Original Article

A Cross-sectional Study of Prevalence and Implications of Depression and Anxiety in Psoriasis

Sreelatha Lakshmy, Sivaprakash Balasundaram, Sukanto Sarkar, Moutusi Audhya[1], Eswaran Subramaniam

ABSTRACT

Background: Physical and mental comorbidity is common and has significant implications for overall health outcomes. Psoriasis, a psychocutaneous disorder, is a classic example of mental-physical comorbidity. **Aims:** In view of the impact of socio-cultural influences on mind-body interactions and the paucity of Indian research pertaining to psychiatric morbidity in psoriatic patients, this study was undertaken to measure the prevalence of anxiety and depression in patients with psoriasis, and to correlate these with severity of psoriasis and quality of life. **Materials and Methods:** This cross-sectional study was conducted on 90 consecutive patients of psoriasis, over a period of 12 months, in a tertiary care centre. The Psoriasis Area and Severity Index was used to assess severity of psoriasis. PHQ-9, GAD-7 and the Perceived Stress Scale were used to screen for depression, anxiety and perceived stress respectively. The WHOQOL-BREF was used to determine the quality of life. **Statistics Analysis:** All analysis was performed using Microsoft Excel software and Statistical Package for Social Sciences. **Results:** A total of 71 (78.9%) subjects had depression and 69 (76.7%) had anxiety. Fifty one patients had significant stress. A significant positive correlation was established between psoriasis variables (severity and duration of psoriasis) and psychological variables (depression, anxiety and stress). Severity of psoriasis had a significant negative correlation with social relationships and environmental domains of WHOQOL. Quality of life was significantly worse in patients with psoriasis with comorbid anxiety/depression. **Conclusion:** Patients with psoriasis have a clinically significant prevalence of depression, anxiety and perceived stress. This study highlights the complex relationship between psoriasis, psychiatric comorbidity and quality of life and the need to simultaneously consider dermatological and psychological factors.

Key words: *Anxiety, depression, psoriasis, psychodermatology*

INTRODUCTION

Mental and neurological disorders account for 10% of total Disability Adjusted Life Years lost due to all

Access this article online	
Website: www.ijpm.info	**Quick Response Code**
DOI: 10.4103/0253-7176.168587	

How to cite this article: Lakshmy S, Balasundaram S, Sarkar S, Audhya M, Subramaniam E. A cross-sectional study of prevalence and implications of depression and anxiety in psoriasis. Indian J Psychol Med 2015; 37:434-40.

Departments of Psychiatry and [1]Dermatology, Mahatma Gandhi Medical College and Research Institute, Puducherry, India

Address for correspondence: Dr. Sivaprakash Balasundaram
Department of Psychiatry, Mahatma Gandhi Medical College and Research Institute, Pillaiyarkuppam, Puducherry - 607 402, India.
E-mail: prakashb1685@gmail.com

diseases.[1] Research evidence consistently demonstrates that the risk of experiencing mental health problems is higher in people with recurrent, or progressive medical conditions.[2]

Psoriasis is a psychocutaneous disease of the skin affecting approximately 1.4-2% of the world's population, with men and women being affected equally.[3] Many studies done worldwide have shown that psychiatric comorbidities are frequently found among patients with psoriasis.[4-8] In view of the paucity of Indian research pertaining to the psychological aspects of psoriasis; it is necessary for further research to be conducted specifically in our cultural milieu.

This study aimed to measure the prevalence of anxiety and depression and levels of perceived stress in patients with psoriasis attending a Tertiary Care Hospital in Puducherry, India. An attempt was also made to study the correlations between psychological variables (depression, anxiety, and perceived stress), severity of psoriasis and quality of life.

MATERIALS AND METHODS

The study was an observational cross-sectional study, conducted by the Departments of Psychiatry and Dermatology, Mahatma Gandhi Medical College and Research Institute, a Tertiary Care Hospital in Puducherry, over 1-year period. The study was approved by the Institutional Ethical Committee.

All consecutive patients aged 18-64 years, registering in the Department of Dermatology, and diagnosed to have psoriasis, were taken up for the study. Patients with comorbid skin disorders and prediagnosed chronic medical conditions were excluded from the study. The Psoriasis Area and Severity Index (PASI)[9] was completed by the consultant dermatologist, to rate the severity of psoriasis. Through a brief clinical interview, patients with features suggestive of psychosis, cognitive impairment, substance-related disorders and history of previously diagnosed mental disorder were excluded from the study and were taken up by the Department of Psychiatry for further assessment.

Those patients who were eligible for inclusion into the study were provided the salient details of the research project, and informed consent was obtained. A total of 120 patients were screened. Ninety patients fulfilling the inclusion criteria were enrolled into the study. A structured proforma was used to record information regarding the sociodemographic and clinical profiles.

All subjects were screened for depression, anxiety, perceived stress, and quality of life using the PHQ-9[10], GAD-7[11], perceived stress scale (PSS)[12] and WHOQOL-BREF[13] respectively. Subjects who received positive scores on any of the mental health screening instruments were taken up by the Department of Psychiatry for further management. Appropriate psychiatric treatment was then added to the treatment regimen prescribed by the Department of Dermatology.

All analysis was performed using Microsoft Excel software and Statistical Package for Social Sciences (SPSS for Windows, Version 16.0. Chicago, SPSS Inc.).

RESULTS

The mean age of the study sample was 41.91 years. The majority of subjects were aged 31-40 years. Of the 90 patients, 69 (76.7%) patients belonged to the lower middle socioeconomic status and 60 (66.7%) were from rural areas. The majority were males (56.7%) and were married (87.8%) [Table 1]. The most frequently diagnosed type of psoriasis was psoriasis vulgaris (75.6%) [Table 2].

Of a total of 90 patients with psoriasis, 71 patients had significant depression, which implies a prevalence of 78.9%. Sixty-nine patients scored positive for anxiety, yielding a prevalence of 76.7%. Fifty-one patients were considered to have significant stress. Twenty patients were found to have a score ≥20, indicating severe degrees of perceived stress.

Twenty-four patients (16.6%) reported that their quality of life was "poor" to "very poor" and 35 (35.6%) patients reported "neither poor nor good." To the question "How satisfied are you with your health?"

Table 1: Distribution of sociodemographic variables in patients with psoriasis (*N* = 90)

Variables	Categories	No of patients *n* (%)
Age in years	20 and below	7 (7.8%)
	21-30	7 (7.8%)
	31-40	25 (27.8%)
	41-50	24 (26.7%)
	51-60	24 (26.7%)
	Above 60	3 (3.3%)
Gender	Male	51 (56.7%)
	Female	39 (43.3%)
Marital status	Single	11 (12.2%)
	Married	79 (87.8%)
Area of domicile	Rural	60 (66.7%)
	Urban	30 (33.3%)
Socio-economic class	Upper	0(0%)
	Upper middle	7 (7.8%)
	Lower middle	69 (76.7%)
	Upper lower	12 (13.3%)
	Lower	2 (2.2%)

26 (28.9) patients reported "poor" to "very poor" and 33(36.7%) reported "neither poor nor good."

Association of sociodemographic variables with psychiatric morbidity, clinical variables of psoriasis and quality of life

The rates of depression were significantly higher if the patient with psoriasis was from a rural area. The odds of depression were 3.28 times higher for rural patients. However, an area of domicile (AD) explained only 5.6% to 8.6% variance in the depression score. As age increased, the PSS score also increases by a small amount. However, age is not a strong predictor as it explained only 5% of the variance in PSS. Anxiety, severity of psoriasis and quality of life were not predicted by any sociodemographic variable.

Table 2: Prevalence of the different types of psoriasis according to ICD-10 categories in patients with psoriasis (*N* = 90)

ICD-10 code	Type of psoriasis	No of patients *n* (%)
L40.0	Psoriasis vulgaris	68 (75.6%)
L40.1	Generalized pustular psoriasis	0 (0%)
L40.2	Acrodermatitis continua	0 (0%)
L40.3	Pustulosis palmaris et plantaris	0 (0%)
L40.4	Guttate psoriasis	0 (0%)
L40.5	Arthropathic psoriasis	0 (0%)
L40.50	Unspecified	0 (0%)
L40.51	Distal interphalangeal psoriatic arthropathy	0 (0%)
L40.52	Psoriatic arthritis mutilans	0 (0%)
L40.53	Psoriatic spondylitis	0 (0%)
L40.54	Psoriatic juvenile arthropathy	0 (0%)
L40.59	Other psoriatic arthropathy	1 (1.1%)
L40.8	Scalp psoriasis	5 (5.6%)
	Palmoplantar psoriasis	15 (16.7%)
	Nail psoriasis	1 (1.1%)
L40.9	Psoriasis unspecified	0

Severity of psoriasis and psychiatric morbidity

Total PASI score (severity of psoriasis) had a significant positive correlation with total depression score (r = 0.465, P = 0.000), anxiety score (r = 0.515, P = 0.000) and perceived stress score (r = 0.544, P = 0.000) [Table 3]. Patients of psoriasis with anxiety and depression had a significantly higher score on PASI in contrast to patients without anxiety and depression. The predictive relationship between severity of psoriasis (PASI) and absolute scores of depression (PHQ-9), anxiety (GAD), and PSS was statistically significant [Table 4]. Severity of psoriasis and depression could predict approximately 22% of the variance in each other. Severity of psoriasis and anxiety could predict approximately 27% of variance in each other. The predictive relationship between severity of psoriasis and stress was the highest (30% variance prediction). There was a higher cumulative probability for patients with higher PASI scores to have a more severe grade of depression/anxiety.

Duration of psoriasis and psychiatric morbidity

There was a positive correlation between the total duration of psoriasis and the total depression score (r = 0.382, P = 0.000), anxiety score (r = 0.309, P = 0.000) and perceived stress score (r = 0.305, P = 0.000) [Table 3]. The predictive relationship between the duration of psoriasis and the absolute scores of depression (PHQ-9), anxiety (GAD) and PSS was statistically significant [Table 5]. There was a higher cumulative probability for patients with longer duration of psoriasis to have a severe grade of depression/anxiety.

Table 3: Correlation between psychiatric morbidity, clinical variables of psoriasis and quality of life

		PHQ9 total score	GAD7 total score	PSS	PASI	Psoriasis Duration
PHQ9 total score	r	—	.919**	.854**	.465**	.382**
	p	—	.000	.000	.000	.000
GAD7 total score	r	.919**	—	.872**	.515**	.309**
	p	.000	—	.000	.000	.003
PSS	r	.854**	.872**	—	.544**	.305**
	p	.000	.000	—	.000	.003
PASI	r	.465**	.515**	.544**	—	.198
	p	.000	.000	.000	—	.061
Psoriasis Duration	r	.382**	.309**	.305**	.198	—
	p	.000	.003	.003	.061	—
WHOQOL physical domain	r	-.031	.045	.249*	.145	-.167
	p	.774	.677	.018	.173	.116
WHOQOL psychological domain	r	.019	.032	.212*	.018	-.162
	p	.858	.762	.044	.868	.127
WHOQOL social domain	r	-.285**	-.208*	-.084	.032	-.223*
	p	.006	.049	.433	.764	.035
WHOQOL environmental domain	r	-.355**	-.269*	-.152	-.067	-.142
	p	.001	.010	.153	.530	.183

Association of quality of life with severity of psoriasis and psychiatric morbidity

The severity of psoriasis had a significant negative correlation with two domains of WHOQOL: Social relationships ($r = -0.285, P = 0.006$) and environmental domain ($r = -0.208$, $P = 0.049$) [Table 3]. The proportion of patients reporting their quality of life as poor to very poor was significantly higher in patients of psoriasis with anxiety and depression [Table 6]. Similarly, a significantly higher proportion of patients of psoriasis with anxiety and depression reported their satisfaction with health as poor to very poor.

DISCUSSION

This study analyzed the prevalence and implications of psychiatric morbidity among patients with psoriasis attending a Tertiary Care Center. We also studied the influence of sociodemographic and

Table 4: Regression analysis of the predictive relationship between psychological variables and severity of psoriasis (PASI)

	Variables		Model	Unstandardized Coefficients		Standardized Coefficients	t	p
				B	Std. Error	Beta		
Depression(PHQ9) and severity of psoriasis(PASI)	Predictors Variable: PASI Dependent Variable: PHQ9	1	(Constant)	8.116	.869	.465	9.339	.000
			PASI	.365	.074		4.925	.000*
	Predictor Variable: PHQ9 Dependent Variable: PASI	1	(Constant)	1.915	1.549	.465	1.237	.219
			PHQ9	.592	.120		4.925	.000*
Anxiety(GAD7) and severity of psoriasis(PASI)	Predictors Variable: PASI Dependent Variable: GAD7	1	(Constant)	6.727	.845	.515	7.962	.000
			PASI	.406	.072		5.641	.000*
	Predictor Variable: GAD7 Dependent Variable: PASI	1	(Constant)	1.901	1.391	.515	1.367	.175
			GAD7	.653	.116		5.641	.000*
Perceived stress(PSS) and severity of psoriasis(PASI)	Predictors Variable: PASI Dependent Variable: PSS	1	(Constant)	10.961	.844	.544	12.986	.000
			PASI	.437	.072		6.078	.000*
	Predictor Variable: PSS Dependent Variable: PASI	1	(Constant)	-1.371	1.786	.544	-.767	.445
			PSS	.676	.111		6.078	.000*

$p < 0.05$ = statistical significance

Table 5: Regression analysis of predictive relationship between depression/anxiety/stress and duration of psoriasis

Model		Unstandardized Coefficients		Standardized Coefficients	t	p
		B	Std. Error	Beta		
1	(Constant)	7.555	1.135		6.659	.000
	PSORIASIS DURATION	.570	.147	.382	3.880	.000*
Dependent Variable: PHQ9 (DEPRESSION)						
Model		Unstandardized Coefficients		Standardized Coefficients	t	p
		B	Std. Error	Beta		
1	(Constant)	7.215	1.173		6.151	.000
	PSORIASIS DURATION	.463	.152	.309	3.047	.003*
Dependent Variable: GAD7 (ANXIETY)						
Model		Unstandardized Coefficients		Standardized Coefficients	t	p
		B	Std. Error	Beta		
1	(Constant)	11.694	1.198		9.760	.000
	PSORIASIS DURATION	.466	.155	.305	3.005	.003*
Dependent Variable: PSS (PERCEIVED STRESS)						

$p < 0.05$ = statistical significance

Table 6: Comparison of the quality of life in patients with psoriasis with and without depressive/anxiety disorders

Variables	Groups	Distribution of the Responses of patients to WHOQOL Questions					Pearson Chi-Square	df	p
		Very poor	Poor	Neither poor nor good	Good	Very good			
WHOQOL question 1	Psoriasis with anxiety/depression	12	12	30	11	9	26.715	4	.000*
	Psoriasis without anxiety/depression	0	0	2	12	2			
WHOQOL question 2	Psoriasis with anxiety/depression	16	10	30	11	7	21.141	4	.000*
	Psoriasis without anxiety /depression	0	0	3	10	3			

$p < 0.05$ = Statistical significance

clinical variables on the mental health of patients with psoriasis. The foremost strength of this study was that patients were also screened for perceived stress.

Prevalence of psychiatric morbidity in psoriatic patients

Our study found an overall prevalence of depression of 78.9% in patients with psoriasis, of which 62.2% had moderate to moderately severe depression that would require psychiatric intervention. Various studies on patients with psoriasis have reported a prevalence of depression ranging from 28% to 67%.[8,14-18] Kumar *et al*. have reported a higher prevalence rate of 90%.[7] The prevalence of depression in patients with psoriasis recorded in our study is higher than that observed by most of the other studies reviewed. Heterogeneity in the screening tools utilized across various studies could explain these variations, to an extent.

The overall prevalence of anxiety disorders among patients with psoriasis in our study was 76.7%. The prevalence of severe anxiety requiring psychiatric intervention was 22.2%. This is in partial agreement with findings of other studies reviewed here.[19,20] The high prevalence of anxiety can be explained by the fact that patients attending the dermatology clinic have significant apprehension about the illness, duration and outcome of treatment, fear of investigations and anxiety concerning the financial aspects of treatment. However, these aspects were not studied and hence further research is required.

Studies have also highlighted the coexistence of both depressive and anxiety disorders in patients with psoriasis.[6,14,21,22] Our study showed that 65 (72.2%) patients were positive for both depression and anxiety simultaneously, which is in agreement with previous research. In other words, patients with psoriasis diagnosed to have a depressive disorder are likely to have symptoms of anxiety as well.

PSS scores in patients with psoriasis in our study showed a mean score of 14.71. Fifty-one patients (56.7%) were considered to have a significant stress score, and twenty patients (22.2%) were found to have score ≥20 indicating severe degrees of perceived stress. These prevalence rates correlate with the findings of previous studies.[5,16,23-25]

Quality of life in patients with psoriasis

Our study showed that, of the 90 patients analyzed, 24 (16.6%) patients reported that their quality of life was poor to very poor. Twenty-six (28.9) patients reported "poor" to "very poor" satisfaction with their health. We found a negative correlation between psychiatric morbidity and two domains of WHOQOL; social relationship and environmental domain. Thus, impairment in social and environmental quality of life of patients with psoriasis is associated with higher psychological distress.

Influence of sociodemographic profile on prevalence of psychiatric morbidity

A major proportion of the study sample comprised of patients in their third to fifth decade of life, and a higher number of male subjects. Males in the third to fifth decade of life belong to the economically productive section of society. Hence, they are more likely to seek prompt treatment. The majority of the Indian studies have shown a similar gender difference in the distribution of psoriasis. Higher prevalence of psoriasis has been observed among males, with most of the patients presenting in their third or fourth decade of life.[26-29]

Sociodemographic variables have consistently remained the least effective, in predicting psychiatric morbidity in patients with psoriasis.[4,19] We found that only two sociodemographic variables showed weak association with psychiatric morbidity: Age with stress, and AD with depression.

In this study, age showed no significant association with anxiety and depression. As age increases, the PSS score also increases, however, by a very small amount. Sampogna *et al*.[30] observed a similar finding, where psychological distress was higher in older patients with psoriasis.

We observed that the prevalence of depression was significantly increased if the patient with psoriasis was from a rural area. These findings can be explained by the fact that patients from a rural background usually belong to a lower economic status, have persistent financial burdens, lower education, difficulties with regard to basic necessities and access to health care. Hence, these patients are likely to have poor adherence to treatment and regular follow-ups, which further worsens the severity of psoriasis. But this observation needs to be interpreted with caution since most of our subjects hailed from a rural setting.

Influence of clinical variables on prevalence of psychiatric morbidity

As found in other studies,[14,15,23,31-33] this study found a significant association between severity and duration of psoriasis and depression/anxiety/stress. The frequency of psychiatric morbidity is higher in patients with severe psoriasis. Our study also showed that there is a higher probability for patients with higher PASI scores to have a severe grade of depression/

anxiety. Similarly, the probability for patients with longer duration of psoriasis to have a severe grade of depression/anxiety was more.

The majority of the studies have observed a positive correlation between the severity of psoriasis and anxiety/depression.[14,15,17,24,33] Devrimci-Ozguven *et al*.,[15] Akay *et al*.[14] and de Korte *et al*.[33] were able to establish a direct correlation between the severity of psoriasis and psychiatric morbidity. Thus, our findings are in agreement with previous studies. However, our finding is in contrast to the report by Fortune *et al*.[31] who claimed that the magnitude of anxiety and depression is not influenced by the severity of psoriasis.

The relationship between duration of psoriasis and depression/anxiety has been yet another topic of research. Fried *et al*.[32] and Esposito *et al*.[34] found a significant association between the magnitude of anxiety/depression and duration of psoriasis. Our study showed a significant association between severity and duration of psoriasis and psychological distress (PSS score). Psychological stress plays a significant role in triggering or exacerbating psoriasis.[35-38] Most researchers have found high levels of stress among psoriasis patients, as shown in our study.[6,31,32,39-41] Several studies are currently being undertaken by research teams worldwide to further investigate into the neuropsychological basis of this association.[34]

Comparison of severity of psoriasis and quality of life in patients with and without anxiety/depression

Previous studies have attempted to examine the impact of disease severity on the quality of life in patients with psoriasis and vice versa.[3,41] The effect of psychiatric morbidity on severity of psoriasis has also been studied individually.[4-7] None of the studies reviewed here have compared the quality of life and PASI scores in patients with and without psychiatric morbidity. We have tried to investigate the effect of depression/anxiety on quality of life and severity of psoriasis. This gives our study a methodological advantage. The proportion of patients reporting their quality of life as poor to very poor was significantly higher in patients of psoriasis with comorbid anxiety/depression. Patients of psoriasis with anxiety and depression had a significantly higher score on PASI. This study, however, had certain limitations. The study conducted on a small sample and was skewed toward male gender and a rural AD. The study was cross-sectional in nature, and, therefore, the impact of treatment was not assessed. Though the patients who scored positive on PHQ-9, GAD 7, and PSS were taken up for further diagnostic clinical interviews, those findings were not part of the study.

CONCLUSIONS AND IMPLICATIONS OF THE STUDY

The study highlights that depression, anxiety and stress are significantly high among patients with psoriasis. Quality of life was significantly lower in patients with psychiatric comorbidities. We found a complex relationship between psoriasis, psychiatric comorbidity and quality of life and the need for an integrated approach in the management of the disease. There is a need for routine screening of all patients with psoriasis for psychiatric comorbidities as early detection of these comorbidities is the first step in effective management. Research shows that psychological interventions improve clinical outcomes in patients with psoriasis. This needs to be established in the Indian sociocultural context. This would facilitate the integration of psychiatric and dermatological treatment. This would ultimately help in improving overall health outcomes and quality of life of psoriasis patients.

Financial support and sponsorship

Nil.

Conflicts of interest

There are no conflicts of interest.

REFERENCES

1. World Health Organization. Mental health: new understanding, new hope. Geneva: World Health Organization; 2001.
2. Naylor C, Parsonage M, McDaid D, Knapp M, Fossey M. Long-term conditions and mental health : the cost of co-morbidities. London: The King's Fund and Centre for Mental Health; 2012.
3. Bhosle MJ, Kulkarni A, Feldman SR, Balkrishnan R. Quality of life in patients with psoriasis. Health Qual Life Outcomes 2006;4:35.
4. Picardi A, Abeni D, Melchi CF, Puddu P, Pasquini P. Psychiatric morbidity in dermatological outpatients: an issue to be recognized. Br J Dermatol 2000;143:983-91.
5. Mattoo SK, Handa S, Kaur I, Gupta N, Malhotra R. Psychiatric morbidity in vitiligo and psoriasis: a comparative study from India. J Dermatol 2001;28:424-32.
6. Sarkar S, Sarkar A, Saha R, Sarkar T. Psoriasis and psychiatric morbidity: a profile from a tertiary care centre of eastern India. J Fam Med Prim Care 2014;3:29-32.
7. Kumar S, Kachhawha D, Das Koolwal G, Gehlot S, Awasthi A. Psychiatric morbidity in psoriasis patients: a pilot study. Indian J Dermatol Venereol Leprol 2011;77:625.
8. Golpour M, Hosseini SH, Khademloo M, Ghasemi M, Ebadi A, Koohkan F, *et al*. Depression and Anxiety Disorders among Patients with Psoriasis: A Hospital-Based Case-Control Study. Dermatol Res Pract 2012;2012:381905.
9. Fredriksson T, Pettersson U. Severe psoriasis - oral therapy with a new retinoid. Dermatologica 1978;157:238-44.
10. Kroenke K, Spitzer RL, Williams JB. The PHQ-9: validity of a brief depression severity measure. J Gen Intern Med 2001;16:606-13.

11. Spitzer RL, Kroenke K, Williams JBW, Löwe B. A brief measure for assessing generalized anxiety disorder: the GAD-7. Arch Intern Med 2006;166:1092-7.
12. Cohen S, Kamarck T, Mermelstein R. A global measure of perceived stress. J Health Soc Behav 1983;24:385-96.
13. Development of the World Health Organization WHOQOL-BREF quality of life assessment. The WHOQOL Group. Psychol Med 1998;28:551-8.
14. Akay A, Pekcanlar A, Bozdag KE, Altintas L, Karaman A. Assessment of depression in subjects with psoriasis vulgaris and lichen planus. J Eur Acad Dermatol Venereol 2002;16:347-52.
15. Devrimci-Ozguven H, Kundakci TN, Kumbasar H, Boyvat A. The depression, anxiety, life satisfaction and affective expression levels in psoriasis patients. J Eur Acad Dermatol Venereol 2000;14:267-71.
16. Dowlatshahi EA, Wakkee M, Arends LR, Nijsten T. The prevalence and odds of depressive symptoms and clinical depression in psoriasis patients: a systematic review and meta-analysis. J Invest Dermatol 2014;134:1542–51.
17. Nasreen S, Ahmed I, Effendi S. Frequency and magnitude of anxiety and depression in patients with psoriasis vulgaris. J Coll Physicians Surg Pak 2008;18:397-400.
18. Rabin F, Bhuiyan SI, Islam T, Haque MA, Islam MA. Psychiatric and psychological comorbidities in patients with psoriasis- a review. Mymensingh Med J 2012;21:780-6.
19. Ader R, Cohen N, Felten D. Psychoneuroimmunology: interactions between the nervous system and the immune system. Lancet 1995;345:99-103.
20. Sadock BJ, Sadock VA, Ruiz P. Anxiety Disorders: Introduction and Overview. In: Kaplan and Sadock's Comprehensive Textbook of Psychiatry. Philadelphia: Wolter Kluwer/ Lippincott Williams & Wilkins; 2009. p. 1840-2.
21. Gascón MRP, Ribeiro CM, Bueno LM de A, Benute GRG, Lucia MCS de, Rivitti EA, et al. Prevalence of depression and anxiety disorders in hospitalized patients at the dermatology clinical ward of a university hospital. An Bras Dermatol 2012;87:403-7.
22. Gupta MA, Gupta AK. Psychiatric and psychological co-morbidity in patients with dermatologic disorders: epidemiology and management. Am J Clin Dermatol 2003;4:833-42.
23. Langley RGB, Krueger GG, Griffiths CEM. Psoriasis: epidemiology, clinical features, and quality of life. Ann Rheum Dis 2005;64 Suppl 2:ii18–23; discussion ii24-5.
24. Gupta MA, Schork NJ, Gupta AK, Kirkby S, Ellis CN. Suicidal ideation in psoriasis. Int J Dermatol 1993;32:188-90.
25. Gupta MA, Gupta AK, Kirkby S, Schork NJ, Gorr SK, Ellis CN, *et al*. A psychocutaneous profile of psoriasis patients who are stress reactors. A study of 127 patients. Gen Hosp Psychiatry 1989;11:166-73.
26. Bedi TR. Psoriasis in North India. Geographical variations. Dermatologica 1977;155:310-4.
27. Bedi TR. Clinical profile of psoriasis in North India. Indian J Dermatol Venereol Leprol 1995;61:202-5.
28. Kaur I, Handa S, Kumar B. Natural history of psoriasis: a study from the Indian subcontinent. J Dermatol 1997;24:230-4.
29. Okhandiar RP, Banerjee BN. Psoriasis in the tropics: An epidemiological survey. J Indian Med Assoc 1963;41:550-6.
30. Sampogna F, Chren MM, Melchi CF, Pasquini P, Tabolli S, Abeni D. Age, gender, quality of life and psychological distress in patients hospitalized with psoriasis. Br J Dermatol 2006;154:325-31.
31. Fortune DG, Richards HL, Griffiths CEM, Main CJ. Psychological stress, distress and disability in patients with psoriasis: consensus and variation in the contribution of illness perceptions, coping and alexithymia. Br J Clin Psychol 2002;41(Pt 2):157-74.
32. Fried RG, Friedman S, Paradis C, Hatch M, Lynfield Y, Duncanson C, *et al*. Trivial or terrible? The psychosocial impact of psoriasis. Int J Dermatol 1995;34:101-5.
33. De Korte J, Sprangers MA, Mombers FM, Bos JD. Quality of life in patients with psoriasis: a systematic literature review. J Investig Dermatol Symp Proc 2004;9:140-7.
34. Esposito M, Saraceno R, Giunta A, Maccarone M, Chimenti S. An Italian study on psoriasis and depression. Dermatol Basel Switz 2006;212:123-7.
35. Richards HL, Ray DW, Kirby B, Mason D, Plant D, Main CJ, *et al*. Response of the hypothalamic-pituitary-adrenal axis to psychological stress in patients with psoriasis. Br J Dermatol 2005;153:1114-20.
36. Arnetz BB, Fjellner B, Eneroth P, Kallner A. Stress and psoriasis: psychoendocrine and metabolic reactions in psoriatic patients during standardized stressor exposure. Psychosom Med 1985;47:528-41.
37. Buske-Kirschbaum A, Ebrecht M, Kern S, Hellhammer DH. Endocrine stress responses in TH1-mediated chronic inflammatory skin disease (psoriasis vulgaris)--do they parallel stress-induced endocrine changes in TH2-mediated inflammatory dermatoses (atopic dermatitis)? Psychoneuroendocrinology 2006;31:439-46.
38. Evers AWM, Verhoeven EWM, Kraaimaat FW, de Jong EMGJ, de Brouwer SJM, Schalkwijk J, *et al*. How stress gets under the skin: cortisol and stress reactivity in psoriasis. Br J Dermatol 2010;163:986-91.
39. Fortune DG, Richards HL, Griffiths CEM. Psychologic factors in psoriasis: consequences, mechanisms, and interventions. Dermatol Clin 2005;23:681-94.
40. Malhotra SK, Mehta V. Role of stressful life events in induction or exacerbation of psoriasis and chronic urticaria. Indian J Dermatol Venereol Leprol 2008;74:594-9.
41. Basavaraj KH, Navya MA, Rashmi R. Stress and quality of life in psoriasis: an update. Int J Dermatol 2011;50:783-92.