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Reliability of Sun Sensitivity Categorization Algorithm Based on Participant-Identified Fitzpatrick Skin Types

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Abstract

For over 40 years, the Fitzpatrick skin classification scale has been the standard approach for categorizing skin type (Types I - VI). However, the sun sensitivity of individuals with darker skin types (Fitzpatrick types V and VI) may be underestimated. Individuals with darker skin experience greater disparities in skin cancer burden, including higher mortality rates, due to individuals being diagnosed at later stages when the disease is more advanced and potentially deadly. Our prior work migrated a dermatologist-assigned classification system (FST-E) to a culturally-neutral self-report measure of sun sensitivity. Reflectance photospectroscopy was used to objectively compare melanin content with FST-E in 85 participants. We show the three question FST-E instrument has good internal consistency (Cronbach's alpha = 0.74, n=376) and melanin could be reliably measured (alpha=0.99, n=85). Using melanin and survey responses, the FST-E algorithm predicted Fitzpatrick skin type with 92% accuracy. The first two questions were highly reliable and produced scores that permitted tailoring of the third question to fine tune sun sensitivity estimates. The self-administered FST-E is an easy, short instrument that can be implemented in a wide variety of settings. The instrument uses culturally-neutral wording to describe skin reaction to ultraviolet light, including phrasing like "itching", "irritation", and "tenderness" that better captures the physical skin reaction across skin types rather than describing the visual changes common in lighter skin. This approach may enable better characterization of individuals' sun sensitivity and can guide tailored recommendations of sun protection behaviors that may reduce individuals' risk of skin cancer.