

Pediatric dermatology: nosological and consultations profile in a hospital complex in southern Brazil

Dermatologia pediátrica: perfil nosológico e de consultorias em um complexo hospitalar no sul do Brasil

Iago Gonçalves-Ferreira^{1,2,a*}, Ana E. Kiszewski-Bau^{1,2}, Magda B. Weber^{1,2}, Lucas A. Bulcão³, Camila S. Almeida⁴, and Renan R. Bonamigo^{1,5}

¹Dermatology Service, Santa Casa de Misericórdia de Porto Alegre; ²Department of Dermatology, Federal University of Health Sciences of Porto Alegre; ³Faculty of Medicine, Federal University of Health Sciences of Porto Alegre; ⁴Faculty of Medicine, University of Caxias do Sul; ⁵Faculty of Medicine, Federal University of Rio Grande do Sul. Porto Alegre, Brazil.

^aORCID: 0000-0002-4695-1982

Abstract

Objective: The study aimed to analyze the profile of dermatoses and Dermatology consultations in a pediatric hospital in southern Brazil. **Method:** This descriptive and quantitative study was conducted from the analysis of admissions, hospital referrals, and dermatology consultations of pediatric inpatients from August 2018 to January 2020. The researchers performed an investigation in three phases: analysis of pediatric hospitalizations with dermatological diagnosis (phase 1), analysis of dermatology consultations referrals (phase 2), and analysis of dermatology consultations (phase 3). **Results:** Throughout the 18-month period analyzed, the authors identified 12,656 pediatric hospitalizations, 266 hospital referrals, and 167 dermatology consultations. Hospital dermatoses evidenced a prevalence of 6.8%, with “cellulitis” (L03) and “abscess” (L02) as the main conditions. In dermatology consultations, “dermatitis and eczema” and “skin infections” were the main groups of cutaneous disorders, whereas “atopic dermatitis” (L20) and “drug eruptions” (L27) were the main skin diseases. Corticoids, moisturizers, and antibiotics were the most recommended therapies by dermatologists. **Conclusion:** From this study, authors evidenced the prominence of inflammatory and infectious cutaneous conditions in children and adolescent populations. Moreover, vulnerabilities and shortcomings of the dermatology consultations process were also found, indicating the need for evaluations and enhancements, mainly regarding clinical data of referrals.

Keywords: Dermatology. Epidemiology. Hospitalization. Pediatrics. Skin diseases.

Resumo

Objetivo: O estudo teve como objetivo analisar o perfil das dermatoses e consultas de Dermatologia num hospital pediátrico do sul do Brasil. **Método:** Este estudo descritivo e quantitativo foi realizado a partir da análise das internações, encaminhamentos hospitalares e consultas de Dermatologia de pacientes pediátricos internados no período de agosto de 2018 a janeiro de 2020. Os pesquisadores realizaram uma investigação em três fases: análise de dermatoses pediátricas hospitalares (fase 1); análise de encaminhamentos de consultas de Dermatologia (fase 2) e análise de consultas de Dermatologia (fase 3). **Resultados:** Ao longo dos 18 meses analisados, os autores identificaram 12.656 internações pediátricas, 266 encaminhamentos

***Corresponding author:**

Iago Gonçalves-Ferreira

E-mail: iago_goncalves14@hotmail.com

2795-501X / © 2022 Portuguese Society of Dermatology and Venereology. Published by Permanyer. This is an open access article under the CC BY-NC-ND license (<http://creativecommons.org/licenses/by-nc-nd/4.0/>).

Received: 22-09-2022

Accepted: 21-12-2022

DOI: 10.24875/PJDV.22000023

Available online: 14-02-2023

Port J Dermatol and Venereol. 2023;81(1):7-17

www.portuguesejournalofdermatology.com

hospitalares e 167 consultas de Dermatologia. As dermatoses hospitalares evidenciaram prevalência de 6.8%, sendo 'Celulite' (L03) e 'Abscesso' (L02) as principais condições. Nas consultas de Dermatologia, 'Dermatite e eczema' e 'Infeções cutâneas' foram os principais grupos de distúrbios cutâneos, enquanto 'Dermatite atópica' (L20) e 'Erupções medicamentosas' (L27) foram as principais doenças de pele. Corticoides, hidratantes e antibióticos foram as terapias mais recomendadas pelos dermatologistas. **Conclusão:** A partir deste estudo, os autores evidenciaram a proeminência de quadros inflamatórios e infecciosos cutâneos em populações de crianças e adolescentes. Além disso, também foram encontradas vulnerabilidades e deficiências no processo de consultas de Dermatologia, indicando a necessidade de avaliações e aprimoramentos, principalmente quanto aos dados clínicos dos encaminhamentos.

Palavras-chave: Dermatologia. Doenças de pele. Epidemiologia. Hospitalização. Pediatria.

Introduction

Skin diseases represent about 30% of pediatric consultations in health systems, with high prevalence in different levels of health care¹⁻⁴. These conditions can have a great psychological and social impact on the affected individuals, impairing their quality of life and daily activities, especially in the pediatric population, which is more sensitive and vulnerable⁵.

Dermatological disorders may present as primary cutaneous diseases, acute or chronic, as well as secondary manifestations of systemic conditions, which may exacerbate or spread, causing associated complications that can be life-threatening⁶⁻⁸. Thus, due to the potential risk to life, especially for children and adolescents, such clinical conditions may require hospitalization, being initially managed by pediatric hospital teams⁶⁻⁸.

Considering the particularities of skin manifestations in children and adolescent populations, pediatricians may demonstrate a certain degree of difficulty with their diagnosis and treatment^{2,9,10}. Hence, dermatology can offer important contributions to inpatient care, providing backing to the management of pediatric patients by performing hospital consultations¹¹.

Thus, in view of the relevance of dermatology in hospital settings, it is pertinent to comprehend the profile of dermatologic consultations, identifying clinical practices, diagnostic and therapeutic patterns, as well as contributions to pediatric services. Therefore, this study aimed to analyze the profile of pediatric consultations performed by a dermatology service in a hospital complex in Southern Brazil.

Method

This descriptive and quantitative study was conducted from the analysis of admissions, hospital referrals, and dermatology consultations of inpatients admitted to Hospital da Criança Santo Antônio, the pediatric segment of the hospital complex Santa Casa

de Misericórdia de Porto Alegre, in Southern Brazil. The research was approved by the Human Research Ethics Committee of the institution and included hospitalization data from 1st August 2018 to 31st January 2020.

From a preliminary data collection, we identified 12,656 pediatric hospitalizations and 816 consultation referrals forwarded to the dermatology Service. Subsequently, we carried out an exploratory analysis, which excluded suspended requests and duplicate referrals from the same medical speciality. Posteriorly, we proceeded to an investigation organized into three analytical phases: analysis of pediatric hospitalizations with dermatological diagnosis (phase 1), analysis of dermatology consultations referrals (phase 2), and analysis of dermatology consultations (phase 3). It is worth mentioning that, based on the analysis of consultations referrals, we performed an additional exclusion procedure of duplicate referrals, even those from different specialties, in order to proceed with the analysis of dermatology consultations.

Considering this research arrangement, we analyzed three groups of variables: "pediatric skin diseases", reported by inpatient pediatric teams; "profile of consultations referrals" (hospital sector, pediatric subspecialties, patients' age and sex, clinical data, and diagnostic hypotheses) and "profile of dermatology consultations" (clinical description, complementary exams, dermatological diagnoses, therapeutic conducts, and recommend follow-ups).

Regarding consultation referrals, according to W Huang and Chong S¹², we established four analysis parameters: "morphology of skin lesions," "distribution of skin lesions," "evolution of clinical condition," and "diagnostic hypothesis or purpose of referral." Dermatological diagnoses were established according to the International Classification of Diseases (ICD-10).

With respect to follow-up recommendations, we considered "outpatient follow-up" for those hospital consultations whose duration of dermatology assistance was equal to or < 7 days, followed by recommendations for outpatient follow-up. In contrast, "inpatient + outpatient

Table 1. Pediatric hospital dermatoses and dermatological consultations referrals

	n	%
Pediatric hospitalizations	12.656	100.0
ICD diagnosis of skin diseases among pediatric hospitalizations	865	6.8
Referrals for dermatological consultations	266	2.1
Dermatological consultations	167	1.3
Major skin diseases ICDs		
L03-Cellulitis and acute lymphangitis	124	14.3
L02-Cutaneous abscess, furuncle and carbuncle	95	11.0
D69-Purpura	76	8.8
L50-Urticaria	56	6.5
L90-Atrophic disorders of skin	47	5.4
L98-Other disorders of skin and subcutaneous tissue	44	5.1
L01-Impetigo	31	3.6
L20-Atopic dermatitis	31	3.6
L72-Follicular cysts	30	3.5
D18-Hemangioma and vascular malformations	29	3.4

follow-up” were considered hospital consultations whose dermatology assistance duration was longer than 7 days, with a recommendation for outpatient follow-up after completion.

In statistical analysis, categorical and numerical variables were represented descriptively by measures of dispersion and frequencies, whereas the groups of hospital dermatoses were analyzed by chi-squared test (χ^2), considering p -value $\leq 5\%$ statistically significant.

Results

Dermatological hospitalizations and consultations referrals

During the period of August 2018-January 2020, we identified 12,656 pediatric hospitalizations, with 865 dermatological ICDs registered, which represents 6.8% of the total hospitalizations. The main dermatological ICDs were “cellulitis and acute lymphangitis” (14.3%), “cutaneous abscess, furuncle, and carbuncle” (11.0%), and “purpura” (8.8%) (Table 1).

Dermatology referrals included 266 referrals from hospital teams, either from the pediatric ward (54.5%) or the pediatric emergency (37.6%) as the main requesting hospital sectors. Most of the referrals originated from general pediatrics (73.3%) and pediatric oncology

(8.3%). The majority of pediatric patients were hospitalized under public health system coverage (66.1%) (Table 2).

In relation to referrals’ information, a significant portion of them did not present data about clinical conditions (48.5%). The location of skin lesions was the most referred clinical data (30.0%). Only 3.7% of referrals reported the four clinical parameters analyzed, whereas diagnostic hypotheses were indicated in only 28.5% of the dermatology referrals (Table 2).

Profile of dermatology consultations

After preliminary analysis and duplicate referrals exclusion, we identified 167 pediatric consultations performed by the dermatology team during the 18-month period, with a response time of < 24 hours for most of the evaluations (80%). Most inpatients were males (56.9%), “younger than 1 year” (19.2%), or “11-14 years” (19.2%). Most evaluations led to single diagnoses (77.8%), with “dermatitis and eczema” and “skin infections” standing out as the most prominent groups of dermatoses, with 38.7 and 31.2%, respectively (Table 3).

Regarding the profile of dermatoses by age groups, we observed a higher prevalence of “Skin infections” among neonates, infants, and preschoolers, whereas “dermatitis and eczema” were most frequent among schoolers and adolescents (Figure 1). About dermatological ICDs, “scabies” (B86) and “impetigo” (L01) stood out among the major skin diseases at younger ages, whereas “drug eruptions” (L27) were more relevant with advancing age, particularly in adolescence. “Atopic dermatitis” (L20) exhibited high prevalence in all age groups but with greater expression in preschoolers and schoolers (Table 4).

Laboratory tests (29.3%) and skin biopsies (10.8%) were the main requested complementary exams. Skin biopsies presented anatomopathological reports in concordance with the clinical diagnoses of dermatology teams in 66.6% of the evaluations ($n = 12/18$). “Bacterial cultures” were requested only in 6% ($n = 10/167$) of hospital consultations, with *Staphylococcus aureus* as the most prevalent etiologic agent (40%; $n = 4/10$).

With respect to dermatologists’ management, corticoids were the most recommended drugs in consultations (35.7%), with a predominance of topical presentations (59.3%), followed by moisturizers (26.3%) (Table 3). Antibiotics were indicated in 22.7% of the dermatology evaluations, highlighting the systemic presentation ($n = 33/86.8\%$), mainly oxacillin ($n = 14/38$; 36.8%) and cephalexin ($n = 9/38$; 23.7%).

Table 2. Profile of hospital dermatological consultations referrals

	n	%
Hospital sector		
Pediatric ward	145	54.5
Pediatric intensive care unit	17	6.4
Pediatric emergence	100	37.6
Pediatric surgery unit	4	1.5
Sector character		
Public health system	176	66.1
Private health system	69	25.9
Mixed	21	7.9
Pediatric subspecialties		
General pediatrics	195	73.3
Intensive pediatrics	9	3.4
Pediatric endocrinology	1	0.4
Pediatric gastroenterology	4	1.5
Pediatric hematology	8	3.0
Pediatric infectology	11	4.1
Pediatric oncology	22	8.3
Pediatric pneumology	3	1.1
Pediatric nephrology	5	1.9
Pediatric neurology/neurosurgery	6	2.2
Pediatric surgery	1	0.4
Neonatology	1	0.4
Clinical information on referrals		
No variable described	129	48.5
1 variable described	54	20.3
2 variables described	49	18.4
3 variables described	24	9.0
4 variables described	10	3.7
Description of skin lesions	56	21.0
Location of skin lesions	80	30.0
Time of clinical evolution	22	8.3
Diagnostic hypothesis	74	27.8
Referral status		
Consultation performed	167	62.8
Duplicate referral	53	19.9
Suspended or lost referral	46	17.3
Total	266	100.0

Table 3. Profile of hospital dermatological consultations

Total	167 consultations	
Monthly average	9.3 consultations	
Daily average	0.3 consultations	
	n	%
Hospital sector		
Pediatric ward	87	52.1
Pediatric intensive care unit	6	3.6
Pediatric emergence	73	43.7
Pediatric surgery unit	1	0.6
Patient demographics		
<i>Gender</i>		
Male	95	56.9
Female	72	43.1
<i>Age group*</i>		
Neonates	16	9.6
Infants	16	9.6
Toddlers	23	13.8
Preschoolers	27	16.2
Schoolers	29	17.4
Adolescents	56	33.6
Dermatological diagnoses**		
One diagnosis	130	77.8
Two diagnoses	30	18.0
Three diagnoses	3	1.8
Complementary exams***		
Skin biopsy	18	10.8
Bacterial culture	10	6.0
Direct mycological examination	9	5.4
Tzanck's smash	3	1.8
Imaging exams	8	4.8
Laboratory exams	49	29.3
Therapeutic recommendations		
<i>Antibiotics</i>		
Yes	38	22.7
Topical	5	3.0
Systemic	33	19.7
No	129	77.3
<i>Corticosteroids</i>		
Yes	59	35.3
Topical	35	20.9
Systemic	24	14.4
No	108	64.7
Antifungals		
Yes	10	6.0
Topical	7	4.2
Systemic	3	1.8
No	157	94.0

(Continues)

Table 3. Profile of hospital dermatological consultations (*continued*)

	n	%
Antiviral		
Yes	6	3.6
Oral acyclovir	3	1.8
Intravenous acyclovir	3	1.8
Other antivirals	0	0.0
No	161	96.4
Antiparasitic*		
Yes	19	11.4
Permethrin	1	0.6
Ivermectin	4	2.4
Permethrin + ivermectin	7	4.2
Sulfur 6%	7	4.2
No	148	88.6
Moisturizer		
Yes	44	26.3
Specific	23	13.8
Generic	21	12.5
No	123	73.7
Total	167	100.0

*Age groups: neonates (under 1 month); infants (2-11 months); toddlers (1-2 years); preschoolers (3-5 years); schoolers (6-10 years); adolescents (11-17 years).

**Due to the multiple diagnoses, the total of 167 consultations corresponds to 199 dermatological diagnoses.

***Multiple response variables.

"Outpatient follow-up" and "inpatient and outpatient follow-up" were the leading orientations of dermatology follow-up, appearing in 35 and 32% of hospital consultations, respectively. Furthermore, 4.8% (n = 8/167) of dermatological consultations presented loss of follow-up during the dermatology hospital assistance, whereas 28.7% (n = 48/167) were managed and discharged by the dermatology team without the need for additional outpatient follow-up (Figure 2).

Discussion

Although dermatology reveals an essentially outpatient character, the speciality provides significant contributions to the management of skin diseases in hospital settings, both for adult and pediatric patients^{10,13}. From this perspective, our findings evidenced the relevance of hospital dermatoses in a pediatric population, representing 6.8% of hospital diagnoses, in line with a similar American study, which pointed out a prevalence of 4.2%¹⁴. Thus, proper management of these cutaneous conditions is essential to prevent complications and poor prognosis.

In contrast, hospital dermatoses are commonly assisted by non-dermatologists' teams, which often do

not properly diagnose these clinical conditions. In view of this tendency, dermatology consultations figure as a meaningful resource to support the assistant medical teams⁹. From our findings, we identified 266 pediatric referrals to dermatology, most of them coming from "general pediatrics" and from pediatric wards and emergency sectors, as noted in previous studies^{2,4,10}.

In the pediatric population, likewise in adults, hospital dermatoses often manifest as acute or life-threatening conditions, entering hospitals through emergency services. According to Alba-Rojas EL et al.¹⁵, skin disorders are among the ten most common classes of diseases in pediatric emergencies. In accordance with such authors, we observed 37.6% of dermatology consultation referrals originated from the emergency department, a higher prevalence than in other studies in India^{4,10} and Turkey².

Regarding consultation referrals, despite the relevance of clinical information for the efficient support of consultant teams, about half of referrals to Dermatology did not present any clinical data, which may suggest a certain difficulty for pediatricians in skin disorders management. On the other hand, in referrals with clinical information, the location of cutaneous lesions was the most reported data, although, in most of them, few

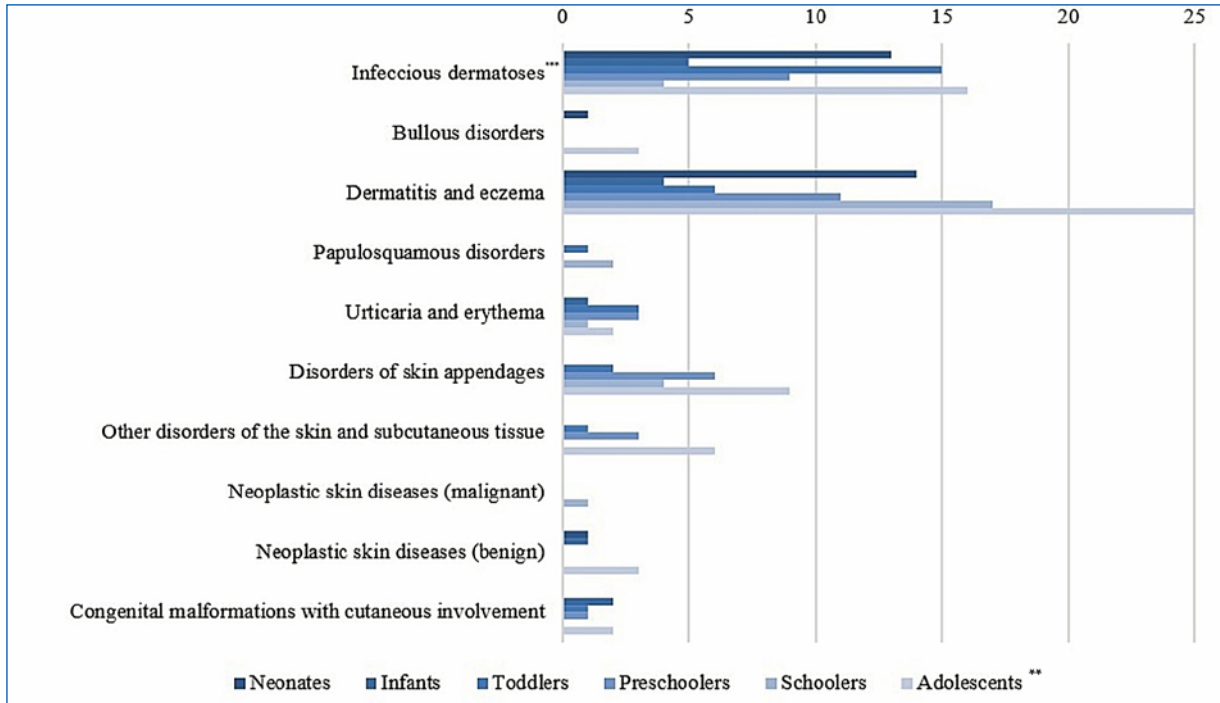


Figure 1. Groups of skin diseases in dermatological consultations, by age groups*.

*Total of 167 consultations corresponds to 199 dermatological diagnoses; chi-square test 63,502, $p = 0,029$.

**Age groups: neonates (under 1 month); infants (2-11 months); toddlers (1-2 years); preschoolers (3-5 years); schoolers (6-10 years); adolescents (11-17 years).

***Infectious dermatoses and ICDs: bacterial infections (L00, L01, L02, L03, L08, A30, A46, A53); viral infections (B00, B01, B02, B07, B08, B97); fungal infections (B35, B36, B37, B42); parasitic infections and infestations (B85, B86, B87).

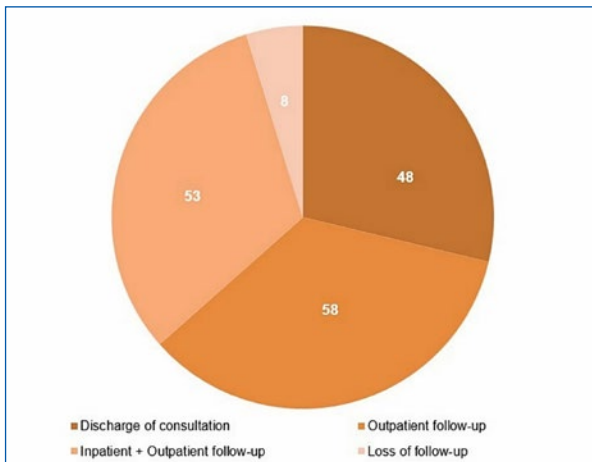


Figure 2. Follow-up recommendations of dermatology consultations*.

*'Outpatient follow-up' consists of dermatological consultations whose duration of dermatology assistance was ≥ 7 days and with recommendation for outpatient follow-up after completion. 'Inpatient + outpatient follow-up' included dermatological consultations whose dermatology assistance duration was longer than 7 days and with a recommendation for outpatient follow-up after completion.

features were mentioned. Inconsistencies in hospital referrals to Dermatology were also identified by Daye M et al.², from a study in a Turkish institution.

In view of these findings, we highlighted the relevance of adequate teaching of dermatology throughout the medical course, mainly in an internship, providing the development of clinical and examination skills in the approach to skin diseases.

Dermatology consultations: epidemiology of hospital skin diseases

Throughout the 18-month period analyzed, dermatology teams performed 167 hospital consultations, with a higher prevalence of adolescent and schooler inpatients, converging with a study in a Brazilian university hospital¹⁶. Conversely, this trend differs from findings in a Turkish pediatric hospital, where infants and preschool were the most frequent age groups⁹.

These contrasts can be related to demographic and epidemiological differences between the populations of such countries or even reflect methodological divergences insofar as studies with pediatric populations

Table 4. Major diagnostic ICDs of dermatological consultations by age groups

		n	%
L20-atopic dermatitis		32	23.7
L27-drug eruptions		23	17.0
L01-impetigo		18	13.3
B86-scabies		17	12.6
L70-acne		10	7.4
L21-seborrheic dermatitis		10	7.4
B00-herpesvirus infections		9	6.7
L50-urticaria		6	4.4
L30-unspecified dermatitis		6	4.4
Q89-congenital malformations		4	3.0
ICDs of dermatological consultations			
Neonates Under 1 month	L21-seborrheic dermatitis	8	27.6
	B86-scabies	6	20.7
	L01-impetigo	4	13.8
	L20-atopic dermatitis	4	13.8
	B081-molluscum contagiosum	1	3.4
Infants 2-11 months	B86-scabies	2	15.4
	L20-stopic dermatitis	2	15.4
	B00-herpesviral infections	1	7.7
	B87-myiasis	1	7.7
	D18-hemangioma and lymphangioma	1	7.7
Toddlers 1-2 years	B86-scabies	5	17.2
	L01-impetigo	3	10.3
	B081-molluscum contagiosum	2	6.9
	L20-atopic dermatitis	2	6.9
	L53-other erythematous conditions	2	6.9
Preschoolers 3-5 years	L20-atopic dermatitis	6	18.2
	L27-drug eruptions	4	12.1
	L01-impetigo	3	9.1
	L50-urticaria	3	9.1
	B00-herpesviral infections	2	6.1
Schoolers 6-10 years	L20-atopic dermatitis	10	30.3
	L01-impetigo	4	12.1
	L27-drug eruptions	4	12.1
	L30-unspecified dermatitis	2	6.1
	L40-psoriasis	2	6.1
Adolescents 11-17 years	L27-drug eruptions	13	19.7
	L20-atopic dermatitis	8	12.1
	L70-acne	8	12.1
	B00-herpesviral infections	6	9.1
	L01-impetigo	3	4.5

*International Classification of Diseases (ICD-10).

Table 5. Literature review about Pediatric Hospital Dermatology

Author (year)	Institution	City (Country)	Duration	Period of time	Casuistry	Main groups of skin diseases (%)
Ferreira et al. (Present study)	Federal University of Health Sciences of Porto Alegre / Santa Casa de Misericórdia de Porto Alegre	Porto Alegre (Brazil)	18 months	August, 2018-January, 2020	167 patients	Dermatitis and eczema (38.7) Skin infections (31.5) Disorders of skin appendages (10.5)
Garg et al. ^{4*} (2019)	Lady Hardinge Medical College and Associated Hospitals	New Delhi (India)	17 months	November, 2015-March, 2017	525 patients	Skin infections (58.6) Eczema (17.6) Urticaria (8.3)
Srinivas et al. ¹⁰ (2015)	Indira Gandhi Institute of Child Health	Bangalore (India)	42 months	January, 2010-June, 2013	486 patients	Skin infections (23.7) Genodermatoses (11.9) Drug reactions (8.0)
McMahon et al. ¹⁶ (2013)	Children's Hospital of Philadelphia	Philadelphia (USA)	52 months	January, 2006-April, 2010	427 patients	Miscellaneous (41.0) Skin infections (19.0) Dermatitis (15.7)
Afsar ⁹ (2017)	Dr. Behcet Uz Children's Hospital	Izmir (Türkiye)	76 months	January, 2004-April, 2010	539 patients	Allergic skin diseases (47.1) Skin infections (14.7) Systemic disorders with skin manifestations (10.2)
Peñate et al. ¹⁸ (2012)	Hospital Universitario Insular de Gran Canaria	Las Palmas de Gran Canaria (Spain)	10 years	January, 2000-January, 2009	387 patients	Inflammatory skin diseases (38.5) Skin infections (18.3) Congenital anomalies (6.9)
Daye et al. ² (2019)	Necmettin Erbakan University Meram Medical Faculty	Konya (Türkiye)	1 year	September, 2016-September, 2017	628 patients	Skin infections (32.1) Eczema (28.2) Miscellaneous (21.5)

*The authors included outpatients and inpatients in the study casuistry.

tend to adopt different compositions of age groups, hampering comparative analysis. Thus, if we consider age, one-third of dermatology consultations addressed 2-year-old or younger patients, which may represent an immunological immaturity and a higher life-threatening risk in the early stages of life⁹.

Regarding the profile of dermatoses, the main groups of diagnoses were “dermatitis and eczema” and “skin infections”, agreeing with previous investigations^{2,4,10,17} (Table 5). Hence, “drug eruptions” (L27) and “atopic dermatitis” (L20) figured as the most prevalent cutaneous disorders assisted by dermatology consultations, followed by “impetigo” (L01) and “herpes virus infections” (B00), which were the most frequent skin infections.

Atopic dermatitis is one of the most frequent dermatological causes of pediatric hospitalizations, particularly in preschool and school ages^{1,2,9,18,19}. This condition may evolve with recurrent exacerbations, presenting eczema, erythroderma, and secondary infections, then requiring hospital care^{1,20}. With this in mind, the high prevalence of atopic dermatitis and skin infections can suggest their concomitance, as asserted by Narla S

and Silverberg JI²⁰, who pointed out the greater susceptibility to bacterial and viral infections among patients with atopic dermatitis. According to Storan ER et al.¹⁸, timely pediatric hospitalizations can contribute both to managing atopic dermatitis, as well as to support parents and caregivers in the adherence to medical and non-medication measures for controlling the disease. Nonetheless, on the other hand, hospital environments may also represent health risks, mainly due to recurrent administration of medications and exposure to nosocomial bacteria.

During the hospital stay, medications are often necessary and widely prescribed by assistant teams, especially in systemic forms. However, the administration of multiple drugs, along with debilitated patients' conditions, increases the risk of drug reactions². Drug reactions can induce a broad range of clinical manifestations, which often involve the skin, namely morbilliform exanthema, Stevens-Johnson syndrome, toxic epidermal necrolysis, among others¹⁰. Corroborating this perspective, we observed a high prevalence of drug eruptions among pediatric inpatients, particularly in the adolescent group.

Furthermore, the skin fragility of early pediatric age groups also increases the risk of iatrogenic lesions, usually associated with healthcare, including dressings, vascular punctures, and prolonged decubitus²¹. Thus, iatrogenic injuries can often suffer complications such as contact dermatitis, ulcers, secondary skin infections, and vascular cutaneous disorders²², which could be a possible reason for the preponderance of “cellulitis and acute lymphangitis,” (L03) “cutaneous abscess, furuncle, and carbuncle,” (L02) and “purpura” (D69), as the main dermatological diagnoses registered by pediatric assistant teams.

Dermatology consultations: diagnosis and recommendations

In view of the variety of skin disorders, dermatology can perform a supporting role to pediatric hospitalists, contributing to avoiding inconsistent diagnosis and incorrect treatments, which would lead to iatrogenic complications and/or drug reactions, mainly in the pediatric population². Thus, the exchange of knowledge and practices among dermatologists and pediatricians can confer a qualification for the assistance of complex skin conditions²³.

Moreover, dermatologists can also contribute by performing complementary exams, such as skin biopsy and direct mycological examination^{1,9}. Considering this assumption, we noted the main complementary exams in hospital consultations: laboratory tests (29.3%) and skin biopsies (10.8%), the latter performed by the dermatology team. Skin biopsies were reduced in relation to previous studies—in India¹⁰ (17.5%) and the United States²³ (35%)—which may be related to different epidemiological profiles of these settings, then necessitating further investigation.

Concerning dermatology recommendations, topical presentations were the main form of medication, in concordance with the literature^{2,9}. Diverging from research in Turkish hospital², which pointed out moisturizers and antihistamines as major prescribing medications, our findings demonstrated topical corticoids and systemic antibiotics.

Although this study did not conduct a comparative analysis between non-dermatologists and dermatologists' managements, Daye M et al.² highlighted a tendency for assistant teams to prescribe treatments before dermatology evaluation in about a third of consultations, then to establish inadequate treatments in half of those hospitalizations.

About two-thirds of dermatology consultations recommended an outpatient follow-up, a higher propensity

than reported by Moon AT et al.²⁴ (48.1%) and Srinivas SM et al.¹⁰ (35.8%). Notwithstanding, disease severity and patients' vulnerability greatly contribute to follow-up recommendations; thus, further studies are demanded to identify relations between epidemiological profiles and follow-up among different scenarios.

Pediatric dermatology and pediatrics: dialogue and contributions

Considering pediatric hospital dermatoses, both in dermatology consultations and in general pediatric wards, we noted that pediatricians demonstrated a tendency to diagnose more common and less complex cutaneous conditions, whereas dermatologists usually established more specific and defiant diagnoses, including atopic dermatitis, acne, psoriasis, and drug eruptions.

Nonetheless, our findings revealed severe cutaneous infectious—relatively common in pediatric populations—also emerged in dermatology consultations, such as scabies, impetigo, herpes virus infections, and molluscum contagiosum. This trend suggests a prominent need for training pediatricians on the diagnosis and management of dermatological disorders⁹. Furthermore, Dermatology consultations also represent a valuable teaching-learning opportunity, favoring the exchange of experiences and improvement of clinical practices¹⁷.

From this perspective, Daye M et al.² and Garg T et al.⁴ recommended integration strategies among pediatricians and dermatology in the shape of seminars, courses, and clinical case discussions. Thus, by proposing and developing these educational activities, a field of shared knowledge can be fashioned: hospital pediatric dermatology¹⁷.

Conclusion

From this study, we outlined the profiles of dermatoses and dermatology consultations in a pediatric hospital, evidencing the prominence of inflammatory and infectious cutaneous conditions in children and adolescent populations. Moreover, vulnerabilities and shortcomings of the dermatology consultations process were also found, indicating the need for evaluations and enhancements, mainly regarding clinical data of referrals.

The acute character of various dermatoses, although not severe in many cases, reinforces the importance of both proper clinical management of cutaneous conditions, as well as the establishment of adequate criteria for

dermatology consultation referrals and hospital admissions for those skin disorders.

About study limitations, we state the retrospective character of this research, based on the analysis of referrals' registration and medical records, which may eventually present inaccuracies and/or absence of data. In addition, since dermatological diagnoses were established by dermatology teams, they can reveal a certain degree of subjectivity, strongly influenced by dermatologists' skills.

In view of the findings and considerations presented through this study, the relevance of dermatology for hospital assistance became evident, which can provide valuable contributions to other medical specialties, including pediatrics.

Funding

None.

Conflicts of interest

None.

Ethical disclosures

Protection of human and animal subjects. The authors declare that no experiments were performed on humans or animals for this study.

Confidentiality of data. The authors declare that no patient data appear in this article.

Right to privacy and informed consent. The authors have obtained approval from the Ethics Committee for the analysis and publication of routinely acquired clinical data, and informed consent was not required for this retrospective observational study.

References

- Miotto IZ, Bessa VR, Vasconcelos LB A, Samorano LP, Rivitti-Machado MC, Oliveira ZNP. Pediatric dermatoses pattern at a Brazilian reference center. *J Pediatr (Rio J)*. 2021;97:211–8.
- Daye M, Temiz SA, Durduran Y, Balevi , Dursun R, Ataseven A, et al. Analysis of consultation cases referred from Pediatrics Department to Dermatology Outpatient Clinic: retrospective study. *Clin Exp Heal Sci*. 2019;9:300–3.
- Liang Y, Chen YL, Zhao MT, Wang ZY, Li L, Zhang B, et al. Pediatric dermatology-critical approach to the new treatments. *Dermatol Ther*. 2018;32:e12801.
- Garg T, Ahmed R, Basu S, Chander R. Clinical spectrum of dermatological disorders in children referred from pediatrics department. *Indian J Paediatr Dermatol*. 2019;20:212–8.
- Nanda A, Al-Hasawi F, Alsaleh QA. A prospective survey of pediatric dermatology clinic patients in Kuwait: an analysis of 10,000 cases. *Pediatr Dermatol*. 1999;16(1):6–11.
- Wolf R, Davidovici BB, Parish JL, Parish LC. *Emergency Dermatology*. First edit. Cambridge University Press; 2010. 378 p.
- Cavero J. Características demográficas y clínicas de los pacientes evaluados en interconsulta dermatológica en un hospital nacional de Lima-Perú. *Dermatologia Peru*. 2017;27:75–8.
- Rosenbach M, Wanat KA, Michelletti RG. *Inpatient Dermatology*. First Edit. Springer London; 2018. 407 p.
- Afsar FS. Análisis de las interconsultas con dermatología pediátrica de pacientes hospitalizados en un hospital pediátrico universitario. *Arch Argent Pediatr*. 2017;115:E377–84.
- Srinivas SM, Hiremagalore R, Venkataramaiah LD, Premalatha R. Pediatric dermatology inpatient consultations: a retrospective study. *Indian J Pediatr*. 2015;82:541–4.
- Ko LN, Kroshinsky D. Dermatology hospitalists: a multicenter survey study characterizing the infrastructure of consultative dermatology in select American hospitals. *Int J Dermatol*. 2018;57:553–8.
- Huang W, Chong WS. Patterns of inpatient dermatology referral and predictors of diagnostic accuracy in non-dermatologists in a Northern District hospital in Singapore. *Int J Dermatol*. 2015;55:546–52.
- McMahon PJ, Yan AC. Inpatient consultative pediatric dermatology: an emerging need in an era of increasing inpatient acuity and complexity. *Pediatr Dermatol*. 2013;30:508–9.
- Arnold JD, Yoon S, Kirkorian AY. Inpatient burden of pediatric dermatology in the United States. *Pediatr Dermatol*. 2018;35:602–6.
- Alba-Rojas EL, Morán-Villaseñor E, Campos-Cabrera BL, Aguirre-Martínez IL, Vega-Rangel RV, Cazares-Ramírez E, et al. Diagnostic concordance between Pediatric Emergency Department physicians and dermatologists in a tertiary hospital in Mexico. *Pediatr Dermatol*. 2020;37:1113–8.
- Ferreira FR, Nascimento LFC, Cirvidiu DC. Prevalence of pediatric dermatoses in a university hospital in southeastern Brazil. *An Bras Dermatol*. 2011;86:477–82.
- Peñate Y, Borrego L, Hernández N, Islas D. Pediatric dermatology consultations: a retrospective analysis of inpatient consultations referred to the dermatology service. *Pediatr Dermatol*. 2012;29:117–8.
- Storan ER, McEvoy MT, Wetter DA, El-Azhary RA, Hand JL, Davis DMR, et al. Pediatric hospital dermatology: experience with inpatient and consult services at the Mayo Clinic. *Pediatr Dermatol*. 2013;30:433–7.
- Castelo-Soccio L, McMahon P. Pediatric dermatology. *J Clin Aesthet Dermatol*. 2017;10:S8–15.
- Narla S, Silverberg JI. Management of atopic dermatitis in the inpatient setting. *Curr Dermatol Rep*. 2021;10:77–88.
- Reddy K, Kogan S, Glick SA. Procedures and drugs in pediatric dermatology: iatrogenic risks and situations of concern. *Clin Dermatol*. 2011;29:633–43.
- Ferreira IG, Weber MB, Bulcão LA, Bonamigo RR. The impact of skin diseases in hospital care and the contributions of dermatology. *J Port Soc Dermatol Venereol*. 2021;79:41–6.
- McMahon P, Goddard D, Frieden IJ. Pediatric dermatology inpatient consultations: a retrospective study of 427 cases. *J Am Acad Dermatol*. 2013;68:926–31.
- Moon AT, Castelo-Soccio L, Yan AC. Emergency department utilization of pediatric dermatology (PD) consultations. *J Am Acad Dermatol*. 2016;74:1173–7.