

## Predictive Factors of Poor Health Literacy in Orthopedics: A Multivariate Analysis

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**Introduction/Purpose:** Evidence shows that patients with limited health literacy (HL) are susceptible to inferior outcomes. By identifying characteristics associated with these poor traits, healthcare policy aimed at improving HL could be more efficiently implemented. The Literacy in Musculoskeletal Problems (LiMP) survey is a validated nine-item orthopedic HL questionnaire. The purpose of this study was to assess predictors of orthopedic HL using the LiMP survey through a large patient sample at an urban academic medical center.

**Methods:** 245 patients presenting with chief complaints previously untreated were approached in the clinic of one foot and ankle surgeon and three hand and wrist surgeons. Inclusion criteria required age greater than 18 and English proficiency. Enrolled patients completed the LiMP questionnaire in addition to a demographic form. Clinical history was retrospectively reviewed. The following information was collected: age, gender, BMI, duration of symptoms, number of children living at home, past surgical history, visit type (trauma/non-trauma), smoking status (current/non-smoker), diabetes status (yes/no), history of psychiatric disorder (yes/no), race (white/non-white), education level (more/less than bachelor's degree), and insurance type (public/private). Pearson correlation coefficients (PCC) were calculated between LiMP score, demographic data, and medical history data. Based on results of the correlational analysis, variables that were significantly correlated with LiMP score were entered into multivariate regression analysis to assess their effect on HL. A p value less than 0.05 was considered significant.

**Results:** 231 patients (131 hand/wrist, 100 foot/ankle) were enrolled and fully completed questionnaires. Mean age was 45.6 ( $\pm 16.8$ , range 18 – 82), and mean score on the LiMP was 5.40 ( $\pm 1.8$ , range 1 – 9). The following variables significantly correlated with LiMP score: race (PCC=0.23), age (PCC=0.16), education (PCC=0.22), past surgical history (SCC=0.18), and insurance type (SCC=-0.16).

Multivariate regression analysis was conducted with LiMP score as the dependent variable, and the factors race, age, education, past surgical history, and insurance type as the independent variables. Results of this analysis can be found in Table I. The final model significantly accounted for 15.0% of variation in LiMP score. Coefficients that significantly contributed to the final model were those of past surgical history, race, and education level.

**Conclusion:** Race, past surgical history, and education level all contribute significantly to a patient's HL. When controlling for age and past surgical history, the latter of which was significantly associated with elevated HL, race significantly increased ability to predict LiMP score. Similarly, the inclusion of education level also significantly added to our model's ability to predict LiMP score. In conclusion, our results indicate that when designing healthcare policy aimed at improving HL, efforts should be focused on lower educated persons and minorities regardless of past experience with medical care, and that age and gender are by no means markers for HL.

**Table 1.** Summary of Multivariate Regression Analysis with LiMP Score as the Dependent Variable

Independent Variables	$\beta$ Coefficient	R <sup>2</sup>
		0.15*
Race	0.78*	
Age	-0.01	
Education	0.86*	
Past Surgical Hx	0.67*	
Insurance Type	-0.73	
<p>Legend: * indicates p&lt;0.05 for the entire model or associated coefficient.. For the variables insurance type, past surgical hx, race, and education, coefficients are representative of the following states: private insurance, does have past surgical hx, white, and bachelor's degree or higher.</p>		