Asthma and Rhinitis in Newark: Characterization of Clinical and Epidemiological Features

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Rationale

Newark has one of the highest rates of childhood asthma in New Jersey.[1] Urban populations experience disproportionately high rates of asthma morbidity, while indoor allergen sensitization can contribute to poor health outcomes.

In our previously uncharacterized urban population, we sought to evaluate the relationship between ethnicity, allergen sensitization and allergic co-morbidities among children with asthma and/or rhinitis.

Methods

A retrospective chart review was performed for patients with a diagnosis of asthma and/or rhinitis seen from 2013-2019 at the Rutgers University pediatric allergy and immunology clinic.

We conducted data analysis using Chi-square and Fisher exact tests to evaluate the association between allergic diagnosis, allergen sensitization, race/ethnicity and co-morbidities.

Results

Table 1. Demographics and clinical characteristics (N=296)

Age (y), median (range)	9.0 (1-18)
Sex, N (%)	
Female	146 (49.3)
Male	150 (50.7)
Race/ethnicity, N (%)	
Black or African-American	138 (46.6)
Hispanic	92 (31.1)
Other (mixed, white, Asian)	30 (10.1)
Unknown	36 (12.2)
Allergic diagnosis, N (%)	
Asthma only	25 (8.5)
Rhinitis only	83 (28.2)
Asthma and Rhinitis	186 (63.3)
Allergic co-morbidities, N (%)	
Eczema	117 (39.5)
Food allergy	123 (41.6)

Table 2. Allergen sensitivity and allergic diagnoses

	Patients tested (N=251)	Diagnosis: Asthma and rhinitis (N=174)			
Allergen	N (%)	N (%)	Adjusted OR*	95% CI	P-value
Pollen	163 (64.9)	111 (63.8)	0.82	0.46, 1.48	0.51
Cat/Dog	157 (62.6)	111 (63.8)	1.18	0.67, 2.06	0.56
Dust Mite	140 (55.8)	102 (58.6)	1.5	0.85, 2.64	0.15
Mold	75 (29.9)	58 (33.3)	1.76	0.93, 3.34	0.09
Mouse	**92 (36.7)**	**76 (43.7)**	**3.34**	**1.74, 6.42**	**0.0003**
Cockroach	11 (44.2)	80 (46.0)	1.2	0.69, 2.08	0.52

*Odds Ratios are adjusted for age, race and sex

Table 3. Allergen sensitivity and race

	Black/African American (N=121)			
Allergen	N (%)	OR	95% CI	P-value
Pollen	84 (69.4)	1.47	0.87, 2.47	0.19
Cat/Dog	76 (62.8)	1.02	0.61, 1.70	1.00
Dust Mite	72 (59.5)	1.34	0.81, 2.21	0.26
Mold	43 (35.5)	1.69	0.98, 2.91	0.07
Mouse	**53 (43.8)**	**1.97**	**1.15, 3.36**	**0.02**
Cockroach	59 (48.8)	1.45	0.88, 2.39	0.16

Table 4. Allergen sensitization patterns by clinic adjacent zip codes

	Zip code: 07103 (N=42)†			07108 (N=22)		
Allergen	OR	95% CI	P-value	OR	95% CI	P-value
Pollen	1.43	0.69, 2.95	0.38	1.17	0.46, 2.99	0.82
Cat/Dog	1.41	0.69, 2.87	0.39	1.31	0.52, 3.35	0.65
Dust Mite	**2.25**	**1.09, 4.63**	**0.03**	1.43	0.58, 3.54	0.51
Mold	1.21	0.60, 2.46	0.58	**3.89**	**1.58, 9.56**	**0.0030**
Mouse	1.72	0.85, 3.49	0.15	1.72	0.70, 4.24	0.25
Cockroach	**2.66**	**1.33, 5.29**	**0.0061**	1.15	0.47, 2.82	0.82

† Rutgers University allergy and immunology clinic location

Discussion

- Among children referred to our urban allergy/immunology clinic, the majority are Black/African-American and Hispanic patients; most had both asthma and rhinitis (Table 1).
- Sensitization to mouse allergen was significant in those with both asthma and rhinitis (Table 2).
- Black/African-American patients had increased likelihood of sensitization to mouse allergen (Table 3).
- Geographic differences reveal that dust mite and cockroach sensitization was significant in one zip code (07103), while mold was more significant in an adjacent zip code (07108) (Table 4).
- Future measures to address socioeconomic disparities can help prevent development of allergic diseases.

References

1. New Jersey Department of Health, Asthma Awareness and Education Program (2014). *Asthma in New Jersey – Essex County Asthma Profile.* Retrieved from https://www.nj.gov/health/fhs/chronic/documents/ asthma_profiles/essex.pdf