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# Psychiatric Comorbidity and Psychosocial Impairments in Children with Dermatologic Disorders

## Dermatolojik Bozukluğu Olan Çocuklarda Psikiyatrik Komorbidite ve Psikososyal Bozulma

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### ABSTRACT

**Objective:** Few studies have explored the psychiatric comorbidity, psychological and social factors in the field of pediatric psycho-dermatology, thus the literature about children and adolescents is limited. In this study, we aimed to find out the prevalence and pattern of psychiatric comorbidity and to investigate the impacts of dermatological problems on psychological well-being, school performance, self-esteem in children suffering from dermatologic disorders. **Method:** In total, 247 consecutive outpatients with different dermatologic disorders aged 4–17 years (143 (52.9%) females, mean age 11.81±3.40 years) were included in this study. A semi-constructed diagnosis interview and The Diagnostic and Statistical Manual of Mental Disorders (DMS-5) criteria were performed to establish a psychiatric diagnosis according to the age range of the child and adolescent. A specially prepared personal information sheet, Rosenberg Self-Esteem scale and Strengths and Difficulties Questionnaire were applied. **Results:** The prevalence of psychopathology was found to be 58.7% in our study population. The most common psychiatric comorbidities were anxiety disorders, mood disorders, attention deficit hyperactivity disorder and disruptive behavior disorders. Dermatologic diagnoses were divided into 8 groups. The riskiest dermatologic diagnostic groups in terms of psychopathology, self-esteem, body appreciation anxiety, academic performance, social isolation, stigmatization, significant association with psychosocial stressors at onset and/or exacerbation were psoriasis, primary psychiatric disorders, pigmentation disorders and hair disorders. **Conclusions:** Psychiatric comorbidity is quite common (58.7%) in the pediatric population with dermatologic disorders. The impacts upon the psychosocial functioning of dermatologic conditions are also enormous. Both dermatologists and child and adolescent psychiatrists should be well aware of psychiatric disturbance or psychosocial impairment, and patients should be meticulously assessed for psychiatric support.


**Keywords:** Pediatric psychodermatology, child psychiatry, psychiatric comorbidity, psychosocial factors, stress.


### ÖZET

**Amaç:**Sınırlı sayıda çalışma, çocuk psikodermatolojisi alanında psikiyatrik komorbidite, psikolojik ve sosyal faktörleri araştırmıştır, bun edenle çocuklar ve ergenlerle ilgili literatür sınırlıdır. Bu çalışmada, dermatolojik bozukluğu olan çocukların psikiyatrik komorbidite prevalansını ve örüntüsünü ortaya koymayı ve dermatolojik problemlerin psikolojik iyilik, okul performansı, benlik saygısı üzerindeki etkilerini araştırmayı amaçladık. **Yöntem:**Çalışmaya 4-17 yaş arası (ortalama yaş 11.81 ± 3.40 yıl), farklı dermatolojik bozukluğu olan 143'ü (% 52.9) kadın, 247 ayaktan hasta dahil edildi. Çocuğun ve ergenin yaş aralığına göre, psikiyatrik tanı koymada, yarı yapılandırılmış tanı görüşmesi ve Ruhsal Bozuklukların Tanısal ve İstatistiksel El Kitabı (DSM-5) kriterleri uygulandı. Özel olarak hazırlanmış kişisel bilgi formu, Rosenberg Benlik Saygısı Ölçeği ile Güçler ve Güçlükler Anketi kullanıldı. **Bulgular:**Çalışma grubumuzda psikopatoloji prevalansı % 58.7 olarak bulundu. En sık görülen psikiyatrik eştanılar anksiyete bozuklukları, duygu durum bozuklukları, dikkat eksikliği hiperaktivite bozukluğu ve yıkıcı davranış bozukluklarıydı. Dermatolojik tanılar 8 gruba ayrıldı. Dermatolojik tanı grupları içerisinde psikopatoloji, benlik saygısı, bedensel beğenilme kaygısı, akademik performans, sosyalizolasyon, damgalama, başlangıç ve / veya alevlenmedeki psikososyal stress faktörlerinin varlığı açısından en riskli olanlar psöriyazis, primeri psikiyatrik bozukluk olanlar, pigmentasyon bozuklukları ve saç bozuklukları idi. **Sonuç:**Dermatolojik hastalığı olan çocuk popülasyonunda psikiyatrik eştanıoldukça yaygındır (% 58.7). Dermatolojik hastalıkların psikososyal işlevler üzerindeki etkileri de çok fazladır. Hem dermatologlar hem de çocuk ve ergen psikiyatristleri psikiyatrik bozukluklar veya psikososyal bozukluğun farkında olmalıdır ve hastalar psikiyatrik destek açısından titizlikle değerlendirilmelidir.


**AnahtarKelimeler:** Pediatrik psikodermatoloji, çocuk psikiyatrisi, psikiyatrik eştanı, psikososyal faktörler, stres

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## INTRODUCTION

The skin is our largest organ with its social, psychological and biological functions. It has further features such as expressing feelings and the development of ego-integrity and self-esteem. Psychodermatology, a branch of neglected dermatology until the last decades, examines diseases affecting the mind and skin.[1-3] In practice, the relationship between psychiatry and dermatology is bidirectional. Dermatologic conditions can result in social, emotional and psychological problems and cause negative effects on self-esteem, while, in the reverse direction, many dermatologic disorders are affected and/or worsened by emotional state, psychosocial variables, conflicts, stress. In addition to psychiatric disorders induced by drugs used in dermatology, some psychiatric drugs can different dermatological adverse effects.[1-3]

It is reported that at least one-third of adult patients with dermatologic conditions have psychological impairment and psychiatric disturbance. Among all psychiatric morbidity are reported usually anxiety, depression, obsessive-compulsive disorders (OCDs) or somatoform disorders.[1-3] Besides decreased self-esteem, social isolation and negative stigmatization, in the pediatric context, it has also been shown that the risk of developing behavioral difficulties is high and academic performance and quality of life may be negatively affected.[4-9] However, the field of pediatric psychodermatology has not been studied in as much detail as in adults except atopic dermatitis, thus, information on the pediatric dermatology subspecialty is limited.[10]

In this study, we aimed to detect the frequency and type of psychiatric comorbidity in children and adolescents who referred to the dermatology outpatient clinic and to investigate the sociodemographic and clinical characteristics that affect these co-morbid conditions. As a second objective, it was aimed to determine the impacts of dermatological problems on psychological well-being, school performance, self-esteem, individual relationships. We hypothesized a significant and positive relationship between the presence and severity of pediatric dermatologic conditions and psychiatric comorbidity and impaired psychosocial functioning. Thereby the current study aimed to fill the knowledge gap on pediatric psychodermatology and contribute to the literature.

## MATERIALS and METHODS

### Participants:

This cross-sectional study was carried out on children and adolescents with dermatologic disorders attending the outpatient clinic of the Department of Dermatology, Sivas Cumhuriyet University Hospital. Ethical approval was obtained from the Human Research Ethics Committee of Cumhuriyet University before the study. All the patients (n=392) were enrolled between March 2018 and August 2018. One hundred forty-five patients were dropped out: 38 parents refused to participate due to shortage of time (21 parents) or their opinion about the uselessness of the study for themselves (17 participants and their parents), and one hundred and seven patients were excluded as they did not meet the inclusion criteria. Two hundred forty-seven volunteers participated in the study. All consecutive admissions for dermatologic disorders were considered for inclusion in the study, and all participants were outpatients. The only inclusion criterion was at least one dermatological disease that lasted longer than three months regardless of the presence of medical diseases and/or psychiatric disorders. Only patients with dermatological conditions lasting less than three months were excluded from the study. After a full verbal explanation of the study, all children and adolescents accepted to participate in the study, and written and verbal informed consent was obtained from all parents.

### Data Collection Tools

**Questionnaire:** Sociodemographic data, medical and psychiatric history, family history and dermatologic information were obtained with a questionnaire designed by the researchers. This personal information form also included questions regarding chronic stressors and traumatic life events. Major events that could be a source of psychological stress were addressed as chronic stress or traumatic life events. These events, which are evaluated by the researchers during the interviews with children and their parents, are listed as follows: separation and losses (family and relationship, object, hobby, mourning), relationship problems (parent, peer, flirt, teacher and important others), be witnesses or victims of any abuse, sudden disease development, hospitalization or operation, the birth of a sibling, starting school, situations related to school and education (exam anxiety, periods of school reports, academic failure), school and environmental change, domestic conflict, the divorce of parents, sudden financial difficulties and other difficulties reported by patients and families. In addition, questions about the impacts of dermatological disease on psychosocial functioning were included in this form (impacts on academic performance, self-esteem/ body appreciation anxiety, social withdrawal /stigmatization), and the questions were evaluated according to self-reports of the children and parents and the psychiatric scales we used. The severity of dermatological disorder was coded as mild and

moderate-severe by two dermatologists according to hospital records, anamnesis, and clinical examination. This questionnaire was evaluated by the researchers during psychiatric and dermatologic examinations.

Psychiatric disorders were diagnosed through DSM-5[11] criteria and KSADS-PL for the 0-6 age group and the other age groups, respectively.

**Kiddie Schedule for Affective Disorders and Schizophrenia for School-Age Children-Present and Lifetime Version (K-SADS-PL):** K-SADS-PL was developed by Kaufman et al[12]., and adapted for Turkish populations by Gokler et al[13]. K-SADS-PL is a semi-constructed diagnosis interview in order to identify current and past episodes of psychopathology in children and adolescents. Current and past symptoms were scored using three-point scales (1="not present," 2="subthreshold," 3="threshold").

After clinical examination, the following tests were performed according to the age range of the participant:

**Rosenberg Self-Esteem Scale (RSES):** The RSES is a tool that focuses on self-esteem an individual has for their own value. It consists of 10 questions and is rated on a 4-point Likert scale ranging from 1 (strongly disagree) to 4 (strongly agree). The questionnaire was developed by Rosenberg[14], and the Turkish validity and reliability study was performed by Cuhadaroglu[15], and self-esteem scores are between 0 and 30, and a high score shows high self-esteem.

**Strengths and Difficulties Questionnaire (SDQ):** The SDQ is used for evaluating emotional and behavioral problems in children and adolescents aged between 4–17 years (parent form), there is also a self-report version for those aged 11-17. The instrument includes 25 items subdivided into five subscales: emotional symptoms, conduct problems, inattention-hyperactivity, peer problems and prosocial behavior.[16] Each item is rated on a 3-point scale as 0 (not true), 1 (somewhat true), or 2 (certainly true). The "Total Difficulty Score" is derived from the sum of all items on the first four subscales and prosocial behaviors reflect the "Strengths Score". In this study, we took these two scores into account using the parent and adolescent versions. The Turkish validity and reliability study was conducted by Guvenir et al.[17]

**Statistical Analysis:**

All statistical analyses were performed using IBM SPSS Statistics version 23 (IBM Corp., Armonk, NY, USA). The numerical and categorical data were expressed as mean ± standard deviation (SD), number (n), median (min-max), and percentage (%) whenever appropriate. Statistical analyses were evaluated with non-parametrical tests (Mann-Whitney-U-Test and Kruskal-Wallis-Test) since the data was not normally distributed as assessed by the Kolmogorov-Smirnov-Test. Group differences for demographic variables were examined by one-way ANOVA or $\chi 2$-test. Significance was set at $p<0.05$.

## RESULTS

### Demographic and Familial Characteristics of Participants

Of the 247 participants, 104 (42.1%) were male, 143 (52.9%) were female and the mean age was 11.81±3.40 years (min-max: 4-17). Participants were divided into 3 groups according to age: preschool (n=27, 10.9%), school-age (n=90, 36.4%) and adolescence (n=130, 52.6%).
Dermatologic disorders by age group and gender are shown in Table 1. No significant difference was determined between different dermatologic diagnosis groups in terms of gender, but age varied by diagnostic group ($p<0.001$). Accordingly, the mean age of acneiform dermatoses, hair disorders, and psoriasis groups were significantly higher than in other diagnostic groups. Acneiform dermatoses, psoriasis, primary psychiatric disorders and hair disorders were not detected in any of the preschool age group. As expected, acneiform dermatoses were most common in the adolescent age group.

The patients in different dermatologic diagnosis groups did not differ in terms of place of residence, family income, family structure, having any chronic disease, the parental educational status and profession, parental attitudes (all p-values $>0.05$) (data not shown).

### Psychosocial stressors and traumatic life events

Chronic stressor(s) and traumatic life events are presented in Table 2. Patients with psoriasis, hair disorders, pigmentation disorders and primary psychiatric disorders had significantly higher stressor(s) or traumatic life events than other dermatologic groups ($p<0.001$). Psychosocial stressor(s) had a temporary relationship with onset and/or exacerbation of dermatologic disorders in 134 (54.3%) of all patients. This temporary relationship was 100% in the group with primary psychiatric disorders. The temporary relationship were detected in at least two-thirds of patients with psoriasis, pigmentation disorders and hair disorders, and this rate was significantly higher than the other groups ($p=0.004$). Also, past psychiatric disorders were detected in at least 75% of the patients with primary psychiatric disorders, pigmentation disorders and

psoriasis, and this rate was significantly higher than the other groups (p<0.001)

**Table 1. Dermatologic disorders according to age groups and gender**

| | Gender | | p-value[a] | Age groups | | | p-value[a] | The average age (Median, min-max) | p-value[b] |
|---|---|---|---|---|---|---|---|---|---|
| **Dermatologic disorders** | **Male (N=104)** | **Female (N=143)** | | **0-6 ages (N=24)** | **7-11 ages (N=91)** | **12-18 ages (N=132)** | | | |
| Acneiform dermatoses (n, %) | 30(55.6) | 24 (44.4) | | 0 (0) | 5 (9.3) | 49 (90.7) | | 14.61±1.48<br>15 (10-17) | |
| Psoriasis (n, %) | 7 (33.3) | 14 (66.7) | | 0 (0) | 9 (42.9) | 12 (57.1) | | 12.05±2.41<br>12 (8-16) | |
| Inflammatory eczematous and allergic dermatoses (n, %) | 17 (30.9) | 38 (69.1) | | 13 (23.6) | 25 (45.5) | 17 (30.9) | | 10.05±3.90<br>11 (4-17) | |
| Infectious dermatoses (n, %) | 12 (44.4) | 15 (55.6) | | 8 (29.6) | 11 (40.7) | 8 (29.6) | | 9.74±3.66<br>10 (4-16) | |
| Primary psychiatric disorders (n, %) | 4 (30.8) | 9 (69.2) | 0,193 | 0 (0) | 7 (53.8) | 6 (46.2) | **<0.001** | 11.77±2.86<br>8<br>12 (7-16) | **<0.001** |
| Pigmentation disorders (n, %) | 7 (43.8) | 9 (56.3) | | 2 (12.5) | 7 (43.8) | 7 (43.8) | | 11.81±2.68<br>12 (5-16) | |
| Hair disorders (n, %) | 17 (51.5) | 16 (48.5) | | 0 (0) | 15 (45.5) | 18 (54.5) | | 12.00±2.70<br>12 (8-16) | |
| Others (n, %)* | 10 (35.7) | 18 (64.3) | | 4 (14.3) | 11 (39.3) | 13 (46.4) | | 11.50±3.27<br>11 (5-16) | |

[a]Chi-square test, [b]Kruskal Wallis test, Bold font indicates statistical significance: P < 0.05
Data were given as mean±standard deviation or number (%).
*Nail disorders, hemangiomas, hyperhidrosis, hirsutism, nevi, dermatitis herpetiformis, pernio, callus, livedo reticularis, Reynold phenomenon, keloid scar

**Table 2: Sociodemographic and psychosocial variables of the participants**

| **Variables** | **AD (N=54)** | **Psoriasis (N=21)** | **IEAD (N=55)** | **ID (N=27)** | **PPD (N=13)** | **PD (N=16)** | **HD (N=33)** | **Others* (N=28)** | **p-value[a]** |
|---|---|---|---|---|---|---|---|---|---|
| Chronic stressor(s)/ traumatic life events | | | | | | | | | |
| Yes (n,%) | 17 (31.5) | 12 (57.1) | 7 (12.7) | 6 (22.2) | 9 (69.2) | 8 (50) | 19 (57.6) | 6 (21.4) | **<0.001** |
| No (n,%) | 37 (68.5) | 9 (42.9) | 48 (87.3) | 21 (77.8) | 4(30.8) | 8 (50) | 14 (42.4) | 22 (78.6) | |
| Stressor(s) in onset/ exacerbation dermatologic disorder | 6 (11.1) | 10 (47.6) | 7 (12.7) | 4 (14.8) | 5 (38.5) | 7 (43.8) | 10 (30.3) | 3 (10.7) | |
| Family problems (n,%) | 19 (35.2) | 7 (33.3) | 17 (30.9) | 7 (25.9) | 8 (61.5) | 5 (31.3) | 11 (33.3) | 8 (28.6) | **0.004[b]** |
| Social-peer and school problems (n,%) | | | | | | | | | |
| No (n,%) | 29 (53.7) | 4 (19.0) | 31 (56.4) | 16 (59.3) | 0 (0) | 4 (25) | 12 (36.4) | 17 (60.7) | |
| Previous psychiatric disorder | | | | | | | | | |
| Yes (n,%) | 17 (31.5) | 16 (76.2) | 7 (12.7) | 9 (33.3) | 10 (76.9) | 12 (75) | 13 (39.4) | 6 (21.4) | **<0.001** |
| No (n,%) | 37 (68.5) | 5 (23.8) | 48 (87.3) | 18 (66.7) | 3 (23.1) | 4 (25) | 20 (60.6) | 22 (78.6) | |

[a]Chi-square test. [b]Chi-square test: After excluding primary psychiatric disorders. Bold font indicates statistical significance: P < 0.05
*Nail disorders, hemangiomas, hyperhidrosis, hirsutism, nevi, dermatitis herpetiformis, pernio, callus, livedo reticularis, Reynold phenomenon, keloid scar
Abbreviations: AD, Acneiform dermatoses; HD, Hair disorders; ID, Infectious dermatoses; IEAD, Inflammatory eczematous and allergic dermatoses; PD, Pigmentation disorders; PPD, Primary psychiatric disorders

## Psychopathology Evaluation Results

More than half of our patients (58.7%) had at least one psychiatric disorder and nineteen patients (7.7%) had at least two psychiatric disorders. Psychopathologies in patients with at least one psychiatric disorder were as follows; anxiety disorders (N=32, 13%), mood disorders (N=26, 10.5%), attention deficit hyperactivity disorder (ADHD) and disruptive behavior disorders (N=19, 7.7%), intellectual disability and learning disorders (N=15, 6.1%), obsessive-compulsive and related disorders (N=13, 5.3%), trauma and stress-related disorders (N=10, 4%) and others (elimination disorders, tic disorders, communication disorders, sleep and eating disorders etc.) (N=11, 4.5%). None of the patients had psychotic disorders, autism spectrum disorders, alcohol or substance abuse.

Subsequently, excluding dermatologic disorders whose origin was psychiatric disorder; psychiatric disorders were divided into 4 groups according to the dominant psychopathology: non-

psychopathology (n=102, 43.6%); internalizing disorders (those with symptoms of depression, anxiety, obsessive-compulsive, and trauma-and-stressor-related disorders, somatic symptom and related disorders) (n=71, 30.3%); externalizing disorders (those with symptoms of conduct disorder, oppositional defiant disorder, attention deficit hyperactivity disorder/hyperkinesis, and tobacco use) (n=34, 14.5%); and others (those with symptoms of intellectual disability and learning disorders, elimination disorders, tic disorders, communication disorders, sleep and eating disorders) (n=27, 11.5%). Psychiatric disorders are given in Table 3. Psychiatric comorbidity significantly differed among the different dermatologic diagnosis groups (p=0.009). Internalizing disorders in psoriasis and hair disorders, and externalizing disorders in acneiform dermatoses and inflammatory eczematous and allergic dermatoses were significantly common (Table 3).

**Table 3: Psychiatric Comorbidity in Patients with Dermatologic Disorders**

| | **Psychiatric disorders** | | | | **p-value[a]** |
|---|---|---|---|---|---|
| **Dermatologic disorders** | **No-psychopathology (N=102)** | **Internalizing disorders (N=71)** | **Externalizing disorders (N=34)** | **Others (N=27)** | |
| Acneiform dermatoses (n, %) | 25 (46.3) | 14 (25.9) | 12 (22.2) | 3 (5.6) | |
| Psoriasis (n, %) | 4 (19.0) | 12 (57.1) | 2 (9.5) | 3 (14.3) | |
| Inflammatory eczematous and allergic dermatoses (n, %) | 27 (49.1) | 12 (21.8) | 8 (14.5) | 8 (14.5) | |
| Infectious dermatoses (n, %) | 17 (63.0) | 2 (7.4) | 3 (11.1) | 5 (18.5) | **0.009** |
| Pigmentation disorders (n, %) | 4 (25.0) | 6 (37.5) | 4 (25.0) | 2 (12.5) | |
| Hair disorders (n, %) | 10 (30.3) | 17 (51.5) | 2 (6.1) | 4 (12.1) | |
| Others* (n, %) | 15 (53.6) | 8 (28.6) | 3 (10.7) | 2 (7.1) | |

[a]Chi-square test. (After excluding primary psychiatric disorders). Bold font indicates statistical significance: P < 0.05
*Nail disorders, hemangiomas, hyperhidrosis, hirsutism, nevi, dermatitis herpetiformis, pernio, callus, livedo reticularis, Reynold phenomenon, keloid scar

Table 4 represents the comparison of psychiatric disorders according to age, gender, severity and duration of dermatologic disorder. Distribution and diversities of psychiatric comorbidity were not significantly affected by age groups (preschool, school age and adolescence) (p=0.058), and duration of dermatologic disorder (p=0.075). Internalizing disorders and other psychiatric disorders in females and externalizing disorders in males were more common but this was not statistically significant (p=0.061). On the other hand, the severity of dermatologic disorder had a significant effect on the distribution and diversities of psychiatric comorbidity (p<0.001); in moderate-severe cases, internalizing disorders were common. We were unable to examine the effect of the body area affected by dermatologic disorder on psychiatric comorbidity because the number of patients was not sufficient for statistical comparison (Table 4).

**Table 4: Comparison of psychiatric disorders according to age, gender, severity and duration of dermatologic disorder.**

| **Variables** | **Psychiatric disorders** | | | | **p-value[a]** |
|---|---|---|---|---|---|
| | **No-psychopathology (N=102)** | **Internalizing disorders (N=71)** | **Externalizing disorders (N=34)** | **Others (N=27)** | |
| **Age Groups** | | | | | |
| Preschool (n,%) | 19 (18.6) | 2 (2.8) | 4 (11.8) | 2 (7.4) | 0.058 |
| School-age (n,%) | 37 (36.3) | 27 (38.0) | 10 (29.4) | 9 (33.3) | |
| Adolescence (n,%) | 46 (45.1) | 42 (59.2) | 20 (58.8) | 16 (59.3) | |
| **Gender** | | | | | |
| Male (n,%) | 47 (46.1) | 24 (33.8) | 20 (58.8) | 9 (33.3) | 0.061 |
| Female (n,%) | 55 (53.9) | 47 (66.2) | 14 (41.2) | 18 (66.7) | |
| **Severity of dermatologic disorder** | | | | | |
| Mild (n,%) | 83 (81.4) | 22 (31) | 17 (50) | 15 (55.6) | **<0.001** |
| Moderate-Severe (n,%) | 19 (18.6) | 49 (69) | 17 (50) | 12 (44.4) | |
| **Duration of dermatologic disorder** | | | | | |
| < 1 year (n,%) | 51 (50) | 22 (31) | 12 (35.3) | 12 (44.4) | 0.075 |
| ≥ 1 year (n,%) | 51 (50) | 49 (69) | 22 (64.7) | 15 (55.6) | |

[a]Chi-square test: After excluding primary psychiatric disorders. Bold font indicates statistical significance: P < 0.05

### Comparison of Psychological Measures of Dermatologic Diagnostic Groups

Self-esteem scores were the lowest in patients with primary psychiatric disorders, again psoriasis and hair diseases were also significantly lower than other groups (p<0.001). Both the Parent Version and Adolescent Version of SDQ differed significantly among dermatologic diagnosis groups. In the Parent Version of SDQ, the total difficulty score of the group with primary psychiatric disorder was significantly higher than all others. In addition, the scores of hair disorders, pigmentation disorders, infectious dermatoses and psoriasis were significantly higher compared to the rest (p<0.001). Similarly, in the parent version of SDQ, prosocial behavior scores which reflect the "Strengths Score" were also significant, and the prosocial behavior score of the group with primary psychiatric disorder was significantly lower than all others (p<0.001). In the adolescent version of SDQ, the total difficulty score of the group with primary psychiatric disorder was significantly highest. In addition, the scores of psoriasis and pigmentation disorders were significantly higher than the others (p<0.001). Likewise, in the adolescent version of SDQ, prosocial behavior scores (strengths scores) differed significantly among groups, and the prosocial behavior score of the group with primary psychiatric disorder was significantly lowest (p<0.001). Comparison of psychological measures of dermatologic diagnostic groups is given in Table 5.

**Table 5: Comparison of Psychological Measures of Dermatologic Diagnostic Groups**

| | | SDQ- Parent Version | | SDQ- Adolescent (Self-report) Version | |
|---|---|---|---|---|---|
| **Dermatologic Disorders** | **RSES Score (mean±sd)** | **Total Difficulties Score (mean±sd)** | **Strengths Score (mean±sd)** | **Total Difficulties Score (mean±sd)** | **Strengths Score (mean±sd)** |
| Acneiform dermatoses (mean±sd) | 22.57±3.86 | 11.96±5.48 | 9.06±1.56 | 10.31±4.58 | 9.53±1.27 |
| Psoriasis (mean±sd) | 18.48± 4.64 | 13.10±4.52 | 9.57±1.02 | 13.50±5.12 | 9.88±0.50 |
| Inflammatory eczematous and allergic dermatoses (mean±sd) | 22.51±3.94 | 10.55±5.25 | 9.00±2.06 | 8.88±3.49 | 9.77±0.58 |
| Infectious dermatoses (mean±sd) | 23.33±3.02 | 13.44±6.44 | 8.56±1.90 | 12.07±5.34 | 9.50±9.41 |
| Primary psychiatric disorders (mean±sd) | 16.08±2.56 | 17.62±1.66 | 7.62±1.26 | 15.10±2.99 | 9.00±0.66 |
| Pigmentation disorders (mean±sd) | 20.27±3.45 | 13.94±5.83 | 9.13±1.40 | 12.29±4.10 | 9.57±0.85 |
| Hair disorders (mean±sd) | 19.30±4.04 | 13.67±5.27 | 9.24±1.39 | 11.46±4.77 | 9.81±0.56 |
| Others* (mean±sd) | 22.56±4.96 | 9.29±4.02 | 9.46±1.97 | 9.28±4.77 | 9.89±0.47 |
| p-value[a] | **<0.001** | **<0.001** | **<0.001** | **0.002** | **<0.001** |

[a]Kruskal-Wallis Test. Bold font indicates statistical significance: P < 0.05

*Nail disorders, hemangiomas, hyperhidrosis, hirsutism, nevi, dermatitis herpetiformis, pernio, callus, livedo reticularis, Reynold phenomenon, keloid scar

Abbreviations: RSES, Rosenberg Self-Esteem Scale; SDQ, Strengths and Difficulties Questionnaire.

### Psychosocial impacts of dermatologic disorders

Table 6 shows the impacts upon psychosocial functioning of dermatologic disorders. Significant differences were observed among the dermatologic diagnostic groups in terms of decline in academic performance which was mostly in the primary psychiatric disorder group (p<0.001). Also, at least half of the patients with psoriasis, pigmentation disorders and hair disorder reported the effect of dermatologic disorder on academic performance and this rate was significantly higher than the rest of the groups.

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**Table 6: The impacts upon psychosocial functioning of dermatologic disorders**

| | **AD (N=54)** | **Psoriasis (N=21)** | **IEAD (N=55)** | **ID (N=27)** | **PPD (N=13)** | **PD (N=16)** | **HD (N=33)** | **Others* (N=28)** | **p-value[a]** |
|---|---|---|---|---|---|---|---|---|---|
| Impact on academic performance | | | | | | | | | |
| Yes (n, %) | 11 (20.4) | 12 (57.1) | 9 (16.4) | 3 (11.1) | 9 (65.2) | 8 (50) | 18 (54.5) | 5 (17.9) | |
| No (n, %) | 43 (79.6) | 9 (42.9) | 46 (83.6) | 24 (88.9) | 4 (30.8) | 8 (50) | 15 (45.5) | 23 (82.1) | **<0.001** |
| Impact on self-esteem / Body appreciation anxiety | | | | | | | | | |
| Yes (n,%) | 49 (90.7) | 16 (76.2) | 18 (32.7) | 10 (37) | 9 (69.2) | 12 (75) | 28 (84.8) | 9 (32.1) | **<0.001** |
| No (n,%) | 5 (9.3) | 5 (23.8) | 37 (67.3) | 17 (63) | 4 (30.8) | 4 (25) | 5 (15.2) | 19 (67.9) | |
| Social withdrawal/ isolation/ stigmatization | | | | | | | | | |
| Yes (n,%) | 26 (48.1) | 12 (57.1) | 14 (25.5) | 8 (29.6) | 8 (61.5) | 9 (56.3) | 23 (69.7) | 10 (35.7) | **<0.001** |
| No (n,%) | 28 (51.9) | 9 (42.9) | 41 (74.5) | 19 (70.4) | 5 (38.5) | 7 (43.8) | 10 (30.3) | 18 (64.3) | |

[a]Chi-square test. Bold font indicates statistical significance: P < 0.05

*Nail disorders, hemangiomas, hyperhidrosis, hirsutism, nevi, dermatitis herpetiformis, pernio, callus, livedo reticularis, Reynold phenomenon, keloid scar
Abbreviations: AD, Acneiform dermatoses; HD, Hair disorders; ID, Infectious dermatoses; IEAD, Inflammatory eczematous and allergic dermatoses; PD, Pigmentation disorders; PPD, Primary psychiatric disorders

Anxiety about bodily appreciation and lower self-esteem were reported significantly higher by patients with acneiform dermatoses, psoriasis, primary psychiatric disorders, pigmentation disorders, and hair disorders than the rest groups ($p<0.001$).
Except for inflammatory eczema and allergic dermatoses, infectious dermatoses and "others" group, an important ration of the participants in all other groups had social isolation and stigmatization ($p<0.001$) (Table 6)

## DISCUSSION

In this study, we have examined the pediatric population with dermatologic conditions in a holistic approach in psychiatric and bio-psycho-social aspects with the cooperation of child/adolescent psychiatry and dermatology specialists, and we found noteworthy differences between different dermatologic diagnostic groups. We found that more than half of our patients (58.7%) had at least one psychiatric disorder and 7.7% had at least two psychiatric disorders. The most common psychiatric diagnoses were internalizing disorders such as anxiety disorders, depression, obsessive-compulsive disorders (OCD), and externalizing disorders such as ADHD and behavioral disorders. In our study population, the incidence of psychopathology was significantly higher in children and adolescents with psoriasis, pigmentation disorders and hair disorder group. This finding may be related to the presence of chronic stress, higher level of social isolation, lower self-esteem, and elevated body appreciation anxiety which are more common in these patients. As for psychiatric diagnoses of dermatologic disorder subgroups, the rates of internalizing disorders in psoriasis and hair disorders; the rates of externalizing disorders in acneiform dermatoses and inflammatory eczematous and allergic dermatoses were significantly common.

In fact, because of the limited number of studies investigated the relationship between pediatric dermatologic disorders and psychiatric comorbidities, data on children and adolescents have not been widely represented in the literature. Still, our study results are consistent with data from a few similar studies on this field.[4-9] Previous studies have reported that psychiatric disorders are quite common in dermatology patients (range from 25% to 43%) and psychiatric morbidity is largely depressive, anxiety or somatoform disorders.[18]Miniksar et al. reported that 57.8% of children and adolescents aged 3-18 years with dermatologic disorders had any psychiatric disorder.[5] Their psychiatric comorbidity pattern is also similar to our findings.

Prior studies have notified a higher prevalence of psychiatric co-morbidity in females among dermatology patients than males. This finding is probably attributable to the fact that females are more prone to psychiatric disorders, give more importance to their appearance and have higher rates of hospital admissions than males.[5, 18]

A study conducted in children and adolescents with dermatologic disorders revealed that adolescents had more psychiatric problems than younger children.[5] Bearing in mind that the nature of this developmental period (such as the idealization of the perfect appearance and the importance of physical attractiveness), it is not surprising that the prevalence of general psychopathology increases markedly during adolescence. In our study, although not statistically significant, psychopathological conditions were more frequent in adolescents and in females. In contrast, as expected, our moderate-severe cases had statistically significantly more psychopathology (predominantly internalizing disorders), which supports some of the previous researches.[4, 6, 7]

Approximately one-third of our patients reported a decline in academic performance owing to dermatologic disorder or its difficulties. We detected that academic performance was more negatively affected in patients with primary psychiatric disorders, psoriasis and pigmentation disorders and hair disorders.

Although not for all, but some of these diagnostic groups, this finding may be explained by having more psychopathology which may affect attention, concentration and learning. Interestingly, school success was not significantly affected by acneiform dermatoses, inflammatory eczematous and allergic dermatoses, which had a higher incidence of ADHD or learning disorders; that are likely to adversely affect academic performance. There is limited data on academic achievement in dermatology. A study has shown that the chronic and itchy features of disorders associated with atopy impair learning and lead to school absenteeism.[19] Our different findings may arise from the characteristics of the study population.

One of our most striking findings is that at least two-thirds of the patients have low self-esteem and a high level of anxiety about bodily appreciation. This finding was mostly seen in acneiform

dermatoses and then in hair disorders, psoriasis, pigmentation disorders and primary psychiatric disorder, respectively. We believe that the finding is due to the fact that in our study group, the majority of patients with these disorders are adolescents. Because, appearance and body image gain great importance in adolescence, and adolescents become extremely oversensitive about how they look. We also observed that a significant proportion of the participants in all diagnostic groups experienced social isolation and stigmatization that we suppose can be ascribable to their external appearance. The results of the previous studies in various dermatologic disorders related to changed body image, social isolation, stigmatization, high physical appreciation anxiety and low self-esteem support our findings.[6-9]

The other remarkable findings of our study are that 34% have chronic stressors and traumatic life events. The participants identified some of these unfavorable psychosocial stressors as the cause of dermatologic disorders and, some as the result of dermatologic disorders. Importantly we determined that 54.3% of all patients had a temporal relationship between the onset and/or worsening of their dermatologic conditions and the psychosocial stressor(s). This confirms that the relationship between psychosocial/psychiatric problems and dermatologic disorders is bidirectional, as reported by some of the researchers.[3]

To summarize our findings in general; the riskiest dermatologic diagnostic groups in terms of psychopathology, self-esteem, body appreciation anxiety, academic performance, social isolation, stigmatization, significant association with psychosocial stressors at onset and/or exacerbation are primary psychiatric disorders, psoriasis, pigmentation disorders and hair disorders.

The strengths of this study are that all pediatric dermatologic disorders are handled in a holistic approach from a bio-psycho-social perspective and that the use of structured interview techniques in a large sample group in the psychiatric diagnosis process. In addition, this study is an important study since it is one of the very few studies examining the relationship between pediatric dermatological disorders and psychiatric comorbidities and psychosocial functioning. Given that in general a single dermatological disease or a single psychiatric disorder is addressed in the relevant literature, another strength of the present study arises from the investigation of all dermatological and all psychiatric disorders without any exclusion criteria. However, our study has certain limitations. First, there was no control group. Second, patients were collected only from outpatient clinics of the dermatology where the disorders are usually evaluated during exacerbation periods, so the findings cannot be generalized. Therefore, our findings need to be replicated and extended in prospective studies and future longitudinal studies including multiple centers will be substantially valuable. Furthermore, it is recommend that future studies use other standard psychometric scales such as Childhood Traumas Scale, Childhood Depression Scale, Anxiety Sensitivity Scale, Body Image Scale, and Peer Bullying Scale, in addition to K-SADS-PL. Future research involving a control group is also needed to explore whether patients respond differently to dermatological treatment models.

In conclusion, our findings show that dermatologic disorders are not only a cosmetic problem but also a health problem that can contribute to the development of various psychopathologies. Also, we observed that psychological distress has an impact on dermatological manifestation. For this reason, a multidisciplinary and holistic approach is essential in order to be more effective in the treatment of pediatric dermatologic disorders; hence, psychopathologies and psychosocial problems would be recognized and treated early in patients who suffered from dermatologic conditions and quality of life would significantly improve.

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