Predicting Psoriasis Area and Severity Index from Physician Global Assessment and Body Surface Area in the Real-World Dermatology Setting

Amanda G Althoff | Lawrence Rasouliyan
OMNY Health | Atlanta, GA, United States

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BACKGROUND

- Physician Global Assessment (PGA) and Body Surface Area (BSA) are practical tools used in routine clinical practice to assess psoriasis. However, both have limited value as stand-alone outcome measures as they do not fully capture all aspects of the disease.[1]
- The Psoriasis Area and Severity Index (PASI) is a composite tool that looks at both disease severity and body surface involvement.[2] However, it is considered impractical to use in routine clinical practice due to its complexity and time-intensive nature.[1]
- Studies have shown correlation between the PASI and PGA x BSA product.[1]
- Developing an equation to predict the PASI outcome using a combination of PGA and BSA would allow for more effective and efficient measurement of psoriasis disease activity in the real-world setting.

OBJECTIVES

- The objective of this research was to predict the PASI for patients in the real-world dermatology setting using only PGA and BSA.

METHODS

- Patients from 6 specialty dermatology networks within the OMNY Health real-world data platform with a diagnosis for psoriasis (ICD-10 L40*) and PASI, PGA, and BSA scores recorded on the same day from 2017 to 2023 were selected.
- BSA, PGA, and/or their product (PGA x BSA) were considered as candidate predictor variables.
- The distribution of PASI scores in relation to the candidate predictor variables was examined, and multiple linear regression models were employed where the logarithm of the PASI score (with 0.5 continuity correction) was modeled as the outcome.
- Combinations of each candidate predictor variables were attempted while employing leave-one-out cross validation.
- Model performance was assessed by root mean squared error (RMSE) and adjusted R squared values.

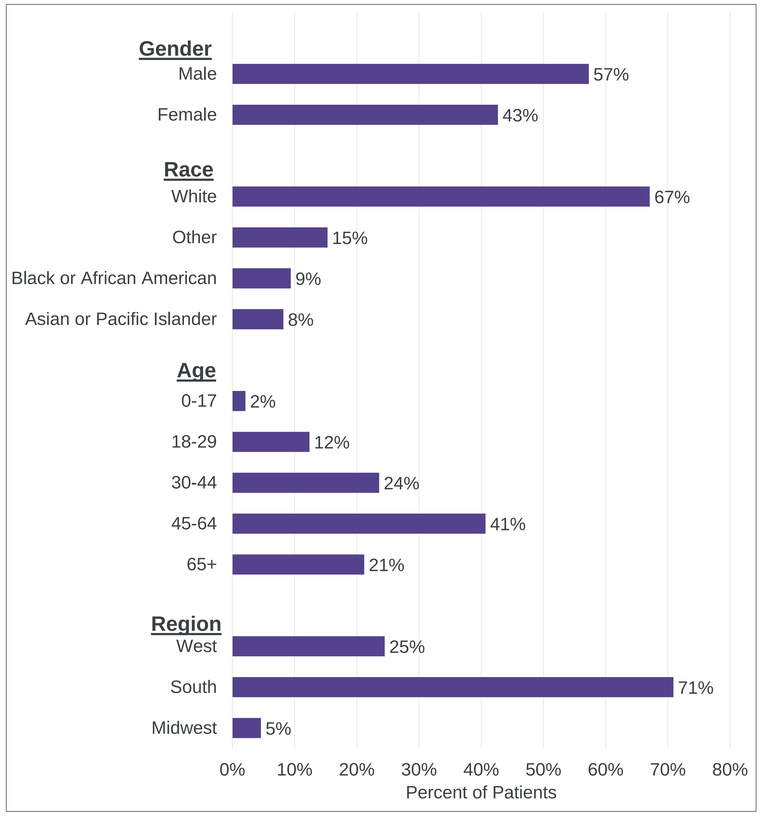
REFERENCES

1. Walsh JA, Jones H, Mallbris L, Duffin KC, Krueger GG, Clegg DO, Szumski A. The Physician Global Assessment and Body Surface Area composite tool is a simple alternative to the Psoriasis Area and Severity Index for assessment of psoriasis: post hoc analysis from PRISTINE and PRESTA. Psoriasis (Auckl). 2018 Oct 8;8:65-74.
2. Duffin KC, Papp KA, Bagel J, Levi E, Chen R, Gottlieb AB. Evaluation of the Physician Global Assessment and Body Surface Area Composite Tool for Assessing Psoriasis Response to Apremilast Therapy: Results from ESTEEM 1 and ESTEEM 2. J Drugs Dermatol. 2017 Feb 1;16(2):147-153.

RESULTS

- Of the 298,326 psoriasis patients, 339 patients with 660 observations were included.
- Demographic characteristics of the patient population are summarized in Figure 1.

Figure 1: Demographic Characteristics of Patient Population



Note: Percentages were based on non-missing data; 25% of patients had known racial categories.

- The model performance of each combination of the candidate predictor variables is summarized in Table 1.
- The best performing model included BSA, PGA (categorical variable), and PGA x BSA (continuous variable) as predictor variables, while the worst performing model included only PGA x BSA (continuous variable).
- In the best performing model, BSA and PGA each had positive associations with the PASI outcome while PGA x BSA had a slightly negative association.

Table 1. Model Selection and Performance

Predictor Variables	RMSE	Adjusted R Squared
BSA	0.94	0.45
PGA	0.70	0.70
PGA + BSA	0.61	0.77
PGA x BSA	0.94	0.45
PGA + BSA + PGA x BSA	0.59	0.78

RMSE = root mean squared error.

- The best performing model had a RMSE of 0.59 and adjusted R squared value of 0.78.
- The equation depicting the best performing model selected to predict the PASI outcome is presented in Figure 2.

Figure 2. Predicted PASI Outcome Equation

$$PASI = -0.5 + \exp[-0.613 + 0.0455(BSA) + 1.129\ (PGA{=}1) + 1.759\ (PGA{=}2) + 2.519\ (PGA{=}3) + 3.705\ (PGA{=}4) - 0.0102\ (PGA{\times}BSA)]$$

DISCUSSIONS AND CONCLUSIONS

- The PASI is a time-intensive tool, which may prevent its routine implementation in the real-world dermatology setting.
- Because PGA and BSA are more likely to be collected regularly, an equation to predict PASI using PGA and BSA may offer an opportunity to understand psoriasis disease activity in routine clinical practice.
- Additional analyses accounting for patient characteristics may be beneficial to develop a higher performing algorithm.

CONTACT INFORMATION

Amanda Althoff | Senior Data Scientist | **OMNY Health** |

Email: amanda@omnyhealth.com | **Website:** www.omnyhealth.com

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