine the relative significance of these 2 factors.

In summary, characterization of ethnicities among pediatric patients with EoE in BC identified a lack of East Asian children in our registry, and a possible earlier onset of the disease in South Asian children. Clinicians should also note discrepancies in treatment choice between ethnic populations, which may guide approaches to management. It is unlikely that primary care physicians are under-recognizing EoE in East Asian children, but we cannot exclude this possibility. Additional studies are needed to confirm these findings, and to explore the role of infant food exposures (eg, traditional vs Western diet), the impact of immigration status (ie, first or second generation), and possible ethnic variation in gene expression conferring EoE risk such as CAPN14.⁸

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REFERENCES

1. Liacouras CA, Furuta GT, Hirano I, Atkins D, Attwood SE, Bonis PA, et al. Eosinophilic esophagitis: updated consensus recommendations for children and adults. *J Allergy Clin Immunol* 2011;128:3-20.
2. Weiler T, Mikhaili L, Singal A, Sharma H. Racial differences in the clinical presentation of pediatric eosinophilic esophagitis. *J Allergy Clin Immunol Pract* 2014;2:320-5.
3. Gill RK, Al-Subu A, Elitsur Y, Gupta R, Treem WR, Rabinowitz S, et al. Prevalence and characteristics of eosinophilic esophagitis in 2 ethnically distinct pediatric populations. *J Allergy Clin Immunol* 2014;133:576-7.
4. Statistics Canada. Ethnic origin (264), single and multiple ethnic origin responses (3), generation status (4), age groups (10) and sex (3) for the population in private households of Canada, provinces, territories, census metropolitan areas and census agglomerations, 2011 National Household Survey. Statistics Canada Catalogue no. 99-010-X2011028. Available from: <https://www12.statcan.gc.ca/nhs-enm/2011/dp-pd/dt-td/Rp-eng.cfm?LANG=E&APATH=3&DETAIL=0&DIM=0&FL=A&FREE=0&GC=0&GID=0&GK=0&GRP=0&PID=105396&PRID=0&PTYPE=105277&S=0&SHOWALL=0&SUB=0&Temporal=2013&THEME=95&VID=0&VNAMEE=&VNAMEF=<https://wm.phsa.ca/oia/wiredir.aspx?C=y6T29uL7cEazrEGAJNFF6tGJ5YtUzDJ2WFzcMK27qMjnF3eooMMuFlxZLSDX5a5AZI308A1fNo&URL=https%3a%2f%2fwww12.statcan.gc.ca%2fnhs-enm%2f2011%2fdp-pd%2ftdt-t%2frp-eng.cfm%3flANG%3de%26APATH%3d3%26DETAIL%3d0%26DIM%3d0%26FL%3da%26FREE%3d0%26GRC%3d0%26GID%3d0%26GK%3d0%26GRP%3d0%26PID%3d105396%26PRID%3d0%26PTYPE%3d105277%26s%3d0%26SHOWALL%3d0%26SUB%3d0%26Temporal%3d2013%26THEME%3d95%26VID%3d0%26VNAMEE%3d%26VNAMEF%3d>>. Accessed June 12, 2015.
5. Harris PA, Taylor R, Thielke R, Payne J, Gonzalez N, Conde JG. Research electronic data capture (REDCap)—a metadata-driven methodology and workflow process for providing translational research informatics support. *J Biomed Inform* 2009;42:377-81.
6. Pinski V, Lemberg DA, Grewal K, Barker CC, Schreiber RA, Jacobson K. Inflammatory bowel disease in the South Asian pediatric population of British Columbia. *Am J Gastroenterol* 2007;102:1077-83.
7. Lakhanpaul M, Bird D, Manikam L, Culley L, Perkins G, Hudson N, et al. A systematic review of explanatory factors of barriers and facilitators to improving asthma management in South Asian children. *BMC Public Health* 2014;14:403.
8. Kottyan LC, Davis BP, Sherrill JD, Liu K, Rochman M, Kaufman K, et al. Genome-wide association analysis of eosinophilic esophagitis provides insight into the tissue specificity of this allergic disease. *Nat Genet* 2014;46:895-900.

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