# Psychobiological Aspects of Patients with Lichen Planus

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## ABSTRACT

**Background:** Lichen planus, a psychocutaneous disorder, is associated with psychoneuroendocrine and psychoimmunological comorbidities. **Objective:** to assess psychiatric comorbidities in a group of patients with lichen planus and its impact on health related quality of life. Also we tried to assess some psychoneuroimmunological and pschoneuroendocrinological pathogenic mechanisms in lichen planus as a model in psychodermatoses. **Subjects and methods:** We included 70 patients with lichen planus All participants were subjected Psychological assessment using SF-36 health related quality of life, alexithymia (SAT9), Taylor manifest anxiety and Beck depression inventory (BDI), and laboratory measures including salivary cortisol and T cell subpopulations (CD+4 and CD8+). **Results:** Lichen plans patients showed higher frequency of psychiatric comorbidities (62.9%), poor health related quality of life and more frequent alexithymia (51.4%) Lichen planus patients with psychiatric comorbidities showed higher scoring on BDI, Taylor anxiety, poorer quality of life and higher tendency for endocrinological and immunological dysregulations. There were negative correlations between some variables and psychiatric comorbidity, quality of life, salivary cortisol and immunological dysregulations in patients with lichen planus. **Conclusion:** These findings may help dermatologists recognizing emotional factors in skin disorders. Consultation liaison psychiatrist may be useful in treating, ameliorating, improving quality of life and coping which may influence susceptibility to infections and immune response in a wide variety of psychodermatoses.

**Key words:** Lichen Planus, Psychobiological aspects, Egypt.

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## INTRODUCTION

Fyodor Desteovsky (1868) wrote that if you happen to have a wart on your nose or forehead, you cannot help imagining that no one in the world has anything else to do but stare at your wart, laugh at it and condemn you for it, even though you have discovered America.

Being a barrier between the external environment and the internal milieu, the skin plays several important functions both physiological and psychological[1]. The physiological role of the skin helps in the preservation of body homeostasis through protective barrier against external noxious stimuli and regulating body temperature. Psychologically, skin is an erogenous zone and channel for emotional discharge so that troubled skin could be a manifestation of unexpressed anger or an inner conflict due to external stress[2].

Brig et al. suggested that there is a diversionary symbiosis between skin and psyche[3]. Psychological stress could have a negative impact on healthy skin, exacerbating or precipitating dermatological disorders suggesting the presence of interface between psychiatry and dermatology[4]. In this way, dermatological disorders may be a skin language to express repressed feelings as symbols for crying out searching for love, respect and protection. Indeed high prevalence of psychiatric problems in patients with skin disorders was reported (20%-40%)[5].

The interaction between mind and skin has led to the emergence of psychodermatology or psychocutaneous disorders concept. Psychodermatological or psychocutaneous disorders are classified into 4 categories[6];

1. Psychophysiological (skin disease precipitated or exacerbated by stressful events).
2. Psychiatric disorders with dermatological symptoms (mostly occurring in somatoform disorders, anxiety, factitious, eating disorders)
3. Dermatologic disorders with psychiatric symptoms (emotional problems secondary to skin disease).
4. Miscellaneous; disorders or symptoms not otherwise classified (e.g.: cutaneous sensory pain, Gardener Diamond syndrome).

Dermatologic manifestation could be adverse effects from psychotropics (antipsychotics, antidepressants, anxiolytics and lithium) as well as changes in mood or behavior could result from steroids used to treat dermatological disorders[7].

Lichen planus is one of the psychodermatological disorders affecting 1-2% of the general population[8], occurring at any age (mean age of onset middle age), affecting both sexes with females being at higher risk for oral mucosal and genital involvement[9]. It is an obstinate disorder baffling not only the patients but also the practitioner. People with viral hepatitis or cirrhosis are at a high risk[10].

Lichen planus is not an infectious disease. The cause is unknown, but it is classified as an autoimmune disorder which may be precipitated or exacerbated by psychosocial stressors[11]. Patients with lichen planus experience stressful events before the onset of the disease[9] Also higher level of anxiety and high salivary cortisol levels in patients with oral lichen planus[12].

Lichen planus manifested as itchy, reddish purple bumps affecting any part of the skin with predilection for inner sides of wrists, forearms, lower legs, genitalia, and to a lesser extent scalp, lower back or nails. Hypertrophic lichen planus is a variant of the disease appearing as thick, reddish–brown lesions covered with scales, mainly appearing on the shin[8].

Lichen planus may affect oral mucous membranes with the risk of progression to oral squamous carcinoma[13]. Several studies reported an association between psychopathological disorder and lichen planus. Major life events especially illness or death of a dear one could precede or exacerbate coetaneous lichen planus[11].

The pathogenesis of lichen planus includes cell mediated immune mechanisms and neuroendocrine dysregulations mainly involving glucocortcoids[14]. Although there conflicting results regarding immunopathogenesis of lichen planus, the

major concept is that lichen planus is a T-cell mediated autoimmune disorder with a lymphotoxic processes against epidermal basal layer as an apoptotic mechanism[15]. Significant increase in CD8+ Tcell subpopulation was also noted[16]. The neuroendocrine mechanism may be mediated either centrally (HPA axis) or by independent cutaneous neuroendocrine axis[17]. Psycholosocial stresses could exacerbate or precipitate lichen planus through neuroendocrine and neuroimmunologic mechanisms.

In a trial to investigate the interface between psychiatry and dermatology, our work aimed at:

a. Screening for psychiatric manifestations in lichen planus.
b. Comparing quality of life in lichen planus patients with and without psychiatric manifestations.
c. Correlating some neuroendocrine and immune changes in lichen planus with psychiatric manifestations.

## SUBJECTS AND METHODS

The study was conducted on 70 patients with coetaneous idiopathic (classic) lichen planus without oral mucosal involvement and 50 subjects with skin disorder with known negligible psychosomatic components as a control group , recruited from Asaad El-Hamid Center for Dermatology.

***Inclusion criteria:***

All participants in the study should fulfill the following criteria;

1- Age ranges 25-45 years.
2- Both sexes were included
3- At least 8 years of education

***Exclusion criteria:***

1. Age less than 25 or more than 45 years.
2. Organic mental syndrome or disorders.
3. Severe mental illnesses (schizophrenia, schizoaffective …).
4. History of substance abuse disorders.
5. Chronic medical disorders.
6. Surgical operation in the previous 6 months prior to study
7. Medications with effects on immune system, behavior or mood at least 3 months prior to the study (Steroids, anti-inflammatory, antihistaminics, beta blockers, antibiotics …..etc.).
8. Pregnant women or women using oral or injectable contraceptives.

***Methods***

All participants in the study were subjected to the following after giving consent:

1- Complete medical history and thorough physical examination with special details regarding onset, duration, site and morphology of lichen planus lesions.
2- Psychiatric sheet.
3- ICD-10 Symptoms Checklist for mental disorders; a semi structured instrument intended for clinician assessment of the psychiatric symptoms and syndromes in F0-F6 categories of the International Classification of Diseases, Tenth Revision (18)
4- Psychometric tools;

a- Health related quality of life assessed by SF-36 instrument (HRQ). It consists of 8 subscales evaluating different domains (physical functioning, physical role, bodily pain, general health, social functioning, emotional role and mental health). Each domain scored from 0-100 with higher scores indicates better quality of life[19].

b- Scored Archetypal Test of 9 elements (SAT9); to measure symbolic function in alexithymic individuals[20].

c- Beck Depression Inventory (BDI) a 21-item scale measuring symptoms related to cognitive, behavioral, affective and somatic components of depression[21].

d- Taylor Manifests Anxiety Scale (TAMS) self reported scale consisting of 50 item statements indicative of anxiety from the Minnesota Multiphasic Personality Inventory (MMPI). Additional items have been added to control for social distractibility, lying and rigidity response[22].

e- Gurmeet singhs presumptive life events stress scale. It contains 47 specific events common to individuals in a variety of situations plus the opportunity for the subject to list 3 other specific events that have occurred over the past year and then rates the positive or negative impact of these events.

***Laboratory measures*:**

a- Salivary cortisol, measuring salivary cortisol has several advantages over blood cortisol including, stress free sampling, laboratory independence and low cost[23]. Salivary cortisol is a measure of unbound cortisol fraction collected by salivette (sarstedt technique) and assayed by a technique combining automated HPLC (high performance liquid chromatography) and polarization fluroscence is used (24).

b- T lymphocytes subpopulations (CD4+ percentage and CD4+/CD8+ ratio) in peripheral blood. CD4+ (T-helper) and CD8+ (T–suppressor) are among T-lymphocytes subpopulations which state of the host immunity. Peripheral blood collected by venupuncture and flow cytometer analysis (EPICS-XL) using dual fluorescence analysis.

***Statistical analysis***

Data were collected, computerized and revised for accuracy and consistency using soft ware package SPSS (version 11). Qualitative parameters assessed by frequency distribution, while means and standard deviation were used to describe quantitative parameters. Association between two qualitative variables was assessed using chi-square tests, while relation between quantitative variables was assessed using correlation analysis. Multiple statistical analyses were used to detect significant associations between different variables. Level of significance in all statistical tests was considered at $p<0.05$.

## RESULTS

This study included 70 patients with lichen planus and 50 control subjects. Both groups matched for age (34.32±9.26 years in patients vesus 32.97±8.76 years in control group), sex (patient group; 51.5% females, 48.5% males, 52% females and 48% males in control group), marital status, educational, occupational and socioeconomic level.

Psychiatric symptoms as shown in table (1) showed statistically significant differences ($p<0.005$) between patients with lichen planus and comparison group. Among lichen planus group phobic anxiety related symptoms were the most frequent (15.7% mixed anxiety depressives, 12.9% social phobia, followed by panic 11.45, obsessive compulsive 10%) while dysthymia was the least frequent (5.7%).

In table (2) mean scores of health related quality of life using short form 36 scale are compared in lichen planus and comparison group. Lower scoring indicating more negative influence on the quality of life were found in lichen planus patients but statistically significant differences ($p<0.05$) could be revealed on five subscales of SF-36 namely physical functions, vitality, social function, emotional role limitation and mental health.

In table (3) lichen planus patients with psychiatric symptoms showed statistically significant lower mean scoring ($p<0.05$) on bodily pain, vitality, social function, emotional role limitation and mental health subscales of SF-36 health related quality of life compared to lichen planus patients without psychiatric symptoms.

In table (4) Lichen planus group showed higher frequency to be alexithymic (51.4%) compared to (10%) of comparison group

Alexithymia showed statistically significant differences in patients with psychiatric symptoms compared to those without psychiatric symptoms as shown in table (5) 63.6% versus 30.8% respectively.

In table (6) higher scoring on Beck depression and Taylor anxiety scales were shown in lichen planus patients with psychiatric symptoms compared to lichen planus without psychiatric symptoms.

Table (7) demonstrated that lichen planus patients with psychiatric symptoms experienced more frequent undesirable events compared to those without psychiatric symptoms.

**Table (1): ICD-10 symptoms checklist frequency in lichen planus & comparison groups.**

| ICD-10 symptom checklist | Lichen planus (N=70) | | Comparison group (N=50) | | p-value |
|---|---|---|---|---|---|
| | No | % | No | % | |
| Phobic anxiety | | | | | |
| Mixed anxiety and depressives | 11 | 15.7 | 2 | 4 | 0.0001* |
| Social phobia | 9 | 12.9 | 0 | 0 | 0.0001* |
| Panic | 8 | 11.4 | 0 | 0 | 0.0001* |
| Obsessive compulsive (predominantly obssesional thoughts and ruminations) | 7 | 10 | 1 | 2 | 0.0001* |
| Generalized anxiety | 5 | 7.1 | 1 | 2 | 0.0002* |
| Mood (affective) disorders; dysthymia | 4 | 5.7 | 0 | 0 | 0.0001* |
| No psychiatric disorder or manifestations | 26 | 37.1 | 46 | 92 | 0,00001* |

**Table (2): Health related quality of life using SF-36 scale**.

| SF -36 Domain | Lichen planus (N=70) | | Comparison group (N=50) | | p-value |
|---|---|---|---|---|---|
| | Mean | # SD | Mean | #SD | |
| Physical function | 50.82 | 32.51 | 75.19 | 21.19 | 0.001* |
| Physical role limitation | 80.38 | 15.31 | 82.17 | 18.12 | ns |
| Bodily pain | 75.31 | 22.46 | 76.15 | 21.17 | ns |
| General health | 71.37 | 21.37 | 72.22 | 18.16 | ns |
| Vitality | 50.82 | 23.15 | 70.19 | 23.12 | 0.001* |
| Social function | 50.14 | 25.12 | 80.19 | 24.13 | 0.0001* |
| Emotional role limitation | 56.18 | 20.14 | 77.16 | 22.16 | 0.0001* |
| Mental health | 57.16 | 22.13 | 76.19 | 31.12 | 0.0001* |

* Significant p ($p<0.05$)

**Table (3): SF-36 quality of life scoring in lichen planus patients with and without psychiatric symptoms.**

| SF-Domain | Lichen planus with psychiatric symptoms (N=44) | | Lichen planus without psychiatric symptoms (N=26) | | p-value |
|---|---|---|---|---|---|
| | Mean | SD | Mean | SD | |
| Bodily pain | 52.13 | 21.12 | 65.14 | 25.18 | 0.001* |
| Vitality | 46.16 | 18.13 | 60.15 | 28.12 | 0.001* |
| Social function | 48.38 | 26.19 | 58.14 | 21.13 | 0.0001* |
| Emotional role limitation | 50.12 | 21.11 | 65.12 | 24.13 | 0,0001* |
| Mental health | 44.16 | 21.13 | 60.12 | 23.19 | 0.001* |

* Significant p (p<0.05).

**Table (4): Frequency distribution of alexithymia using (SAT9) in lichen planus and comparison groups.**

| SAT9 | Lichen planus (N=70) | | Control group (N=50) | | P-value |
|---|---|---|---|---|---|
| | No. | % | No. | % | |
| Alexithymics | 36 | 51.4 | 5 | 10 | 0.0001* |
| Non-alexithymics | 34 | 48.6 | 45 | 90 | |

*significant p (p<0.05)

**Table (5): Frequency distribution of alexithymia in lichen planus with and without psychiatric symptoms.**

| SAT9 | Lichen planus with psychiatric symptoms | | Lichen planus without psychiatric symptoms | | p-value |
|---|---|---|---|---|---|
| | No. | % | No. | % | |
| Alexithymics | 28 | 63.6 | 8 | 30.8 | 0.0001* |

* Significant p (p, 0.05)

**Table (6): Mean scoring on beck depression inventory and Taylor manifest anxiety scales in lichen planus patients with and without psychiatric symptoms.**

| variable | Lichen planus with psychiatric symptoms | | Lichen planus without psychiatric symptoms | | P-value |
|---|---|---|---|---|---|
| | Mean | Sd | Mean | Sd | |
| Beck inventory | 13.33 | 8.21 | 6.35 | 2.79 | 0.001* |
| Taylor anxiety | 24.18 | 9.76 | 11.86 | 7.98 | 0.001* |

* Significant p (p<0.05).

**Table (7): Frequency of categorized events among lichen planus patients with and without psychiatric symptoms.**

| Categorized events | Lichen planus with psychiatric symptoms (N=44) | | Lichen planus without psychiatric symptoms (N=26) | | p-value |
|---|---|---|---|---|---|
| | No. | % | No. | % | |
| Undesirable | 30 | 68.2 | 10 | 38.5 | 0.0001* |
| Desirable | 14 | 31.8 | 16 | 61.5 | 0.001* |

*Significant p ($p<0.05$).

**Table (8): Frequency of salivary cortisol, CD4+ percent and CD4+/CD8+ ratio in lichen planus patients with and without psychiatric symptoms and control group**.

| Variable | Lichen with psychiatric symptoms (N=44) | | Lichen without psychiatric symptoms (N=26) | | Control group (N=50) | | p |
|---|---|---|---|---|---|---|---|
| | N. | % | No. | % | No. | % | |
| **Salivary cortisol (high level)** | 30 | 68.2 | 10 | 38.5 | 0 | 0 | |
| **Low CD4+ %** | 28 | 63.3 | 9 | 34.7 | 0 | 0 | 0.000* |
| **Decreased CD4+/CD8+ ratio** | 30 | 68.2 | 11 | 42.3 | 0 | 0 | |

**Table (9): Correlations between SF-quality of life, Taylor Anxiety scoring, salivary cortisol and immune dysregulations in lichen planus patients.**

| variable | SF-36 quality of life scoring | Taylor anxiety | High salivary cortisol | Immune changes |
|---|---|---|---|---|
| **Morphology of Lesion (Hypertrophic)** | -0.42* | -0.51* | -0.28* | -0.49* |
| **Site of lesion; Genital** | -0.25* | -0.38* | -0.39* | -0.41* |
| **Upper limbs** | -0.71* | -0.42* | -0.36* | -0.29* |
| **Gender (females)** | -0.35* | -0.33* | -0.29* | -0.37* |
| **Occupation(professionals)** | -0.68* | -0.63* | | |
| **Socioeconomic (low status)** | -0.57* | -0.42* | -0.30* | -0.42* |
| **Psychiatric symptoms** | -0.69* | -0.71* | -0.48* | -0.52* |

* Significant p ($p<0.05$).

Table (8) showed that lichen planus patients had increased salivary cortisol and immune dysregulations (low CD4+ % and low CD4+/CD8+ ratio) compared to control. Also, lichen planus patients with psychiatric symptoms showed statistically significant differences regarding neuroendocrine and immunological dysregulations compared to lichen planus patients without psychiatric symptoms ($p<0.05$).

Table (9) showed correlations between some variables (hypertrophic lesions, lesions affecting genitalia or upper limbs, occupations as teachers', nurses' low economic status and presence of psychiatric symptoms) and poor quality of life, higher level of anxiety, high salivary cortisol and immune dysregulations

## DISCUSSION

Psychodermatology is an interesting area for interface between psychiatry and dermatology, as there is a bidirectional interaction or crosstalk between the brain, psyche and skin. This crosstalk may stem

from the fact that the ectoderm is the embryologic origin for nervous and most skin tissue. In addition psychosocial stress could induce autoimmune or inflammatory skin disorders through neuroendocrine and neuroimmune dysregulations as well as dermatologic disorder may result in psychiatric morbidity and negative impact on quality of life. Having bad skin can result in poor self image, lack of confidence especially if the affected areas are exposed.

The present study showed that (63.6%) of lichen planus patients had psychiatrists symptoms with mixed anxiety and depressives being the most frequent (15.7%), followed by social phobia (12.9%), panic symptoms (11.4%), obsessive compulsive predominantly obsessional thoughts and ruminations (10%), and dystymia (5.7%) arranged in order. Magin et al. estimated that 30%-60% (nearly 10 fold that of the general population) of dermatological patients have psychiatric problems and dermatologists should not be surprised by that figure. This is not consistent with Mansur et al. who found that lichen planus patients did not differ from controls regarding psychiatric disorders[9]. This disagreement may be due to differences in methodology and sample selections.

Regarding health related quality of life our results showed statistically significant differences between lichen planus and control group on five subscales (physical function, vitality, social functions, emotional role and mental health). The presence of psychiatry symptoms in subgroup of lichen planus increases the negative impact on life quality as demonstrated by statistically significant lower scoring on SF-36 health related quality of life subscales in lichen planus patients with psychiatric symptoms compared to those without psychiatric symptoms. Due to visibility of skin, dermatological disorder not only associated with cosmetic disfigurement but can result in a variety of psychopathological problems affecting patient, family and society[25]. Some studies suggested that social success correlated positively with physical appearance and the more better looking you are, the more positively people will relate to you[26].

Our results showed alexithymia was more frequent in lichen planus than control group (51.4% versus 10%), and those with psychiatric symptoms had higher frequency of alexithymia than those without psychiatric symptoms with lichen planus (6306% versus 30.8%) indicating that inhibited symbolic functions. This finding is consistent with Mansur et al. who reported statistically significant differences between lichen planus and controls[9].

The results of this study showed that lichen planus patients with psychiatric symptoms scored more on anxiety symptoms using Taylor scale and BID than those without psychiatric symptoms. This may be due to social embarrassment, feeling of inadequacy, low self esteem and impaired coping strategies to deal with physical stress resulting from the disease and psychological stress. This finding is also in agreement with Mansur et al. who reported higher degree of anxiety in lichen planus compared to control[9]. Our results showed that lichen planus with psychiatric symptoms experienced more frequent undesirable events compared to those without psychiatric symptoms. This is consistent with many suggestions considering that psychosocial or stressful

events may precipitate or exacerbate dermatological disorders.

The results of this study showed statistically significant differences regarding neuroendocrine (salivary cortisol) and T-cell mediated immune dysregulations (decreased CD4+ % and low CD4+/CD8+ ratio) in lichen planus and control group and the presence of psychiatric symptoms is associated with more dysregulations. There are conflicting results regarding cortisol and cell mediated immune changes in lichen planus. The neuroendocrine and neuroimmunological findings in skin disorders may be difficult to interpret because it is not fully understood. There may be a multidirectional communications between skins, endocrine, immune, brain as well as other internal organs suggesting the existence of new layer for the regulation of global homeostasis[27]. Some investigators hypothesized that skin has cutaneous neuroendocrine axes equivalent of the hypothalamic–pituitary–adrenal axis (HPA) that would regulate local response to stress independently from the central level[17].

As an attempt to find patients with lichen planus are at higher risk to have poor quality of life, higher anxiety, endocrine and immune dysregulations; correlation analysis was done and we tried to explain these correlative relations between these variables and each other according to our study;

a- Lichen planus lesion morphology hypertophic type. This may be explained by knowing that hypertophic lesions tend to be more itchy sometimes severe enough to interfere with daily activities, hyperpigmentation, chronicity and scaly.

b- Lesion site ;1- genital lesion (may cause psychosexual discomfort, may be confused with sexually transmitted disease and this could result in severe psychosocial distress shame feelings especially in our culture, 2- upper limbs (site of predilection flexors of wrists and forearm) mainly exposed areas increasing sense of disfigurement, decreased self esteem, more anxiety and depression.

c- Gender (females); mainly because the mean age of our sample was 23 .26±9.65 years being at age to have a partner or early marital years; having a dermatological disorder may generate a sense of moving from a beautiful or attractive one to a good or disfigured one

d- Occupational status; those dealing or working with publics or other groups (teachers, nurses...) especially if lichen affecting exposed area or associated with severe itching.

e- Low economic status (may be due to associations with crowdedness which may disturb skin permeability barrier, delaying skin healing in addition to psychosocial and behavioral adverse effects of crowdedness).

f- Psychiatric symptoms (inadequate coping strategies, more psychological stress and more endocrine and immune dysregulations). Our study has several limitations including small size of sample, lack of lichen planus with oral mucosal involvement, lack of correlation of our results with immune studies in skin lesions.

## CONCLUSION

Lichen planus is to some extent a psychosomatic or somatopsychic disease or both. Dermatologists should pay attention to the emotional state of their patients knowing that they treat human beings not a skin lesion. Emotional factors are important

as evidenced by higher frequency of psychiatric symptoms, poor quality of life, higher level of anxiety and neuroendocrine and immune dysregulations. Liason consultations between psychiatrist and dermatologist may more helpful in dealing with lichen planus as an autoimmune disorder with no cure but counseling may help in ameliorating symptoms, improving quality of life and enhancing recovery.

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