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Mental health status is associated with discordance between patient and physician psoriasis severity ratings: a repeated cross-sectional study

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Key points

Question

Is mental health associated with discordance between patient and physician assessments of psoriasis severity?

Findings

Analysis of repeated cross-sectional data from a tertiary psoriasis service in central London found discordance in patient and physician psoriasis severity ratings at 39% of appointments, with 26% of patients underestimating their psoriasis severity, and 13% of patients overestimating their psoriasis severity, compared to physician ratings. Depression and anxiety were associated with increased likelihood of patients overestimating their psoriasis severity compared to their physicians (relative risk ratio [95% C. I.] = 2.7 [1.6, 4.5] and 2.1 [1.3, 3.3] for depression and anxiety, respectively).

Meaning

While patient assessments of disease severity remain vital for informing appropriate treatment decisions, these data indicate that recognition of anxiety and depression among individuals with psoriasis is important for their interpretation.

Abstract

Importance The emerging paradigm of 'treat-to-target' in psoriasis requires accurate monitoring of treatment response. The commonly used physician global assessment does not capture the patient's perception of their disease. Patient assessments facilitate shared decision-making and foster patient-centred care however recent research demonstrates a discordance between patient and physician-reported psoriasis severity. Understanding the factors underlying this discordance may improve treatment satisfaction and disease outcomes.

Objective Given the high prevalence of mental health disorders among individuals with psoriasis, we aimed to identify the impact of anxiety and depression on discordance between patient- and physician-reported measures of psoriasis severity.

Design Repeated cross-sectional analysis of real-world longitudinal data.

Setting A large specialist psoriasis service serving London and Southeast England.

Participants Patients attending the psoriasis service between May 2016 and November 2018.

Outcome(s), Measure(s) Psoriasis severity was assessed with identical five-point physician and patient global assessment scales (clear/nearly clear, mild, moderate, severe, very severe). Each individual completed validated self-report screens for depression (PHQ-9) and anxiety (GAD-7).

Results Longitudinal data from 502 individuals with psoriasis (1985 total observations) were available; 67% male, 79% white ethnicity, mean age 47 years [standard deviation 13], 39% concurrent psoriatic arthritis. 9% and 10% of individuals screened positive for depression and anxiety, respectively. There was discordance between physician and patient measures of disease severity in 39%; 26% of

patients rated their psoriasis as less severe and 13% as more severe than their physician. Individuals who screened positive for depression or anxiety were more likely to overestimate their psoriasis severity compared with their physician (relative risk ratio [95% C. I.] = 2.7 [1.6, 4.5] and 2.1 [1.3, 3.3], respectively). These findings were robust to adjustment for age, ethnicity, sex, body mass index, smoking, number of comorbidities, treatment modality and presence of psoriatic arthritis.

Conclusion These data suggest that discordance between patient and physician assessments of psoriasis severity is strongly associated with mental health status. Recognition of anxiety and depression in individuals with psoriasis is therefore important when interpreting patient-reported outcome measures and informing appropriate treatment decisions.

Introduction

Psoriasis is a common inflammatory skin condition affecting 2-4% of the global population[1]. It is associated with reduced quality of life and significant morbidity, including psoriatic arthritis, cardiovascular disease and obesity[2]. The management of psoriasis has been transformed by biologic drugs in recent years, such that skin clearance is now a realistic treatment goal[3]. This has opened avenues for treat-to-target approaches, whereby target disease activity end-points are used to drive the introduction and modification of treatments, with the ultimate aim of improving clinical and cost effectiveness outcomes[4]. Since the introduction and continuation of biologic treatments is informed by clinical assessments of disease severity[5–7], ensuring current measures are accurate and relevant is vital.

Physician global assessment and psoriasis area severity index (PASI) are physician-rated disease activity measures commonly used in real-world practice and clinical trials and recommended in treatment guidelines[5–7]. Although data are limited in psoriasis[8–10], past studies have identified discordance between physician and patient measures of disease severity in chronic inflammatory diseases – for example, among one third of patients with rheumatoid arthritis[11–13]. Since this discordance is associated with patient dissatisfaction, lower treatment adherence, and poorer disease outcomes[11–13], an improved understanding of the underlying factors is important.

Past evidence suggests that pain and fatigue lead patients with arthritis to overestimate their disease activity relative to their physicians[14–18]. Patient-physician discordance in psoriatic and rheumatoid arthritis has also been associated with poor mental health[14,16,17]. This latter finding warrants further investigation in psoriasis due to the high prevalence of

depression and anxiety, particularly among individuals with worse psoriasis[19,17]. A previous pilot study also showed that psychological interventions such as mindfulness-based cognitive therapy (used as an adjunct to usual psoriasis therapy) may improve self-assessed psoriasis severity[20].

This real-world repeated cross-sectional study therefore aimed to (1) determine the extent of discordance between physician- and patient-reported measures of psoriasis severity, (2) identify whether discordance is associated with adverse mental health and (3) explore the interaction between adverse mental health and psoriasis disease severity.

Methods

Study participants

All participants were recruited during dermatology outpatient visits between May 2016 and November 2018 in a large specialist psoriasis centre serving London and South East England (REC ref 11/H0802-7). Longitudinal clinical data were combined with information collected from the same patients as part of the IMPARTS screening programme (Integrating Mental and Physical Healthcare: Research Training and Services)[21]. Participants first completed self-report questionnaires (via a tablet device) including a patient global assessment and questions on depression and anxiety. They subsequently underwent clinical assessments by their physician as part of their routine care. Participants attended multiple appointments (between 1 and 8) during the study.

Since IMPARTS is a clinical initiative used in routine care, participants did not require formal consent to take part. Everyone was informed that their anonymised data might be used for research purposes and could opt out at any time. Ethical approval was given by the

IMPARTS Research Ethics Committee, and ethical approval for IMPARTS itself was given by NHS Research Ethics Committee (reference 12/SC/0422).

Measures

Discordance. Psoriasis severity was quantified using identical physician and patient global assessment (GA) scales. This five-point scale (1 = Clear/Nearly clear; 2 = Mild; 3 = Moderate; 4 = Severe; 5 = Very severe) had no specific descriptors relating to redness, thickness or scaling[22,23]. We elected to use the physician's assessment as the standard against which to evaluate discordance since it is the gold standard measure used in clinical guidelines[5,7]. Psoriasis severity discordance was measured by subtracting the patient assessment from the physician assessment and categorising as either: 'Overestimate' (the patient reported a greater level of psoriasis severity compared to the physician, by at least one point on the scale); 'Neutral' (patient and physician reported the same category of psoriasis severity); or 'Underestimate' (patient reported a lower level of psoriasis severity, compared to the physician, by at least one point on the scale). We chose a difference of one point following past evidence, albeit using varied global assessment measures, showing differences of one point to correspond to meaningful differences in physician-assessed outcome measures such as the PASI[4,24]. Although a difference of two or more points resulted in smaller groups of participants in each discordant category, we also assessed this more stringent threshold in a sensitivity analysis. Psoriasis severity was also assessed with the PASI, a clinician rated measure of lesion area coverage and appearance[22].

Mental health. Screening for probable major depressive disorder (MDD; herein 'depression') was conducted with the Patient Health Questionnaire-2 (PHQ-2[25]) and PHQ-9[26]. Screening

for probable generalized anxiety disorder (GAD; herein 'anxiety') was screened with the Generalized Anxiety Disorder scale (GAD-7[27]). Please see eMethods for details.

Covariates. Covariates were recorded at each appointment. Demographic information included age, sex, and ethnicity. Ethnicity was coded into six categories (White; Asian/Asian British; Black/Black British; Chinese, Japanese, Korean, or Indochinese; Mixed background; Other). We further adjusted for clinical factors previously shown to influence treatment outcomes. These included smoking status (Current smoker; Non-smoker)[28], body mass index (BMI)[29], psoriatic arthritis diagnosis (Yes; No)[30], and number of comorbid conditions (0; 1-2; 3-4; 5+)[31] as well as current treatment (None; Topical only; Non-biologic systemic; Biologic systemic)[32].

Statistical analysis

Psoriasis disease severity (Patient GA and Physician GA) was summarised as counts and percentages across all appointments over follow-up. Demographic and clinical covariates were summarised for each participant's first appointment. Discordance was summarised (counts and percentages) for the overall sample, as well as for subsamples defined by presence of depression and anxiety. The weighted Kappa was calculated[33].

Multivariable multinomial logistic regression models were used to assess the relationship between mental health status and patient-physician psoriasis severity discordance. The outcome was the three-category measure of discordance defined above ('Overestimate', 'Neutral', or 'Underestimate'), with 'Neutral' treated as the base category. Depression and anxiety (as defined by PHQ-9 and GAD-7 screening tools, detailed above) were entered as binary variables in separate models, given the substantial overlap between these conditions.

To investigate whether mental health was more strongly associated with discordance among patients with more severe clinician-assessed psoriasis, we also included a term representing the interaction between probable depression and the continuous PASI score. The statistical significance of the interaction effect (main effects and interaction term) was tested with a Wald test.

All models were adjusted for age, sex, ethnicity, smoking status, BMI, psoriatic arthritis, current treatment, and number of comorbidities. A sandwich estimator was used to adjust standard errors to take into account clustering due to repeated appointments per participant[34]. Estimates are reported as Relative Risk Ratios (RRR; with associated 95% confidence intervals (CI)) and predicted probabilities estimated with other covariates set to their sample mean values. Models were estimated in Stata 15[35].

Results

Cohort characteristics

After excluding those with missing information on patient GA or physician GA (n=65) or covariates (n=5), the analytical sample comprised 502 participants. Excluded participants tended to be younger (mean age 42.6 vs. 46.9; p = 0.02), had higher prevalence of probable depression (9% vs. 16%; p = 0.09) and probable anxiety (10% vs. 18%; p = 0.09) but were similar in terms of sex (32% vs. 42% female; p = 0.2) compared to those in the analytical sample.

Table 1 summarises the analytical sample. Participants tended to be male (68%), of White ethnicity (79%), non-smokers (78%) and overweight (mean BMI = 29.4). The mean age was 47 (standard deviation = 13). Over a third of participants (39%) had concurrent psoriatic

arthritis, and most were receiving a systemic treatment (51% non-biologic, 34% biologic). Around half reported at least one comorbid condition (the most prevalent comorbidities were hypertension, autoimmune disorders and liver disease).

Discordance between patient and physician assessments of psoriasis severity

Overall, patient and physician severity assessments tended to be in agreement (Table 2). At 893 appointments where the patient rated their psoriasis severity as 'clear/nearly clear', 76% were also assessed by their physician as 'clear/nearly clear'. The weighted Kappa statistic was 0.58 (95% CI = 0.56, 0.60) indicating 'moderate' agreement. Regarding the three-category measure of discordance, 61% of appointments resulted in agreement between patient and physician about symptom severity ('Neutral'; Table 3) and 39% of appointments resulted in disagreements. Where disagreements occurred, patients were more likely to underestimate their psoriasis severity, compared to the physician rating (26% of appointments) rather than overestimate severity (13% of appointments).

Discordance between patient and physician measures of psoriasis severity was associated with mental health status

Compared with physician ratings, patients screening positive for depression or anxiety were more likely to overestimate their psoriasis severity (26% and 23% for depression and anxiety, respectively) than were patients without depression or anxiety (13% and 13%, respectively). To investigate the risk of discordance attributable to mental health, we used multivariable multinomial logistic regression analysis. After adjustment for covariates, depression and anxiety were separately associated with an increased risk of patients overestimating their disease severity, compared to their physician, versus those without

depression or anxiety (Figure 1; RRR for depression = 2.7, 95% CI 1.6, 4.5; for anxiety = 2.1, 95% CI 1.3, 3.4).

Psoriasis severity moderates the impact of mental health status on patient-physician discordance

We investigated the interaction between mental health status and disease severity on patients' probability of overestimating or underestimating severity, compared to the physician GA (Figure 2; eTable 1). We found that patients with milder psoriasis (PASI ≤ 5) and concurrent depression or anxiety were more likely to overestimate their psoriasis severity. Conversely, patients with moderate-severe psoriasis (PASI > 10) and concurrent depression or anxiety were more likely to underestimate their psoriasis severity. This interaction was statistically significant based on a Wald test (X^2 for depression = 8.8 (2 df) P-value < 0.001; X^2 for anxiety = 37.0 (2 df) P-value < 0.001). Thus, psoriasis severity may moderate the association of mental health status with patient-physician discordance.

Sensitivity analysis

Our findings were consistent when using a more stringent threshold for discordance (a difference of two categories between patient and physician global assessments). The proportion of patients over- or under-estimating severity was lower, as would be expected, but the patterns of association with mental health were preserved (eTable 2 and eFigure 1).

Discussion

This represents the first study in psoriasis to characterise the real-world impact of both depression and anxiety (assessed using validated screening tools) on discordance between patient and physician psoriasis severity ratings. These data suggest a substantial (39%)

discordance between patients and physicians in their psoriasis severity assessments, and highlight patient mental health status as a significant contributor to rating discordance. Patients with depression (MDD) and anxiety (GAD) were twice as likely to have overestimated their disease severity assessments (vs. physician rating), compared to patients without depression/anxiety, after adjustment for potential demographic and clinical confounders.

These data have important clinical relevance. Shared decision making between patients and their physicians is crucial for safe and effective care of psoriasis, which often requires lifelong treatment. Decisions about when to start or switch psoriasis therapies in routine practice are currently informed by physician-rated disease severity assessments, such as the Physician Global Assessment and PASI[4–6]. However data from other chronic inflammatory diseases have underscored the importance of considering the patient's perspective through the use of patient-reported measures; agreement between patient and physician assessments improves both treatment adherence and outcomes[8]. Our data highlight an unmet need to align physician and patient perceptions of disease severity, which must be addressed in order to reach a consensus about optimal treatment strategy[36].

As the prevalence of psoriasis continues to rise in the face of limited health service resource[37], virtual/non-face to face clinical review is increasingly important for the efficient and sustainable delivery of healthcare. In particular, the implementation of virtual consultations has been rapidly accelerated in recent months in response to the COVID-19 pandemic. Virtual consults rely upon the accurate interpretation of patient-reported disease severity measures. Our data suggest that co-existent depression and anxiety may lead to the overestimation of psoriasis severity by patients compared to their physician – particularly at

the less severe end of the disease severity spectrum. If not considered in the correct context, the patient GA thus has the potential to influence clinical decision making inappropriately. This underscores the importance of concurrent screening for anxiety and depression to ensure that treatment plans accurately address disease activity, in addition to mental health comorbidity. A multidisciplinary approach to psoriasis care is thus vital.

There is a paucity of real-world data on physician-patient discordance of disease severity ratings in psoriasis and the underlying factors contributing to this[14,38], so our study provides important evidence to inform clinical practice. Our rate of discordance (39%) is similar to that reported by Griffiths et al. from their multi-national surveys of 524 dermatologists and 3821 patients with psoriasis[8]. Their retrospective study found 45% of physician-patient pairs were in disagreement about psoriasis severity (assessed using a five-point scale: clear/almost clear/mild/moderate/severe) but did not examine reasons for discordance. Two studies in trial settings similarly highlight discordance between patient and physician assessments of psoriasis, but again, did not explore the factors contributing to discrepancy[9,10]. There are also reports of discordance between physicians and patients regarding their satisfaction with the level of psoriasis control achieved. Two surveys in the US showed patient-physician discordance in satisfaction with psoriasis control among 18% of patients, and this was associated with higher disease severity and reduced quality of life[39].

Although limited data exists, the influence of mental health on patient-physician discordance has mostly been explored in individuals with rheumatic disease[14,16,17,40]. Barton et al. found a significant impact of PHQ-9 depression score on patient-physician disease severity assessment discordance among 223 patients with rheumatoid arthritis[16].

Discordance was found in 36% (compared with 39% in our psoriasis study) and patients overestimated their disease severity compared with physicians' assessments in 85% of these cases. Consistent with our findings, Barton et al. found depressive symptoms (a five-point increase in PHQ-9 score) to be the strongest predictor of a patient overestimating their psoriasis severity, compared to their physician (OR 1.61, 95% CI 1.02, 2.55).

Eder et al. analysed data from 331 individuals attending a psoriatic arthritis clinic[14] and found lower patient-physician (rheumatologist) discordance (15%) for skin assessments compared to our study. However, the scores of patient and physician global assessments ranged from 0 to 10 on a numeric rating scale, and a difference of >2 points was considered a clinically relevant discordance. Discordance was attributed to increased pain and Dermatology Life Quality Index (DLQI), which accounted for 17% and 14% of variation in patient-physician discordance, respectively. Unlike our findings, Eder et al. did not identify an important role for mental health in patient-physician discordance of disease severity ratings. However, they used a simple mental component score derived from the short form 36 health survey (SF-36 MCS) as a surrogate for general psychological distress (which accounted for just 1% of variation in patient-physician discordance). A need to improve physician detection and management of psychological distress in patients with psoriasis has also previously been highlighted[41].

Strengths and limitations

This represents the largest study to date of patient-clinician discordance in psoriasis severity ratings, drawing on real-world clinical data. We were able to adjust for important demographic and clinical confounders and used validated screening tools for depression and

anxiety (GAD-7 and PHQ-9), improving on previous studies where mental health was assessed using the SF-36 MCS[14].

In terms of limitations, these data were collected from a single specialist psoriasis clinic comprising patients with moderate-severe psoriasis, so may not be generalisable. The repeated cross-sectional analysis was unable to address questions of causation. There was no information on the stage or duration of treatment, which may help to contextualise the severity of psoriasis (e.g. patients experiencing failure of a long-term treatment may perceive their disease severity differently compared to those starting treatment). Due to the sample size, discordance was defined as a difference of one category on the patient and physician global assessments; however a difference of two categories identified similar findings in sensitivity analyses. While past evidence shows differences of one category to be clinically meaningful[4], further work is required to understand what constitutes a clinically significant level of discordance. There are also no current gold standard definitions for physician and patient global assessments; there is a paucity of research on patient-reported measures and 5-, 6- or 7-point Likert scales have variously been used for physician global assessments in prior studies[22].

Depression and anxiety were assessed using the PHQ-9 and GAD-7 screening tools rather than via clinical interview. However, these screening tools have been shown to be valid and reliable[27,42,43], with sensitivity of 89% and specificity of 76% for the PHQ-2 in primary care samples[44]. The percentage screening positive for depression (9%) was lower than the 22% reporting a history of depression (i.e. current or prior diagnosis) in BADBIR (the UK pharmacovigilance psoriasis registry[45]) but consistent with the UK General Practice Research Database (13% of those with severe psoriasis reported a history of depression[46]), the

PsoBest registry in Germany (7%[47]), and the global PSOLAR study (15%[48]). We were unable to measure pain or fatigue in our sample, which have previously been shown to be predictors of discordance[14]. We were also unable to consider characteristics of the assessing dermatologist – such as age, sex, or level of experience – which may have influenced the extent of discordance.

Conclusions

Taken together, our results suggest that discordance between patient and physician measures of psoriasis severity is strongly associated with patient mental health status. Patient-reported disease severity scores should thus be interpreted in the context of comorbid anxiety and depression, which can be facilitated by the routine use of mental health screening tools. The recognition, monitoring and management of depression and anxiety in psoriasis by multidisciplinary healthcare teams (preferably encompassing clinical psychology expertise) has the potential to alleviate the substantial mental health burden in psoriasis while aligning clinician and patient perceptions of disease and treatment goals.

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Access to Data and Data Analysis

The lead author (EC) had full access to all the data in the study and takes responsibility for the integrity of the data and the accuracy of the data analysis.

Conflicts of interest

SKM has received departmental funding from AbbVie, Celgene, Eli Lilly, Janssen-Cilag, Novartis, Sanofi and UCB.

CHS has received departmental research funding from AbbVie, GSK, Pfizer, Novartis, Regeneron, and Roche, and is co-investigator on consortia with industry partners (see biomap-imi.eu and psort.org.uk).

The other authors (EC, AB, TD, AP, JB, LR, MT, KG) have no conflicts of interest to declare.

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The funders had no role in the design and conduct of the study; collection, management, analysis, and interpretation of the data; preparation, review, or approval of the manuscript; and decision to submit the manuscript for publication.

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Table 1. Sample characteristics at first recorded appointment (n=502)

Continuous variables		Mean (SD)
Age		46.8 (13.1)
BMI		29.4 (6.0)
PASI		4.3 (5.1)
Categorical variables		N (%)
Sex	Female	163 (32)
	Male	339 (68)
Ethnicity	White	396 (79)
	Asian or Asian British	65 (13)
	Black or Black British	10 (2)
	Chinese, Japanese, Korean, Indochinese	15 (3)
	Mixed Background	7 (1)
	Other	9 (2)
Current smoker	No	393 (78)
	Yes	109 (22)
Psoriatic arthritis	No	305 (61)
	Yes	197 (39)
Current treatment	None	65 (13)
	Topical only	10 (2)
	Non-biologic systemic	257 (51)
	Biologic systemic	170 (34)
Number of comorbidities	0	281 (56)
	1-2	160 (32)
	3-4	53 (11)
	5+	8 (2)
PHQ-9 caseness		43 (9)
GAD-7 caseness		49 (10)

Table 2. Patient Global Assessment by Physician Global Assessment (1985 appointments); Row percentage (N)

		Physician GA					
		Clear/nearly clear	Mild	Moderate	Severe	Very severe	Total
Patient GA	Clear/nearly clear	76.2% (893)	20.3% (238)	3.2% (37)	0.2% (2)	0.2% (2)	100.0% (1172)
	Mild	24.4% (86)	44.6% (157)	23.9% (84)	2.8% (10)	4.3% (15)	100.0% (352)
	Moderate	6.0% (17)	26.3% (75)	43.2% (123)	10.2% (29)	14.4% (41)	100.0% (285)
	Severe	2.2% (3)	10.2% (14)	33.6% (46)	15.3% (21)	38.7% (53)	100.0% (137)
	Very severe	0.0% (0)	0.0% (0)	12.8% (5)	28.2% (11)	59.0% (23)	100.0% (39)
	Total	50.3% (999)	24.4% (484)	14.9% (295)	3.7% (73)	6.8% (134)	100.0% (1985)

Table 3. Discordance in patient vs. physician ratings, overall and by mental health status

		Type of discordance N (%)		
Sample		**Overestimate**	**Neutral**	**Underestimate**
All patients (1985 appointments)		257 (13)	1217 (61)	511 (26)
Patients by depression (PHQ-9) caseness				
	Cases (129 appointments)	33 (26)	57 (44)	39 (30)
	Non-cases (1856 appointments)	224 (12)	1160 (62)	472 (25)
Patients by anxiety (GAD-7) caseness				
	Cases (155 appointments)	36 (23)	80 (52)	39 (25)
	Non-cases	221 (12)	1137 (62)	472 (26)
Notes. Discordance indicated by differences of 1+ categories for patient vs. physician ratings.				