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ORIGINAL ARTICLE

Skin disorders in childhood: Pattern of dermatoses in a Pediatric Dermatology workforce 2016

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Abstract

Objective: The present study aims to analyze a pattern of patients referred to the specialized centers of Pediatric Dermatology which were attended in a workforce on 2016. **Methods:** It is a retrospective, cross sectioned, observational and analytical study. Data were collected from medical records. Children and adolescents from zero to sixteen years of age were included. Provided data were: age, gender, time of disease progression, previous treatments, comorbidities, diagnostic hypotheses, interventions and outcomes. **Results:** Of the 261 patients, 59% female, 13.8% infants, 31.4% preschoolers, 31.8% school and 22.9% teenagers. The majority (62.5%) had no comorbidities, and among the 98 who presented some, a predominance of atopic diseases was observed: rhinitis in 22.6% and asthma in 15%. The majority, 63.2%, had already received some type of treatment. Eczematous disorders were the most prevalent (37.2%), followed by infectious ones (21%), benign hyperplasias and neoplasms (15.7%). Atopic dermatitis occurred in 19.9% of patients. Among the infections, viral infections occurred in a greater number (11.8%), mainly in the preschool and school groups. Among the glandular disorders, acne was the most frequent (11.5%), and its highest prevalence was in adolescents. More than a half, 52.5% of the patients were discharged, 32.6% were referred to Pediatric Dermatology and 9.6% were directed to maintain the follow-up in primary care. **Conclusions:** Eczematous disorders were the most frequent skin diseases, followed by infectious ones and by the group of benign hyperplasias and neoplasms. Among eczemas, atopic dermatitis was the most prevalent.

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INTRODUCTION

Skin disorders are quite common among children and account for approximately 30% of the complaints made during visits to pediatricians. Thirty percent of the patients seen by dermatologists are children.^{1,2}

The prevalence of skin disorders in childhood is influenced by several elements, including age, sex, the climate, and geographic/socioeconomic factors.^{2,3} Many skin disorders manifest only during childhood, with some presenting during the early years of life and others showing specific traits compared to the adult form of the condition. Skin disorders are also present in neurocutaneous syndromes and some indicate the presence of systemic diseases not always similar to the adult form of the condition.

Most pediatric skin disorders are acute conditions, but diseases such as psoriasis, vitiligo, and atopic dermatitis may manifest chronically and affect patients for their entire lives, potentially changing the way they look, damaging their interpersonal relationships, and decreasing quality of life.⁴

Studies on the impact of dermatoses in the United States of America showed that the high prevalence of these conditions has led to significant expenditures with healthcare and loss of productivity caused by absenteeism at work and school.⁵

Therefore, assessing the impact of dermatoses in pediatric populations is relevant to primary, pediatric, and specialist care in the area.⁶ Epidemiological studies improve the comprehension around the spectrum of skin disorders present in specific regions and form the basis for the planning of care, health education, and research.^{4,7}

The proportion of patients seeking primary care for skin complaints ranges from 10% to 36.5% depending on the region, while 4-10% are referred to specialist care.⁸

There is significant variety in the roster of skin disorders treated at health care clinics. Primary care physicians are expected to recognize, treat, and follow patients with more common disorders and refer more complex cases to secondary and tertiary care institutions.⁸

This study offers a clinical/epidemiological description of the patients and the main dermatoses treated during a Pediatric Dermatology Drive organized at a referral state hospital in partnership with the Municipal Health Department.

MATERIALS AND METHODS

This retrospective cross-sectional observational analytical study included the charts of patients seen by the members of the Pediatric Dermatology Service of a state referral hospital working in a municipal health care clinic during a drive organized on November 5, 2016.

According to the Municipal Health Department, approximately 2,000 children and adolescents were in the waiting line for pediatric dermatology care in 2016. All health care clinics were advised to get in touch with the families of prospective patients, find which still needed specialized care, and schedule appointments with them.

The study included all children and adolescents aged 0-16 years seen during the drive. The Research Ethics Committee approved the study design and assigned it permit no. 64806817.0.0000.0096.

The following variables were analyzed: age; sex; time of disease progression; previous treatments; comorbidities; diagnostic hypotheses; prescribed treatment; and outcomes described as referral to a basic care unit or a tertiary care hospital.

The included patients were divided based on their ages into the following groups: infants (age < 2 years); preschoolers (age ≥ 2 and < 6 years); school-age children (age ≥ 6 and < 12 years); or adolescents (age ≥ 12 and < 17 years). The diagnosed dermatoses were divided into the following groups based on the classification proposed by Hurwitz⁹: eczematous disorders; papulosquamous disorders; infection; benign hyperplasia and tumors; disorders of sebaceous and sweat glands; hair and nail disorders; pigmentary disorders; vascular disorders; hypersensitivity reaction; or others. The diagnoses assigned to the patients seen during the drive were accounted for to calculate the frequency of occurrence of dermatoses in each category and individually. Patients presenting more than one skin lesion had their disorders accounted for separately, except when the diagnosis was undefined or the lesions originated from the same disorder. Patients with undefined diagnoses were excluded.

The data were entered on Microsoft Excel® and analyzed on software program JMP®.

RESULTS

A total of 261 patients were seen during the drive. Nearly three fifths (59%) were females. Patient age ranged from two to 198 months (median: 92 months or 7.6 years). In terms of age groups, 13.8% were infants; 31.4% were preschoolers; 31.8% were school-age children; and 22.9% were adolescents. In regard to comorbidities, most of the patients (62.5%) had non-associated conditions. Atopic conditions prevailed among the comorbidities presented by 98 individuals (37.5%), with rhinitis present in 22.6% of the cases, asthma in 15%, and atopic dermatitis in 2.7%. The time of disease progression ranged from two to 12 months (median: 12 months). Most of the patients (63.2%) had received treatment previously (Table 1).

A little over half of the patients (53.3%) were diagnosed with one condition; 29.5% with two conditions; 11.1% with

Table 1. Clinical/epidemiological description of the patients seen during the 2016 Pediatric Dermatology drive

Variable		N	%
Sex	Female	154	59
	Male	107	41
Age (years)	< 2	36	13.8
	≥ 2 and < 6	82	31.4
	≥ 6 and < 12	83	31.8
	≥ 12 and < 17	60	23
Comorbidities	Yes	98	37.5
	No	163	62.5
Previous treatment	Yes	165	63.2
	No	96	36.8
Total		261	100
	Minimum	Maximum	Median
Time of progression	2 months	12 years	12 months
Age	2 months	198 months	92 months

three conditions; 1.2% with four conditions; and one individual with five conditions. Ten patients had undefined diagnoses and one patient did not have skin disorders at the time of examination.

Table 2 shows the prevalence of categories of dermatoses seen during the drive. Eczematous disorders ranked first with 97 patients (37.2%) followed by infection (21%), benign hyperplasia and tumors (15.7%), and gland disorders (13.4%).

Atopic dermatitis was the most frequent dermatosis, diagnosed in 19.9% of the patients. Still in the group of eczematous disorders, pityriasis alba was found in 9.5% and contact dermatitis in 6.1% of the patients.

Infection ranked second among the groups of dermatoses, with 21% of the patients. Viral, bacterial, fungal, and parasitic infection was seen in 11.8%, 6.1%, 3.5%, and 1.1% of the patients, respectively. In the subgroup of viral infections, warts and molluscum contagiosum were found in 6.1% and 5.3% of the patients, respectively. Six patients (2.3%) with bacterial infection had secondary infection, while four patients (1.5%) had folliculitis, four (1.5%) had impetigo, and two had boils. Tinea was the most common fungal infection, with five cases. The three patients with infection caused by parasites/insects had pediculosis (1.1%).

Benign hyperplasia or tumors occurred in 15.7% of the patients, with nevus (10.7%) topping the list with melanocytic nevus and nevus depigmentosus found in 4.2% and 3.8% of the patients, respectively. Gland disorders were seen in 13.4% of the patients. Acne was the most frequent condition in this group of diseases with 11.5% of the patients, most of whom adolescents. The prevalence of pigmentary disorders was 8.8%, with vitiligo occurring in 3.5% of the patients. Hair

Table 2. Prevalence of categories of dermatoses in the patients seen during the 2016 Pediatric Dermatology drive.

	N	%
Eczematous disorders	97	37.2
Infection	55	21
Benign hyperplasia and tumors	41	15.7
Disorders of sebaceous and sweat glands	35	13.4
Pigmentary disorders	23	8.8
Hypersensitivity reaction	23	8.8
Hair and nail disorders	9	3.5
Vascular disorders	6	2.3
Papulosquamous disorders	6	2.3
Others	65	24.9

and nail disorders were seen in 3.5% of the patients, with alopecia areata occurring in half of the cases in this group. Papulosquamous disorders and vascular malformations were the least prevalent groups. The four patients with hemangioma were females.

Hypersensitivity reaction was seen in 8.8% of the patients, with strophulus infantum occurring in greater numbers of patients (7.3%).

Xerosis (13.8%) was the most frequent finding among disorders not belonging to any specific group followed by keratosis pilaris (6.9%). Table 3 shows the main disorders found in our study by order of frequency.

Table 4 shows the most frequent dermatoses by age range. Cases of atopic dermatitis were evenly distributed among individuals aged from two months to 12 years. Acne was more predominant in adolescents and hemangioma occurred preferentially among infants. Viral infection was more frequent in preschoolers and school-age children.

Treatment was prescribed to 218 patients (83.5%) and 21 underwent procedures on the day of the drive (curettage, cryotherapy, biopsy, or chemical cauterization). Additional tests were ordered for 14 patients (5.3%), including direct microscopic examination and fungal culture, complete blood count, blood sugar, thyroid function, serology, and urine tests.

In regard to outcomes, more than half of the patients (52.5%) were discharged, 85 (32.6%) were referred to a pediatric dermatologist, and 25 (9.6%) were advised to seek follow-up care at a health care clinic. Fourteen patients (5.3%) were referred to other medical specialties, with pulmonology/pediatric allergology ranking first with eight patients.

DISCUSSION

Dermatoses are often seen during childhood and must be properly understood so that public policies and preventive measures are developed based on local epidemiological

Table 3. Main dermatoses identified during the 2016 Pediatric Dermatology task force

	N	%
Atopic dermatitis	52	19.9
Xerosis	36	13.8
Acne	30	11.5
Pityriasis alba	25	9.5
Strophulus infantum	19	7.3
Keratosis pilaris	18	6.9
Contact dermatitis	16	6.1
Warts	16	6.1
Molluscum contagiosum	14	5.3
Melanocytic nevus	11	4.2

data. In addition, knowledge of the main skin disorders is a basic requirement in the training of general practitioners and pediatricians.

Eczematous disorders (37.2%) were the most prevalent group of conditions in our study, followed by infection (21%) and benign hyperplasia and tumors (15.7%).

Atopic dermatitis was the most frequent skin disorder, affecting 19.9% of the patients. Other studies have reported similar proportions, indicating that the incidence of this condition is on the rise.^{10,11} One of the explanations proposed in the literature for the increase is the improvement of socioeconomic, health, and poverty conditions, which decreased the prevalence of infection thereby increasing the relative proportion of chronic and inflammatory diseases. Atopic dermatitis is relevant in public health and for health care providers due to the financial burden and emotional distress it usually imposes on families and patients.

Atopic diseases were the most prevalent associated health conditions, with rhinitis and asthma found in 22.6% and 15% of the patients, respectively. Xerosis (the second most frequent skin disorder), pityriasis alba, and keratosis pilaris - skin disorders that might be minor signs of atopy^{12,13} - were seen in 13.8%, 9.5%, and 6.9% of the patients, respectively. These proportions speak of the high prevalence of atopic diseases and their signs, a finding possibly related to local population and climate characteristics.¹⁴

Acne was observed in 11.5% of the patients. As expected, most of the individuals with acne were adolescents.^{15,16}

The results found in our study were similar to the results published in other studies on the epidemiology of skin disorders in pediatric populations. A study carried out in Brazil at the Taubaté University Hospital also reported higher prevalence of allergic conditions (28%) - and atopic dermatitis in particular - followed by pigmentary disorders (15.9%), infection (14.4%), and benign tumors (9.5%).¹⁷

A dermatology referral center in Switzerland reported higher prevalence of allergic and inflammatory conditions (45.73%) than other dermatoses.¹⁸ A pediatric dermatology referral center in southern India described higher prevalence of infection (54.5%), while diseases categorized as eczema/dermatitis occurred in 8% of their patients.¹⁹ The most frequent dermatoses reported in a study performed in Mexico at a specialized center were atopic dermatitis (14.6%), warts (6.6%), and acne (5.5%). Its authors compared the prevalence of diseases in different periods and concluded that the proportion of dermatoses changed throughout the decades,²⁰ stressing the influence of the environment on skin disorders.

Comparing between epidemiological studies is not an easy task. Studies are often carried out in different places, on different environmental and socioeconomic backgrounds, based on diverse methods and skin disorder categorization scales. However, developed nations have reported higher prevalence of allergic conditions such as atopic dermatitis, while infection is more prevalent in developing countries.^{1,3,7,18,21}

In the 2016 Pediatric Dermatology Drive, infection of all types ranked second among skin disorders, with viral infection (warts in 6.1% and molluscum contagiosum in 5.3% of the patients) sitting atop this subgroup of conditions, particularly among preschoolers and school-age children. Warts and molluscum contagiosum are often described as the most frequent types of infection to affect school-age children, possibly because the two are contagious diseases that spread more easily in crowded places such as day care centers and schools.^{4,10,20}

Our study included more female patients (59%) and individuals categorized as preschoolers and school-age children, who accounted for 63.2% of the patients referred to health care clinics. The prevalence of dermatoses in school-age children varies significantly in the literature. In a study carried out in Turkey, 79.9% of school-age children had some form of skin disease.⁴ In northern India, 38.8% had skin disorders³ and

Table 4. Main Dermatoses by age range identified during the 2016 Pediatric Dermatology drive

Age	< 2 years (n=36)	%	≥ 2 and < 6 years (n=82)	%	≥ 6 and < 12 years (n=83)	%	≥ 12 and < 17 years (n=60)	%
Dermatoses	Atopic dermatitis		Atopic dermatitis		Atopic dermatitis		Acne	
	Xerosis		Nevus		Pityriasis alba		Keratosis pilaris	
	Nevus		Molluscum contagiosum		Xerosis		Nevus	
	Strophulus infantum		Xerosis		Warts		Vitiligo	
	Hemangioma		Strophulus infantum		Nevus		Folliculitis	
			Contact dermatitis		Strophulus infantum			

Legend: inc.: incomplete; Derm.: dermatitis.

in Switzerland school-age children (30.9%) were the largest group of patients seen for skin disorders.¹⁸ The Swiss study also described a predominance of females, as previously reported by Ferreira, Nascimento and Cirvidiu (2011),¹⁷ and Mohammedamin *et al* (2006)¹¹.

Bacterial and fungal infections were not as prevalent, a finding illustrated by the lower number of patients with these conditions seen during the drive and the non-referral of patients for treatment of these conditions to primary care institutions. Studies have described differences in the prevalence of skin disorders reported for individuals seen in primary care, at schools, and patients seen in specialized care facilities.^{3,22}

In addition to chronic diseases that require specialist care such as atopic dermatitis, vitiligo, and psoriasis, many conditions call for procedures and/or tests performed at tertiary care centers. In our drive, the patients with benign hyperplasia and tumors (15.7%) fell into this description and required additional testing. Vitiligo was found in 3.5% of the patients seen during the drive, an unusually high prevalence in relation to other studies, in which incidence varied between 0.8% and 2.16%. Psoriasis was seen in few cases (0.7%), with other studies reporting higher prevalence (2-3%).^{3,10,18}

Papulosquamous and vascular disorders were seen in few cases. Hemangioma occurred only in girls and infants, thus confirming the pattern described in the literature.⁹

More than half of the patients (52.5%) seen during the drive were discharged and 25 (9.6%) were advised to seek follow-up care at a health care clinic, showing that most dermatoses can be treated in primary care institutions. Eighty-five patients (32.6%) were referred to a pediatric dermatologist and 14 individuals (5.3%) were referred to other medical specialties.

The reasons to refer patients to a pediatric dermatologist included need for further examination, testing, biopsy, treatment, procedures, chronic disease, relapsing disease, and difficult-to-manage condition.

It is important to understand why patients are referred to pediatric dermatology care. Lowell *et al* (2001)²³ showed that more than 40% of the referrals to a dermatologist occur for need of biopsy, excision of a lesion, and assessment of a suspect lesion. Other reasons include need for diagnostic confirmation, failed treatment, and chronic disease follow-up.

The literature indicates that skin lesions are rather common in the pediatric population. In the course of their careers, primary care physicians, pediatricians, and medical doctors from other specialties will most likely see patients with dermatosis. Although patients often come for an appointment complaining of skin lesions, primary care physicians must perform thorough physical examination and probe deeper into each case to manage common disorders and refer more complex cases to specialist care.

CONCLUSION

Eczematous disorders followed by infection and benign hyperplasia and tumors were the most prevalent conditions seen during the 2016 Pediatric Dermatology Drive. Atopic dermatitis ranked first among the conditions seen in the drive. Viral infections were the most common type of infection. They preferentially affected preschoolers and school-age children. Acne was the most frequent skin disorder in adolescents. Nevus was the most common finding in the group of benign hyperplasia and tumors.

The high demand for care to children with skin disorders underlines the need to train more physicians in the related medical specialties and to open additional medical positions in the area at care centers. However, more than half of the patients could have been treated by primary care physicians with knowledge of the more prevalent dermatoses, a finding that sheds light on the importance of teaching pediatric dermatology in medicine, family medicine, and pediatrics programs.

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