

ORIGINAL RESEARCH

Association between Housing Instability and Severity of Psoriasis and Psoriatic Arthritis: A Cross-Sectional Study

Jalal Maghfour, MS¹, Frances Gill, BS, MPH¹, Justin Olson, BS¹, Andrea Murina, MD¹

¹Tulane University School of Medicine, New Orleans, LA

ABSTRACT

Introduction: Psoriasis and psoriatic arthritis are interrelated chronic inflammatory disorders that can be exacerbated by stress. The impact of housing instability on severity of psoriasis and psoriatic arthritis (PsA) has not been examined.

Methods: An eight-question survey was administered to 59 psoriasis participants, with and without PsA, to assess participants' housing status. The severity of psoriasis and PsA diseases was assessed using Body Surface Area (BSA) and clinical Disease Activity Index of Psoriatic Arthritis (cDAPSA) measurements respectively. A multivariate linear regression model was used to predict BSA and cDAPSA scores differences among participants.

Results: Housing unstable psoriasis participants had a higher average BSA than housing stable psoriasis participants (14% vs 7.1%). Using a regression equation model, housing status and smoking were significant predictors ($p < 0.04$). Housing unstable PsA participants [13 (33%)] were also found to have a higher average cDAPSA than housing-stable PsA participants [26 (66%)] (31 vs 16.7). Housing instability was the only variable to predict differences in cDAPSA scores among PsA participants ($p = 0.021$). Housing unstable participants had a higher BSA even on biologics (21.3% vs 1.65%; $P < 0.001$), oral therapy (14.6% vs 4%; $P < 0.001$) and phototherapy (10% vs 4%; $P = 0.031$).

Discussion: This study demonstrated that housing instability might be associated with an increased severity of psoriasis and PsA and may also affect treatment selection.

Conclusion: Housing instability is a psychosocial stressor that could be an important element to consider in the management of psoriasis patients.

INTRODUCTION

Psychological stress has been shown to trigger and exacerbate a number of dermatological conditions, including psoriasis, which is thought to be due to an upregulation of inflammatory cytokines.¹⁻³ Many key stress mediators are produced

locally within the skin, and environmental stressors can impair the barrier function of the skin. A cross-sectional study showed that health related quality of life in psoriasis patients was significantly associated with their demographic and socioeconomic characteristics, including employment status.² Stress has been shown to be a precipitating factor in patients with psoriasis. Literature review demonstrated that 31-88%

July 2020 Volume 4 Issue 4

of patients report stress as not only being a precipitating trigger for their disease, but a continuous cause of exacerbation of their psoriasis.⁴

Housing instability, lacks of housing affordability, and homelessness have been shown to be one of the many factors that contribute to chronic stress among low-income individuals.⁵ Housing instability does not have a standard definition, but encompasses a number of challenges from trouble paying rent, to overcrowding and frequent moves. Housing instability was found to be a source of chronic stress and several studies linked housing instability to adverse health outcomes.⁶

In 2013, over one in four renters paid more than half their income in rent. This number has risen by more than 3 million households since 2000 and is projected to continue to increase over the next five to ten years. Non-white households are projected to endure the bulk of this change, as are renters over the age of 65.⁵ Rates of rent burden are particularly demanding in high-cost metro areas such as New Orleans, Louisiana, where our study was conducted. Due to high cost living, doubling up has been increasing. This is a phenomenon that results from economic hardships which forces individuals to live with others. It has been demonstrated that doubling up is not only a risk factor for homelessness but it can also be detrimental to the health of affected individuals.⁶ From 2005 to 2008, the number of people doubling up increased five percent, with an increase to 11.6% from 2006 to 2009.⁶

The severity in rent burden, due to increased rent and decreased income, was shown to be a source of psychosocial stress and financial instability particularly for low-income families with children.⁷

Moreover, the link between chronic stress and negative health outcomes is well established. It was found that many individuals suffering from chronic stress are at increased risk for hypertension and diabetes even after adjusting for potential confounders.⁸

Similar studies have established that stress secondary to housing instability contributes to adverse health outcomes in the general population.⁹ Yet, little to no studies have been conducted on the impact of housing instability, as a psychosocial stressor, on chronic inflammatory dermatologic conditions such as psoriasis and psoriatic arthritis.

In this study, we investigated whether or not housing instability is associated with increased severity of psoriasis and psoriatic arthritis. Participants were asked a series of questions pertaining to homelessness, rent payment, and moving frequency. Questions were derived from a validated study based on the definition of housing instability.¹⁰

The primary hypothesis is that psoriasis and psoriatic arthritis participants with at least one element of housing instability have more severe psoriatic and psA disease as clinically assessed by a higher BSA and cDAPSA scores.

METHODS

Population Studied

We assessed housing instability among established psoriasis and psoriatic arthritis patients at a safety-net hospital in New Orleans, Louisiana. This study was approved by Tulane University Institutional Review Board (IRB). We administered an eight-question housing instability survey to all consenting participants ≥ 18 years of age, who were seen in dermatology clinic.

The survey was administered from November 2018 through June of 2019. The severity of psoriasis and psA was clinically assessed through measurement of BSA and cDAPSA scores respectively, at the time of the office visit. These assessments were performed by a board-certified dermatologist.

Measures

Patients were stratified based on sex, race as well as alcohol and cigarette use. Patients' current treatment regimen and all other medications were recorded at the time of the visit.

Housing unstable participants, who had at least two or more elements of housing instability or currently homeless, were offered a pre-prepared packet of housing and rent assistance resources available in the community.

Statistical Analysis

A multivariate linear regression analysis was performed to assess the effects of several variables, in addition to housing instability, on BSA and cDAPSA scores. The additional variables included smoking, alcohol, sex and race. For multiple linear regression models, housing instability was coded as 0 and stable housing was coded as 1. Similarly, sex was coded as 1 for male and 2 for female. Smoking, alcohol, race were coded as yes or no.

The statistical hypothesis was that housing instability is associated with increased severity of psoriasis and PsA, resulting in higher BSA and cDAPSA scores respectively. An unpaired t-test was performed to compare the average BSA between housing stable and housing unstable psoriasis participants who were on similar treatment regimen. Both analyses

were conducted using IBM SPSS Statistics 20.

RESULTS

We assessed the housing status of 59 psoriasis patients, of which 35 had concomitant psA. Among the twenty-four patients (41%) with housing instability, three (12.5%) were currently homeless; nine (15%) patients had lived in more than one place in the last year. Seven (11%) patients had moved in the last year or moved in with someone to lower household expenses. Twelve (20%) patients reported falling behind on their rent or mortgage at some point in the last year.

Among housing unstable psoriasis participants with or without PsA disease, there were 20 (83%) males, 11 (46%) were Caucasians, seven (29.2%) were African American, two (8.3%) were Hispanics. Of 24 housing unstable psoriasis participants, 12 (50%) reported tobacco use, eight (33%) reported alcohol consumption and two participants (8.3%) reported smoking and alcohol use. The remaining two participants (8.3%) did not report any alcohol or cigarettes use.

Among housing stable psoriasis participants, 11 (31.4%) reported tobacco use, 13 (37%) reported alcohol use and three (8.6%) reported using both substances. Eight participants (22.5%) did not report any alcohol or cigarettes use.

Housing unstable psoriasis participants [24 (41%)] had a higher average BSA than housing stable participants [35 (60%)] (14% vs 7.1%).

Using a significant multiple linear regression analysis, a significant regression equation

was found ($F(7,51)=2.567$, $p=0.024$); $R^2 = 0.2605$. Participants' predicted BSA was equal to $9.383 + 3.55$ (Housing Instability) + 8.44 (Smoking) + 1.40 (alcohol) + 5.5 (male sex) - 11.73 (race(B)) - 6.4 (race(H)) - 9.830 (race(W)).

As seen in table 2, both smoking and housing instability were significant predictors in accounting for BSA differences among psoriasis participants ($P < 0.04$).

Similarly, PsA participants who reported any element of housing instability [13(33%)] had a higher cDAPSA scores than housing stable PsA participants [26(66%)] (28.4 vs 16.8).

A multiple linear regression model was performed to predict participants' cDAPSA scores based on housing status, smoking, alcohol, race and sex. The regression equation was not significant $F(7,31)=1.903, p=0.103$; $R^2=0.30$.

In the cDAPSA model, housing instability was the only significant variable in accounting for the differences in cDAPSA scores among PsA participants ($p = 0.021$) (table 3). Remaining variables including smoking, alcohol and sex were not significantly associated with increased cDAPSA scores among housing unstable participants.

In terms of treatment, a total of 15 (25%) psoriasis participants were on long-term biologic (> 1 year) at the time of questionnaire. Six (25%) housing unstable psoriasis participants had a higher average BSA than housing stable participants [10 (28%)] (21.3% vs 1.65%; $P < 0.001$).

Housing unstable psoriasis participants [3(12.5%)] on oral systemic therapy (such as Apremilast or Methotrexate) had a higher

average BSA than housing stable psoriasis participants [7(20%)] (14.6% vs 5.6%; $P < 0.001$).

Housing unstable psoriasis participants [3(12.5%)] were undergoing phototherapy had a higher average BSA than housing stable participants [7(11.8%)] (10% vs 4%; $P=0.031$).

Several psoriasis patients were not undergoing any treatment related to their disease. Nine psoriasis patients with at least one element of housing instability had an average BSA of 7.5%. Among those nine patients, three patients were currently homeless with an average BSA of 12%.

Table 1. Prevalence of Housing Instability Markers Amongst Psoriasis Participants in a Dermatology Clinic

Respondent type	Patients, No.(%)
Gender = Male (%)	20 (34)
Currently homeless (%)	3 (5)
Lived in more than one place during the last year (%)	9 (15)
Moved in the last year due to cost (%)	2 (3)
Doubled up to save on household expenses	5 (8)

Table 2. Coefficients Used in Predicting Outcome of BSA among Psoriasis Participants.

Co-efficients	Estimate	Std. Error	t value	Pr (> t)
Intercept	9.383	5.907	1.589	0.1183
Housing Unstable Y	3.546	3.221	1.101	0.0376*
Smoking Y	8.437	3.593	2.348	0.0228*
Alcohol	1.394	3.83	0.412	0.682
Sex M	5.515	3.115	1.771	0.0826
Race B	-11.726	6.383	-1.837	0.072
Race H	-6.379	6.571	-0.0971	0.3362
Race W	-9.83	5.82	-1.689	0.0973

* $P < .05$

Table 3. Coefficients Used in Predicting Outcome of cDAPSA scores among Psoriatic Arthritis Participants.

Co-efficients	Estimate	Std. Error	t value	Pr (> t)
(Intercept)	16.16	12.93	1.25	0.220
Housing Unstable	20.647	8.462	2.44	0.021*
Smoking	-8.426	8.595	-0.98	0.33
Alcohol	13.374	8.327	1.606	0.12
Sex M	-7.351	8.284	-0.899	0.38
Race B	8.088	14.79	0.547	0.59
Race H	-1.202	14.64	-0.082	0.94
Race W	-4.61	13.96	-0.33	0.74

*P<.05

DISCUSSION

Psoriasis is a chronic skin disease with a complex multifactorial etiology. It is due to dysregulation of immune cells triggered by environmental and genetic factors including stress, smoking and alcohol consumption.⁸ It has been reported that cellular stress leads to formation of free radicals that promote inflammatory process, and exacerbate disease.⁹ PsA is an inflammatory musculoskeletal disease that occurs in 20-30% of patients.¹¹ Mechanical stress and trauma are known to precipitate psoriatic arthritis.

The results of this study showed that housing instability is significantly associated with increased BSA among psoriasis participants. In addition, smoking was a significant covariate in predicting differences in average BSA score among psoriasis participants. Previous reports have demonstrated the role of smoking on the increased severity of both psoriasis and psoriatic arthritis. Even though smoking was not a significant predictor for cDAPSA scores among PsA participants, studies have shown that psoriasis patients who

smoked had an earlier onset of arthritis in comparison to non-smoker groups.¹²

While cDAPSA scores were higher among housing unstable PsA participants, the difference was not significant in the linear multivariable regression model. However, housing instability was a significant variable in accounting for differences in cDAPSA scores among PsA participants (p=0.021).

The role of psychosocial factors such as socioeconomic factors including employment status on severity of psoriasis has been a focus of attention in the recent years. Although housing instability has been studied among public health researchers where it was linked to increased adverse health outcomes, studies on the impact of housing instability on inflammatory dermatologic conditions have been limited.

In this study, we also found that housing instability may impact treatment availability and selection. Participants who reported unstable housing while being on biologics, oral systemic therapies and phototherapy had a higher BSA than similarly treated patients without housing instability.

Although the mechanism is unclear, this may be due to the direct impact of housing instability, as a stressor, on achieving therapeutic benefits. Previous studies have demonstrated that psoriasis patients who have experienced psychological stress had a delayed clearance of their psoriasis on PUVA therapy.¹³ We did not control for adherence, as it was difficult to do in this setting. Adherence can be an important element in assessing treatment efficacy and may account for the differences seen among patients undergoing various treatments. For instance, phototherapy is an effective way to treat psoriasis but requires reliable

transportation in order to attend 2-3 phototherapy visits per week.

A home address delivery is required for psoriasis and PsA patients that require refrigeration, such as the biologic drugs. Most patients with housing instability had an average BSA considered to be in the severe range (>10% BSA) and are more likely to require advance therapies. Our clinic offers an outpatient pharmacy that allows single dose pickup, so that housing unstable patients can self-inject as needed or plan regular nursing visits to inject their biologic drugs.

Limitations of the study include cross sectional study by design, small number of surveyed patients. The study sampled patients from a safety-net dermatology clinic, and most patients had some form of health coverage. The health insurance status of patients seen at University Medical Center is 60% Medicaid/Medicare and 20% uninsured. The same assessment performed at a free clinic may yield different results.

CONCLUSION

In summary, assessing for housing instability is important for dermatologists to consider because it may be associated with more severe psoriatic disease and can also limit treatment selection. Dermatologists can consider linking their patients to social support services in order to reduce stressors due to housing instability, which may also improve overall clinical outcomes.

Conflict of Interest Disclosures: Dr. Murina is a speaker for Abbvie, Celgene, Janssen and Novartis.

Funding: None

Corresponding Author:

Jalal Maghfou, MS
1430 Tulane Avenue, #8031
New Orleans, LA 70112
Email: jmaghfou@tulane.edu

References:

1. Alexopoulos, A., & Chrousos, G. P. (2016). Stress-related skin disorders. *Rev Endocr Metab Disord*, 17(3), 295-304. doi:10.1007/s11154-016-9367-y
2. Chen, Y., & Lyga, J. (2014). Brain-skin connection: stress, inflammation and skin aging. *Inflamm Allergy Drug Targets*, 13(3), 177-190. doi:10.2174/1871528113666140522104422
3. Tampa, M., Sarbu, M. I., Mitran, M. I., Mitran, C. I., Matei, C., & Georgescu, S. R. (2018). The Pathophysiological Mechanisms and the Quest for Biomarkers in Psoriasis, a Stress-Related Skin Disease. *Dis Markers*, 2018, 5823684. doi:10.1155/2018/5823684
4. Rousset, L., & Halioua, B. (2018). Stress and psoriasis. *Int J Dermatol*, 57(10), 1165-1172. doi:10.1111/ijd.14032
5. Charette, A. C. H. (2015, September 21). Projecting Trends in Severely Cost-Burdened Renters: 2015–2025 | Joint Center for Housing Studies of Harvard University. Retrieved March 3, 2020, from <https://www.jchs.harvard.edu/research-areas/reports/projecting-trends-severely-cost-burdened-renters-2015%E2%80%932025>
6. Frederick, T. J., Chwalek, M., Hughes, J., Karabanow, J., & Kidd, S. (2014). How Stable is Stable? Defining and Measuring Housing Stability. *Journal of Community Psychology*, 42(8), 964-979. doi:10.1002/jcop.21665
7. Bartfeld, Judi and Rachel Dunifon (2005). "State-level Predictors of Food Insecurity among Households with Children" *Journal of Policy Analysis and Management* 25(4): 921-942 and Newman, Sandra J. and C. Scott Holupka (2015). "Housing Affordability and Child Well-Being" *Housing Policy Debate* 25(1):116-151
8. Kushel, M. B., Gupta, R., Gee, L., & Haas, J. S. (2006). Housing instability and food insecurity as barriers to health care among low-income Americans. *J Gen Intern Med*, 21(1), 71-77. doi:10.1111/j.1525-1497.2005.00278.x
9. Hernández, D., Phillips, D., & Siegel, E. L. (2016). Exploring the Housing and Household Energy Pathways to Stress: A Mixed Methods Study. *Int J Environ Res Public Health*, 13(9). doi:10.3390/ijerph13090916

July 2020 Volume 4 Issue 4

10. Burgard, S. A., Seefeldt, K. S., & Zelner, S. (2012). Housing instability and health: findings from the Michigan Recession and Recovery Study. *Soc Sci Med*, 75(12), 2215-2224. doi:10.1016/j.socscimed.2012.08.020
11. Vijayaraghavan, M., Kushel, M. B., Vittinghoff, E., Kertesz, S., Jacobs, D., Lewis, C. E., Bibbins-Domingo, K. (2013). Housing instability and incident hypertension in the CARDIA cohort. *J Urban Health*, 90(3), 427-441. doi:10.1007/s11524-012-9729-z
12. Naldi, L. (2016). Psoriasis and smoking: links and risks. *Psoriasis (Auckl)*, 6, 65-71. doi:10.2147/ptt.S85189
13. Vardy, D., Besser, A., Amir, M., Gesthalter, B., Biton, A., & Buskila, D. (2002). Experiences of stigmatization play a role in mediating the impact of disease severity on quality of life in psoriasis patients. *Br J Dermatol*, 147(4), 736-742. doi:10.1046/j.1365-2133.2002.04899.