Title: Assessing quality of life and depression in psoriasis patients: A cross-sectional study

Short running title: QoL and depression in psoriasis

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Conflict of interest

The authors of this study do not have any conflict of interest that would influence the author's objectivity.

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Assessing quality of life and depression in psoriasis patients: A cross-sectional study

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Psoriasis is a chronic, auto-immune skin condition with a severe impact on mental health and marked quality of life impairment due to its effect on cosmesis and physical function[1,2]. Depression is common in psoriasis patients with an estimated prevalence rate of 30%[1]. It has been shown to account for the significant portion of quality impairment in the Dermatology Life Quality Index (DLQI) that could not otherwise be explained by the low Psoriasis Area Severity Index (PASI)[3,4]. A literature review has recently shown that the DLQI has major weaknesses in reporting the mental and emotional aspects of quality of life[5]. The Beck Depression Inventory-II (BDI-II) is a clinical instrument commonly used in psychiatry to screen for depression, but its use is not currently a standard practice in dermatology[6]. This letter analyses the DLQI's ability to detect depression in psoriasis patients and evaluates the association between the domains of quality of life in the DLQI and depression.

This prospective cross-sectional study was conducted at The Royal Melbourne Hospital dermatology outpatient's clinic, a tertiary referral centre, in Australia. Forty-five

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adult patients with psoriasis of all types were recruited and their PASI, DLQI and BDI-II scores were collected. Total DLQI scores were categorised into low (0 to 10) or high (11 to 30) as per the Australian psoriasis treatment consensus[7].

Across the low and high DLQI groups, patient demographic data were similar, but, the high DLQI group had a higher proportion of females and visible lesions on their skin (table 1). The overall prevalence rate for depression in this study was 13.3%.

The correlations between total PASI, DLQI and BDI-II scores were all found to be statistically significant. The correlation between the DLQI and BDI-II was the strongest with a Spearman's rho value of 0.52 ($p < 0.01$). The Spearman's rho correlation between the PASI and DLQI and, PASI with BDI-II, were weak with values of 0.47 ($p < 0.01$) and 0.36 (p 0.01) respectively. Using Fisher's r to z transformation, differences in all of the correlation values were not statistically significant.

To explore the clinical value of using the PASI and DLQI for predicting depression in psoriasis patients, this study calculated the sensitivity, specificity, positive predictive value and negative predictive value for 4 possible PASI and DLQI score combinations (table 2). It was found that a high DLQI score alone produced a sensitivity of only 50% for depression. Either one of the DLQI or PASI score being high produced the highest negative predictive value of 91%. Both a high PASI and DLQI score had the highest specificity and positive predictive value of 92% and 40% respectively.

As a whole, all the domains in the DLQI shared a significant association with total BDI-II scores with symptoms and feelings, leisure and treatment burden being the strongest (table 3). Differences were noted when the correlation was measured in the context of patient socio-demographic variables. Patients with a mild PASI score showed a significant association in all the domains of the DLQI excluding occupation. Patients with moderate to severe PASI score were found to only have significant associations in leisure and treatment burden. Comparing for age, young patients showed highly significant findings on all the domains of the DLQI, whereas the older patient group had significant findings only for symptoms and feelings and treatment burden. Differences in gender revealed that impairment in daily activities was significantly associated with a higher BDI-II score for females, whilst disturbance in relationship was more statistically important for male psoriasis patients. Patients identified as having no co-morbidities showed significant associations in all domains of the DLQI apart from occupation, whereas patients having additional co-morbidities had significant findings only in symptoms and feelings and treatment burden. Finally, all the domains of the DLQI were significantly associated with the BDI-II in patients with visible plaque lesions. When these lesions were coverable, symptoms and feelings was the only domain significantly associated with the BDI-II. Joint involvement,

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smoking, alcohol, psoriasis type and treatment type were not assessed as they had significant asymmetrical distributions.

The evidence presented here suggests that whilst quality of life, disease severity and depression are linked, both the PASI and DLQI have a low sensitivity for detecting clinical depression in psoriasis patients. The use of more psychologically oriented tools, such as the BDI-II, could therefore aid clinicians in detecting and managing depression early. Focus should be given to patients who report impairment in the domains of symptoms and feelings, leisure and treatment burden due to its increased association with depression.

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Table 1

The basic demographic data of adult psoriasis patients in this study by level of DLQI impairment.

	Low DLQI (n = 35)	High DLQI (n = 10)	Total
Age			
Mean years (SD)	51 (13.9)	45 (14.7)	
Young (%)	23 (66%)	6 (60%)	29 (64%)
Old (%)	12 (34%)	4 (40%)	16 (36%)
Gender (%)			
Male	18 (51%)	3 (30%)	21 (47%)
Female	17 (49%)	7 (70%)	24 (53%)
Psoriasis type (%)			
Chronic plaque	30 (86%)	10 (100%)	40 (89%)
Palmoplantar	4 (11%)	0 (0%)	4 (9%)
Guttate	1 (3%)	0 (0%)	1 (2%)
Lesion visibility (%)			

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Visible	21 (60%)	9 (90%)	30 (67%)
Hidden	14 (40%)	1 (10%)	15 (33%)
Co-morbidities (%)			
Present	13 (37%)	3 (30%)	16 (36%)
Absent	22 (63%)	7 (70%)	29 (64%)
Joint involvement (%)			
Present	7 (20%)	1 (10%)	8 (18%)
Absent	28 (80%)	9 (90%)	37 (82%)
Smoking (%)			
Yes	4 (11%)	1 (10%)	5 (11%)
No	31 (89%)	9 (90%)	40 (89%)
Alcohol (%)			
Yes	7 (20%)	3 (30%)	10 (22%)
No	28 (80%)	7 (70%)	35 (78%)
Treatment type (%)			
Topical	3 (8%)	0 (0%)	3 (7%)
Phototherapy	1 (3%)	0 (0%)	1 (2%)
Oral systemic	5 (14%)	5 (50%)	10 (22%)
Biologic	24 (69%)	4 (40%)	28 (62%)
Combination	2 (6%)	1 (10%)	3 (7%)

Table 2

The sensitivity, specificity, positive predictive value and negative predictive value of a high PASI and/or DLQI score for depression in adult psoriasis patients

	Sensitivity	Specificity	PPV[†]	NPV[‡]

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High PASI	33%	90%	33%	90%
High DLQI	**50%**	82%	30%	**91%**
Either DLQI or PASI high	**50%**	79%	27%	**91%**
Both DLQI and PASI high	33%	**92%**	**40%**	90%

Note. A high score in the DLQI or PASI means it is within the moderate to severe range

†means positive predictive value

‡means negative predictive value

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Table 3

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Spearman's correlation values between the domains of the DLQI and BDI-II total score according to PASI severity and patient socio-demographic variables

		PASI		Age‡		Gender		Co-morbidities		Visibility	
DLQI domains	Total cohort	Mild	Mod to severe†	Old	Young	Male	Female	Present	Absent	Visible	Hidden
Symptoms and feelings	0.54**	0.43**	0.60	0.48**	0.60*	0.62**	0.48*	0.71**	0.43*	0.47**	0.63*
Daily activities	0.44**	0.32*	0.81	0.29	0.65*	0.42	0.46*	0.50	0.42*	0.44*	0.26
Leisure	0.51**	0.38*	0.94**	0.33	0.70**	0.52**	0.52**	0.50	0.55**	0.53**	0.26
Occupation	0.32*	0.28	0.54	0.28	0.43*	0.43	0.23	0.38	0.28	0.27*	0.32
Relationship	0.43**	0.33*	0.81	0.29	0.61*	0.52**	0.40	0.48	0.43*	0.44*	0.36
Treatment burden	0.53**	0.44**	0.84*	0.44*	0.64**	0.58**	0.45*	0.66**	0.48**	0.55**	0.26

Note. * means p <0.05 and ** means p <0.01

†This is the abbreviated version of the moderate to severe PASI group. A moderate to severe PASI is classified as a score of greater than 10.

‡ The age groups are defined as young, being between the ages of 0 to 50 years-old, and, old as being above 50 years-old.

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