ABSTRACT

Background: Skin diseases are a major health problem in the paediatric age group and are associated with significant morbidity. Dermatoses in children are more influenced by socioeconomic status, dietary habits, climatic exposure and external environment as compared to adults. The present study was undertaken to know the prevalence of paediatric dermatoses among patients attending Dermatology outpatient department in a tertiary care hospital in Puducherry.

Methods: All newly diagnosed, untreated male and female paediatric patients (from neonates to adolescents ≤19 years of age) attending Dermatology OPD, from October 2015 to September 2017 were evaluated to study the prevalence and patterns of paediatric dermatoses. The skin disorders were classified into groups like infections, infestations, eczemas, acne, hypersensitivity disorders, sweat gland disorders, pigmentary disorders, nevi, keratinisation disorders, hair and scalp disorders, papulosquamous disorders, bullous disorders, nail disorders, drug reactions, other dermatoses.

Results: The prevalence of pediatric dermatoses in our OPD is 25.21%. Incidence of pediatric dermatoses was found to be more in males 237 (59.39%) than in females 162 (40.60%) and the majority of the patients were in adolescent age group (217; 54.38%). Present study showed that majority of cases belonged to the lower socioeconomic group 186(46.6 %). In our study, majority (58.98%) of dermatoses belonged to infections and infestations group. Of the infective dermatoses, fungal infections (27.88%) were the most common.

Conclusions: Infectious dermatoses were commonly seen in this study that may be due to poverty, overcrowding, poor hygiene. There is an increasing trend of fungal infections which might be related to hygiene and environment.

Keywords: Paediatric dermatoses, Children, India, Fungal infections, Bacterial infections

INTRODUCTION

Paediatric dermatology deals with diseases and skin care needs from birth to adolescence, during which significant physiological, psychological and maturity changes occur.¹

In paediatric age group, skin diseases are a major health problem and they are associated with significant morbidity. Thirty percent of all outpatient visits to a paediatrician includes skin diseases and 30% of all visits to a dermatologist involve children.² Based on school-based surveys, the prevalence of paediatric dermatoses in various parts of India has ranged from 8.7% to 35%.¹

A significant portion of paediatric dermatological disorders is of genetic origin. Majority of these disorders are multisystemic and persist throughout life.³ Factors
like socioeconomic status, dietary habits, climatic exposure and external environment influences dermatoses in children as compared to adults. Cutaneous infections are common in school going children. Paediatric dermatoses can be transitory or chronic and recurrent and are associated with psychological impact and significant morbidity.

The present study was undertaken to know the prevalence and patterns of paediatric dermatoses among patients attending Dermatology outpatient department in a tertiary care hospital in Puducherry.

METHODS

This study was conducted in Dermatology OPD of our Institute, a tertiary care centre in Puducherry, between October 2015 and September 2017.

Inclusion criteria

All newly diagnosed, untreated male and female paediatric patients (from neonates to adolescents ≤19 years of age) attending Dermatology OPD.

Exclusion criteria

Exclusion criteria were previously diagnosed and treated cases; patients not willing to consent for the study; patients in whom definite diagnosis cannot be arrived at.

Methodology

Patients were grouped according to age:

1. Infant: birth to 1 yr of age
2. Pre-school: 1-5 yrs of age
3. School age: 6 yrs-12 yrs
4. Adolescent: 13 yrs-19 yrs

Informed verbal consent was taken from either of the patient’s parents before including into the study. Thorough general, systemic and cutaneous examination and relevant investigations were done. The collected data was tabulated and analysed.

RESULTS

During the study period of 2 years, 8,472 new cases attended our out-patient Department of which 2,136 belonged to paediatric age group. Thus the prevalence of paediatric dermatoses in our OPD is 25.21%.

Table 1 shows various dermatoses encountered in paediatric population. Of the 434 dermatoses encountered in this study, fungal infections (27.88%) constitute majority of the dermatoses followed by bacterial infections (11.05%), viral infections (8.98%), infestations (11.05%), eczemas (11.05%), acne (8.06%), hypersensitivity disorders (6.22%), sweat gland disorders (3.68%), pigmentary disorders (1.84%), nevi (2.07%), keratinisation disorders (1.84%), hair and scalp disorders (1.61%), papulosquamous disorders (0.92%), bullous disorders (0.46%), nail disorders (0.23%), drug reactions (0.23%) and other dermatoses (2.76%).

Table 2 shows age and sex distribution of paediatric dermatoses. In the present study 8 patients belonged to the age group <1 year, out of which 4 patients were males and four were females. Seventy six patients belonged to the age group 1-5 years, out of which 51 are males and 25 are females. Ninety eight patients belong to the age group 6-12 years, out of which 60 patients are males and 38 are females. Two hundred seventeen patients belong to the age group 13-19 years, out of which 122 patients are males and 95 patients are females.

Table 1: Various dermatoses in paediatric population.

| Types of dermatoses               | Total No of patients (%) | Male   | Female | Total no of dermatoses (N=434) (%) |
|------------------------------------|--------------------------|--------|--------|-----------------------------------|
| Fungal infections                  | 103 (25.81)              | 56     | 47     | 121 (27.88)                       |
| Bacterial infections               | 48 (12.03)               | 30     | 18     | 48 (11.05)                        |
| Viral infections                   | 39 (9.77)                | 24     | 15     | 39 (8.98)                         |
| Infestations                       | 48 (12.03)               | 38     | 10     | 48 (11.05)                        |
| Eczemas                            | 47 (11.77)               | 28     | 19     | 48 (11.05)                        |
| Acne                               | 35 (8.77)                | 17     | 18     | 35 (8.06)                         |
| Hypersensitivity disorders         | 27 (6.76)                | 15     | 12     | 27 (6.22)                         |
| Sweat gland disorders              | 16 (3.75)                | 9      | 7      | 16 (3.68)                         |
| Pigmentary disorders               | 8 (2.00)                 | 4      | 4      | 8 (1.84)                          |
| Nevi                               | 9 (2.25)                 | 5      | 4      | 9 (2.07)                          |
| Keratinisation disorders           | 8 (2.00)                 | 5      | 2      | 8 (1.84)                          |
| Hair and scalp disorders           | 7 (1.75)                 | 4      | 3      | 7 (1.61)                          |
| Papulosquamous disorders           | 4 (1.00)                 | 3      | 1      | 4 (0.92)                          |
| Bullous disorders                  | 2 (0.50)                 | 0      | 2      | 2 (0.46)                          |
| Nail disorders                     | 1 (0.25)                 | 0      | 1      | 1 (0.23)                          |
| Drug reactions                     | 1 (0.25)                 | 1      | 0      | 1 (0.23)                          |
| Other dermatoses                   | 12 (3.00)                | 6      | 6      | 12 (2.76)                         |
Table 2: Age and sex distribution of paediatric dermatoses.

| Age (in years) | Male | Female | Total |
|----------------|------|--------|-------|
| <1             | 4    | 4      | 8     |
| 1-5            | 51   | 25     | 76    |
| 6-12           | 60   | 38     | 98    |
| 13-19          | 122  | 95     | 217   |
| Total          | 237  | 162    | 399   |

Table 3: Infections & infestations.

| Infections       | Infestations       | Total dermatoses (%) | Male | Female |
|------------------|--------------------|-----------------------|------|--------|
| Fungal infections| Pityriasis versicolor | 33 (27.27)          | 16   | 17     |
|                  | Candidial Intertrigo | 4 (3.30)             | 1    | 3      |
|                  | T. corporis        | 36 (29.75)           | 21   | 15     |
|                  | T. cruris          | 41 (33.88)           | 25   | 16     |
|                  | T. incognito       | 4 (3.30)             | 2    | 2      |
|                  | T. faciei          | 2 (1.65)             | 1    | 1      |
|                  | Candidial balanoposthitis | 1 (0.82) | 1    | 0      |
| Total            |                    | 121 (100)            | 67   | 54     |
| Bacterial infections | Impetigo          | 37 (77.08)           | 23   | 14     |
|                   | Folliculitis       | 6 (12.5)             | 4    | 2      |
|                   | Furunculosis       | 2 (4.16)             | 0    | 2      |
|                   | Pitted keratolysis | 1 (2.08)             | 1    | 0      |
|                   | Lupus vulgaris     | 1 (2.08)             | 1    | 0      |
|                   | Lepromatous leprosy| 1 (2.08)             | 1    | 0      |
| Total             |                    | 48 (100)             | 30   | 18     |
| Viral infections  | Chicken pox        | 2 (5.12)             | 1    | 1      |
|                   | Herpes zoster      | 1 (2.56)             | 0    | 1      |
|                   | Molluscum contagiosum | 8 (20.51) | 6    | 2      |
|                   | HFMD               | 2 (5.12)             | 1    | 1      |
|                   | Pityriasis rosea   | 5 (12.82)            | 4    | 1      |
|                   | Papular acrodermatitis | 1 (2.56) | 1    | 0      |
|                   | Verruca vulgaris   | 14 (35.89)           | 7    | 7      |
|                   | Digitate wart      | 1 (2.56)             | 1    | 0      |
|                   | Plane wart         | 1 (2.56)             | 1    | 0      |
|                   | Palmar wart        | 2 (5.12)             | 1    | 1      |
|                   | Plantar wart       | 2 (5.12)             | 1    | 1      |
| Total             |                    | 39 (100)             | 24   | 15     |
| Infestations      | Scabies            | 45 (93.75)           | 38   | 7      |
|                   | Pediculosis        | 3 (6.25)             | 0    | 3      |
| Total             |                    | 48 (100)             | 38   | 10     |

Table 3 shows various infections and infestations encountered in this study. Fungal infections (27.81%) were the commonest infections in this study followed by bacterial infections (12.03%) and viral infections (9.77%). Scabies was the most common infestation seen in 45 patients (93.75%). Pediculosis is seen in 3 female patients (6.25%) only. Infestations are more common in males (79.16%) when compared to females (20.83%).

Among 48 patients with eczematous disorders, 28 (58.33%) were males and 20 (41.66%) were females. Pityriasis alba was the commonest eczematous dermatoses seen in 16 (33.33%) patients, followed by atopic dermatitis in 11 (22.91%) patients, seborrhoeic dermatitis in 8 (16.66%), subacute eczema in 3 (6.25%), keratosis pilaris in 3 (6.25%), chronic eczema in 1 (2.08%), papompholyx in 1 (2.08%), nipple eczema in 1 (2.08%), infective eczema in 1 (2.08%), infected eczema in 1 (2.08%), allergic contact dermatitis in 1 (2.08%), and irritant contact dermatitis 1 (2.08%) patient.

Among 35 Acne patients, females were affected more (51.42%) when compared with males (48.57%). Acne vulgaris was seen in 31 (88.57%) patients, followed by Acne corporis in 3 (8.57%) and neonatal acne in 1 (2.86%) patient.
Urinary incontinence was found to be the most common hypersensitive disorder seen in 11 (40.74%) patients followed by polymorphic light eruption in 10 (37.04%) and Insect bite allergy in 6 (22.22%) patients. Males (55.55%) were more affected than females (44.44%).

Among 15 patients with sweat gland disorders, 9 (56.25%) were males and 7 (43.75%) were females. Sweat retention syndrome was the commonest disorder seen in 13 (81.25%) patients followed by hyperhidrosis in 2 (12.5%) and periporitis in 1 (6.25%) patient.

Postinflammatory hyperpigmentation is the commonest pigmentary disorder seen in 3 (37.5%) patients, followed by seborrhoeic melanosis in 1 (12.5%), phototanning in 1 (12.5%), lenticigens in 1 (12.5%), lichen planus pigmentosus in 1 (12.5%) and vitiligo in 1 (12.5%) patient.

Veruccous epidermal nevus and Becker’s nevus were the most common nevi seen in 3 (33.33%) patients each, followed by melanocytic nevus in 2 (22.22%) patients and compound nevus in 1 (11.11%) patient. Out of 9 nevi cases, 5 (55.55%) were males and 4 (44.44%) were females.

Ichthyosis vulgaris and keratolysis exfoliativa are seen in 2 (25%) patients each. One patient (12.5%) each was affected with phynonodera, lichen planus, lichen nitidus and acanthosis nigricans. Keratinisation disorders were common in males (62.5%) than females (37.5%).

Among hair and scalp disorders, alopecia areata was seen in 4 male (57.14%) patients only, diffuse hair loss in 2 (28.58%) and traction alopecia in 1 (14.29%) patient. Males (57.14%) are more affected than females (42.85%).

Among papulosquamous disorders, lichen planus is seen in 3 (75%) and psoriasis in 1 (25%) patient. Males (75%) were more affected than females (25%).

Epidermolysis bullosa simplex was the only vesiculobullous disorder constituting to about 0.46% of total dermatoses with two cases.

Apart from these dermatoses, dermatosis papulosa nigra was seen in 2 patients (16.66%). One patient each (8.33%) was affected by lipoma, pyogenic granuloma, xerosis, corn foot, balanitis, vaginal discharge, hemangioma, frictional dermatitis, chelitis and perioral dermatitis respectively.

**DISCUSSION**

The prevalence of paediatric dermatoses in our OPD is 25.21%, while in various parts of India, it has ranged from 8.7% to 35% in school-based surveys. The present study was carried out on a group of 399 paediatric cases. 434 dermatoses are seen in 399 patients. Among these children, 32 patients had more than one dermatoses.

In our study, majority of the patients were in adolescent age group (54.38%) followed by school children (25.06%), preschool children (19.04%) and infants (2.00%) respectively. Similar observation was made by Reddy et al and Sharma et al. Also reported that paediatric dermatoses are more common in adolescent age group. Sacchidanand et al observed 5–11 years is the common age group followed by adolescents with 33.21% and 29.81%, respectively.

Incidence of paediatric dermatoses was found to be more in males 237 (59.39%) than in females 162 (40.60%) in the present study with male to female ratio of 1.46:1. Similar observation was made by Sharma et al. Females outnumbered males in very few studies.

Present study showed that majority of cases belonged to the lower socioeconomic group (46.6 %) followed by the middle socioeconomic group (29.5%) as per Kuppuswamy socioeconomic classification. This could be due to large rural population attending our hospital.

In our study, majority of dermatoses belonged to infections and infestations group (58.98%). Sacchidanand et al and Bisht et al reported infections and infestations to be 32.47% and 36.46%, respectively. Negi et al Sharma and Mendiratta, and Bhatia and Ghosh et al have reported them occurring in the range of 35.6–85%. In all these studies, whether institution based or community based, the infections and infestations were the main group of dermatoses. The higher frequency of infections and infestations in our study could possibly be due to large rural population of low socio-economic strata attending our hospital.

Of the total paediatric dermatoses (434), fungal infections (121 patients; 27.88%) were the most common of the infectious dermatoses, followed by bacterial infections (48 patients; 11.05%) and viral infections (39 patients; 8.98%). Similar pattern has been observed by Sayal et al.

Fungal infections of the skin constituted 58.17% of the total infections and 27.88% of total dermatoses. Dermatophytic infections were the most common among these infections making up to 68.59%. Tinea cruris was found in a significant number of children forming 49.39% of dermatophytic infections and 9.44% of all dermatoses followed by tinea corporis (8.29%). Pityriasis versicolor (as shown in Figure 1) was seen in 27.27% of total fungal infections and 7.60% of the total dermatoses. The incidence varied from 3.3 to 8.5 in various other studies. Candidal infections constituted 1.15% of total dermatoses. Karthikeyan et al study showed candidal infections to be 2.1% of total dermatoses.
Bacterial infections constituted 23.07% of the total infections and 11.05% of total paediatric dermatoses. Impetigo (as shown in Figure 2), was the most common bacterial infection with 77.08% of total bacterial infections, followed by folliculitis with 12.5%, furunculosis with 4.16%, pitted keratolysis with 2.08%, lupus vulgaris with 2.08%, lepromatous leprosy with 2.08% of bacterial infections. Pyoderma was the most common dermatoses found out by Bhatia and Ghosh et al.12,13

The viral infections constituted 18.75% of the total infections and 8.98% of total dermatoses of our study. Viral warts (as shown in Figure 3), was the most common viral disease constituting 51.28% of these infections and 4.60% of total dermatoses. Second most common viral infection was molluscum contagiosum which constituted 20.51% of viral infections and 1.84% of total dermatoses Karthikeyan et al in their study observed that incidence of molluscum contagiosum was 2.5% in children aged 1 to 15.7 Pityriasis rosea was the next common viral infection with 12.82% of viral infections and 1.15% of total dermatoses in our study. Hand foot mouth disease constituted 5.12% of viral infections and 0.46% of total dermatoses. The incidence of Varicella was 0.46% in our study which is similar to that reported by Karthikeyan et al (0.4%).3 The incidence of herpes zoster was 0.23% in our study whereas in Karthikeyan et al study, it was 0.37%.7 Papular acrodermatitis constituted 0.23% in our study.

Scabies (as shown in Figure 4) alone constituted the majority of infestation, making 10.36% of the total dermatoses. Sacchidanand et al in their study found that the incidence of scabies was 6.97%.6 The incidence of scabies had varied from 5.1% to 22.4% in studies done by Negi et al, Sharma and Mendiratta, and Bhatia.10-12 Sarkar and Kanwar in their study pointed out that the prevalence of scabies in general population of rural communities in India is about 5%.15 Pediculosis capitis was the next most common infestation constituting 0.69% in our study. It was exclusively seen in females in our study. A school survey done in Pondicherry in India had found pediculosis capitis to be the most common dermatological disorder in children.16 The decreased frequency of pediculosis capitis in our study could be due to increasing awareness about hair care and hygiene among females.
Figure 5: Pityriasis alba over left cheek.

Eczema was the second common group of dermatoses in our study constituting 11.05% of total dermatoses. The incidence rate of eczema in the study by Sacchidanand et al was 20.66% whereas in Karthikeyan et al study, it was 8.6%. Of the eczema group, pityriasis alba as shown in Figure 5, was the commonest and constituted 33.33% of eczematous disorders, followed by atopic dermatitis (22.91%), seborrhoeic dermatitis (16.66%), subacute eczema (6.25%), keratosis pilaris (6.25%), chronic eczema (2.08%), pompholyx (2.08%), nipple eczema (2.08%), infective eczema (2.08%), infected eczema (2.08%), allergic contact dermatitis (2.08%), and irritant contact dermatitis (2.08%). Exogenous eczema constituted 4.16% of eczematous disorders. Sacchidanand et al reported atopic dermatitis as the most common eczematous dermatitis which constituted 6.12%. Few other studies also showed atopic dermatitis as the most common endogenous eczema which ranges from 3% to 28%.

Figure 6: Acne vulgaris seen over face.

Acne constituted 8.06% of all dermatoses. Acne vulgaris as shown in Figure 6, constitutes 7.14% of all dermatoses, followed by acne corporis (0.69%), and neonatal acne (0.23%). All the patients of acne vulgaris and acne corporis belong to adolescent age group. Prevalence rate of 5.6% is seen in a study by Reddy et al.

Figure 7: Wheals seen over back in urticarial.

Hypersensitivity disorders constituted 6.22% of all dermatoses. Urticaria as shown in Figure 7, was the most common disorder constituting 40.74% of hypersensitivity disorders and 2.53% of total dermatoses followed by Polymorphic light eruption (2.30%). In a study by Karthikeyan et al, urticaria constituted 2.5% of all cases. Insect bite allergy (papular urticaria) contributed to 1.38% of the study population. Ghosh et al observed a frequency of 4% in their study. In the study done by Karthikeyan et al, the prevalence of miliaria was 4.1%.

Sweat gland disorders constituted 3.68% of dermatoses during this study period. Sweat retention syndrome was the commonest among sweat gland disorders and constituted 2.99% of all dermatoses followed by hyperhidrosis (0.46%), and periporitis (0.23%). Prevalence rate of 1.2% is seen for miliaria in a study by Reddy et al. In the study done by Karthikeyan et al, the prevalence of miliaria was 4.1%.

Pigmentary disorders constituted 1.84% of total dermatoses in our study. Post inflammatory hyperpigmentation was seen in 0.69%, followed by 0.23% each in seborrhoeic melanosis, phototanning, lentigines, lichen planus pigmentosus and previtiligo respectively. Sacchidanand et al reported that pigmentary disorders constituted 5.81% and Karthikeyan et al reported 5.7%.

Nevoid disorders constituted 2.07% of total dermatoses in this study. Thappa et al in their study observed a prevalence of 0.5%. Dogra and Kumar observed a prevalence of 1.1%. Verrucous epidermal nevus (Figure 8) was the most common nevoid and developmental disorder in our study (0.69%), followed...
by Becker’s nevus (0.46%), melanocytic nevus (0.23%) and compound nevus (0.23%).

Figure 8: Veruccous epidermal nevus over neck.

Figure 9: Ichthyosis vulgaris seen over both lower legs.

Among keratinization disorders, Ichthyosis (Figure 9) was seen in 0.46%, keratosis exfoliativa in 0.46% followed by phrynoderma (0.23%), lichen spinulosus (0.23%), lichen nitidus (0.23%) and acanthosis nigricans (0.23%). Reddy et al observed the prevalence of ichthyosis in 0.8%. In contrast, Ghosh et al did not encounter any of these disorders in their studies.\textsuperscript{13} In the study conducted by Dogra and Kumar the prevalence was 1.3%.\textsuperscript{21}

Hair and scalp disorders constituted 1.61% of the total dermatoses. Alopecia areata (0.92%) was the most common hair and scalp disorder followed by diffuse hair loss (0.46%) and traction alopecia (0.23%). All cases of alopecia areata were males. Vora et al observed alopecia in 0.07% of children.\textsuperscript{22}

Papulosquamous disorders were noted in 0.92% of the cases during this study period. Prevalence of papulosquamous disorders in the study of Sacchidanand et al was 6.08%.\textsuperscript{6} Lichen planus was the most common dermatoses and constituted about 0.69% of the total dermatoses. Psoriasis constituted about 0.23% of the total dermatoses. Karthikeyan et al reported prevalence of psoriasis as 1.4%.\textsuperscript{5}

Vesiculobullous disorders constituted 0.46% of total dermatoses with two cases of epidermolysis bullosa simplex. According to Sarkar et al, the prevalence rate of epidermolysis bullosa simplex was 4.65%.\textsuperscript{15} There was no significant association of various dermatoses with systemic diseases in our study.

The prevalence of certain dermatoses may be influenced by seasonal and climatic changes. This was quite evident in our study in which atopic dermatitis was noted predominantly in winters while papular urticaria was seen more frequently in rainy season.

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