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Epidemiology of pediatric skin diseases in the mid-western anatolian region of Turkey

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ABSTRACT

Background: The field of pediatric dermatology has gained importance with the increment of pediatric patients and the discrepancy of their skin diseases with the adult versions. We aimed to describe frequency and distribution of pediatric skin diseases, and the diagnostic procedures and treatments prescribed.

Methods: Cross-sectional epidemiological study. We collected data about diagnostic patterns, diagnostic methods and treatment modalities in pediatric dermatology outpatient clinic visits over 18 months.

Results: Infectious diseases (27.9%) and among them viral warts (17.5%) were the most prevalent diagnoses, followed by acne-acneiform diseases (19.9%) and allergic diseases (14.5%). Among the diagnostic tests histopathology was required in 5.2%, usually to diagnose inflammatory and tumoral lesions. Topical treatments (49.3%) were followed by systemic treatments (32.4%) in majority of cases.

Conclusions: Viral warts were among the most common dermatoses, and preventive measures for HPV transmission should become important part of public health efforts in children.

Key words: *pediatric skin disease, epidemiology, viral warts, diagnostic tests.*

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INTRODUCTION

Skin diseases are common in children as well as in adults. Besides certain diseases are almost always observed in childhood, others may display age specific findings.

The field of pediatric dermatology (PD) has gained importance with the increment of pediatric patients and the discrepancy of skin diseases with the adult versions. Epidemiologic studies worldwide in the field of PD are limited. Geographical, environmental and socioeconomical factors may affect the frequency of diseases in pediatric population.

Data of pediatric cases among outpatient visits is not well described yet although there are studies estimating frequency of diseases at various pediatric age groups. We aimed to determine the distribution of diseases between various age groups, frequency of diagnostic procedures performed and the treatment modalities commonly used including immunosuppressive drugs.

We consider this information could be useful to take proper measures for prevention of diseases and handle the distribution of the public health resources.

MATERIAL AND METHODS

Study population

This study was designed as a cross-sectional epidemiological study, retrospectively analyzing all consecutive pediatric admissions to Afyon Kocatepe University PD outpatient clinic over 18 months from September 2011 to February 2013. Permissions were obtained from the department and the study was conducted according to the Declaration of Helsinki guidelines. Afyonkarahisar is a small city located in midwestern Anatolia, with a population of 701.572 of which 355.073 (50.61%) people live in city center, the remaining, inhabit in rural area.[1]

Our PD outpatient clinic examines and records patients less than 18 years old, who admits by himself/with parents or refers from a pediatrician, general physician or other clinics since September 2011.

Demographic data, diagnosis, diagnostic methods and treatment modalities of patients' are routinely recorded and we retrospectively collected the data from the medical records.

The pediatric population is evaluated in 4 age groups, as: infantile period (0-1), preschool age (2-5), school age (6-11) and adolescent period (12-17).

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None.

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Diagnosis and diagnostic methods

The diagnostic evaluation is recorded under ten main headings based mainly on etiopathogenesis. Diagnosis under headings are included in *Table 1*. All the diagnoses were made by dermatologists, based on clinical findings and diagnostic tests when required. The diagnostic tests including patch testing, microscopic, microbiological and histopathological examinations are noted as well.

Treatment modalities

Treatment methods were recorded in 4 groups based on the primary treatment modality preferred as simple topical treatment, systemic treatment, phototherapy, and other minor invasive methods including cryosurgery, cauterization, intralesional steroid injection, iontophoresis, and laser applications. Immunosupressive medication were additionally noted.

TABLE 1. *The main diagnostic headings and diagnoses under headings (n total= 1984)*

Acne and follicular diseases (395)
acne vulgaris (381)
infantile acne (5)
hidradenitis suppurativa (4)
milaria (4)
steroid acne (1)

Eczemas (218)
irritant/ allergic contact dermatitis (107)
pityriasis alba (34)
seborrheic dermatitis (29)
nummular dermatitis (8)
photocontact dermatitis (9)
diaper dermatitis (10)
cheilitis (6)
xerotic eczema (5)
pityriasis amiantecea (4)
dyshidrotic eczema (3)
ashy dermatosis (2)
juvenile plantar dermatitis (1)

Infectious diseases (553)
viral warts (347)
molluscum contagiosum (34)
tinea capitis (22)
tinea corporis/pedis (60)
herpes infections (19)
folliculitis/furunculosis (16)
impetigo (9)
scabies (9)
candidiasis (3)
pityriasis versicolor (7)
zona zoster (7)
varicella (3)
acute paronychia (2)
cellulitis (5)
viral exanthemas (2)
pediculosis (1)
tinea unguim (3)
balanitis (1)
infected dental sinus (1)
carbuncle (1)
Gianotti-Crosti syndrome (1)

Papulosquamous diseases (86)
guttate psoriasis (32)
pityriasis rosea (18)
chronic plaque psoriasis (16)
pityriasis rubra pilaris (6)
lichen planus (3)
lichen simplex chronicus (2)
lichen niditus (2)
pustular psoriasis (2)
pityriasis lichenoides chronica (1)
pityriasis lichenoides et varioliformis acuta (2)
lichen striatus (2)

Nevi and benign skin tumors (88)
junctional/compound nevi (31)
mongol spot (1)
verrucous epidermal nevus (2)
nevus sebaceous (4)
milium (7)
Becker nevus (1)
lymphangioma (1)
nevus lipomatosis superficialis (1)
infantile hemangioma (3)
congenital melanocytic nevus (3)
skin tag (2), ephelides (2)
pilonidal sinus (2)
epidermal cyst (2)
pyogenic granuloma (4)
keloid (9)
angiokeratoma corporis diffusum (1)
spider angioma (3)
port wine stain (1)
capillary venous malformation (1)
spitz nevus (1)
lipoma (1)
nevus depigmentosus (1)
dermoid cyst (1)
pilomatricoma (1)
eruptive vellus hair cysts (1)
Klippel-Treunay syndrome (1)

Allergic skin diseases (288)
atopic dermatitis (141)
urticaria/ angioedema (71)
insect bite (68)
erythema multiforme (4)
drug eruptions (3)
acute generalized erythematous pustulosis (1)

Hair and nail diseases (120)
alopecia areata (33)
telogen effluvium (19)
constitutional hirsutismus (18)
tractional alopecia (4)
hypertrichosis (4)
cicatricial alopecia (1)
dystrophic nail (36)
ingrown toe nail (4)
onycholysis (1)

Disorders of pigmentation (56)
vitiligo (35)
postinflammatory hyperpigmentation (17)
cafe au lait macule (1)
carotenemia (1)
periorbital hyperpigmentation (1)
postinflammatory hypopigmentation (1)

Genodermatosis (21)
icthyosis vulgaris (6)
lamellar icthyosis (4)
keratosis pilaris (2)
neurofibromatosis (2)
ectodermal displasia (2)
tuberous sclerosis (1)
epidermolysis bullosa (2)
Vogt-Koyanagi-Harada syndrome (1)
Osler Weber Rendu syndrome (1)

Others (159)
generalized pruritus (76)
localized hyperhydrosis (19)
urticaria pigmentosa/ mastocytosis(7)
Behcet's disease (6)
juvenile scleroderma (7)
lichen sclerosis (2)
pruritus vulva (5)
recurrent afthous stomatitis (5)
pruritus ani (3)
granuloma annulare (2)
posttraumatic bullae (2)
sun burn (2)
striae distancea (2)
erythema nodosum (1)
linear IgA bullous dermatosis (1)
erythema annulare centrifigum (1)
mycosis fungoides patch stage (1)
vasculitis (2)
Henoch Schoenlein purpura (1)
glandular cheilitis (1)
erythema toxicum neonatarum (2)
geographic tongue (1)
pigmented purpuric dermatosis (1)
hematoma (1)
juvenile xanthagranuloma (1)
pernio (1)
lingual frenulum (1)
polimorphic light eruption (1)
Lipschutz ulcer (1)
decubitus ulcer (1)
hot water burn (2)

* Numbers in paranthesis show the number of patients.

RESULTS

Age and sex distribution

Among 2789 admissions to the PD outpatient clinic, 805 were repetitive either as control or recurrent treatment courses as cryosurgery or phototherapy. Of the 1984 patients enrolled to the study, the mean age was 10.87±5.11 .

Frequency and pattern of skin diseases

The most common diseases according to age groups are summarized in *Table 2* and the top 15 dermatoses among all age groups are summarized in *Table 3*.

Frequency of diagnostic tests

Standart direct microscopy with potassium hydroxide was used in 229 of cases (11.54%) of which 146 were positive. Fungal culture was less frequently preferred as in only 13 cases, with 2 positive results. Dermoscopy was performed in 72 cases (3.63%), usually to diagnose benign skin tumors and hair diseases. Laboratory investigations were required in 232 (11.69%) patients. Patch testing was applied in 12 (0.60%) patients and only 3 of them revealed positive results with nickel, thiomersol and wool alcohol. On the other hand histopathology was required in 103 (5.2 %) patients, and the diagnosis of the patients who required histopathological examination are summarized in *Table 4*.

Preferred treatment modalities

Among the treatment modalities, topical treatments were given to 978 (49.29%) of patients, followed by systemic treatment 643 (32,41%) which more often consisted of antihistaminics and antibiotics. Immunosuppressive drugs including systemic steroids (38), methotrexate (2), cyclosporine (4) were given in 44 (2,22%) of patients with diagnosis of psoriasis (4), urticaria (23), severe allergic/eczematous reactions (9) and alopecia areata (8). Phototherapy in the form of narrow-band UVB treatment was given in 27 (1.36%) cases with the indications summarized in *Table 5*. Cryosurgery, cauterization and intralesional steroid injection were prefered in 207 (10.43%), 2 (0.10%) and 3 (0.15%) cases, respectively. Of the 207 patients treated with cryotherapy, 204 had cutaneous warts. Eight (0.40%) patients with localized hyperhydrosis

TABLE 3. *The top 15 diseases in pediatric age group in our clinic*

Skin diseases	**n (%)**
Acne vulgaris	381 (19.20%)
Viral warts	347 (17.49%)
Atopic dermatitis	141 (7.11%)
Irritant contact dermatitis	102 (5.14%)
Generalized pruritus	76 (3.83%)
Urticaria/angioedema	71 (3.58%)
Insect bite	68 (3.28%)
Tinea corporis/pedis/inguinalis	60 (3.02%)
Psoriasis	50 (2.52%)
Dystrophic nail	36 (1.81%)
Vitiligo	35 (1.76%)
Molluscum contagiosum	34 (1.71%)
Pityriasis alba	34 (1.71%)
Alopecia areata	33 (1.66%)
Benign melanocytic nevi	31 (1.56%)

TABLE 2. *Distribution of main dermatoses among age groups*

		Age groups n (%)			
	n	**0-1**	**2-5**	**6-11**	**12-17**
Total	1984	56 (2.82%)	362 (18.24%)	538 (27.12%)	1028 (51.82%)
Male	958	34 (3.55%)	198 (20.67%)	274 (28.60%)	452 (47.18%)
Female	1026	22 (2.14%)	164 (15.98%)	264 (25.73%)	576 (56.14%)
Dermatoses	**n (%)**				
Acne and follicular diseases	395 (19.91%)	6 (10.71%)	5 (1.38%)	13 (2.42%)	371(36.09%)
Allergic skin diseases	287 (14.46%)	14 (25.00%)	139 (38.40%)	80 (14.87%)	54 (5.25%)
Eczemas	219 (11.04%)	11 (19.64%)	40 (11.05%)	68 (12.64%)	100 (9.73%)
Infectious diseases	553 (27.87%)	4 (7.14%)	100 (27.62%)	238 (44.24%)	211 (20.52%)
Papulosquamous diseases	86 (4.33%)	0 (0.00%)	9 (2.49%)	34 (6.32%)	43 (4.18%)
Genodermatoses	22 (1.11%)	3 (5.36%)	3 (0.83%)	8 (1.48%)	7 (0.68%)
Nevi and benign skin tumors	87 (4.18%)	6 (10.71%)	14 (3.87%)	21 (3.53%)	47 (4.57%)
Disorders of pigmentation	56(2.82%)	3 (5.36%)	8 (2.21%)	19 (3.53%)	26 (2.53%)
Hair and nail diseases	120 (0.60%)	4 (7.14%)	18 (4.97%)	16 (2.97%)	82 (7.98%)
Others	159 (%)	5 (8.93%)	26 (7.18%)	41 (7.62%)	87 (8.46%)

TABLE 4. *The diagnosis of patients in whom histopathology is required*

Diagnosis	number of patients (n total= 103) (5.2%)	Diagnosis	number of patients (n total= 103) (5.2%)
Psoriasis	13	Lichen striatus	1
Urticaria pigmentosa/mastocytosis	6	Seborrheic dermatitis	1
Localized scleroderma	5	Mycosis fungoides	1
Pityriasis rubra pilaris	5	Tinea corporis	1
Atopic dermatitis	5	Pernio	1
Pityriasis rosea	4	Pyogenic granuloma	1
Vitiligo	4	Linear IgA bullous dermatosis	1
Benign melanocytic nevus	4	Erythema annulare centrifugum	1
Lichen planus	3	Pigmented purpuric dermatosis	1
Sebaseous nevus	3	Juvenile xanthagranuloma	1
Insect bite	3	Lymphangioma	1
Leucocytoclastic vasculitis	3	Spitz nevus	1
Lichen sclerosis	2	Nevus lipomatosis superficialis	1
Epidermolysis bullosa	2	Glandular cheilitis	1
Erythema multiforme	2	Cicatricial alopecia	1
Granuloma annulare	2	Acute generalized erythematous pustulosis	1
Drug eruption	2	Erythema nodosum	1
Ashy dermatosis	2	Verrucous epidermal nevus	1
Urticaria	2	Angiokeratoma corporis diffusum	1
Becker nevus	1	Pilomatricoma	1
Postinflammatory hypopigmentation	1	Compound nevus	1
Pityriasis lichenoides et varioliformis acuta	1	Lingual frenulum	1
Pityriasis lichenoides chronica	1	Eruptive vellus hair cysts	1
Lichen simplex chronicus	1	Polimorphic light eruption	1
Ichthyosis vulgaris	1		
Lichen niditus	1		

TABLE 5. *The diagnosis of patients in whom phototherapy was required*

Diagnosis	number of patients n total= 27 (1.3%)
Psoriasis	11
Vitiligo	7
Localized scleroderma	2
Atopic dermatitis	2
Pityriasis rosea	2
Lichen planus	1
Pityriasis lichenoides chronica	1
Mycosis fungoides	1

received tap water iontophoresis. Fifteen (0.76%) patients all girls and more than 16 (only one with localized hypertrichosis was 6 year aged) underwent laser hair removal. Laser treatment of vascular lesions (spider angioma) were done in 2 (0.10%) patients. In 93 (4.69%) patients no treatment is required. Six (0.30%) of patients required surgical interventions.

DISCUSSION

The establishment of PD as a specialty is rather a recent activity with about 30 years background in U.S. and Europe. Whereas in our country, efforts of the Turkish Society of PD to adopt PD as a subspecialty is still going on, the official legislation is not provided, yet. By the year 2012, the Turkish children between 0-17 comprise 30% of the total population.[1] Although dermatology and pediatrics residency programmes cover the main topics of PD, the specialists on PD will probably fullfill an important gap.

The epidemiologic studies worldwide in the field of PD are limited. Geographical, environmental and socioeconomical factors may alter the frequencies of diseases in pediatric

population. In many western studies,[2-4] atopic dermatitis was found to be most common dermatoses whereas studies from developing countries usually demonstrate infectious diseases as the most common.[5-7] Our study also found infectious diseases as the most common dermatoses and among the infectious diseases the frequency of viral warts were prominent with a clear cut edge.

Viral warts are common in children worldwide and in our study it was the second most prevalent disease. Many western epidemiologic studies on pediatric skin diseases among PD clinic referrals found viral warts as the most common infectious diseases.[3,8-10] In our study warts were especially common in school age children and adolescents. In a Dutch study,[11] carried among children of school age the prevalence of cutaneous warts was found to be 29%, and a similar British study found the prevalence rate as 33%.[12] A recent study in our country performed in primary school children, revealed a prevalence of 10.9%.[13] Preventive measures for HPV transmission gains importance. There are few reports of effectiveness of quadrivalent HPV vaccine on refractory cutaneous warts.[14,15] In the future, routine vaccination of children for HPV may have beneficial effects. The high number of warty patients attending to our clinic may also reflect patients knowledge about role of cryotherapy in treatment of warts. Although spontaneous regression is possible in warts, a treatment modality is always offered in our clinic, and nearly two thirds of patients were treated with cryosurgery.

Viral exanthemas, pediculosis, parasitic diseases which are commonly encountered in general practice or pediatrics practice, were rare among our referrals. Furthermore, the common infectious diseases as impetigo that usually indicate the low socioeconomic status and poor hygiene status were relatively rare. But, since raising livestock and agriculture are the mainstay in rural area, dermatophyte infections were found to be common as well as insect bites.

Acne was the most common disease in our study, attributed to the high adolescent population in our study. Namely, it is a limitation for the study thus more than half of the study population is over 12. It also reflects the situation over the country. The neonatal and preschool age patients usually admit to clinics of pediatrics and dermatologists encounter these patients only in case of a referral. Both specialities have some superiority on the other so that a collaborative work must be carried out and the recognition and referral of the cases that are outside one's expertise is an important issue.

Atopic dermatitis was the third most common regarding all age groups but were the commonest disease among infants and preschool age children. Many western studies found atopic dermatitis as the most common disease,[2,3] but the high adolescent population in our study group probably peaked acne and warts.

Contact dermatitis in children was previously underrecognized but nowadays agreed as a common condition.[16] It was the fourth most common dermatoses in our study. It is not always possible to perform patch testing to all individuals. Besides the positive patch test results in children can often be conflicting as false postive reactions may occur with the unstandardized hapten concentrations for children. Urticaria/angioedema was also among the most common dermatoses similar to previous studies.

Psoriasis was again among the top ten dermatosis in children, with a 2.52% incidence among PD admissions. This is parallel with previous studies[3,4] but actually one third of psoriasis patients are said to be at pediatric age group,[17] thus a higher number was expected. Other common autoimmune skin diseases like alopecia areata (1.66%) and vitiligo (1.76%) have literature compatible results.[18]

The histopathology in skin diseases is an essential complementary part of the diagnosis. On the other hand, it is not commonly applied in diseases other than inflammatory or tumoral lesions in pediatric population. Although clinical diagnosis for psoriasis is frequently, biopsy can be mandatory sometimes just to relieve parent's concern. Not only psoriasis but other papulosquamous diseases in the differential diagnosis of psoriasis may require histopathological confirmation. The second most common dermatosis in which biopsy performed was cutaneous mastocytosis which usually has a benign course in children but follow-up is required since systemic involvement is possible in about 30% of the cases.[19] In our clinic all patients suspected of mastocytosis undergo histopathological examination. On the other hand, tumoral or cystic lesions and sometimes nevi with suspicious dermoscopy usually require histopathological confirmation. In a previous study by Wenk and Itin,[3] biopsy was performed in 1.7% of the cases which is much more lower

than our rates (5.2%). Patients finally admitting to a PD outpatient clinic of a university hospital are full of expectations and some of the biopsies performed may be to relieve the parents concerns.

When the preferred treatment modalities are considered, the low number of patients without any treatment also support the above mentioned situation on parents concern. Doctor shopping is common in childrens' diseases and this may be a common reason of preferring to give a treatment. Wenk and Itin[3] reported in their study, 66.0% of patients were given local treatments, 27.6% had no treatment and 18.6% were administered systemic treatments. On the other hand, the severity of diseases determine treatment options. In our study 2.2% of patients treated by immunosuppressive drugs, and systemic corticosteroids were the preferred agents. Iontophoresis and laser procedures are routinely available in our clinic and the high number of patients of localized hyperhidrosis and constitutional hirsutism which were not mentioned in previous studies may be attributed to this.

The congenital vascular and melanocytic lesions were relatively low in number. This makes us think that pediatricians should be informed, may be by in service training about the recent data on these conditons, as well as the public instructions for the conditions should be prepared.

In addition to retrospective nature, one of the limitations of our study may be the age limit, which is not obviously defined and varies in many other studies.[2-10] In fact, the patterns between different age groups varies prominently thus in the future, the pediatric dermatology may be further divided into neonatal dermatology, pediatric dermatology and adolescent dermatology.

This study is performed not only to demonstrate the distribution of various dermatoses among pediatric population but also to reveal the frequency of the diagnostic tests used and preferred treatment modalities.

CONCLUSION

Epidemiological studies on pediatric skin diseases are valuable to plan for preventive measures for the common dermatoses. Similar to many other studies, viral warts were among the common dermatoses in our study. Preventive studies for HPV transmission should become important part of the public health efforts in children. ■

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