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Sesame allergy is more prevalent among Middle Eastern/North African patients in an urban healthcare system

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Clinical Communications

Sesame allergy is more prevalent among Middle Eastern/North African patients in an urban healthcare system

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Clinical Implications

- Electronic health record data were used to estimate the prevalence of sesame allergy by race/ethnicity in a large healthcare system. Despite limitations, our results suggest that sesame allergy is higher in those with Middle Eastern or North African ancestry living in the United States.

Sesame allergy is the ninth most common food allergy in the United States, and reports suggest that the prevalence is increasing.[1] Sesame allergy develops in early infancy and is seldom outgrown.[2] In Canadian children, sesame allergy had a higher annual rate of accidental reactions than peanut (15.9% vs 12.4%, respectively).[3] Sesame-induced anaphylaxis accounts for 43% of all food-induced anaphylaxis cases in Israeli children,[4] but little is known about the prevalence of sesame allergy among the Americans of Middle Eastern or North African descent (MENA) currently residing in the United States.[5] We estimated the prevalence of sesame allergy at Henry Ford Health System (HFHS) and examined the association of sesame allergy with self-report of MENA ethnicity.

HFHS is a large healthcare system located in metropolitan Detroit, an area estimated to have one of the largest concentrations of MENA in the United States.[5] In 2012, HFHS implemented Institute of Medicine recommendations for collection of patient race and ethnicity.[6] HFHS allows patient self-report of Hispanic/Latinx ethnicity, Arab/Chaldean ethnicity, and patient self-report of ancestry (eg, Syrian and Lebanese) allowing enumeration of patients self-identifying as MENA who might otherwise be categorized as "white" according to Office of Management and Budget categories.[6]

We retrieved electronic medical record (EMR) data for all patients aged 0 to 18 years, seen at HFHS between November 1, 2015, and February 28, 2019, with International Classification of Diseases, Tenth Revision (ICD10) codes for food allergy and/or with a food allergy on the Epic allergy list. Because there is no ICD10 code distinguishing sesame from tree/nut allergy, sesame allergy was considered present if 2 or more of the following criteria were met: (1) laboratory results for sesame specific IgE >0.35 IU/mL; (2) sesame allergy listed in the Epic allergy list; or (3) documented order for epinephrine autoinjector (Figure 1). We corroborated sesame allergy cases through a medical chart review conducted by a board-certified allergist (HK). We also retrieved patient demographics, insurance, allergist visits during the study period, and ICD10 codes for eczema and asthma.

The prevalence of sesame allergy for the study period was calculated by dividing the number of persons meeting sesame allergy criteria by total patients making encounters during that period. The association of patient characteristics with sesame allergy was described using χ^2 tests. Odds ratios (ORs) (95% confidence intervals) were calculated using logistic regression. All tests were 2-sided using $P < .05$ for statistical significance.

A total of 334,175 unique patients had ≥1 encounter during the study period, and 15,056 (4.5%) had evidence of a food allergy. Among those with food allergy, 140 (0.93%) had sesame allergy, corresponding to an overall prevalence = 0.042% (0.035%, 0.050%). Seventy-five percent of patients meeting criteria for sesame allergy had an ICD10 code for food allergy.

A total of 18,681 patients, 5.6% (5.5%, 5.7%), reported MENA ethnicity by selecting Arab/Chaldean or ancestry aligned with MENA countries[7] (compared with an estimated 3.9% of MENA patients visiting HFHS in 2018). MENA patients were more likely to have sesame allergy compared with other food allergies and compared with no food allergy; OR = 3.15 (1.85-5.08) and 2.75 (1.63-4.41), respectively, $P < .001$ for both comparisons (Table I). Compared with other food allergies, persons with sesame allergy were younger, more likely to have a past allergist visit, and more likely to have EMR evidence of eczema. Non-Hispanic black race was inversely related to sesame allergy. Patients with sesame allergy were more likely to be co-sensitized to peanut (59%) and tree nut/seeds (63%). Adjusting for patient demographics and other variables, MENA ethnicity remained associated with sesame allergy relative to other and no food allergy; adjusted OR = 3.15 (1.85-5.08) and 2.75 (1.63-4.41), respectively, $P < .001$. Allergist chart review corroborated 75% of EMR-identified sesame allergy cases. Results were similar when restricting analysis to these cases; adjusted OR = 3.76 (2.12, 6.31) for other food allergy and 3.33 (1.89, 5.56) for no food allergy, $P < .001$.

Our objective was to determine the prevalence of sesame allergy in a large health system, during a specified observation period, using evidence from the EMR. The criteria used cannot be said to represent a definitive diagnosis of sesame allergy, and for this reason, we included a chart review by an allergist and associations with MENA were stronger when the analysis was limited to these cases. We do not suspect that potential misclassification would differ by MENA ethnicity. Our denominator (persons with ≥1 health system encounter during the observation period) may not be entirely representative of the healthcare system's patient population, because it comprises patients referred or patients who visited HFHS no more than once. Over-representation of MENA patients in allergy cases may be driven by sesame allergy. If patients who have sesame allergy are more likely to visit HFHS allergists, or if patients who self-report as MENA are more likely to visit or be referred to HFHS allergists, our results could be biased.

We are unaware of other US reports that include an assessment of ethnicity at a granular level showing that MENA

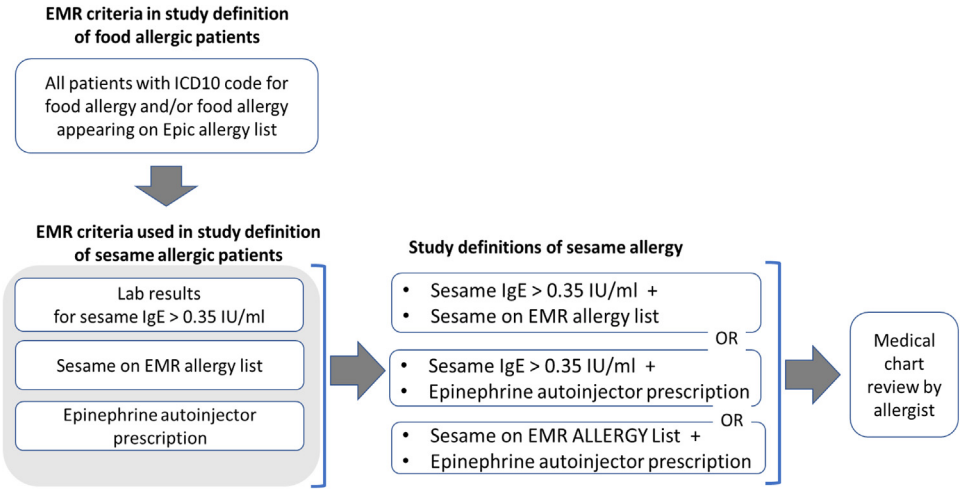

FIGURE 1. Identifying sesame-allergic patients using the electronic medical record (EMR). *ICD10*, International Classification of Diseases, Tenth Revision.

individuals in the United States may be at increased risk of sesame allergy. Sesame allergy is associated with severe reactions, and in this analysis, most sesame-allergic patients also had evidence of a peanut allergy, which is also associated with higher incidence of anaphylaxis. Evidence of an increased likelihood of visits to an allergist among sesame allergy patients may reflect disease severity.

Given that the United States is home to a growing diaspora of MENA individuals and that sesame reactions can be serious, modifiable dietary factors increasing the likelihood of sesame allergy should be investigated. Roasted forms of sesame, such as tahini, exhibit the presence of IgE-specific proteins in sesame-allergic patients. These same IgE-specific proteins are not present in commercially available extracts, suggesting that roasting may increase allergenicity.[8] Cultural factors related to dietary exposures during infancy may play a role in our results.[4,9] For example, sesame allergy may be more readily diagnosed if children of MENA descent are more likely to be exposed to sesame-containing foods, or if sesame-allergic patients are more likely to be allergic to multiple foods. Identifying modifiable factors related to severe anaphylaxis due to sesame allergy could contribute to life-saving advances.

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TABLE I. Description and characteristics of the Henry Ford Health System study sample by food allergic status

	Allergic status											
	A		B		A vs B			C		A vs C		
	Sesame allergy (n = 140)		Other food allergy (n = 14,916)					No food allergy (n = 319,119)				
Characteristic	n	Col %	n	Col %	OR	(95% CI)	*P*	n	Col %	OR	(95% CI)	*P*
Age (y)*												
0-4	37	26	2,556	17	3.08	(1.68, 6.02)	.001	71,043	22	2.52	(1.37, 4.92)	.004
5-11	58	41	4,644	31	2.65	(1.5, 5.07)	.002	85,345	27	3.28	(1.86, 6.26)	<.001
12-18	32	23	4,953	33	1.37	(0.74, 2.71)	.336	99,939	31	1.55	(0.83, 3.05)	.185
19-22	13	9	2,763	19	*Reference*			62,792	20	*Reference*		
Sex												
Male	79	56	7,524	50	1.27	(0.91, 1.79)	.159	158,896	50	1.31	(0.94, 1.83)	.118
Female	61	44	7,392	50				160,192	50			
Unknown	0	0	0	0				31	0			
Race-ethnicity												
Non-Hispanic white	72	51	5,820	39	*Reference*			149,605	47	*Reference*		
Non-Hispanic black	17	12	5,701	38	0.24	(0.14, 0.4)	<.001	81,571	26	0.43	(0.25, 0.72)	.002
Non-Hispanic other	20	14	1,094	7	1.48	(0.87, 2.39)	.126	23,914	7	1.74	(1.03, 2.79)	.029
Hispanic	3	2	511	3	0.47	(0.12, 1.28)	.207	15,535	5	0.40	(0.1, 1.08)	.121
Unknown	28	20	1,790	12	1.26	(0.8, 1.94)	.296	48,494	15	1.20	(0.76, 1.83)	.414
MENA												
Yes	19	14	627	4	3.58	(2.13, 5.7)	<.001	18,035	6	2.62	(1.57, 4.14)	<.001
No	121	86	14,289	96				301,084	94			
HAP insurance												
Yes	29	21	2,226	15	1.49	(0.97, 2.21)	.058	29,555	9	2.56	(1.67, 3.8)	<.001
No	111	79	12,690	85				289,564	91		(1.67, 3.8)	<.001
Past allergist visit												
Yes	76	54	2,299	15	6.52	(4.66, 9.14)	<.001	3,280	1	114.3	(81.9, 160.1)	<.001
No	64	46	12,617	85				315,839	99			
Eczema												
Yes	68	49	3,605	24	2.96	(2.12, 4.14)	<.001	26,004	8	10.65	(7.63, 14.84)	<.001
No	72	51	11,311	76				293,115	92			
Asthma												
Yes	43	31	3,621	24	1.38	(0.95, 1.97)	.078	20,987	7	6.30	(4.36, 8.95)	<.001
No	97	69	11,295	76				298,132	93		(4.36, 8.95)	<.001

CI, Confidence interval; *HAP*, Health Alliance Plan; *MENA*, Middle Eastern/North African; *OR*, odds ratio.
*This is age at the end of the study period. All individuals were 0-18 years at some time during the study period.