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A cross-sectional study of the distribution of psoriasis subtypes in different ethno-racial groups

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Abstract
Skin of colored patients with psoriasis are more likely to remain undiagnosed and experience a greater impact on quality of life than their white counterparts. A better understanding of the ethno-racial differences in the presentation of psoriasis can help address these disparities. To compare the prevalence of psoriatic subtypes (plaque, guttate, pustular, erythrodermic, palmoplantar, and inverse) and lesion locations in Caucasian, Asian, and Hispanic/Latino patients, we analyzed cross-sectional, patient-reported, physician-reviewed survey data from 882 adult and 16 pediatric psoriasis patients seen at the University of California, San Francisco Department of Dermatology between 2006 and 2016. Multivariate logistic regression was used to compare the prevalence of psoriasis subtypes and lesional distributions amongst the ethno-racial groups. Asians and Hispanics/Latinos had higher odds of having pustular psoriasis compared to Caucasians (OR=4.36 [95%CI: 1.24-17.62], P=0.026; and OR=5.94 [95%CI: 1.03-31.03], P=0.036, respectively). Asians also had a higher frequency of erythrodermic psoriasis (OR=5.56 [95%CI: 1.41-27.17], P=0.018), but a lower frequency of inverse psoriasis compared to Caucasians (OR=0.26 [95%CI: 0.06-0.80], P=0.036). These differences may relate to genetic or environmental factors or access to care. Clinician awareness of ethno-racial differences in psoriasis subtype and lesion location can facilitate earlier diagnosis and therapeutic intervention.

Keywords: psoriasis, skin of color, ethnic skin, pustular psoriasis, inverse psoriasis

Introduction
Psoriasis exhibits racial disparities, whereby non-Caucasian patients are more likely to remain undiagnosed compared to Caucasians [1, 2]. Moreover, African American and Hispanic/Latino psoriasis patients experience a greater negative impact on quality-of-life (QoL) compared to Caucasians, irrespective of severity [3]. However, little is known about ethno-racial differences in psoriasis presentation. This study aims to investigate the distribution of psoriasis subtypes and lesion locations in patients of Caucasian, Asian, and Hispanic/Latino descent.

Methods
We analyzed cross-sectional, patient-reported, physician-reviewed survey data from 882 adult and 16 pediatric psoriasis patients seen at the University of California, San Francisco Department of Dermatology between 2006 and 2016. Patients were asked to identify parental ancestry from 23 ethno-racial groups and were subsequently grouped into Caucasian (61%), Asian (25%), Hispanic/Latino (8%), or Other (6%) categories according to a standard algorithm. Survey respondents also identified their psoriasis subtypes (plaque, guttate, pustular, erythrodermic, palmoplantar, inverse), which were confirmed by their treating dermatologist. The total sum of psoriasis subtypes was greater than 100 percent because patients could have multiple subtypes. In addition to subtype, patients identified which body parts had psoriasis lesions. These lesional areas were grouped into 5 categories of lesional distributions: 1) extremities comprising arms, legs, elbows, and knees, 2) palms and soles, 3) face, 4) scalp, and 5) flexural areas (armpit, skin folds, groin). We compared the prevalence of psoriasis subtypes and lesional distributions amongst the ethno-racial groups using multivariable logistic models. To control for

Table 1. *Demographic features of our multi-ethnic patient cohort. Demographic features were compared across Caucasian, Asian, and Hispanic/Latino subjects using unadjusted, univariate Student's t-tests for continuous variables and chi-squared tests for categorical variables.*

Demographic characteristics			
	Caucasian n = 549	Asian n = 228	Hispanic n = 75	P value
Age Mean (SD)	48.49 (16.62)	44.23 (17.09)	46.16 (17.34)	0.006**
Gender	45.8% (F)	42.7% (F)	45.3% (F)	0.773
BMI (SD)	26.28 (6.04)	26.80 (5.27)	29.42 (6.92)	0.013*
Age at onset Mean (SD)	28.25 (17.38)	28.68 (17.36)	32.73 (19.52)	0.414

demographic factors, including those that were significantly different between ethno-racial groups, the logistic regression models used body mass index, age, age of onset, and gender as covariates. All statistical analyses were conducted in R (Version 3.3.2).

Results

Analysis of baseline demographic characteristics (Table 1) showed that Asians were significantly younger at time of presentation than Caucasians (mean 44.23 versus. 48.49). Hispanics/Latinos had higher BMIs at time of presentation than Caucasians (mean 29.42 versus. 26.28). There were no significant differences in the age of onset and gender distribution. After adjustment for these demographic factors, logistic regression revealed

Table 2. *Comparison of the prevalence of psoriasis subtypes and the anatomic distribution of lesion locations in different ethno-racial groups. The prevalence of psoriasis subtypes and location distributions across the Caucasian, Asian, and Hispanic/Latino groups were compared using multivariable logistic regression, adjusted for age, gender, body mass index, and age of onset.*

Subtypes					OR, [95%CI]
Plaque Y/Total (Y%)	488/549 (89%)	202/228 (89%)	68/75 (91%)	A vs. C: p= 0.701 H vs. C: p= 0.684	----
Guttate	164/549 (30%)	69/228 (30%)	21/75 (28%)	A vs. C: p= 0.211 H vs. C: p=0.480	----
Palmoplantar	46/549 (8%)	14/228 (6%)	3/75 (4%)	A vs. C: p= 0.705 H vs. C: p= 0.988	----
Erythrodermic	12/549 (2%)	12/228 (5%)	3/75 (4%)	A vs. C: p= 0.018*	5.56 [1.41-27.17]
				H vs. C:p= 0.466	----
Inverse	54/549 (10%)	14/228 (6%)	7/75 (9%)	A vs. C: p= 0.036*	0.26 [0.06-0.80]
				H vs. C: p= 0.654	----
Pustular	15/549 (3%)	16/228 (7%)	7/75 (9%)	A vs. C: p= 0.026*	4.36 [1.24-17.62]
				H vs. C:p= 0.034*	5.94 [1.03-31.03]
Lesion Location					OR, [95%CI]
Extremities	502/549 (91%)	209/228 (92%)	71/75 (95%)	A vs. C:p=0.150 H vs. C:p=0.163	----
Palms/Soles	122/549 (22%)	67/228 (30%)	21/75 (28%)	A vs. C:p=0.478 H vs. C:p=0.854	----
Flexures	196/549 (36%)	88/228 (39%)	23/75 (31%)	A vs. C:p=0.736 H vs. C:p=0.999	----
Face	212/549 (39%)	114/228 (50%)	33/75 (44%)	A vs. C:p=0.080 Ⱶ	1.57 [0.95-2.60]
				H vs. C:p=0.096 Ⱶ	1.92 [0.90-4.25]
Scalp	422/549 (77%)	194/228 (85%)	61/75 (81%)	A vs. C:p=0.210 H vs. C:p=0.938	----

that Asians and Hispanics/Latinos had higher odds of having pustular psoriasis compared to Caucasians (OR=4.36 [95%CI: 1.24-17.62], P=0.026; and OR=5.94 [95%CI: 1.03-31.03], P=0.036, respectively, (Table 2). Asians also had a higher frequency of erythrodermic psoriasis (OR=5.56 [95%CI: 1.41-27.17], P=0.018), but a lower frequency of inverse psoriasis compared to Caucasians (OR=0.26 [95%CI: 0.06-0.80], P=0.036). There were no significant ethno-racial differences in the anatomic locations of psoriasis lesions (Table 2).

Discussion

Although plaque psoriasis is the most common subtype across all ethno-racial groups, our results show that non-Caucasians are more likely to present with erythrodermic and pustular psoriasis compared to Caucasians. Genetic differences between ethnicities may partly explain the ethno-racial differences in the frequency of pustular, erythrodermic, and inverse psoriasis. For instance, population-specific effects for HLA variants and pustular psoriasis rare variants have been described.[4, 5]. Socioeconomic disparities between ethno-racial groups, leading to differences in access to care [6] and thresholds for seeking care, may also contribute to a higher prevalence of more severe subtypes in non-Caucasians. Although we were able to see significant differences in the Hispanic/Latino group, the demographics of our study population may limit our power to detect differences with **smaller effect sizes. Furthermore, the "Other" group,** which included patients of African ancestry, was too small to be included.

Conclusion

Despite these limitations, this study reveals significant ethno-racial differences in psoriasis subtypes that may aid in the clinical diagnosis and management of psoriasis in skin of color patients.

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