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Original Article

The Pattern of Pediatric Parasitic Skin Diseases in a Secondary Hospital in East Java: A Retrospective Study

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ABSTRACT

Background: Epidermal parasitic skin diseases (EPSDs) are a group of neglected infectious diseases caused by parasites that infect the upper layer of the skin. A parasitic infection of the skin is caused by small insects or worms that burrow into the skin to live there or lay their eggs. EPSDs are a public health issue and can occur in children of all ages. **Purpose:** This study aims to describe the pattern and incidences of parasitic skin infections in children. **Methods:** This is a cross-sectional study utilizing medical records from the Dermatology and Venereology Clinic of Dr. Harjono Ponorogo General Public Hospital from 2016 to 2020. **Result:** Our study showed that, of the 1426 children brought to our clinic, parasitic infection was the second most common skin disease found in children with a prevalence of 27.1%. Parasitic infection in children was dominated by males with a proportion of 69.7%, and occurred mostly in the ≥13-year-old age group. Among all ages, scabies is the most frequent parasitic infection found, followed by cutaneous larva migrant (CLM) and pediculosis. **Conclusion:** The prevalence of EPSDs is increasing with age and is more common in males. This high prevalence is probably due to increased intensity of contact with other people, decreased parental care, and low socio-economic status.

Keywords: Parasite, pediatric, skin infection.

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BACKGROUND

The skin condition can affect patients' quality of life, especially in vulnerable populations such as the elderly, women, and children.[1] The health status and personal hygiene of a community can be measured by the prevalence of certain chronic skin diseases in children.[2] A recent review stated that children with chronic skin diseases also experienced a decrease in quality of life as compared to children with other chronic diseases.[3] Furthermore, a study in Brazil reported that children with scabies experienced shaming, stigmatization, and bullying.[4] Therefore, the evaluation of skin diseases in children is an important component of primary health care.[5]

Epidermal parasitic skin diseases are a group of infectious diseases caused by parasites that infect the upper layer of the skin and are one of the oldest diseases known by humans.[6,7] This group of diseases is often neglected, although it is one of the most common public health problems found in tropical and sub-tropical countries.[7]

The pattern of skin disease varies in each region due to differences in genetic and environmental factors.[5] It is known that in most developing countries, infections and infestations are the predominant skin diseases in children.[5,8] However, the data on the pattern and incidence of pediatric parasitic skin infections in Indonesia is still scarce. This study aims to describe parasitic skin disease distribution in children based on data from one of the public hospitals in Indonesia.

METHODS

This was a retrospective descriptive study utilizing medical records from the Dermatovenereology

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clinic of Dr. Harjono Ponorogo General Public Hospital in the last five years, starting from 2016 to 2020. This study protocol had been approved by the Health Research Ethics Committee of Dr. Harjono S. Ponorogo General Public Hospital (Ref number: 352021K111462021110600001/ XI/ KEPK/ 2021.

The research subjects were all pediatric patients brought for the first time to our clinic. They were divided into six groups based on their age: newborn (0-7 days), neonates (8-30 days), infants (1-12 months), toddlers and preschoolers (2-5 years), children (6-12 years), and adolescents (13 to <18 years). The diseases were classified into 11 groups according to their etiology and organs involved. Parasitic infections were further classified them into scabies, pediculosis, and cutaneous larva migrant. The data were analyzed using IBM SPSS Statistics 25 software.

RESULT

Parasitic skin infection was ranked second among the most common pediatric skin diseases in the Dermatovenereology Clinic of Dr. Harjono Ponorogo General Public Hospital from 2016 to 2020. In this period, the number of pediatric patients who came with a parasitic skin infection fluctuated from year to year, with the highest prevalence in 2017 and the lowest prevalence in 2020. Moreover, there were a total of 309 (21.7%) patients with parasitic skin infections, consisting of scabies in 301 (21.1%) patients, cutaneous larva migrans in 7 (0.5%) patients, and pediculosis in 1 (0.1%) patient (Table 1).

Table 1. Distribution of skin diseases in the Dermatovenereology Clinic of Dr. Harjono Ponorogo General Public Hospital in the last five years

Diseases	Years					Total (%)
	2016 (%)	2017 (%)	2018 (%)	2019 (%)	2020 (%)	
Parasite Infection	61 (4,3)	93 (6,5)	72 (5,0)	51 (3,5)	32 (2,2)	309 (21,7)
Scabies	59 (4,1)	93 (6,5)	68 (4,8)	50 (3,5)	31 (2,2)	301 (21,1)
Pediculosis	1 (0,1)	0 (0,0)	0 (0,0)	0 (0,0)	0 (0,0)	1 (0,1)
Cutaneous larva migrans	1 (0,1)	0 (0,0)	4 (0,3)	1 (0,1)	1 (0,1)	7 (0,5)
Dermatitis	122 (8,5)	145 (10,2)	109 (7,6)	75 (5,3)	20 (1,4)	471 (33,0)
Viral infection	15 (1,1)	17 (1,2)	18 (1,3)	15 (1,1)	5 (0,4)	70 (4,9)
Bacterial infection	11 (0,8)	32 (2,2)	27 (1,9)	25 (1,8)	12 (0,8)	107 (7,5)
Fungal infection	45 (3,2)	57 (4,0)	34 (2,4)	23 (1,6)	16 (1,1)	175 (12,3)
Skin pigment disorder	7 (0,5)	14 (1,0)	8 (0,6)	7 (0,5)	0 (0,0)	36 (2,5)
Sebaceous gland disorder	3 (0,2)	7 (0,5)	4 (0,3)	4 (0,3)	1 (0,1)	19 (1,3)
Vascular disorder	0 (0,0)	1 (0,1)	3 (0,2)	2 (0,1)	2 (0,1)	8 (0,6)
Hair disorder	2 (0,1)	2 (0,1)	0 (0,0)	2 (0,1)	0 (0,1)	6 (0,4)
Allergy and autoimmune	5 (0,4)	5 (0,4)	7 (0,5)	4 (0,3)	1 (0,1)	22 (1,5)
Others	44 (3,1)	60 (4,2)	50 (3,5)	33 (2,3)	16 (1,1)	203 (14,2)
Total (%)	315 (22,1)	433 (30,3)	332 (23,3)	241 (16,9)	105 (7,4)	1426 (100)

Table 2. Parasitic infection according to age groups and sex

Classification	Years					Total (%)
	2016 (%)	2017 (%)	2018 (%)	2019 (%)	2020 (%)	
Age groups						
Newborns	1 (0,3)	2 (0,6)	0 (0,0)	0 (0,0)	0 (0,0)	3 (1,0)
Neonates	0 (0,0)	0 (0,0)	0 (0,0)	0 (0,0)	0 (0,0)	0 (0,0)
Infants	5 (1,6)	4 (1,3)	10 (3,2)	0 (0,0)	1 (0,3)	20 (6,5)
Toddler and preschool	15 (4,8)	8 (2,6)	12 (3,9)	4 (1,3)	1 (0,3)	40 (12,9)
Childrens	18 (5,8)	37 (11,9)	19 (6,1)	20 (6,5)	11 (3,5)	105 (33,9)
Adolescents	22 (7,1)	42 (13,5)	31 (10,0)	27 (8,7)	19 (6,1)	141 (45,6)
Sex						
Male	39 (12,6)	61 (19,7)	52 (16,8)	37 (12,0)	27 (8,7)	216 (69,9)
Female	22 (7,1)	32 (10,3)	20 (6,5)	14 (4,5)	5 (1,6)	93 (30,1)

According to their age groups, the majority of the patients were adolescents with a total of 141 (45.6%) patients, followed by school-age children with 105 (33.9%) patients, toddlers and preschoolers with 40

(12.9%), infants with 20 (6.5%) patients, and newborns with 3 (1.0%) patients. Whereas, based on sex, the majority of patients were male, with a total of 216 (69.9%) patients (Table 2).

Parasitic infection in children was dominated by scabies in older age groups, namely adolescents (138 patients), followed by the school-age group (102 patients), infants (20 patients), and newborns (3 patients). Similar results were found in cutaneous larva migrans that only occurred in older age groups such as adolescents (2 patients), school-age (3 patients), and toddlers and preschoolers (2 patients). Whilst pediculosis only occurred in the adolescent age group (Table 3).

Based on gender, the majority of parasitic infectious diseases in children occurred in males compared to females (69.9% vs. 30.1%). However, this happened because the majority of scabies patients were male (214 patients), thus making the total percentage higher. Pediculosis and cutaneous larva migrans were more common in females than males (Table 3).

Table 3. Distribution of each parasitic skin infection according to their age group and sex

Classification	Diseases			Total (%)
	Scabies	Pediculosis	CLM	
Age groups				
Newborns	3 (1,0)	0 (0,0)	0 (0,0)	3 (1,0)
Neonates	0 (0,0)	0 (0,0)	0 (0,0)	0 (0,0)
Infants	20 (6,5)	0 (0,0)	0 (0,0)	20 (6,5)
Toddlers and preschoolers	38 (12,3)	0 (0,0)	2 (0,6)	40 (12,9)
School age	102 (33,0)	0 (0,0)	3 (1,0)	105 (34,0)
Adolescents	138 (44,6)	1 (0,3)	2 (0,6)	141 (45,6)
Sex				
Male	214 (69,3)	0 (0,0)	2 (0,6)	216 (69,9)
Female	87 (28,1)	1 (0,3)	5 (1,6)	93 (30,1)

CLM: cutaneous larva migran

DISCUSSION

The prevalence of pediatric skin diseases is very high, especially in developing countries.[9] Unfortunately, the data of skin diseases patterns and incidence caused by parasite infection in Indonesia are still lacking. Epidemiological data is important in planning public health policies for disease control and formulate therapy recommendations for common diseases in the area.[9,10]

Our results found that the prevalence of parasitic skin infection in children is ranked second, with a total of 309 patients from all patients who came to the Dermatovenereology Clinic at Dr. Harjono Ponorogo General Public Hospital from 2016 to 2020. The finding is different from a study conducted by Tanamal *et al.* (2015), which reported that parasitic skin infection is ranked eighth in the prevalence of pediatric skin diseases at Prof. Dr. R. D. Kandou Manado General Hospital.[11] Nonetheless, our finding is in accordance with a study conducted by Gustia *et al.* (2020) in Dr. M. Djamil Padang General Hospital, also reported that parasitic infection was the second most common cause of skin and venereal disease in children.[12]

Scabies is ranked first as the most common etiological cause of parasitic infection in children, with total cases of 301 patients, followed by cutaneous larva migrants and pediculosis, with total cases of 7 and 1 patient respectively. Balai *et al.* (2012) also reported that scabies is the most common parasitic infection in children, with a prevalence of 10.41%.[2] Furthermore, we found that the prevalence of skin diseases caused by parasitic infection is more frequent in males than females (69.9% vs, 30.1%). If we look at each disease, we can see that scabies, which is the highest contributor to skin parasitic infection in children, is also dominated by males (69.3% vs. 28.1%). This finding is in accordance with a study by Jose *et al.* (2017), who reported that scabies prevalence is more common in males than females (8.65% vs. 2.63%) and pediculosis is more frequent in females than males (17.30% vs. 3.67%).[9] Two retrospective studies in Indonesia also reported that scabies prevalence is more common in males than females.[13,14]

This study revealed that scabies prevalence is increasing with age, with the highest prevalence in the adolescents (>13 years). This result is similar to a retrospective study conducted at Dr. Soetomo General Hospital Surabaya in 2015, which revealed that 63.8% of scabies infections occurred in children aged 5-14 years-old.[14] It might be caused by the fact that as children get older, they become more active and make more contact with other people, especially their peers. Since scabies is mainly transmitted through direct skin contact, this increases the risk of transmission.[15]

However, this result is different from a study conducted in a boarding school in Indonesia, which reported that the scabies prevalence in junior high school students is higher than that in senior high school students.[16] This result gap might be caused by the difference in the sample population.

In this study, there was only one case of pediculosis, which occurred in a female patient. The pediculosis incidence is more common in women, especially those who live in crowded places such as orphanages, penitentiaries, or boarding schools.[17] This may be due to longer hair and less frequent shampooing in women.[9] In addition, the patient in this study is also in the adolescent age group, where at that age, parents concern for their child's hygiene decreases because the child is considered independent.[9]

Cutaneous larva migrans is a tropical skin disease caused by hookworm infection that live in cats and dogs such as *Ancylostoma braziliense, Ancylostoma caninum, Uncinaria stenocephala*, and *Bunostomum phlebotomum*.[18,19] This study shows that the prevalence of this disease increases with age and occurs mainly in women. This result is slightly different from the research conducted by Reichert *et al.* (2018), who reported that the most at-risk population groups for cutaneous larva migrans were male, aged 10-14 years, and in low economic strata.[18] However, this difference may have occurred because we did not analyze the economic status of the patients. In another study, it was reported that cutaneous larva migrans were common in communities living in poverty.[20] In order to reduce the burden of this disease, the living conditions of the community must be improved.

In the period 2016-2020, 309 of the 1426 children who visited the Dermatology and Venereology Clinic at Dr. Harjono Ponorogo General Public Hospital experienced parasite infection on the skin. The skin infection was dominated by scabies, followed by cutaneous larvae migrans nd pediculosis. This prevalence increases with age and tends to be higher in males. The high prevalence of these diseases may be caused by an increase in the intensity of child contact, a decrease in parental care for children because they feel they are already independent, and socio-economic factors in the family.

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