Race and Alopecia Areata amongst US Women

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Few studies have examined the clinical epidemiology of alopecia areata (AA) in regard to patient race, and therefore, any disparities in incidence or prevalence of disease are largely unexplored. We sought to investigate potential racial disparities amongst two large cohorts of women. We conducted a cross-sectional analysis from the Nurses' Health Study (NHS) and Nurses' Health Study II (NHSII), wherein participants self-reported a diagnosis of AA. We determined odds ratios for AA by race in a multivariate analysis. Among 63,960 women from NHS and 88,368 women from NHSII with information on race and diagnosis of AA, we identified 418 and 738 cases of AA, respectively. In NHS, the multivariate-adjusted odds ratio for AA was 2.72 (95% confidence interval 1.61–4.61) amongst black women as compared with white women. In NHSII, the multivariate-adjusted odds ratio was 5.48 (95% confidence interval 4.10–7.32) amongst black as compared with white women. In a secondary analysis designating participants by Hispanic ethnicity, in NHSII the multivariate odds ratio was 1.94 (95% CI 1.24–3.02) in Hispanic compared with non-Hispanic white women. In this study, we found increased odds of AA based on self-reported race in black and Hispanic women as compared with white women. Further studies are needed to explore the mechanism of this racial disparity related to AA.

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INTRODUCTION

Alopecia areata (AA) is a nonscarring form of immune-mediated hair loss. To date, there have been relatively few epidemiologic studies of AA, and thus, certain aspects of burden of disease have yet to be described. Current understanding is largely attributed to two population-based studies in Olmstead County, Minnesota, wherein the lifetime incidence rate was 1.7% in years 1975–1989 (Safavi et al., 1995), and 2.1% from 1990 to 2009 (Mirzoyev et al., 2014), with no significant gender difference. However, detailed assessment of incidence based on patient race was not described, and to our knowledge this important epidemiologic aspect of disease is previously unreported. Therefore, the purpose of the current study was to determine potential disparities of AA based on race in two cohorts of female nurses.

RESULTS

A total of 63,960 women from the Nurses' Health Study (NHS) and 88,368 women from the Nurses' Health Study II (NHSII) were included in this study. We identified 418 and 738 cases of AA, respectively. Age-standardized baseline characteristics of participants at the time of collection of information on diagnosis of AA by race are shown in Table 1. Participants from NHS were older than those in NHSII (mean age approximately 77 vs. 57). Alcohol intake was greatest amongst white women, and the history of hypertension and type 2 diabetes was greatest amongst black women. Otherwise, there were no compelling differences in standard lifestyle characteristics between races. Lifetime incidence and odds ratios (ORs) of AA by participant race are shown in Table 2. In age-adjusted analyses, black as compared with white women had greater lifetime incidence of AA in NHS (OR: 2.63; 95% confidence interval [CI] 1.56–4.42) and in NHSII (OR: 5.23; 95% CI 3.95–6.93). The results were similar in multivariate analyses. Compared with white women, there was no difference in AA incidence in a composite "other" race group in NHS (multivariate OR: 0.95; 95% CI 0.35–2.57) or NHSII (multivariate OR: 1.10; 95% CI 0.67–1.83). When characterizing women by Hispanic ethnicity (Supplementary Table S1 online), there was a greater lifetime incidence of AA in Hispanic women compared with non-Hispanic white women in NHSII (multivariate OR: 1.94; 95% CI 1.24–3.02). There was no significant difference in incidence by Hispanic ethnicity in the NHS cohort (multivariate OR: 1.14; 95% CI 0.42–3.09).

DISCUSSION

In this study, we found a higher lifetime incidence of AA in black as compared with white women in two large cohorts of US nurses. Increased incidence of AA was also found in Hispanic women in NHSII. The current understanding of AA epidemiology is primarily based on population studies in Olmsted County, Minnesota, a location with a predominately white racial demographic (United States Census Bureau, 2015). In the most recent assessment, only 18 black patients were identified amongst the 530 total patients with AA (Mirzoyev et al., 2014). One study has alluded to a disparity in incidence between black and white patients. Using International Classification of Disease, Ninth Revision codes,

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Abbreviations: AA, alopecia areata; CI, confidence interval; NHS, Nurses' Health Study; OR, odds ratio; SLE, systemic lupus erythematosus

Table 1. Age-standardized characteristics of study participants by race in the Nurses' Health Study (in 2012) and Nurses' Health Study II (in 2011)

	Nurses' Health Study			Nurses' Health Study II		
	Race			Race		
	White (n = 62,376)	Black (n = 905)	Others[1] (n = 679)	White (n = 85,062)	Black (n = 1,352)	Others[1] (n = 1,954)
Age, mean (SD)	76.3 (6.6)	76.6 (6.0)	76.9 (6.0)	56.6 (4.6)	57.7 (4.5)	57.0 (4.5)
Body mass index (kg/m^2), mean (SD)	26.2 (5.4)	27.7 (5.4)	24.8 (4.9)	27.7 (6.4)	30.9 (7.0)	25.7 (5.3)
Current smoking (%)	4.5	2.2	2.7	5.9	5.3	3.7
Physical activity level (metabolic equivalents hours/wk), mean (SD)	19.0 (23.9)	16.1 (18.2)	24.0 (29.7)	23.8 (29.4)	18.3 (30.0)	24.8 (44.0)
Alcohol intake (g/d), mean (SD)	6.1 (10.6)	2.8 (7.9)	2.8 (7.6)	6.6 (10.8)	3.0 (7.8)	3.7 (9.0)
History of comorbid disease						
Atopy (%)	–	–	–	8.3	8.8	11.2
Cardiovascular disease (%)	5.6	4.6	4.1	1.2	1.3	0.9
Hypertension (%)	50.6	62.5	50.5	37.1	59.5	42.2
Hypercholesterolemia (%)	44.1	46.7	44.2	35.2	34.8	36.8
Other immune-mediated disease[2] (%)	10.0	8.1	9.9	7.7	8.4	5.9
Type 2 diabetes (%)	11.4	20.4	15.9	6.4	14.6	8.9
Menopausal status and hormone use						
Pre (%)	0	0	0	16.6	15.7	17.4
Post—never use (%)	21.2	27.9	16.2	37.3	43.6	44.1
Post—current (%)	10.4	7.0	10.6	16.7	10.8	11.6
Post—past (%)	68.4	65.0	73.2	29.4	29.9	26.8
Annual UV flux[3], RB	125.2 (26.7)	131.0 (29.2)	141.8 (26.8)	125.7 (24.8)	133.1 (27.6)	140.8 (26.1)

Values are means (SD) or percentages and are standardized to the age distribution of the study population.
Values of polytomous variables may not sum to 100% because of rounding.
Abbreviations: AA, alopecia areata; RB, Robertson-Berger; SD, standard deviation.
[1]Other races include American Indian, Asian, and Native Hawaiian or Pacific Islander.
[2]Includes Crohn disease or ulcerative colitis, multiple sclerosis, psoriasis, polymyositis, rheumatoid arthritis, Sjögrens syndrome, scleroderma, and vitiligo.
[3]Value is ($\times 10^{-4}$ RB units); an estimate of amount of UVR reaching Earth's surface of residence within 1 y.

McMichael et al. (2007) characterized outpatient visits for AA from 1990 to 2000, from the North American Medical Care Survey. They identified a relatively greater number of black versus white patients presenting with AA (108 vs. 91 patients per 10,000 population).

In the current study, we identified a significantly greater lifetime incidence of AA in black and Hispanic females, compared with white females. Other immune-mediated diseases are known to disproportionately affect certain racial or ethnic groups, and previous studies might provide clues toward the underlying cause of the disparity we have identified with AA. For example, systemic lupus erythematosus (SLE), like AA, is an immune-mediated disease that disproportionately affects women with African or Hispanic ethnic backgrounds (Fernández et al., 2007). In a multiethnic, multicenter cohort of patients with SLE, Fernández et al. (2007) found that African American and Texan Hispanic patients had more severe disease, including greater frequency

Table 2. Race and AA in the NHS and NHSII

Cohort	Race	Total participants	No. of AA cases	Lifetime incidence (%)	Age-adjusted OR (95% CI)	Multivariate-adjusted OR[1] (95% CI)
NHS	White	62,376	399	0.64	1 (referent)	1 (referent)
	Black	905	15	1.66	2.63 (1.56–4.42)	2.72 (1.61–4.61)
	Other[2]	679	4	0.59	0.93 (0.35–2.49)	0.95 (0.35–2.57)
NHSII	White	85,062	667	0.78	1 (referent)	1 (referent)
	Black	1,352	55	4.07	5.23 (3.95–6.93)	5.48 (4.10–7.32)
	Other[2]	1,954	16	0.82	1.03 (0.63–1.70)	1.10 (0.67–1.83)

Abbreviations: AA, alopecia areata; CI, confidence interval; NHS, Nurses' Health Study; NHSII, Nurses' Health Study II; OR, odds ratio.
[1]Multivariate model adjusts for age (continuous), body mass index (<22, 22–24.9, 25–29.9, 30–34.9, >35 kg/m^2), alcohol intake (0, 0.1–4.9, 5–9.9, >10 g/d), UV flux (quintiles), and post-menopausal hormone use (premenopausal, postmenopausal never, past, or current use), smoking history (never, past, current), history of type 2 diabetes, cardiovascular disease, and history of any of the following immune-mediated diseases: Crohn disease or ulcerative colitis, multiple sclerosis, psoriasis, polymyositis, rheumatoid arthritis, Sjögren syndrome, scleroderma, and vitiligo. Atopic dermatitis (eczema) was an additional covariate in NHSII analysis
[2]Other races include American Indian, Asian, Native Hawaiian or Pacific Islander.