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The incidence of anxiety may not be correlated with severity of psoriasis: A prospective pilot study

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ABSTRACT

Psoriasis is associated with certain psychiatric disorders such as anxiety and depression. Although a growing body of literature has indicated high prevalence of anxiety in patients with psoriasis, it is unclear if the incidence of anxiety is correlated with severity of psoriasis. In this article, we hypothesize that anxiety is not correlated with severity of psoriasis, and therefore the issue of anxiety should not be neglected in patients with mild psoriasis. To testify this hypothesis, we performed a pilot study to investigate the correlation between anxiety questionnaires and severity of psoriasis. Thirty-two patients with psoriasis were recruited. The patients were further classified into mild or moderate to severe psoriasis according to their body surface area or Psoriasis Area Severity Index (PASI). Zung's self-rating anxiety scale (SAS) and SF-36 were adopted to evaluate anxiety and quality of life, respectively. Spearman's rank correlation coefficients were calculated between SAS and each scale of SF-36 among these 32 patients. SAS is negatively correlated with role limitation due to emotional problems, vitality, emotional well-being of SF-36. Although SAS is not significantly different between mild and moderate to severe psoriasis, the detected levels of anxiety were higher than normative standards. Physicians should not neglect potential anxiety in patients who have mild psoriasis. Inter-discipline collaboration between psychiatry and dermatology is required to provide comprehensive patient care.

Introduction

Psoriasis is a chronic skin inflammatory disease with a prevalence of around 1–2% in most Western countries and a prevalence of less than 1% in Asians [1–3]. Nordic countries have the highest prevalence of psoriasis in the world, ranging from 3.73% to 8.50% [4]. A growing body of literature has indicated patients with psoriasis have impaired quality of life (QoL) [5,6]. The poor QoL may be attributed to disfiguring skin lesions and itch or pain caused by skin inflammation [7–9]. Furthermore, psoriasis is associated with a variety of comorbidities, such as hypertension, diabetes mellitus, end-stage renal disease, among others [10–12]. Comorbidities of psoriasis, together with inflammatory skin lesions, may further aggravate discomforts and impair QoL.

An accumulating body of literature indicates selected psychiatric disorders are more prevalent in patients with psoriasis [13–16]. For instance, a study using claims data showed adjusted hazard ratios of depression and anxiety in patients with psoriasis compared with controls are 1.39 (95% confidence interval [CI], 1.37–1.41) and 1.31 (95% CI, 1.29–1.34), respectively [14]. The adjusted hazard ratio of depression is even higher in patients with severe psoriasis. A European study showed patients with psoriasis have higher odds of anxiety and depression as defined by Hospital Anxiety and Depression Scale (HADS) [17]. Taken together, psoriasis is associated with impaired QoL, anxiety, and depression. For a comprehensive care of patients with psoriasis, it is important to use appropriate tools to identify potential psychiatric disorders and to evaluate quality of life [18].

Health questionnaire can be classified in to two categories: general and condition-specific [19]. Condition-specific questionnaires, such as Dermatology Quality of Life Index and Skindex-16, are widely used in dermatologic research. However, these skin-specific questionnaires focus on the impact of certain skin diseases, making it difficult to compare with the impact on QoL of non-dermatologic diseases. General health questionnaires, on the contrary, make it possible to compare the

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effects on QoL of diseases in multiple disciplines. Therefore, it is worth to use general health questionnaires in dermatologic research so that physicians with different specialties can communicate with dermatologists more easily. The Medical Outcomes Study 36-Item Short Form (SF-36; Medical Outcomes Trust, Waltham, MA) is one of the general health questionnaires. The reliability and reproducibility of SF-36 has been validated by previous studies [20,21].

It has been proposed that SF-36 is useful as a screening tool for anxiety [22–24]. For example, Matcham et al. showed that, in patients with rheumatoid arthritis, SF-36 mental component summary scores with a threshold of ≤38 is useful to screen anxiety that is defined by the 7-item Generalized Anxiety Disorder (GAD7) questionnaire [22]. Since Zung's self-rating scale is easier to perform and can be self-evaluated by patients, it is imperative to know if this tool is useful to evaluate anxiety in patients with psoriasis. Nevertheless, its application in patients with psoriasis is still lacking. Furthermore, to provide comprehension patient care, it is crucial to evaluate how anxiety is correlated with different aspects of QoL. In the present study, we used a Chinese translation of SF-36 to ensure each survey participants understand the questions. Zung's self-rating anxiety scale was adopted to evaluate individual psoriatic patient's extent of anxiety. We examined if Zung's self-rating anxiety scale is a valid tool to evaluate anxiety status in patients with psoriasis. We also examine if Zung's self-rating anxiety scale is correlated with each scale of SF-36 and if these two questionnaire have similar results in respect to severity of psoriasis.

The hypothesis

Anxiety is not correlated with severity of psoriasis, and therefore the issue of anxiety should not be neglected in patients with mild psoriasis.

Evaluation of the hypothesis

Data source

Patients with diagnosis of psoriasis and received outpatient care in Department of Dermatology, Kaohsiung Municipal Ta-Tung Hospital, Kaohsiung Medical University and Department of Dermatology, Kaohsiung Medical University Hospital, Kaohsiung Medical University were recruited. Their age, sex, body mass index (BMI), waist circumstance, education, marriage status, wage, night shift, work hours per week, comorbidities, smoking, alcohol were recorded. For the severity of psoriasis, body surface area (BSA) and Psoriasis Area Severity Index (PASI) was evaluated. This study was approved by Institutional Review Board of Kaohsiung Medical University.

Signed informed consents were acquired from all the patients. The format of signed informed consents was approved by Institutional Review Board of Kaohsiung Medical University.

Correlation between Zung's self-rating anxiety scale and SF-36

Zung's self-rating anxiety scale examines the severity of anxiety for individual. The questionnaire contain 20 self-report items scored between 1 and 4, with a total score range from 20 to 80. The scores of 20–44 are 'normal', while scores of 45–59 indicate mild anxiety, scores of 60–74 indicate moderate anxiety and scores higher than 75 suggest severe anxiety [25]. On the other hand, SF-36 is composed of 36 items divided in 11 questions. Except for item 2, which is a subjective description of health in general compared with the past one year, other 35 items are further classified into eight scales: 1) physical function, 2) role limitations due to physical health, 3) role limitations due to emotional problems, 4) vitality, 5) emotional well-being, 6) social functioning, 7) pain, 8) general health. The answers of each items are transformed into a subscale from 0 to 100, with 0 means severe disability and 100 means no disability. Spearman's rank correlation coefficients (ρ) was calculated between Zung's self-rating anxiety scale and each scale of SF-36.

The differences between patients with mild psoriasis and patients with moderate to severe psoriasis in Zung's self-rating anxiety scale and SF-36

Patients with psoriasis were further classified according to their disease severity. Moderate to severe psoriasis was defined as BSA ≧ 10% or PASI ≧ 10 while mild psoriasis was defined as BSA < 10% or PASI < 10. Zung's self-rating anxiety scale and SF-36 between moderate to severe psoriasis and mild psoriasis were compared. Items in the same scale of SF-36 were examined by Cronbach's alpha (alpha reliability) to inspect internal consistency.

Statistical analysis

The comparison of continuous variables between samples was based on a nonparametric hypothesis. The level of statistical significance was set at 0.05. The patients' data were analyzed using SAS statistical software, version 9.4 (SAS Institute, Cary, NC, USA).

Empirical data

Characteristics of the patients with psoriasis

Totally thirty-two patients with psoriasis were enrolled. The background data and severity of psoriasis were shown in Table 1. Between patients with BSA ≧ 10% and those with BSA < 10%, only marriage status was significantly different. Other co-variables, including age, sex, BMI, waist circumstance, education, wage, night shift, work hours per week, comorbidities, smoking, alcohol, were not significantly different between patients with moderate to severe psoriasis and those with mild psoriasis.

Zung's self-rating anxiety scale is negatively correlated with role limitation due to emotional problems, vitality, and emotional well-being of SF-36

Among the eight scales of SF-36, role limitation due to emotional problems ($\rho = -0.39$, $P = 0.0278$), vitality ($\rho = -0.51$, $P = 0.0027$), and emotional well-being ($\rho = -0.36$, $P = 0.0426$) have significant negative correlations with Zung's self-rating anxiety scale (Table 2).

Zung's self-rating anxiety scale and SF-36 in the thirty-two patients with psoriasis.

The mean (standard deviation, SD) of Zung's self-rating anxiety scale of the thirty-two patients is 38.1 (7.2). No matter between patients with BSA ≧ 10% and those with BSA < 10%, or between patients with PASI ≧ 10 and those with PASI < 10, the measured levels of anxiety had no significant difference (Table 3). However, the degrees of anxiety were higher than Chinese national normative standards [26]. The mean (SD) of the eights scales of SF-36 in the present study is shown in Table 3. These results are commensurate to a non-hand eczema group recruited in a study conducted in the same hospital in Taiwan except that general health is much lower in the present study [27].

Vitality and Emotional well-being were significantly different between moderate to severe psoriasis and mild psoriasis

The Zung's self-rating anxiety scale is not significantly different between patients with BSA ≧ 10% and those with BSA < 10% ($P = 0.1501$) as well as between patients with PASI ≧ 10 and those with PASI < 10 ($P = 0.2849$). Among the eight scales of SF-36, vitality ($P = 0.0152$) and emotional well-being ($P = 0.0203$) are significantly different between patients with BSA ≧ 10% and those with BSA < 10%. Emotional well-being ($P = 0.0494$) is also significantly different between patients with PASI ≧ 10 and those with PASI < 10.

Consequences of the hypothesis and discussion

A growing body of literature indicates that psoriasis is associated

Table 1
Demographic distribution of patients with psoriasis.

	Total samples	BSA		P	PASI		P
		≥10%	< 10%		≥10	< 10	
n	32	15	17		8	24	
BSA, mean(SD)	15.0 (16.0)	26.9 (16.6)	4.4 (2.4)	< 0.0001			
PASI, mean(SD)					15.9 (5.7)	3.5 (2.2)	< 0.0001
Age mean(SD), years	40.7 (12.5)	44.7 (13.1)	37.2 (11.3)	0.0948	43.9 (15.0)	39.7 (11.8)	0.4201
BMI, mean(SD), kg/m^2	25.1 (5.1)	25.0 (4.6)	25.2 (5.5)	0.8911	24.5 (4.5)	25.3 (5.3)	0.6970
Waist, mean(SD), cm	90.6 (13.0)	89.4 (13.5)	91.7 (12.9)	0.6241	88.5 (12.2)	91.3 (13.5)	0.6072
Sex, n(%)							
Males	21(65.6)	12(80.0)	9(52.9)		6(75.0)	15(62.5)	
Females	11(34.4)	3(20.0)	8(47.1)	0.1078	2(25.0)	9(37.5)	0.6808
Education							
≤senior high school	13(40.6)	7(46.7)	6(35.3)		5(62.5)	8(33.3)	
> senior high school	19(59.4)	8(53.3)	11(64.7)	0.5133	3(37.5)	16(66.7)	0.2191
Marriage, n(%)							
Married	18(56.3)	11(73.3)	7(41.2)		6(75.0)	12(50.0)	
Unmarried	13(40.6)	3(20.0)	10(58.8)		1(12.5)	12(50.0)	
Divorce	1(3.1)	1(6.7)	0(0.0)	**0.0468**	1(12.5)	0(0.0)	0.0550
Wage, n(%)							
≤35,000	20(62.5)	7(46.7)	13(76.5)		4(50.0)	16(66.7)	
> 35,000	12(37.5)	8(53.3)	4(23.5)	0.0822	4(50.0)	8(33.3)	0.4325
Night shift, n(%)							
No	23(71.9)	12(80.0)	11(64.7)		7(87.5)	16(66.7)	
Yes	9(28.1)	3(20.0)	6(35.3)	0.4440	1(12.5)	8(33.3)	0.3858
Work/week, n(%), hours							
< 40	18(56.3)	8(53.3)	10(58.8)		3(37.5)	15(62.5)	
≥40	14(43.8)	7(46.7)	7(41.2)	0.7547	5(62.5)	9(37.5)	0.2517
Arthritis, n(%)							
No	27(84.4)	12(80.0)	15(88.2)		5(62.5)	22(91.7)	
Yes	5(15.6)	3(20.0)	2(11.8)	0.6454	3(37.5)	2(8.3)	0.0854
Comorbidity, n(%)							
No	14(43.8)	6(40.0)	8(47.1)		2(25.0)	12(50.0)	
Yes	18(56.3)	9(60.0)	9(52.9)	0.6879	6(75.0)	12(50.0)	0.4123
Smoking, n(%)							
No	19(59.4)	9(60.0)	10(58.8)		5(62.5)	14(58.3)	
Yes	13(40.6)	6(40.0)	7(41.2)	0.9461	3(37.5)	10(41.7)	1.0000
Alcohol, n(%)							
No	6(18.8)	4(26.7)	2(11.8)		3(37.5)	3(12.5)	
Yes	26(81.3)	11(73.3)	15(88.2)	0.3828	5(62.5)	21(87.5)	0.1479

BSA: body surface area.
PASI: Psoriasis Area and Severity Index.
Comorbidity includes arthritis, hypertension, diabetes mellitus, hyperlipidemia, angina or myocardial infarction, urticaria, gout, and liver disease.
Characteristics of the study participants for the continuous and categorical variables were analyzed by *t* test and the Chi-squared test/Fisher exact test, as appropriate, for comparisons between BSA groups or PASI groups.

Table 2
Spearman's correlation between Zung's self-rating anxiety scale and SF-36.

	Total Zung's anxiety scale	P
SF-36, median (IQR)		
1. Physical functioning	−0.34	0.0602
2. Role limitations due to physical health	−0.21	0.2392
3. Role limitations due to emotional problems	−0.39	**0.0278**
4. Vitality	−0.51	**0.0027**
5. Emotional well-being	−0.36	**0.0426**
6. Social functioning	−0.23	0.2094
7. Pain	−0.31	0.0854
8. General health	−0.33	0.0657

with anxiety. In the present study, however, we found that Zung's self-rating anxiety scale was not significantly different between patients with mild psoriasis and those with moderate to severe psoriasis. But the levels of measured anxiety were higher than Chinese national normative standards. The results imply patients with psoriasis may suffer from anxiety even if PASI or BSA of psoriasis is mild or small.

The present study showed emotional well-being of SF-36 is negatively correlated with Zung's self-rating anxiety scale. It is worth noting that when being applied to patients with mild psoriasis and moderate to severe psoriasis, however, emotional well-being of SF-36 is significantly different between these two groups while Zung's self-rating anxiety scale is not significantly different. In other words, emotional well-being of SF-36 is more sensitive than Zung's self-rating anxiety scale to differentiate the severity of emotional disturbance between patients with moderate to severe psoriasis and mild psoriasis. Similarly, vitality of SF-36 is significantly different between psoriatic patients with BSA ≧ 10% and those with BSA < 10% while Zung's self-rating anxiety scale is not. Taken together, SF-36 has more sensitivity to differentiate the degree of emotional well-being between patients with BSA ≧ 10% and those with BSA < 10%, and between patients with PASI ≧ 10 and those with PASI < 10.

Our present study has several strengths. First, we showed that Zung's self-rating anxiety scale has negative correlations with several scales of SF-36. Second, we demonstrated that, when being applied to real patients, Zung's self-rating anxiety scale and SF-36 may have discordant ability in differentiating from different severity of psoriasis patients (Table 3) even if there are statistically significantly negative correlations (Table 2). Thus, it is important to select appropriate tools before researchers engage in a study to evaluate anxiety status and QoL [28]. Furthermore, in the current study, patients with mild psoriasis and those with moderate to severe psoriasis have similar status of arthritis and comorbidity. Arthritis and comorbidity may exacerbate

Table 3
The differences between moderate to severe psoriasis and mild psoriasis in Zung's self-rating anxiety scale and SF-36.

	Total sample	Cronbach's alpha	BSA		P	PASI		P
			≥10%	< 10%		≥10	< 10	
n	32		15	17		8	24	
Zung's self-rating anxiety scale, mean (SD)	38.1(7.2)		35.9(7.2)	40.0(6.8)	0.1097	36.6(6.2)	38.6(7.5)	0.5115
SF-36, mean (SD)								
1. Physical functioning	93.0(11.9)	0.88	92.3(15.0)	93.5(8.8)	0.7819	90.6(19.2)	93.8(8.8)	0.5291
2. Role limitations due to physical health	85.2(29.0)	0.82	85.0(35.1)	85.3(23.5)	0.9777	84.4(35.2)	85.4(27.5)	0.9316
3. Role limitations due to emotional problems	72.9(38.3)	0.81	77.8(37.1)	68.6(39.9)	0.5087	70.8(37.5)	73.6(39.3)	0.8623
4. Vitality	60.3(20.4)	0.89	70.7(16.8)	51.2(19.3)	**0.0051**	71.3(19.0)	56.7(19.9)	0.0802
5. Emotional well-being	68.9(16.1)	0.83	76.3(13.3)	62.4(15.9)	**0.0123**	78.5(12.8)	65.7(16.0)	**0.0494**
6. Social functioning	76.6(20.0)	0.51	77.5(20.2)	75.7(20.5)	0.8081	76.6(21.6)	76.6(20.0)	1.0000
7. Pain	84.5(16.9)	0.81	84.7(19.2)	84.3(15.2)	0.9477	80.6(22.2)	85.7(15.1)	0.4677
8. General health	54.7(21.3)	0.83	59.3(21.0)	50.6(21.4)	0.2535	58.1(25.8)	53.5(20.1)	0.6067

BSA: body surface area.
PASI: Psoriasis Area and Severity Index.
Characteristics of the study participants for the continuous variables were analyzed by *t* test for comparisons between BSA groups or PASI groups.
Cronbach's alpha (alpha reliability) was calculated to inspect internal consistency.

psychological burden in patients with psoriasis. Based on our data, we demonstrated that severity of psoriasis is not associated with incidence of anxiety if the study populations have similar arthritis and co-morbidity status, which further strengthens the idea that, if simply examining PASI or BSA, the severity of psoriasis skin lesions is not correlated with incidence of anxiety.

There are also limitations to the present study. First, there is no control group in this study and therefore it is difficult to conclude anxiety is associated with psoriasis based on our data. However, an accumulating body of evidence has indicated anxiety is more prevalent in patients with psoriasis. Based on that common consensus, this current pilot study focuses on examining the difference in anxiety scales between mild psoriasis and moderate to severe psoriasis. Second, the sample size of this study is small. Research with larger sample size is warranted to validate these results. Third, it seems paradoxical that patients with large BSA have higher scores in certain scales of SF-36. These results may also be due to small sample size. It is also possible that which body parts are involved by psoriasis have more impact on QoL than the overall PASI or BSA [5,29]. Another possibility is that patients with BSA ≧ 10% are slightly older in our study population, and these older patients have more insights to cope with psoriasis. Indeed, several studies have revealed that patients with severe psoriasis have an earlier age of onset and longer disease duration [30–32]. In addition, certain medication use, such as biologics for moderate to severe psoriasis, might be considered potential confounders contributing to no significant difference in the measured levels of anxiety when comparing with mild psoriasis.

In conclusions, patients with psoriasis have similar anxiety scale regardless of their BSA and PASI. In views of anxiety is a well-recognized issue, clinicians should not neglect the potential anxiety in patients who have small psoriatic lesions or low PASI. Inter-discipline collaboration between psychiatrists and dermatologists is required to provide comprehensive patient care. Furthermore, it is important to select proper questionnaires for researchers when performing studies with an issue of measuring levels of anxiety and QoL.

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Declaration of Competing Interest

The authors have no conflicts of interest to declare.

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