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Inpatient Dermatology Mortality by Skin Type: A Retrospective Cohort Study of an Inpatient Dermatology Consultation Database Evaluating Socioeconomic Factors

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Short Report

Keywords: inpatient dermatology, Fitzpatrick skin type, health equity, social determinants of health, mortality, area deprivation index

Posted Date: October 30th, 2026

DOI: https://doi.org/10.21203/rs.3.rs-11355923/v1

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Additional Declarations: No competing interests reported.

Abstract

Inpatient dermatology consultations play a vital role in the care of hospitalized patients, yet the differences in mortality outcomes by skin type and their relationship to socioeconomic factors remain poorly characterized. We conducted a retrospective cohort study, using a prospectively maintained inpatient dermatology consultation database at a large, urban, academic hospital, including adult patients evaluated from 2021 to 2025. Patients were stratified by Fitzpatrick skin type (FST IV-VI vs. FST I-III), and neighborhood socioeconomic disadvantage was measured using the area deprivation index (ADI). Among 768 patients (1139 total consultations), diagnostic distribution, or the spectrum of conditions for which dermatology was consulted, differed by skin type, with FST IV-VI patients having higher odds of inflammatory diagnosis and lower odds of infectious diagnosis. In-hospital mortality was higher among FST IV-VI patients (13.1% vs. 5.0%) and remained significant after adjustment for intensive care unit (ICU) stay, insurance, language, and ADI (OR 3.46; 95% CI 1.70-7.00; $p < 0.001$). Overall mortality, time to death, and ICU utilization did not differ by skin type. FST IV-VI patients more often resided in high-deprivation neighborhoods (OR 3.79; 95% CI, 2.82–5.09; $p < 0.001$), but ADI was not associated with any mortality outcome. Mortality disparities by skin type were confined to in-hospital events and were not explained by illness severity or neighborhood deprivation, suggesting a possible role for differences in disease presentation, diagnostic approach, or hospital-level systemic factors.

Introduction

Dermatology consultations are critical to the management and outcomes of hospitalized patients, yet mortality differences by skin type and their relationship to socioeconomic factors are poorly characterized. Fitzpatrick skin type (FST) has been linked with disparities in disease presentation and outcomes [1]. Area deprivation index (ADI), a measure of neighborhood-level socioeconomic disadvantage, has been associated with dermatologic disease severity [2,3].

Methods

We retrospectively analyzed an inpatient dermatology consultation database at a large, urban, academic quaternary care hospital to characterize associations between FST, clinical outcomes, and socioeconomic factors (insurance, language, ADI); full methods provided in Online Resource 2. Adult patients evaluated by the inpatient dermatology service from 2021-2025 were included. The primary outcome was in-hospital mortality by FST; secondary outcomes included overall mortality, time to death, diagnostic distribution, and ADI. Diagnoses were grouped into 17 categories (Online Resource 1). Patients were stratified by FST (Cohort 1: FST IV–VI vs Cohort 2: FST I-III) consistent with prior studies using this grouping and to maintain statistical power. Patients with unknown FST (n=31) were excluded from analyses comparing outcomes by skin type. Comparisons used chi-square or Fisher's exact test, with odds ratios (ORs) and 95% confidence intervals (CIs). Time-to-event analyses used Kaplan-Meier and Cox proportional hazards models. Multivariate models adjusted for Intensive Care Unit (ICU) status, insurance, language, and ADI.

Results

Our cohort (n = 768) was racially and socioeconomically diverse (median age 58.5 years (IQR 44.4–69.8)), with widely spanning ADI (median 45, IQR 26–63) (Table 1). Cohort 1 comprised 213 (27.7%) patients, and Cohort 2 comprised 524 (68.2%).

Table 1
Demographic Characteristics of Patients Receiving Inpatient Dermatology Consultations (n = 768)

Demographics	**Total Patients (n = 768)**
Sex (%)	
Male	340 (44.3)
Female	428 (55.7)
Race/Ethnicity (%)	
White	438 (57.0)
Black or African American	179 (23.3)
Hispanic	83 (10.8)
None/Declined to respond	34 (4.4)
Asian[a]	32 (4.2)
American Indian or Alaska Native	2 (0.3)
Primary Language (%)	
English	710 (92.4)
Spanish	39 (5.1)
Chinese	4 (0.5)
Other	15 (2.0)
Insurance (%)	
Private	244 (31.8)
Medicare	332 (43.2)
Medicaid	130 (16.9)
Medicare/Medicaid	22 (2.9)
None	38 (4.9)
Military Services	2 (0.3)
Fitzpatrick Skin type (%)	
I-III	524 (68.2)
IV-VI	213 (27.7)

[a]Includes Chinese/Filipino/Indian/Korean/Pacific Islander; [b]ADI, Area Deprivation Index; [c]NA, Not available

Demographics	Total Patients (n = 768)
NA	31 (4.0)
ADI[b]	
1–10	51 (6.6)
11–20	96 (12.5)
21–30	84 (10.9)
31–40	109 (14.2)
41–50	104 (13.5)
51–60	101 (13.2)
61–70	84 (10.9)
71–80	60 (7.8)
81–90	43 (5.6)
91–100	24 (3.1)
NA[c]	12 (1.6)

[a]Includes Chinese/Filipino/Indian/Korean/Pacific Islander; [b]ADI, Area Deprivation Index; [c]NA, Not available

Among 1139 dermatology consultations, diagnostic distributions differed by skin type (χ^2=31.2, p = 0.013). Cohort 1 had lower odds of infectious (OR 0.62; 95% CI, 0.40–0.94; p = 0.02) and higher odds of inflammatory diagnoses (OR 1.34, 95% CI 1.03–1.73; p = 0.02). Diagnoses were similar between all consultations and those associated with in-hospital death (χ^2 = 23.64, p = 0.098) (Table 2).

Table 2
Diagnostic Distribution of Inpatient Dermatology Consultations (n = 1139)

Diagnostic Categories	Total consultations (n = 1139)	Consultations associated with in-hospital mortality (n = 53)
Inflammatory (%)	453 (39.8)	14 (26.4)
Infectious (%)	141 (12.4)	5 (9.4)
Drug (%)	123 (10.8)	6 (11.3)
TBSE[a] and benign skin findings (%)	82 (7.2)	6 (11.3)
Malignancy (%)	73 (6.4)	10 (18.9)
Edema (%)	66 (5.8)	2 (3.8)
Autoimmune (%)	62 (5.4)	3 (5.7)
Ulcers NOS (%)	23 (2.0)	1 (1.9)
Trauma (%)	21 (1.8)	1 (1.9)
Vascular (%)	20 (1.8)	1 (1.9)
Urticaria (%)	16 (1.4)	2 (3.8)
Pruritus (%)	14 (1.2)	1 (1.9)
Environmental (%)	11 (1.0)	0 (0)
Erythroderma NOS[b] (%)	11 (1.0)	1 (1.9)
Morbilliform NOS[b] (%)	10 (0.9)	0 (0)
Nutritional (%)	9 (0.8)	0 (0)
Exogenous (%)	4 (0.4)	0 (0)

[a]TBSE, total body skin exam; [b]NOS, not otherwise specified

Overall 185 of 768 patients (24.1%) died, including 53 (6.9%) in-hospital deaths. In-hospital mortality was higher among Cohort 1 and remained significant after adjustment for ICU status, insurance, language, and ADI (28/213 [13.1%] vs. 26/524 [5.0%]; OR, 3.46; 95% CI 1.70-7.00; $p < 0.001$). Overall mortality did not differ by FST (OR 1.18; 95% CI, 0.77–1.81; $p = 0.45$). Time-to-death distributions were similar across skin types (log rank $p = 0.50$). FST was not associated with hazard of death (HR 0.97; 95% CI 0.68–1.39) or ICU utilization (OR 0.87; 95% CI 0.58–1.29; $p = 0.50$).

FST IV-VI patients were more likely to reside in neighborhoods with higher deprivation (median ADI 51–60 vs 31–40; OR 3.79; 95% CI, 2.82–5.09; $p < 0.001$). ADI was not associated with overall mortality (OR

0.96; 95% CI, 0.89–1.03), in-hospital mortality (OR 0.9; 95% CI, 0.85–1.07), or hazard of death (HR 1.01; 95% CI, 0.95–1.08).

Discussion

Mortality disparities by skin type were limited to in-hospital events and persisted after adjustment for ICU stay and socioeconomic factors. These disparities are not sufficiently explained by illness severity or neighborhood deprivation, but may reflect differences in disease presentation, diagnostic approach, healthcare access, or systemic factors within hospital systems. Limitations include single-center design, limited generalizability, and residual confounding.

Abbreviations

Fitzpatrick skin type, FST

Intensive Care Unit, ICU

Area Deprivation Index, ADI

Declarations

Funding: The authors declare that no funding or support was received during the preparation of this manuscript

Conflict of Interest: The authors declare that they have no conflict of interest.

Competing Interests: The authors declare that they have no financial or non-financial interests to disclose.

Ethics Approval: This retrospective chart review study involving human participants was in accordance with the ethical standards of the institutional and national research committee and with the 1964 Helsinki Declaration and its later amendments or comparable ethical standards. The Human Investigation Committee (IRB) of Northwestern University (#STU00212714-MOD0016) approved this study.

Consent to Participate: Written informed consent was obtained from all individual participants for inclusion in the prospectively maintained inpatient dermatology consultation database used in this study.

Author Contributions: All authors contributed to the study conception and design. Data collection, data analysis, and manuscript preparation were performed by Daniella Jaguan, Sidney Lampert, and Zoya Siddiqui. Rachel E. Lipman, Lida Zheng, and Cuong V. Nguyen reviewed and revised the manuscript. The study was supervised by Cuong V. Nguyen. Daniella Jaguan, Sidney Lampert, and Zoya Siddiqui

contributed equally to this work and share first authorship. All authors read and approved the final manuscript.

Data Availability Statement: The data analyzed in this study was obtained from an inpatient dermatology consultation database at Northwestern Memorial Hospital and are not publicly available due to patient privacy restrictions. De-identified data are available from the corresponding author upon reasonable request and with permission of the Northwestern University Institutional Review Board.

IRB approval status: Reviewed and approved by Northwestern IRB; approval #STU00212714-MOD0016

Patient Consent: Written informed consent was obtained from all participants for inclusion in the database used in this study.

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