Association Between Psoriasis and Sunburn Prevalence in US Adults

Sara Osborne, BS; Olivia Kam, BA; Shivani Thacker, DO; Raquel Wescott, BS; Carolynne Vo, BS; Jashin J. Wu, MD

PRACTICE **POINTS**

- It is important for dermatologists to encourage rigorous sun-safety practices in patients with psoriasis, particularly those aged 20 to 59 years.
- A thorough sunburn history should be taken for skin cancer risk assessment in patients with psoriasis.

To the Editor:

UV light plays an essential role in various environmental and biological processes.[1] Excessive exposure to UV radiation can lead to sunburn, which is marked by skin erythema and pain.[2] A study of more than 31,000 individuals found that 34.2% of adults aged 18 years and older reported at least 1 sunburn during the survey year.[3] A lack of research regarding the incidence of sunburns in patients with psoriasis is particularly important considering the heightened incidence of skin cancer observed in this population.[4] Thus, the aim of our study was to analyze the prevalence of sunburns among US adults with psoriasis utilizing data from the National Health and Nutrition Examination Survey (NHANES) database.[5]

Our analysis initially included 11,842 participants ranging in age from 20 to 59 years; 35 did not respond to questions assessing psoriasis and sunburn prevalence and thus were excluded. Multivariable logistic regression analyses were performed using Stata/SE 18 (StataCorp LLC) to assess the relationship between psoriasis and sunburns. Our models controlled for patient age, sex, income, race, education, diabetes status, tobacco use, and body mass index. A P value $<.05$ was considered statistically significant. The study period from January 2009 to December 2014 was chosen based on the availability of the most recent and comprehensive psoriasis data within the NHANES database.

In the NHANES data we evaluated, psoriasis status was assessed by asking, "Have you ever been told by a doctor or other health professional that you had psoriasis?" History of sunburns in the survey year was assessed by the question, "How many times in the past year have you had sunburn?" Patients who reported 1 or more sunburns were included in the sunburn cohort, while those who did not report a sunburn were included in the no sunburn cohort.

In our analysis, the prevalence of at least 1 sunburn in the survey year in patients with psoriasis was 55.4% (weighted), compared to 45.6% (weighted) among those without psoriasis (eTable 1). Although there was no statistically significant relationship between psoriasis and history of sunburn in patients aged 20 to 59 years, a subgroup analysis revealed a significant association between psoriasis and sunburn in adults aged 20 to 39 years after adjusting for potential confounding variables (adjusted OR, 1.57 [95% CI, 1.00-2.45]; P=.049)(eTable 2). Further analysis of subgroups showed no statistically significant results with adjustment of the logistic regression model. Characterizing response rates is important for assessing the validity of survey studies. The NHANES response rate from 2009 to 2014 was 72.9%, enhancing the reliability of our findings.

Our study revealed an increased prevalence of sunburn in US adults with psoriasis. A trend of increased sunburn prevalence among younger adults regardless of psoriasis status is corroborated by the literature. Surveys conducted in the United States in 2005, 2010, and 2015 showed that 43% to 50% of adults aged 18 to 39 years and 28% to 42% of those aged 40 to 59 years reported experiencing at least 1 sunburn

Sara Osborne is from the University of Minnesota School of Medicine, Twin Cities. Olivia Kam is from the Renaissance School of Medicine at Stony Brook University, New York. Dr. Thacker is from the KPC Health Hemet Global Medical Center, California. Raquel Wescott is from the University of Nevada Reno School of Medicine. Carolynne Vo is from the University of California Riverside School of Medicine. Dr. Wu is from the University of Miami Miller School of Medicine, Florida.

Sara Osborne, Olivia Kam, Raquel Wescott, Carolynne Vo, and Dr. Thacker have no relevant financial disclosures to report. Dr. Wu is or has been an investigator, consultant, or speaker for AbbVie, Almirall, Amgen, Arcutis, Aristea Therapeutics, Bausch Health, Boehringer Ingelheim, Bristol-Myers Squibb, Dermavant, DermTech, Dr. Reddy's Laboratories, Eli Lilly & Company, EPI Health, Galderma, Janssen, LEO Pharma, Mindera, Novartis, Pfizer, Regeneron, Samsung Bioepis, Sanofi Genzyme, Solius, Sun Pharmaceuticals, UCB, and Zerigo Health.

The eTables are available in the Appendix online at www.mdedge.com/cutis.

Correspondence: Jashin J. Wu, MD, University of Miami Miller School of Medicine, 1600 NW 10th Ave, RMSB, Room 2023-A, Miami, FL 33136 (jashinwu@gmail.com).

Cutis. 2025 February;115(2):63-64, E4-E5. doi:10.12788/cutis.1171

within the respective survey year.[6] Furthermore, in our study, patients with psoriasis reported higher rates of sunburn than their counterparts without psoriasis, both in those aged 20 to 39 years (psoriasis, 62.8% [73/136]; no psoriasis, 51.1% [2425/5840]) and those aged 40 to 59 years (psoriasis, 50.5% [n=75/179]; no psoriasis, 40.2% [1613/5652]), though it was only statistically significant in the 20-to-39 age group. This discrepancy may be attributed to differences in sun-protective behaviors in younger vs older adults. A study from the NHANES database found that, among individuals aged 20 to 39 years, 75.9% [4225/5493] reported staying in the shade, 50.0% [2346/5493] reported using sunscreen, and 31.2% [1874/5493] reported wearing sun-protective clothing.[7] Interestingly, the likelihood of engaging in all 3 behaviors was 28% lower in the 20-to-39 age group vs the 40-to-59 age group (adjusted OR, 0.72; 95% CI, 0.62-0.83).[7]

While our analysis adjusted for age, race/ethnicity, and tobacco use to mitigate potential confounding, we acknowledge the statistically significant differences observed in these variables between study groups as presented in eTable 2. These differences may reflect inherent disparities in the study population. We employed multivariable regression analysis to control for these covariates in our primary analyses. Of note, there was a statistically significant difference associated with race/ethnicity when comparing non-Hispanic White individuals with psoriasis (77.0% [n=182/315]) and those without psoriasis (62.5% [n=4516/11,492])($P<.0001$)(eTable 1). The higher proportion of non-Hispanic White patients in the psoriasis group may reflect an increased susceptibility to sunburn given their typically lighter skin pigmentation; however, our analysis controlled for race/ethnicity (eTable 2), thereby allowing us to isolate the effect of psoriasis on sunburn prevalence independent of racial/ethnic differences. There also were statistically significant differences in tobacco use ($P=.0026$) and age ($P=.002$) in our unadjusted findings (eTable 1). Again, our analysis controlled for these factors (eTable 2), thereby allowing us to isolate the effect of psoriasis on sunburn prevalence independent of tobacco use and age differences. This approach enhanced the reliability of our findings.

The association between psoriasis and skin cancer has previously been evaluated using the NHANES database—one study found that patients with psoriasis had a significantly higher prevalence of nonmelanoma skin cancer compared with those without psoriasis (3.0% vs 1.3%; relative risk, 2.29; $P<.001$).[8] This difference remained significant after adjusting for confounding variables, as it was found that psoriasis was independently associated with a 1.5-fold increased risk for nonmelanoma skin cancer (adjusted relative risk, 2.06; $P=.004$).[8]

The relationship between psoriasis and sunburn may be due to behavioral choices, such as the use of phototherapy for managing psoriasis due to its recognized advantages.[9] Patients may seek out both artificial and natural light sources more frequently, potentially increasing the risk for sunburn.[10] Psoriasis-related sunburn susceptibility may stem from biological factors, including vitamin D insufficiency, as vitamin D is crucial for keratinocyte differentiation, immune function, and UV protection and repair.[11] One study examined the effects of high-dose vitamin D3 on sunburn-induced inflammation.[12] Patients who received high-dose vitamin D3 exhibited reduced skin inflammation, enhanced skin barrier repair, and increased anti-inflammatory response compared with those who did not receive the supplement. This improvement was associated with upregulation of arginase 1, an anti-inflammatory enzyme, leading to decreased levels of pro-inflammatory mediators such as tumor necrosis factor α and inducible nitric oxide synthase, thereby promoting tissue repair and reducing prolonged inflammation.[12] These findings suggest that vitamin D insufficiency coupled with dysregulated immune responses may contribute to the heightened susceptibility of individuals with psoriasis to sunburn.

The established correlation between sunburn and skin cancer[4,8] coupled with our findings of increased prevalence of sunburn in individuals with psoriasis underscores the need for additional research to clarify the underlying biological and behavioral factors that may contribute to a higher prevalence of sunburn in these patients, along with the implications for skin cancer development. Limitations of our study included potential recall bias, as individuals self-reported their clinical conditions and the inability to incorporate psoriasis severity into our analysis, as this was not consistently captured in the NHANES questionnaire during the study period.

REFERENCES

1. Blaustein AR, Searle C. Ultraviolet radiation. In: Levin SA, ed. *Encyclopedia of Biodiversity*. 2nd ed. Academic Press; 2013:296-303.
2. D'Orazio J, Jarrett S, Amaro-Ortiz A, et al. UV radiation and the skin. *Int J Mol Sci*. 2013;14:12222-12248.
3. Holman DM, Ding H, Guy GP Jr, et al. Prevalence of sun protection use and sunburn and association of demographic and behavioral characteristics with sunburn among US adults. *JAMA Dermatol*. 2018;154:561-568.
4. Balda A, Wani I, Roohi TF, et al. Psoriasis and skin cancer—is there a link? *Int Immunopharmacol*. 2023;121:110464.
5. Centers for Disease Control and Prevention. National Health and Nutrition Examination Survey. NHANES questionnaires, datasets, and related documentation. Accessed December 4, 2024. https://wwwn.cdc.gov/nchs/nhanes/Default.aspx
6. Holman DM, Ding H, Berkowitz Z, et al. Sunburn prevalence among US adults, National Health Interview Survey 2005, 2010, and 2015. *J Am Acad Dermatol*. 2019;80:817-820.
7. Challapalli SD, Shetty KR, Bui Q, et al. Sun protective behaviors among adolescents and young adults in the United States. *J Natl Med Assoc*. 2023;115:353-361.
8. Herbosa CM, Hodges W, Mann C, et al. Risk of cancer in psoriasis: study of a nationally representative sample of the US population with comparison to a single-institution cohort. *J Am Acad Dermatol Venereol*. 2020;34:E529-E531.
9. Elmets CA, Lim HW, Stoff B, et al. Joint American Academy of Dermatology-National Psoriasis Foundation guidelines of care for the management and treatment of psoriasis with phototherapy. *J Am Acad Dermatol*. 2019;81:775-804.
10. Åkerla P, Pukkala E, Helminen M, et al. Skin cancer risk of narrow-band UV-B (TL-01) phototherapy: a multi-center registry study with 4,815 patients. *Acta Derm Venereol*. 2024;104:adv39927.
11. Filoni A, Vestita M, Congedo M, et al. Association between psoriasis and vitamin D: duration of disease correlates with decreased vitamin D serum levels: an observational case-control study. *Medicine (Baltimore)*. 2018;97:E11185.
12. Scott JF, Das LM, Ahsanuddin S, et al. Oral vitamin D rapidly attenuates inflammation from sunburn: an interventional study. *J Invest Dermatol*. 2017;137:2078-2086.

APPENDIX

eTABLE 1. Characteristics of Study Population

Characteristic	Psoriasis Status[a]		
	Psoriasis (weighted %)[b]	No psoriasis (weighted %)[b]	*P* value[c]
History of sunburn in the survey year[d]			
Yes	148/315 (55.4)	4038/11,492 (45.6)	.0111
No	167/315 (44.6)	7454/11,492 (54.4)	
Mean age, y (SD)	42.3 (9.07)	39.41 (9.74)	.002
Sex			
Male	151/315 (49.6)	5564/11,492 (49.1)	.9007
Female	164/315 (50.4)	5928/11,492 (50.9)	
Annual household income, $			
≥20,000	228/300 (83.5)	8700/10,921 (85.6)	.3401
<20,000	72/300 (16.5)	2221/10,921 (14.4)	
Race/ethnicity			
Non-Hispanic White	182/315 (77.0)	4516/11,492 (62.5)	<.0001
Non-Hispanic Black	37/315 (5.9)	2483/11,492 (12.5)	
Other Hispanic/Mexican American	54/315 (10.2)	2902/11,492 (16.8)	
Other race/multiracial	42/315 (6.9)	1591/11,492 (8.4)	
Education			
Did not graduate high school	61/315 (12.2)	2508/11,480 (15.9)	.3853
High school graduate	72/315 (22.6)	2523/11,480 (21.1)	
Some college	93/315 (31.3)	3594/11,480 (32.6)	
College graduate	33/315 (33.9)	2855/11,480 (38.4)	
Diabetes status[e]			
Yes	25/315 (6.7)	774/11,485 (5.6)	.4723
No	290/315 (93.3)	10,711/11,485 (94.4)	
Tobacco use[f]			
Yes	167/315 (52.8)	4712/11,489 (41.7)	.0026
No	148/315 (47.2)	6777/11,489 (58.3)	
Mean BMI (SD)	29.19 (5.19)	28.80 (5.88)	.409

Abbreviations: BMI, body mass index (calculated as kg/m^2); NHANES, National Health and Nutrition Examination Survey.

[a]Psoriasis status was assessed by asking, "Have you ever been told by a doctor or other health professional that you had psoriasis?"

[b]Weighted percentage was calculated using NHANES design parameters.

[c]$P \leq .05$ indicates statistical significance.

[d]Sunburn was assessed by asking, "How many times in the past year have you had sunburn?"

[e]Diabetes status was assessed by asking, "Other than during pregnancy, have you ever been told by a doctor or health professional that you have diabetes or sugar diabetes?"

[f]Tobacco use was assessed by asking, "Have you smoked at least 100 cigarettes in your entire life?"

eTABLE 2. Subgroup Analysis of Association Between Psoriasis and Sunburn Prevalence

Psoriasis status by subgroup	History of sunburn in the survey year (weighted %)[a]	OR (95% CI)	*P* value[b]	Adjusted OR (95% CI)	*P* value[b]
All participants (aged 20–59 y)					
Yes	148/315 (55.4)	1.48 (1.10–1.99)	.012	1.40 (0.98–1.98)	.061
No	4038/11,492 (45.6)	1.00 (reference)		1.00 (reference)	
Females					
Yes	84/164 (58.4)	1.78 (1.07–2.96)	.028	1.71 (0.95–3.09)	.072
No	2036/5928 (44.1)	1.00 (reference)		1.00 (reference)	
Males					
Yes	64/151 (52.3)	1.22 (0.87–1.73)	.246	1.15 (0.76–1.74)	.490
No	2002/5564 (47.4)	1.00 (reference)		1.00 (reference)	
20–39 y					
Yes	73/136 (62.8)	1.61 (1.12–2.32)	.011	1.57 (1.00–2.45)	.049
No	2425/5840 (51.1)	1.00 (reference)		1.00 (reference)	
40–59 y					
Yes	75/179 (50.5)	1.52 (0.95–2.41)	.077	1.32 (0.76–2.28)	.315
No	1613/5652 (40.2)	1.00 (reference)		1.00 (reference)	

[a]Weighted percentage was calculated using National Health and Nutrition Examination Survey design parameters.

[b]$P \leq .05$ indicates statistical significance.