Comparison of quality of life and illness perception among patients with acne, eczema, and psoriasis

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Abstract

Dermatologic diseases have a similar influence on quality of life (QoL) and disability as other chronic medical conditions. Although QoL has been studied in relation to acne, eczema, and psoriasis, there is little information on how patients conceptualize their diseases — the illness experience. More information about illness perception (IP) and the impact of these perceptions on QoL, will help clinicians identify and address patients' conceptions, with the potential to positively impact patients' wellbeing. We sought to examine the effect of IP on QoL and make comparisons across acne, psoriasis, and eczema among a diverse population. A cross-sectional survey-based study was completed anonymously by patients presenting to an urban university hospital-based dermatology clinic. In our final model, we showed that IP was independently associated with overall QoL. A secondary finding showed that overall QoL was significantly worse for nonwhite patients compared to white patients. Our results are based on patient survey data, without correlation with objective clinical information. Taken together, our data demonstrate a direct relationship between IP and QoL in three common dermatologic conditions in a clinic-based setting and suggest that this relationship may be influenced by group differences, such as race/ethnicity.

Keywords: acne, psoriasis, eczema, Dermatologic Life Quality Index, quality of life, illness perception, racial disparity

Introduction

Dermatologic diseases, including acne, eczema, and psoriasis, have a strong emotional and social impact on patients and have a similar influence on quality of life (QoL) and disability as other chronic medical conditions such as heart disease, arthritis, and depression [1]. Illness perception (IP), defined as the cognitive and emotional representation of an illness or health threat held by an individual, is intricately linked with health-related behaviors, such as help-seeking and treatment adherence [2]. IP has been extensively studied in a variety of chronic medical conditions and has been shown to affect objective outcomes, with a more positive IP being associated with higher engagement in rehabilitation efforts following myocardial infarction, greater self-management of diabetes, and fewer physical symptoms in rheumatoid arthritis [3]. According to the self-regulatory theory by Leventhal, individuals develop cognitive and emotional representations about their health, which in turn influence the way they regulate their healthcare-related behaviors [4]. An *illness* is the subjective experience of living with a disease and will be different for each individual — both influencing, and being influenced by, the course of the disease, as well as other social, psychological, and environmental factors [5, 6]. Although QoL has been studied in relation to acne [7-11], eczema [12, 13], and psoriasis [14-17] there is little information on how patients conceptualize their diseases — the illness experience. Prior

research has focused more on psychological sequelae of depression and anxiety [18] and personality traits [19]. More information about IPs in common dermatologic conditions and the impact of these perceptions on QoL, will help clinicians identify and address patients' conceptions, with the potential to positively impact patients' health and wellbeing. To explore this subject, a survey-based study of IP and QoL was undertaken in an ethnically-diverse urban university hospital-based dermatology clinic.

Methods

Study Design

The study was approved by the Institutional Review Board at Weill Cornell Medicine (WCM), and analyzed data from a cross-sectional survey of patients presenting to the WCM Dermatology outpatient clinic in New York, New York from March-April 2017. All patients presenting to the clinic on a given day were sequentially offered the survey as they checked-in for their appointment; approximately 85% opted to participate. Patients with a self-reported diagnosis of acne, psoriasis, or eczema were administered the survey prior to their visit with their physician, thus excluding patients that were given a new diagnosis on that day. Demographics (age, gender, race/ethnicity), dermatologic diagnosis, time since diagnosis, number of treatments utilized, illness severity, IP, and QoL were assessed. The primary objectives of this study were to analyze the effect of self-reported measures of IP on self-reported QoL and compare IP and QoL across three common dermatologic diagnoses.

Severity

Patients reported illness severity on a scale of 1 (very mild) to 10 (severe). They reported time since diagnosis (in years) and total number of treatments utilized.

Quality of Life

Impact on QoL was measured using the Dermatologic Life Quality Index (DLQI), a questionnaire developed based on interviews of patients with various dermatologic conditions. Questionnaire design and validation is detailed by Finlay et al. [20]; its utilization has increased in the last decade as an outcome in dermatologic research [21]. Each of the 10 items consisted of a response from 0 (not relevant/not at all) to 3 (very much). An overall score (with a maximum of 30) and subscale scores can be calculated. These included symptoms and feelings, daily activities, leisure, work and school, personal relationships, and treatment. Both overall score and subscales were analyzed. Higher scores indicate worse overall QoL.

Illness Perception

Illness perception was measured using the Brief Illness Perception Questionnaire, a nine-item scale developed to assess the cognitive and emotional representation of illness. Questionnaire design and validation has been detailed by Broadbent et al. [2]. For this study, only the first eight multiple-choice items were included and the ninth item "Please list in rank-order the three most important factors that you believe caused your illness" was omitted. Each of the eight items consisted of a response from 0 to 10. An overall score was calculated (with a maximum score of 80), along with individual item scores for consequences, timeline, personal control, treatment control, identity, concern, coherence, and emotional response. Higher scores on individual items and overall score indicate a more threatening view of the illness; owing to this, three items were reverse coded.

Race/Ethnicity

Race/ethnicity was self-selected by each participant. Categories included "White, " "Black or African American," "Asian or Asian American," "Hispanic or Latino," and "Other." For the purpose of statistical comparisons, patients were also grouped into two, identifying them as either "white" or "nonwhite" (including all other race/ethnicities).

Statistical Analysis

All statistical analysis was completed using IBM SPSS Statistics Version 24. Normality of the data was assessed by examining boxplots and using the Shapiro-Wilks test. Continuous variables with a normal distribution were analyzed using analysis of variance to compare between diagnosis groups. Variables that were non-normally distributed were compared using Kruskall-Wallis tests. Post-hoc analyses were made with Bonferroni adjustments.

Comparisons between racial/ethnic groups (white versus nonwhite) with normally distributed data were examined using Independent Sample t-test, whereas data not normally distributed were examined using the Mann-Whitney U test. Chi-Square tests were used to examine differences in gender or race/ethnicity between diagnosis groups. Multivariable linear regression was used to examine the independent effects of predictor variables of interest on QoL.

Results

Population

The study included 132 individuals: 61 patients with acne, 24 patients with psoriasis, and 47 patients with eczema (**Table 1**). The entire study cohort included 45 males and 87 females with a mean age of 40 years (range, 16-88 years).

Demographic characteristics

One-way ANOVA demonstrated that there was no significant difference among the three diagnosis groups with respect to time since diagnosis, number of treatments, illness severity, or IP. Patients with acne were significantly younger than patients with eczema (mean difference=-14.4, P<0.001) and psoriasis (mean difference=-19.6, P<0.001). Chi-Square tests demonstrated no significant difference in the distribution of males and females within each diagnosis group (Chi-square=5.45, P=0.065), but there was a significant difference within race/ethnicity based on diagnosis group (Chi-square=15.05, P=0.020), with white patients representing the majority of patients with psoriasis (**Table 1**).

Brief Illness Perception

There was a significant difference for items of timeline [F(2, 127)=9.952, P<0.001) and understanding [F(2, 129)=4.235, P=0.017), but not for overall IP among diagnosis groups [F(2, 129)=0.434, P=0.649]. Post-hoc analysis showed that patients with acne believed, on average, that their illness would continue for a shorter duration than patients with psoriasis (mean difference=-2.507, P<0.001) and patients with eczema (mean difference=-1.898, P=0.002). Post-hoc analysis also showed that patients with acne demonstrated better illness understanding compared to those with psoriasis (mean difference=-1.711, P=0.014), (**Table 2**).

Nonwhite patients demonstrated significantly worse overall IP compared to white patients (*t*(129)=-3.43, P<0.001). For individual items, nonwhite patients reported worse impact on their identity, more

Table 1. *Demographic and Study Variables in the 3 Diagnosis Groups.*

	Acne	Psoriasis	Eczema
N	61	24	47
Sex, N (%)			
Male	17 (27.9)	13 (54.2)	15 (31.9)
Female	44 (72.1)	11 (45.8)	32 (68.1)
Race, N (%)			
White	27 (44.3)	17 (70.8)	22 (47.8)
Black or African American	17 (27.9)	1 (4.2)	5 (10.9)
Hispanic or Latino	11 (18.0)	1 (4.2)	10 (21.3)
Asian or Asian American	6 (9.8)	5 (20.8)	9 (19.6)
Mean age, y (SD)	31.3 (11.2)	51.0 (18.2)	45.8 (18.1)
Illness Duration, y	8.8 (9.2)	9.0 (11.1)	12.4 (14.3)
Number of Treatments	4.3 (2.9)	2.9 (2.2)	4.1 (4.6)
Mean DLQI (SD)	5.6 (5.3)	7.5 (6.1)	8.3 (5.8)
Mean Illness Perception (SD)	43.1 (12.1)	45.7 (12.8)	44.1 (10.8)

Patients who completed the entirety of the survey but did not meet one of the three diagnostic criteria were also excluded from the final analysis. A total of 5 patients who omitted more than one item in a given scale of either Illness Perception or Dermatologic Quality of Life were excluded from the sample analysis. Three patients omitted a single item in Illness Perception, and for these patients that item was treated as a score of "0."

concern, and more emotional impact compared to white patients; however, they reported greater coherence of their illness than white patients. Post-hoc analysis showed differences between groups for overall IP is driven by Hispanic or Latino patients compared to white patients (mean difference=8.48, P=0.019). Hispanic or Latino patients scored significantly worse on illness consequences compared to white patients (mean difference=1.80, P=0.034). All nonwhite groups including Black or African American (mean difference=-2.55, P<0.001), Asian or Asian American (mean difference=-2.026, P=0.016), and Hispanic or Latino (mean difference=-2.712, P<0.001) scored significantly worse on concern relative to white patients, but with no significant difference among nonwhite groups (**Table 3**).

Dermatologic Life Quality Index

Dermatologic Life Quality Index scores deviated from a normal distribution, so the Kruskall-Wallis H test was used to compare medians across diagnosis groups. There was a significantly different overall DLQI score between diagnosis groups, χ^2 (2)=7.927, P=0.019. There were significant differences for subscales of Symptoms and Feelings (χ^2 (2)=10.213, P=0.006) and Daily Activities (χ^2 (2)=5.999, P=0.050), (**Table 2**).

Mann-Whitney U test showed significant differences between white and nonwhite patients on overall DLQI (U=1251.5, P<0.001) as well as on subscales of Symptoms and Feelings (U=1414.0, P<0.001), Daily Activities (U=1319.0, P<0.001), Leisure (U=1324.0, P<0.001), Work and School (U=1758.5, P=0.014), and Personal Relationships (U=1713.0, P=0.014), with nonwhite patients scoring consistently worse on all measures (**Table 3**).

Multivariable linear regression was utilized to examine cumulative effects of all variables of interest on DLQI. The final model included Dermatologic Life Quality Index as the dependent variable with fixed factors including gender, race/ethnicity, and diagnosis. Covariates included age, illness severity, and IP. We found significant main effects for race/ethnicity, diagnosis, and IP. For a diagnosis of acne compared to a diagnosis of eczema, DLQI was on average 3.26 points lower (*B*=-3.261, 95% CI=-5.247- -1.274, P<*0*.001), indicating better DLQI in the former. White patients, compared to nonwhite patients, had an average DLQI 2.261 points lower (*B*=-2.261, 95% CI=-4.058-0.464, P=0.014), indicating

Table 2. *Comparisons among patients with acne, psoriasis, eczema.*

	Acne	Psoriasis	Eczema	Significance *p*
Brief Illness Perception Mean Scores (S.D.)				
Consequences	5.4 (2.6)	5.0 (2.7)	4.8 (2.7)	.514
*Timeline**	5.7 (2.7)	8.2 (2.2)	7.6 (2.9)	*<.0001*
Personal Control	6.7 (2.4)	6.2 (2.5)	5.9 (2.3)	.254
Treatment Control	4.4 (2.3)	4.7 (2.7)	4.3 (2.3)	.853
Identity	5.0 (2.5)	5.1 (2.1)	5.8 (2.2)	.154
Concern	6.1 (2.8)	6.2 (2.9)	6.1 (2.8)	.958
*Understanding**	3.7 (2.4)	5.4 (2.6)	4.0 (2.3)	*.017*
Emotional Response	6.0 (2.8)	5.0 (2.9)	5.6 (3.1)	.382
Illness Perception	43.1 (12.1)	45.7 (12.8)	44.1 (10.8)	.649
Dermatology Life Quality Index Median Score (Interquartile Range 25th-75th %)				
*Symptoms and Feelings**	2.0 (1.0-4.0)	3.0 (1.2-4.0)	3.0 (2.0-4.0)	*.006*
*Daily activities**	0.0 (0.0-2.0)	0.5 (0.0-2.0)	2.0 (0.0-3.0)	*.050*
Leisure	0.0 (0.0-2.0)	0.0 (0,0-1.0)	1.0 (0.0-2.0)	.535
Work and School	0.0 (0.0-0.0)	0.0 (0.0-1.0)	0.0 (0.0-1.0)	.156
Personal Relationships	0.0 (0.0-1.0)	0.0 (0.0-2.0)	0.0 (0.0-2.0)	.689
Treatment	0.0 (0.0-1.0)	1.0 (0.0-1.0)	0.0 (0.0-1.0)	.057
*DLQI**	4.0 (1.0-9.5)	4.0 (2.2-13.0)	7.0 (4.0-11.0)	*.019*

higher DLQI. Finally, IP is significantly associated with DLQI, with a 0.192 point increase in DLQI for every one point increase in IP (*B*=0.192, 95% CI=0.101-0.282, P<0.001), indicating a direct relationship between a more threatening view of illness and worse DLQI (**Table 4**).

Discussion

Illness Perception and Quality of Life

This study examined IP and its effect on QoL (measured by DLQI as a surrogate) among three dermatologic conditions, acne, psoriasis, and eczema, which were chosen owing to their relative prevalence in dermatologic practice. We found significant differences in IP and overall DLQI among patients with these three diagnoses. Although IP overall score was not significantly different among the three groups, acne patients had a more favorable view of their disease timeline and reported greater understanding of their condition. These findings are consistent with clinical practice, as most patients with acne have shorter, more predictable courses, whereas patients with psoriasis and eczema typically have more chronic and fluctuating courses. Acne patients may report greater understanding of their disease given its relative prevalence or its presence in the popular media and press [22]. Overall DLQI differed significantly among diagnosis groups, with acne patients demonstrating better DLQI, primarily related to less impairment in daily activities, and symptoms and feelings, compared to patients with psoriasis or eczema. These findings are supported by the literature, in which patients with eczema and psoriasis had similar levels of DLQI disturbances, which were worse than in patients with acne [23, 24].

In our final model, we showed that IP was independently associated with overall DLQI, even after controlling for other variables, a finding supported by the literature. For example, in individuals with atopic dermatitis, illness beliefs predicted symptoms of depression and upset [4]. In a study by Fortune et al., the majority of patients with psoriasis reported that their illness had major consequences on their lives and affected their self-perception [5]. Scharloo et al. found that in patients with psoriasis, strong illness identity, passive coping, belief in a long illness duration, and belief in strong consequences were associated with worse measures of functioning [6]. Cognitive and emotional representations of illness are also associated with subjective health complaints in patients with psoriasis [25]. One proposed theory posits that a process of *cognitive sensitization* leads to objective changes in a patient's experience of illness through cognitive bias (such as increased attention to, or

Table 3. *Comparisons between White patients versus Nonwhite patients.*

	White	Nonwhite	Significance *p*	Mean Difference (S.E.)
Brief Illness Perception Mean Scores (S.D.)				
*Consequences**	*4.2 (2.3)*	*5.9 (2.7)*	*<0.001*	*-1.6 (0.45)*
Timeline	6.8 (3.1)	6.8 (2.8)	0.979	-0.01 (0.51)
Personal Control	6.2 (2.3)	6.4 (2.6)	0.587	-0.23 (0.43)
Treatment Control	4.2 (2.2)	4.6 (2.5)	0.393	-0.35 (0.41)
*Identity**	4.6 (2.3)	5.9 (2.2)	*<0.001*	-1.3 (0.41)
*Concern**	4.9 (2.5)	7.3 (2.5)	*<0.001*	-2.4 (0.45)
*Coherence**	4.8 (2.5)	3.4 (2.3)	*0.002*	1.3 (0.42)
*Emotional Response**	4.5 (2.7)	6.8 (2.7)	*<0.001*	-2.2 (0.48)
*Illness Perception**	40.5 (11.6)	47.4 (11.1)	*<0.001*	-6.8 (1.9)
Dermatology Life Quality Index Median Score (Interquartile Range 25th-75th %)				
*Symptoms and Feelings**	2.0 (1.0-3.2)	4.0 (2.0-4.0)	*<0.001*	-------
*Daily activities**	0.0 (0.0-1.0)	1.0 (0.0-3.5)	*<0.001*	-------
*Leisure**	0.0 (0.0-1.0)	2.0 (0.0-3.0)	*<0.001*	-------
*Work and School**	0.0 (0.0-0.0)	0.0 (0.0-1.0)	*0.014*	-------
*Personal Relationships**	0.0 (0.0-0.0)	0.0 (0.0-2.0)	*0.014*	-------
Treatment	0.0 (0.0-1.0)	0.0 (0.0-1.0)	0.221	-------
*DLQI**	3.0 (1.8-7.0)	8.0 (4.0-12.0	*<0.001*	-------

worrying about, negative aspects of their health or condition), [25].

Race/ethnicity and IP and QoL

A secondary, but important finding in our study, was the differences in both IP and DLQI between white and nonwhite patients. Nonwhite patients had worse overall IP compared to white patients, with differences in IP subscales of identity, concern, coherence, and emotional response. Overall DLQI was also significantly worse for nonwhite patients, with additional differences in subscales of symptoms and feelings, daily activities, leisure, work and school, and personal relationships. Race/ethnicity remained a significant predictor of DLQI even after controlling for gender, diagnosis, age, severity, and IP. These findings are consistent with previous studies. For example, Callender et al. found that nonwhite women had more misconceptions about acne than white women [26]. Rendon et al. found that nonwhite patients expected more immediate improvement of their acne than did white patients [27]. Gorelick et al. studied acne-related QoL in females of different races and ethnicities and found that white patients experienced less negative impact on social functioning than non-white patients [28]. Kerr et al. found that African American patients reported significantly worse psoriasis-related QoL compared to Caucasians and also reported greater psychological impact of their condition [29].

Differences among our white versus. nonwhite populations could be attributed to a number of factors, including healthcare disparities, clinical disease characteristics that vary by race/ethnicity, or physician-related factors, that together may influence health beliefs and QoL. Access to, and setting of, dermatologic care differ across racial/ethnic groups [34, 35]. Even after controlling for socioeconomic status, ethnic minorities experience inequality in insurance coverage, access, and quality of care [30]. In addition, they are more likely to receive treatment in emergency medical settings [36]. Clinical disease characteristics may vary among different racial/ethnic groups [31]. Disease patterns among skin of color put patients at risk for being diagnosed at later stages [32] and present unique complications such as post-inflammatory hyperpigmentation [31] and scarring [33].

Comfort and attitudes among providers and patients may also influence experiences and outcomes. A US survey showed that 47% of dermatologists and dermatology residents reported that respondents felt that their medical training did not train them for diagnosing skin conditions in black patients. Nonwhite women with acne report that their race/ethnicity need more targeted therapies and prefer a healthcare professional with experience treating people of their race/ethnicity [26].

Table 4. *Multivariable Linear Regression Predicting Dermatologic Life Quality Index.*

Variable	β	Standard Error	*t*	Significance	95% CI (Lower)	95% CI (Upper)
Intercept	1.216	2.423	0.502	0.617	-3.581	6.014
Gender						
Male	0.425	0.929	0.458	0.648	-1.413	2.264
Female	0[r]	--	--	--	--	--
*Race/Ethnicity**						
White	-2.261	0.907	-2.492	0.014	-4.058	-0.464
Nonwhite	0[r]	--	--	--	--	--
*Diagnosis**						
Acne	-3.261	1.003	-3.250	0.001	-5.247	-1.274
Psoriasis	-0.420	1.240	-0.339	0.735	-2.874	2.035
Eczema	0[r]	--	--	--	--	--
Age	-0.040	0.028	-1.447	0.150	-0.095	0.15
Severity	0.301	0.226	1.328	0.187	-0.148	0.749
*Illness Perception**	0.192	0.046	4.196	>0.0001	0.101	0.282

[r] Indicates that this group is the reference for the other comparison variable

Conclusion

Limitations

Our results are based on patient survey data, without correlation with objective clinical information, such as disease severity. These methods were chosen for the purpose of this initial project to maximize confidentiality and patient participation. Our study was not designed to examine racial and ethnic disparities; factors that could provide explanatory support for our findings, such as differences in the race/ethnicity of the providers, patient insurance status, and socioeconomic status, were not collected. We simplified analyses by grouping patients into racial/ethnic groups of white and nonwhite because this study was not powered to detect differences between individual racial/ethnic minorities.

Implications and future directions

Taken together, our data demonstrate a direct relationship between IP and QoL in three common dermatologic conditions in a clinic-based setting and suggest that this relationship may be influenced by group differences, such as race/ethnicity. To the best of our knowledge, our study is the first to assess this association in these specific conditions in a diverse clinical setting, while using these or similar structured measurement tools. Our results suggest that physicians should make an effort to understand their patients' ideas and attitudes about their illnesses and their effect on quality of life. They also should be aware of how differences such as race/ethnicity may moderate IP and QoL. Future studies could include expanding the study to a larger geographically diverse population, with collection of additional data, including objective ratings of disease severity, socioeconomic factors, and clinician-related information (such as clinician race/ethnicity, and comfort level in assessing and addressing illness beliefs). Development of a tool for providers to easily and efficiently better identify inaccurate or distorted illness perceptions in the clinic setting could enhance patient-centered care, with potential impact on wellbeing and outcome. Efforts to increase education among dermatologists about the management of patients from different racial, ethnic, and socioeconomic background, with attention to how these factors influence illness perception and course of illness, may improve care and increase satisfaction amongst both patients and clinicians.

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Potential conflicts of interest

The authors declare no conflicts of interests.

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