

## Integration of Mind and Skin; Psychological Co-morbidity in Dermatology and Skin Signs in Psychiatry

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### Abstract

*Being the largest organ of the body, the skin is known to respond to both exogenous and endogenous stimuli. Whereas it is known that having a dermatological ailment can have a negative effect on one's body image, in addition to one's mental state, it should also be noted that the opposite is also true. That is to say that possessing psychological issues can subsequently lead to dermatological ailments. Considering this, the study aimed to analyze the co-integration of the skin and mind, analyzing the comorbidity of psychiatric disorders and dermatological issues. 30 dermatological patients, 25 psychiatry patients, and 10 control patients were enrolled into the study. Patients were tasked to complete a 21-item Depression, Anxiety and Stress Scale (21-DASS) questionnaire and a 10-item Dermatology Life Quality Index. Each patient was then assessed by a dermatologist and a psychologist. It was found that when compared to the control group, the psychological out-patients were more likely to experience dermatological ailments ( $p < 0.001$ ). In addition, it was found that when compared to the control group, the dermatological patients experienced an overall lower quality of life and a higher 21-DASS test result. Ultimately, it can be seen that one's mental state does in fact, have the potential to affect one's dermatological condition. With that in mind, it has been proposed to utilize stress reduction techniques and psychological intervention as adjuvant treatments for dermatological ailments.*

**Keywords:** Comorbidity, Dermatological, Mind, Mental, Psychological, Skin.

### Introduction

The skin is the largest organ of the body, serving as a protective wrapper that defends the body against injury and infection while modulating environmental influences such as ultraviolet light, heat, cold, and air pollution. The skin is also involved in a range of complex biological processes through its array of nerve endings which are in constant contact with the brain, in addition to its set of immune system cells that help to fend off bacteria and viruses. The mind and skin are two disciplines which are interconnected at the embryonal level through the ectoderm.

The skin has the potential to respond to both exogenous and endogenous stimuli; it can sense

and integrate environmental triggers and transmit intrinsic conditions externally. In several dermatological ailments, such as atopic dermatitis, the tissue level of nerve growth factors and neuropeptide, such as substance P have been associated with the pathogenesis of disease and markers of disease activity [1].

The nervous system influences the skin's immunity through various receptors and neuropeptides.

Research suggests that chronic negative stress can disrupt the function of the skin's permeability barrier, which normally keeps out harmful substances and prevents the loss of fluid from skin cell layers. This kind of disruption is thought to be a major factor in many skin diseases.

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## **Types of Mind-Skin Connections**

### **Psychophysiological**

There are psychophysiological conditions that have a physiological basis but are exacerbated by stress and emotional influence. They include, among others, acne, alopecia areata (hair loss), various types of eczema or dermatitis (skin inflammation), herpes (oral and genital), hyperhidrosis (profuse sweating), pruritus (itching), psoriasis (skin scaling and redness), rosacea (skin flushing and eruption), urticaria and warts.

### **Secondary Psychiatric**

A cosmetically disfiguring or potentially socially stigmatizing skin disorder such as severe acne, psoriasis, vitiligo (the loss of pigmentation in the skin), or genital herpes, that can produce feelings of shame or humiliation, an erosion of self-esteem, depression, anxiety and in produce a lower quality of life. There is much evidence of a correlation between skin disorders and depressive symptoms.

### **Primary Psychiatric**

Some skin difficulties are symptoms of a psychiatric disorder, such as chronic hair-pulling (trichotillomania), the belief that the body is infested with organisms (delusional parasitosis), preoccupation with and distress about an imagined or minor defect (body dysmorphic disorder), and self-inflicted damage to the skin (dermatitis artefacta). Such illnesses require psychotherapy and sometimes psychiatric medications. But a dermatologist, who may be the first health professional the individual sees, can treat damage to the skin or scalp.

Not everyone responds emotionally through the skin, nor do all people react the same way to having a skin problem. But evidence suggests that in some people, psychological issues often intersect with skin physiology, and treating both may offer the best chance for improvement.

Psychiatric comorbidity is high in patients with dermatological conditions, and stress has a

significant impact on the presentation and course of skin disease

The relationship between skin and the brain exists due to more than a fact, that the brain, as the centre of psychological functions, and the skin, have the same ectodermal origin and are affected by the same hormones and neurotransmitters [1].

Psychoderma are toses are the skin changes that are:

1. Caused by psychiatric problems.
2. Cause psychiatric or psychological disorders due to its clinical manifestation.
3. Influence the psychological state and is maintained or aggravated by it.

Psychodermatology refers to the interaction between the mind and skin. Psychiatry involves internal non-invisible disease, and dermatology deals with visible external diseases. Lack of positive nurturing during childhood may lead in adulthood to disorders of self-image, distortion of body image, and behavioral problems [2]. In more than one-third of dermatology patients, effective management of the skin condition involves consideration of associated psychological factors [3]. Dermatologists have stressed the need for psychiatric consultation in general, and psychological factors may be of particular concern in chronic intractable dermatologic conditions, such as eczema, prurigo, and psoriasis [4-6]. More than just a cosmetic disfigurement, dermatologic disorders are associated with a variety of psychopathologic problems that can affect the patient, their family, and society together. Increased understanding of bio-psychosocial approaches and liaison among primary care physicians, psychiatrists, and dermatologists could be very useful and highly beneficial. Psychophysiological disease: Here, psychiatric factors are instrumental in the etiology and course of skin conditions. The skin disease is not caused by stress but appears to be precipitated or exacerbated by stress [7]. The proportion of patients reporting emotional triggers varies with the disease, ranging from approximately 50%

(acne) to greater than 90% (rosacea, alopecia areata, neurotic excoriations, and lichen simplex) and maybe 100% for patients with hyperhidrosis [8]. Stress management, relaxation techniques, benzodiazepines, and selective serotonin reuptake inhibitors (SSRIs) have been found to be useful in these disorders, these will be the aspects in focus for this study.

Psychiatric disorders with dermatological symptoms: Most of these disorders occur in the context of somatoform disorder, anxiety disorder, factitious disorder, impulse-control disorder, or eating disorder. There is not much in the medical literature on this aspect of Psychodermatology, although these conditions have a greater incidence of suicidal tendency. Some examples are dermatitis artefacta, trichotillomania which is presented at a dermatology department and should be treated in liaison with a psychiatrist. Dysmorphophobia is a condition which is also called body dysmorphic disorder or dermatological non-disease [9]. Self-reported "complaints" or "concerns" usually occur in three main areas: the face, scalp, and genitals. Facial symptoms include excessive redness, blushing, scarring, large pores, facial hair, and protruding or sunken parts of the face. Other symptoms are hair loss, red scrotum, urethral discharge, herpes, and AIDS phobia. Associated comorbidity in Dysmorphophobia may include depression, impairment in social and occupational functioning, social phobias, OCD, skin picking, marital difficulties, and substance abuse [10-11]. SSRIs, clomipramine, haloperidol, and cognitive-behavioral therapy have been used in this condition with variable success [12-13].

Realistic goals in the treatment of Psychodermatology diseases include reducing pruritus and scratching, improving sleep, and managing psychiatric symptoms such as anxiety, anger, social embarrassment, and social withdrawal. Non-pharmacologic management may include psychotherapy, hypnosis, relaxation training, biofeedback, operant conditioning, cognitive-behavioral therapy,

meditation, affirmation, stress management, and guided imagery. As research continues to show, the skin is intensely affected by everything that goes on in mind and retrogradely triggers thoughts and emotions. There is a permanent mind - nervous system - skin connection and reciprocal relation between these three areas. The skin sends messages to the nervous system and the mind, and this influences the skin [14-15].

From this interaction, the field of Psychodermatology was developed, which can be defined as the concept that encompasses all the personal and social consequences of dermatoses and the mental and emotional mechanisms involved in their origin, maintenance, or aggravation.

The burden of skin disease represents more than just the economic burden and may not be measured by classic morbidity or mortality data. Rather, it represents the overall influence of skin disease on patients (including quality of life issues), their families, and society (Barendregt et al., 1997; Murray and Lopez, 1997; Lopez and Murray, 1998). There is a relative (almost absolute) lack of data for most of these burdens and, more importantly, a deficiency of valid instruments to measure them at this time [16] according to a history on movement on the association for psychocutaneous medicine of North America (APMNA) website reports that there are very few Psychodermatology clinics in North America and most medical school curriculum doesn't include Psychodermatology, as well as there, are limited researches and research funding in this area [18].

Skin diseases are not just a cosmetic concern; they have a strong relationship with psychiatric reactions that affect a patient's level of functioning and is agonizing for the family. Psychiatric disturbance resulting from dermatological disease or dermatological drugs is not fully understood. For instance, Isotretinoin which is used for recalcitrant acne, has been implicated in causing mood swings, depression, and suicidal tendencies. There are conflicting

reports on the use of Isotretinoin and depression or suicidal tendencies. There should be more studies to support the exact cause in the use of Isotretinoin, acne itself and psychiatric symptoms. In a survey of the National Rosacea Society conducted in 2014, including 1,675 rosacea patients, revealed that 90% of respondents reported low self-esteem, 54% reported anxiety and helplessness, and 435 of patients reported depression [18]. Since Psychodermatology is relatively a new field, there is relatively little literature to support the importance of mind and skin co-relation and hence building up an inter-professional relationship between a Psychiatrist and Dermatologist. There should be more research-based literature available to support the pathophysiology and management of psychocutaneous disorders. There are multiple questionnaires that have been developed to measure the quality of life (QOL) in patients with skin diseases, but due to validation of research techniques, this still needs to be explored in the future [17].

The thesis would be focusing on Psychiatric disorders with dermatological symptoms and Dermatological disorders with psychiatric symptoms emphasizing the co-relation between mind and skin. The hypothesis will test the integration of Mind and skin, psychological comorbidity in dermatology, and skin signs in psychiatry.

## Methods

A study was conducted to investigate the psychodermatology co-relation. The study had an observational case-control trial. The study was initiated within a dermatology department in a well-known medical clinic in Kuwait and psychiatry department in an out-patient clinic in Pakistan. There were 30 participants in the dermatology department, 25 adult out-patients and 10 co-employees volunteer participants that were assessed at the Clinical department of Dermatology and Venereology at a medical center in Kuwait.

The total number of subjects was 30 patients in the dermatology department and 25 patients in the psychiatry outpatient clinic. 10 patients were recruited as controls accompanying the psychiatric patients in the out-patient clinic. Out of 30 patients in the dermatology department, 20 were females and 10 males with a mean age of  $38 + (-) 8.7$  years. The number of subjects in the psychiatry department was 25, among which 15 were psychiatric patients, and 10 subjects were controls. There were 22 female patients and 13 male patients, with the mean age being  $42.7 + (-) 6.5$  years.

The primary psychiatric disorders which were studied in the psychiatry OPD clinic included schizophrenia, depression, anxiety, obsessive-compulsive disorder; The patients' most frequent skin diseases in the dermatology department were Urticaria 41.67%, Psoriasis 33.33%, Vitiligo 28.57%, and Atopic Dermatitis 20% (Table-1).

The psychiatry department enrolled 25 patients who came with psychological issues but were observed to have skin signs, among which dermatitis artefacta 44%, Trichotilomania 36%, and Delusional Parastosis 20% were common (Table-2). 15 control subjects were recruited for the study as control who were taken from those accompanying the patient.

The inclusion criteria in the dermatology department required participants to be 18 years old or above, being able to read, write while not suffering from any mental retardation to accurately answer the questionnaire. Depression, anxiety, and stress were self-assessed by participants using a 21-item Depression, Anxiety, and Stress Scale (DASS-21) [21-22].

Each item had four possible responses (never, sometimes, often, and almost always) represented by scores of 0, 1, 2, and 3, respectively [21-22]. Participants were considered to have a negative emotional state if they suffered from at least one symptom of depression, anxiety, or stress, according to their questionnaire responses. Quality of life (QOL) was assessed using the validated Arabic version

of the 10-item Dermatology Life Quality Index (DLQI) [23-24]. The DLQI is a self-administered tool that evaluates the impact of dermatological diseases on QOL [23-24]. Items were scored on a four-point scale (range: 0–3); a score of <1 was considered to indicate an adequate QOL [23-24]. Also, GAD-7 was used to assess anxiety levels in the patients.

Psychologists ensured the professional informing of the participants. Each participant had to complete a questionnaire and give it to the consultant before being examined clinically. Dermatologists examined each patient and recorded their diagnosis, in addition, secondary diagnoses were recorded, such as cardiovascular disease, chronic respiratory disease, diabetes, and rheumatological disease.

The volunteer samples were recruited from co-employees and staff members of the dermatology department of private medical center Kuwait. A complete information about the study was given to the employees with skin conditions, and they were handed out a questionnaire about QOL and an anxiety questionnaire after giving informed consent. Information about co-morbidities were self-reported and recorded.

The inclusion criteria in the psychiatry department was age between 18-50 years while possessing a primary psychiatric disorder. Exclusion criteria was any patient that did not fulfill the inclusion criteria, patients with systemic disorders associated with these chronic diseases such as liver and renal problems, and patients with a debilitating disease. Psychiatric consultation by a psychiatrist was done, and statistical manual of mental disorders (DSM IV) criteria that describes the symptoms of mental disorders was used to meet the criteria for diagnosis of mental disorders. General clinical examination and investigations to exclude systemic diseases were done (complete blood count, liver, and renal function tests, fasting blood sugar) hormonal investigations were also performed.

## **Selection of Subjects Free from Psychiatric Problems:**

Individuals free from psychiatric problems were recruited from those accompanying patients after explaining the purpose of the study and taking verbal consent.

### **Inclusion Criteria**

Inclusion criteria for controls are Individuals free from psychiatric symptoms. Age, sex, and social class matched to patient's group.

### **Exclusion Criteria**

Exclusion criteria for controls are Individuals with any systemic disease, such as liver problems, renal disease, or diabetes.

All participants underwent the following:

1. Psychiatric consultation by psychiatrist using the diagnostic and statistical Manual of Mental Disorders (DSM IV) Criteria that describes the symptoms for all mental disorders and the criteria that should be obtained to establish a diagnosis of each disorder or exclude psychiatric disease of healthy participants after taking a medical history of psychiatric disease of each patient.
2. A detailed history was taken on Skype by the dermatologist, and photographs of the involved areas were reviewed. In some cases, for skin examination, patients were referred to a local dermatologist and were advised to bring a report.
3. A specially designed form including the name, age, sex, address, marital history, smoking history, education, occupation, and special habits was to be filled by all participants.
4. Laboratory investigations were done (CBC< LFT's, RFT's, Blood glucose). In some cases, hormonal investigations.

## **Measuring Instruments**

Quality of Life was measured using the Dermatology Life Quality Index (DLQI), from which a total score is calculated (ranging from 0 to 30). A high DLQI-value implicated severe

detriment to the quality of life because of skin condition.

Generalized Anxiety Disorder – 7 items (GAD-7) scale was used to score the anxiety level.

DSM-IV: Psychiatric Diagnoses are categorized by the Diagnostic and Statistical Manual of Mental Disorders, 4<sup>th</sup> Edition. Better known as the DSM-IV, the manual is published by the American Psychiatric Association and covers all mental health disorders for both children and adults. It also lists known causes of these disorders, statistics in terms of gender, age at onset, and prognosis as well as some research concerning the optimal treatment approaches.

### **DASS-21**

The DASS is a clinical assessment that measures the three related states of depression, anxiety and stress. It has 21 questions. [22]

### **Statistical Analysis**

Data collected was reviewed and given a unique ID. Skin issues and psychiatric illnesses were compared using  $\chi^2$  tests as categorical variables and t-tests for continuous variables,  $p < .05$  was used for statistical significance.

In order to exhibit a graphical display, the relationship between skin disease and psychiatric illness, the patients were classified to have a prevalent, intermittent, or incidental finding of skin issue (Figure-1). Patients who reported often having skin disease were prevalent cases, those who rarely said skin disease were intermittent cases, and those who never had skin issues were incidental cases.

### **Results**

When compared to healthy controls or the general population, dermatology patients were more likely to suffer from anxiety and depression; in a 13% versus 3.7% and 5.8% versus 0.9% of dermatology patients versus controls suffered from anxiety and depression, respectively.

Prevalence rates of depression, anxiety and stress were 12.6% (95% CI: 8.8–17.3%), 22.1%

(95% CI: 17.1–27.7%) and 7.5% (95% CI: 4.6–11.4%), respectively. The prevalence of at least one of these negative emotional states was 24.4% (95% CI: 19.3–30.2%). Table-1 presents rates of depression, anxiety, stress, or at least one of these negative emotional states in relation to demographic and clinical data. Those with poor QOL were also significantly more likely to be depressed compared to those with adequate QOL (15.6% versus 1.9%;  $P = 0.007$ ).

It was found that there was a higher percentage of skin diseases in psychiatric patients (20 subjects; 80%) as compared to the control group, which only had 2 patients (20%) ( $p < 0.001$ ). The number of psychiatric patients with skin infections was 20, and non-psychiatric patients (the control group) were 2 subjects with infectious skin disease. The number of patients with dermatitis artefacta was 9, those who had delusional Parasitosis were 4, and 7 patients with obsessive-compulsive disorder had Trichotillomania and infectious disease. The frequency of infectious versus noninfectious diseases was higher in psychiatric patients ( $p < 0.001$ ).

### **Discussion**

The relationship between stress and skin has existed and been documented since ancient times. The recent clinical observations show that psychological stress is linked to various skin disease onset or aggravation. As mentioned, the skin is the largest organ of the body and the primary organ for external stressors such as heat, cold, pain, and mechanical tension. The skin and its appendages are also a local source for factors that cause various immune and inflammatory responses. Stress conditions exert their effects on the skin mainly through the HPA-axis. The peripheral HPA system is fully developed by the skin, which produces CRH, ACTH, and their receptors in the skin cells. CRH is produced by epidermal and hair follicle keratinocytes, melanocytes, sebocytes, and mast cells upon stress, including immune cytokines, UV irradiation, and cutaneous pathology [19-20].

Meanwhile, acute stress has an impact on innate and adaptive immune responses. Finally, chronic stress suppresses immunoprotection, increases skin infections, and exacerbates some allergic inflammatory diseases.

In the study, we attempted to co-relate the skin-brain connection, the detrimental effect of dermatological diseases on quality of life and skin signs in psychiatric patients which reveals the importance of emerging psychodermatology and treating patients holistically.

This study highlights the importance of Psychodermatology, considering the connection between the mind and skin when managing a patient with dermatological problems. A holistic approach should be considered; due to the fact that, as seen in our study, stress can aggravate or cause skin disease, and skin diseases itself can cause psychological issues. Our study highlights the importance of combining medical treatment with a psychiatric approach, including techniques for stress reduction to improve one's quality of life and a better prognosis for the patient. It also highlights the importance of the presence of a psychiatry department in collaboration with the dermatology department in order to manage the patient holistically and provide a better outcome with a good quality of life.

## Figures and Tables

**Table 1.** Dermatology Department Patients

Dermatological Diseases	30 Patients	25 Adult O/P		10 Volunteers	
		Numbers	Percentage	Numbers	Percentage
Psoriasis	6	4	20.00%	2	20.00%
Vitiligo	7	5	25.00%	2	20.00%
Urticaria	12	4	20.00%	5	50.00%
Atopic Dermatitis	5	7	35.00%	1	10.00%
<b>Total</b>	30	20		10	

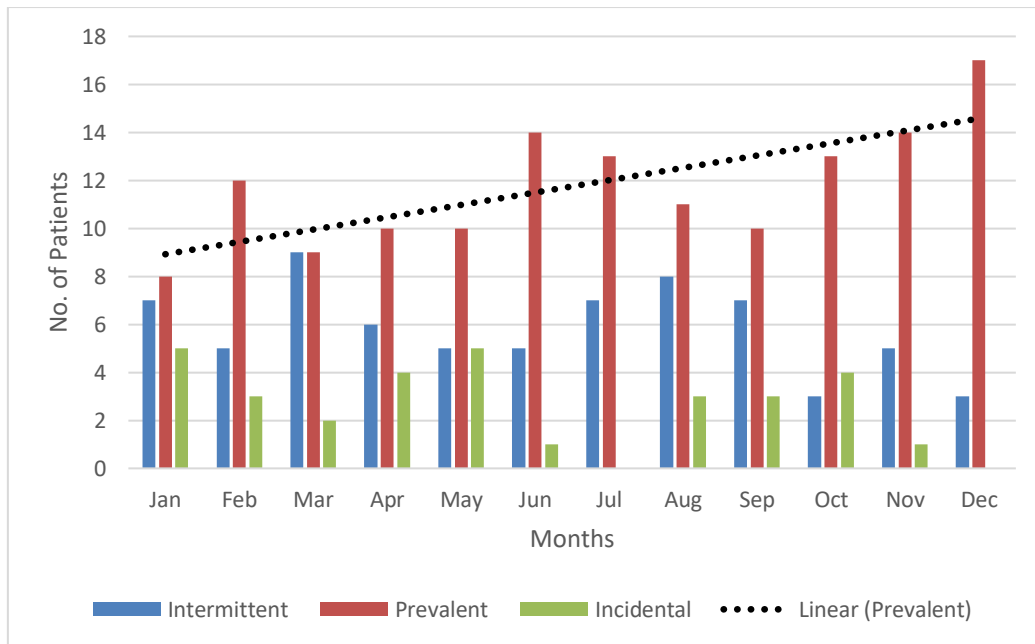
**Table 2.** Skin Diseases in Psychiatric Patients

Skin Diseases	Patients	Percentage of Total Enrolled Patients
Dermatitis Artefacta	9	36.00%
Trichotilomania	7	28.00%
Delusional Parastosis	4	16.00%
Total	20	80%

Stress reduction techniques and psychological intervention are proposed as adjunctive treatment in skin diseases. Since our study involves a small group of patients which limits the study, in addition to a long distance to examine skin signs in psychiatric patients is another limitation. The study examines a heterogeneous group rather than analyzing the skin disease individually for separate analysis. Considering the limitations of the study it is suggested that inclusion of clinical assessment of skin diseases as well as psychological interventions in a large-scale population-based cohort study is required.

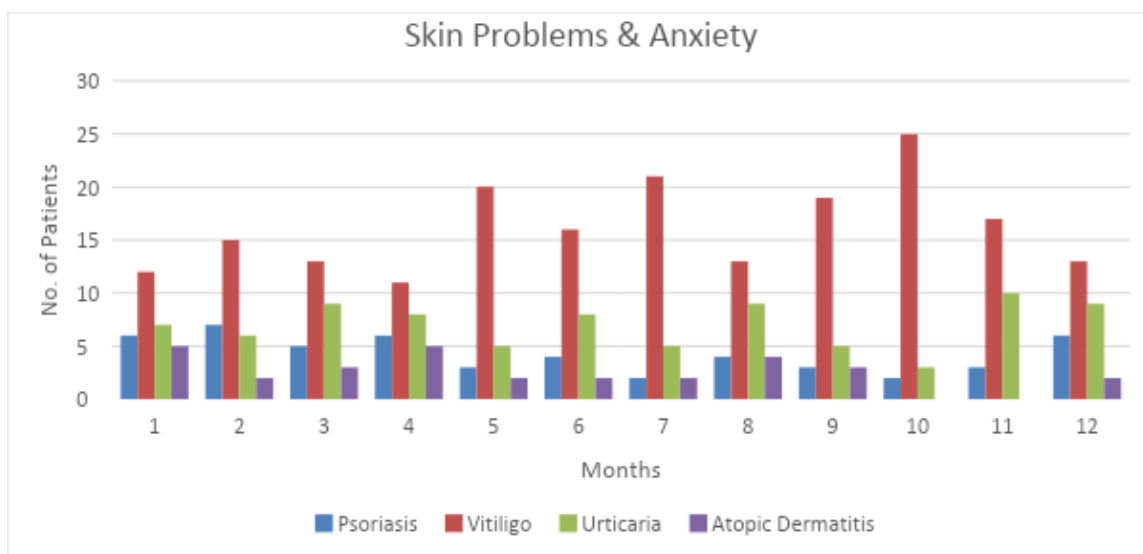
## Conclusion

The mind and skin inter-relationship has been studied extensively at the cellular and molecular level in various studies. The results of our study show that patients with depression undergo more physical illness and show skin signs while patients with chronic skin diseases suffer from a depressive illness which displays that the state of one's mind has a remarkable impact on how the illness is perceived its severity and its content. Stress reduction techniques and psychological intervention are proposed as adjunctive treatments in skin diseases.



**Figure 1.** The Prevalence of an Impaired Quality of Life Amongst Patients with Skin Ailments Over the Course of One Year

Figure - 1 demonstrates that patients with intermittent skin problems had the second-highest level of QOL. Patients with incidental skin problems were the least impacted.



**Figure 2.** Reported Cases of Anxiety in Patients with Psoriasis, Vitiligo, Urticaria and Atopic Dermatitis Over the Course of One Year

Figure - 2 shows that Vitiligo and Psoriasis patients had the highest level of anxiety. Urticaria intermediate level and Atopic Dermatitis was at a minimal level. Generalized estimating equation (GEE) analysis was performed to determine the longitudinal relationship between skin diseases and psychological symptoms. In this, the dependent variable was skin disease, and the independent variable was the psychological symptoms.



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