

Clinical Characteristics and Some Related Factors in Children with Prurigo Nodularis in Vietnam

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Abstract

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BACKGROUND: Prurigo nodularis in children can become chronic, lasting from several months to many years, triggered and sustained by environmental allergens. In Vietnam, prurigo nodularis is relatively common; however, few studies have been conducted on pediatric populations.

AIMS: This study aims to describe the clinical characteristics and related factors of prurigo nodularis in children.

METHODS: This prospective, cross-sectional descriptive study was conducted at the National Hospital of Dermatology and Venereology from December 2023 to June 2024. A total of 117 children participated in the study. Data were collected according to the study's medical record template.

RESULTS: The results showed that the proportion of male patients was higher than that of female patients (62.4% vs. 37.6%), with the highest proportion of cases in the under-6 age group (47%). Most patients lived in urban areas (88%). Nearly half of the cases had disease duration of < 12 months (42.2%). The onset rate on the legs was the highest (58.2%). Some related factors were herbal baths (1.7%), food allergies (8.5%), pet keeping (22.2%), insect bites (23.1%), family history of prurigo (24.8%), long fingernails (59.8%), and self-medication (73.5%). The rate of regular deworming was 93.2% of the children. Most patients experienced severe itching (97.4%), with the severity and activity level of the disease mainly at moderate levels (96.6% and 97.4%, respectively).

CONCLUSION: Prurigo nodularis in children presents with diverse clinical characteristics. Factors such as food allergies, pet keeping, insect bites, and family history may play a role in triggering and maintaining the disease, but further research is needed.

Introduction

Prurigo nodularis is characterized by primary skin lesions such as pruritic papules or nodules that are symmetrically distributed, often found on the limbs, buttocks, and/or trunk [1], [2]. The disease can present in acute, subacute, or chronic form. In children, prurigo nodularis is frequently described as papules or papular urticaria and is considered a hypersensitivity reaction [3]. Prurigo nodularis in children can become chronic, lasting from several months to many years, triggered and sustained by environmental allergens. Acute prurigo is commonly seen in areas with poor sanitation, associated with insect bites or infections [4], whereas chronic prurigo may be caused by endogenous pruritic factors [5]. Prurigo nodularis mainly affects middle-aged and elderly individuals [1], [2], with a lower incidence in children [6]. The etiology of prurigo can be complex, involving climatic and environmental conditions [5]. In addition, inflammatory diseases, internal organ diseases, infections, or malignancies

can contribute to prurigo [7]. Treating prurigo in children is challenging due to the lack of standard treatment protocols and insufficient clinical data, making it difficult to control scratching behavior [4]. The persistent nature of the disease can impact children's physical and mental development and increase the risk of secondary skin infections.

In Vietnam, prurigo nodularis is relatively common; however, few studies have been conducted on pediatric populations. According to Nguyen Quy Thai (2012) the disease mostly affects those aged 45 years and older (93.7%), with the highest prevalence in individuals over 60 years (53.1%), and is more common in males (71.9%) than females (28.1%) [8]. Providing evidence on the clinical and subclinical characteristics and related factors of prurigo in children is crucial for developing appropriate diagnostic, treatment, and prevention strategies. This study aims to describe the clinical characteristics and related factors of prurigo nodularis in children at the National Hospital of Dermatology and Venereology.

Subjects and Methods

Subjects

The study included children who have been definitively diagnosed with prurigo nodularis and were under 16 years of age at the time of the research. Parental or guardian consent is required for participation. Diagnostic criteria are as follows: (1) The disease persists for at least 6 consecutive weeks; (2) Characteristic lesions include papules (<1 cm in size), nodules (1–2 cm), or dome-shaped plaques (>2 cm), which are isolated and often present with excoriations or crusts, typically distributed symmetrically on the extensor surfaces of the limbs and trunk [9]. Lesions on the trunk may exhibit the “butterfly sign,” where the interscapular region is spared while both scapular regions are affected [10]. The number of lesions ranges from a few to hundreds, with sizes varying from a few millimeters to several centimeters. The color of the lesions may range from skin-colored to red, brown, or gray [2], [10]. Itching varies in intensity.

Methods

This descriptive, prospective, and cross-sectional study was conducted at the National Hospital of Dermatology and Venereology from December 2023 to June 2024. A convenience sample was selected, including children with prurigo who met the inclusion criteria, and medical records were prepared using a standardized form. In total, 117 children participated in the study.

The research team developed medical records and consent forms and conducted interviews with patients and/or their parents to collect personal information, dermatological history, other medical conditions, and related factors such as age of onset, allergies, deworming, family history, and environmental factors. Physical examinations assessed functional symptoms such as itching and sleep disturbance [11] using a six-level pruritus scale. The number and severity of lesions were evaluated using the Investigator Global Assessment-Chronic Prurigo (IGA-CPG) stage scale with five levels [12], and disease activity was assessed using the IGA-CPG activity scale with five levels [12]. Lesion characteristics, color, distribution, and location were also recorded.

Assessment of the level of itching as below [11]

The degree of itching	Score
No itch at all	0
Mild itch, mainly in the evening	1
Mild itch all day	2
Severe itch, mainly in the evening	3
Severe itch, mainly in the evening, with impaired sleep	4
Severe itch all day and night, with impaired sleep	5

Assessment of the level of prurigo lesions according to the IGA-CPG stage [12]

Level	Characteristic	Score
Clear	No pruriginous lesions (0 lesions)	0
Almost clear	Rare palpable pruriginous lesions (approximately 1–5 lesions)	1
Mild	Few palpable pruriginous lesions (approximately 6–19 lesions)	2
Moderate	Many palpable pruriginous lesions (approximately 20–100 lesions)	3
Severe	Abundant palpable pruriginous lesions (over 100 lesions)	4

Assessment of prurigo disease activity according to the IGA-CPG activity [12]

Level	Characteristic	Score
Clear	No pruriginous lesions have excoriations or crusts	0
Almost clear	Very small proportion of pruriginous lesions have excoriations or crusts (up to approximately 10% of all pruriginous lesions)	1
Mild	Minority of pruriginous lesions have excoriations or crusts (approximately 11–25% of all pruriginous lesions)	2
Moderate	Many pruriginous lesions have excoriations or crusts (approximately 26–75% of all pruriginous lesions)	3
Severe	Majority of pruriginous lesions have excoriations or crusts (approximately 76–100% of all pruriginous lesions)	4

Data were collected according to the study's medical record template. Skin lesions were photographed using a digital camera with the same settings and lighting conditions. The photography protocol included comprehensive images of all lesion sites and detailed close-ups of typical and atypical lesions.

Data were entered and analyzed using SPSS version 20.0. Descriptive statistical methods were applied. Qualitative variables were presented as percentages, whereas quantitative variables were expressed as mean, standard deviation, variance, and median as appropriate.

Ethics in research

All patients received counseling and voluntarily participated in the study. The patient's personal information was kept confidential. The researchers adhered to the ethical guidelines outlined in the Declaration of Helsinki for biomedical research. The study received approval from the Research Ethics Committee of the National Hospital of Dermatology and Venereology under decision number 49/HĐĐĐ-BVDLTW, dated November 13, 2023.

Results

The general characteristics of the study participants are presented in Table 1. The proportion of male patients was higher than that of female patients (62.4% vs. 37.6%), with the <6 years age-group accounting for the highest percentage (47%). Most patients lived in urban areas (88%). Nearly half of the cases had duration of illness less than 12 months (42.2%). The most common associated skin disease was atopic dermatitis (9.4%).

Table 1: General characteristics of patients (n=117)

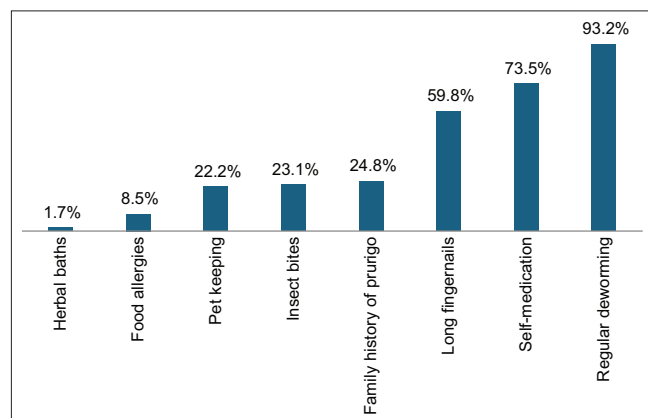
Characteristic	N	%
Gender		
Male	73	62.4
Female	44	37.6
Age group		
<6 years	55	47.0
6–10 years	34	29.1
11–16 years	28	23.9
Mean±SD (Min-max)	6.96±4.09 (1–16)	
Place of residence		
Rural	14	12.0
Urban	103	88.0
Duration of illness		
<12 months	50	42.7
12–24 months	41	35.0
>24 months	26	22.2
Mean±SD (Min-max)	15.56±12.40 (1–72)	
Associated skin diseases		
Atopic dermatitis	11	9.4
Insect bites	7	6.0
Eczema	6	5.1
Impetigo	1	0.9
Urticaria	1	0.9
Dermatophytosis	1	0.9
No other skin diseases	90	76.8

The proportion of patients experiencing itching before the appearance of papules was nearly equal to that of those who developed papules before itching (47.9% vs. 52.1%). The highest onset rate was observed in the legs (58.2%) (Table 2).

Table 2. Onset symptoms and initial locations (n=117)

Characteristic	n	%
Onset symptoms		
Itching	56	47.9
Papules	61	52.1
Initial locations		
Arms	31	26.5
Legs	68	58.2
Trunk	18	15.4

Figure 1 presents various factors associated with prurigo and the care/treatment approaches used by patients. The rates were as follows: herbal baths – 1.7%, food allergies – 8.5%, pet keeping – 22.2%, insect bites – 23.1%, family history of prurigo – 24.8%, long fingernails – 59.8%, and self-medication – 73.5%. The rate of regular deworming among children was 93.2%.

**Figure 1: Factors related to prurigo (n = 117)**

All 117 patients (100%) had primary lesions of papules. Regarding acute lesions, 98 patients (83.8%) had papules and 15 (12.8%) had erythematous edema. The color of the lesions included red (59.0%), skin-colored (6.8%), dark brown (12.8%), and gray (32.5%).

The papules were primarily <1 cm in size (100%) (Table 3).

Table 3: Characteristics of primary lesions (n=117)

Characteristic	N	%
Chronic lesions		
Papules	117	100.0
Nodules	28	23.9
Plaques	10	8.5
Hyperpigmented macules	12	10.3
Scars	91	77.8
Acute lesions		
Papules	98	83.8
Erythematous edema	15	12.8
Color		
Red	69	59.0
Skin-colored	8	6.8
Dark brown	15	12.8
Gray	38	32.5
Size (papules)		
<1 cm	117	100.0
1–2 cm	86	73.5
>2 cm	31	26.5

The secondary lesions included vesicles due to eczema (6.8%), excoriations (27.4%), ulceration with exudation (17.9%), and crusts (19.7%). All patients had isolated lesions, with 24.8% having clustered lesions. The lesions primarily appeared on the legs (95.7%), followed by the arms (83.8%) and the trunk (35.9%) (Table 4).

Table 4: Characteristics of secondary lesions and distribution (n=117)

Characteristic	N	%
Secondary lesions		
Vesicles (due to eczema)	8	6.8
Excoriations	32	27.4
Ulceration with exudation	21	17.9
Crusts	23	19.7
Distribution		
Isolated	117	100.0
Clustered	29	24.8
Location		
Legs	98	83.8
Arms	112	95.7
Trunk	42	35.9

Most patients experienced severe itching (97.4%), with the majority of lesion severity and disease activity at moderate levels (96.6% and 97.4%, respectively; Table 5).

Table 5: Characteristics of itching severity, lesion severity, and disease activity (n=117)

Characteristic	n	%
Itching severity		
Mild (score: 1–2)	1	0.9
Severe (score: 3–4)	114	97.4
Very severe (score: 5)	2	1.7
Lesion severity (IGA-CPG stage)		
Mild	2	1.7
Moderate	113	96.6
Severe	2	1.7
Disease activity (IGA-CPG)		
Mild	1	0.9
Moderate	114	97.4
Severe	2	1.7

IGA-CPG: Investigator Global Assessment-Chronic Prurigo.

Discussion

The results indicated that prurigo has diverse and complex clinical characteristics. The majority of patients were male, outnumbering female patients, and most of them resided in urban areas. The disease was

commonly seen in children under the age of 6 years, with an average duration of approximately 15 months. The study documented the presence of typical symptoms and skin lesion features of prurigo, along with related risk factors and environmental influences. Boys were noted to be more mischievous and have poorer hygiene than girls [13], possibly contributing to the higher proportion of male patients in the study. Prurigo nodularis often has a long-term, persistent course, sometimes extending as the child ages. However, the disease tends to worsen in summer and improve in winter, potentially due to environmental factors, for example, mosquito, *Dermatophagoides pteronyssinus*, and *Dermatophagoides farinae* [13]. In our study, the factors associated with prurigo included food allergies (8.5%), pet keeping (22.2%), insect bites (23.1%), family history of prurigo (24.8%), long fingernails (59.8%), and self-medication (73.5%). These factors may play crucial roles in triggering and maintaining the symptoms of the disease. The high rate of regular deworming among children (93.25%) is likely due to school-based deworming programs. This finding contrasts with the common concern among parents and the general Vietnamese population, who often attribute prurigo to parasitic infections. The etiology and pathogenesis of prurigo remain unclear. Prurigo is believed to be associated with certain diseases. A study by Huang *et al.* in 2022 found that children with prurigo nodularis have higher risks of anxiety disorders (OR = 2.84), attention-deficit/hyperactivity disorder (OR = 2.04), skin diseases such as psoriasis (OR = 7.30), asthma (OR = 2.48), urticaria (OR = 3.15), metabolic syndrome (OR = 16.7), diabetes mellitus (OR = 5.44), and obesity (OR = 1.62) compared to their peers [6]. Many cases without a known cause or underlying disease are classified as idiopathic prurigo [6].

The detailed clinical characteristics of prurigo nodularis in children in this study reflect the complexity and diversity of the disease. The symptom of itching affects not only the physical condition but also the sleep and daily activities of the children. According to the PNRS scale, most patients experienced severe to very severe itching, significantly impacting their quality of life. The primary lesions of prurigo nodularis included papules and nodules, with some cases developing into hyperpigmented plaques or macules. The presence of scars in most patients indicates severe skin damage and a high possibility of recurrence. Acute lesions often consisted of papules and erythematous edema, with colors ranging from red, skin-colored, dark brown, and gray, reflecting the disease's progression over time. The PNRS scale assessment showed that severe itching (97.4%) was common, substantially affecting quality of life. The severity of lesions and disease activity, predominantly moderate (96.6% and 97.4%, respectively), underscores the complexity of prurigo. These findings align with global observations. Patients with prurigo nodularis may experience intense itching, which can be intermittent or continuous and may worsen

with sweating, irritating clothing, or heat. Patients undergo a combination of sensations including burning, stinging, and temperature changes in the lesions [14]. In some cases, atopic dermatitis and xerosis are found alongside pruritic nodules and may act as initiating factors. The lesions are often prone to scratching due to itching, with a higher risk of secondary infection, and may develop crusts, erythema, or pain if infected. Prurigo nodularis can also be localized in some diseases such as postherpetic neuralgia or brachioradial pruritus [15]. Neurological factors play a role in the pathogenesis of prurigo, with increased expression of calcitonin gene-related peptide (CGRP) and increased density of substance P-positive nerve fibers observed in the dermis. Substance P is a neurotransmitter sensitive to allergic reactions, mast cell degranulation, and other proinflammatory responses. It also stimulates mast cells to release vascular endothelial growth factor, promoting local angiogenesis and forming pruritic nodules and papules [16].

The study has several limitations. First, the sample primarily consisted of patients from a large urban hospital, which may not fully represent the prevalence and characteristics of prurigo in rural areas and other regions. Second, due to the study's observational nature and clinical data collection, it was impossible to establish causal relationships between risk factors and disease development. This study also did not delve into genetic and immunological factors, which may play an important role in the pathogenesis of prurigo nodularis. Expanding the scope of research to include these factors could provide a better understanding of the disease and aid in developing effective treatments.

Conclusion

Prurigo nodularis in children presents with diverse clinical characteristics. The proportion of male children is higher than that of female children. Most patients reside in urban areas. Lesions most frequently appear on the legs. Most patients experience a high degree of itching, while the severity of lesions and disease activity is generally moderate. Factors such as food allergies, pet keeping, insect bites, and family history may play a role in triggering and maintaining the disease, but further research is needed.

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We declare that there are no conflicts of interest in this study.

References

1. Satoh T, Yokozeki H, Murota H, Tokura Y, Kabashima K, Takamori K, *et al.* 2020 guidelines for the diagnosis and treatment of prurigo. *J Dermatol.* 2021;48(9):e414-31. <https://doi.org/10.1111/1346-8138.16067>
PMid: 34314056
2. Williams KA, Roh YS, Brown I, Sutaria N, Bakhshi P, Choi J, *et al.* Pathophysiology, diagnosis, and pharmacological treatment of prurigo nodularis. *Expert Rev Clin Pharmacol.* 2021;14(1):67-77. <https://doi.org/10.1080/17512433.2021.1852080>
PMid:33191806
3. Dégoé B, Koudoukpo C, Maffo N, Otémé S, Kouassi A, Akpadjan F, *et al.* Prurigo in children of tropical zone: Epidemiological, clinical, and etiological characteristics in a dermatology department in Cotonou (Benin). *Dermatol Res Pract.* 2019;2019:2673981. <https://doi.org/10.1155/2019/2673981>
PMid:31781184
4. Albela H, Leong KF. Early-onset, severe prurigo nodularis in a young child with atopic dermatitis treated successfully with dupilumab. *Indian J Paediatr Dermatol.* 2022;23(2):170-1. https://doi.org/10.4103/ijpd.ijpd_175_21
5. Oliveira J, Nogueira M, Pinto D, Machado S, Araújo AR, Teixeira F. Role of dupilumab in pediatric prurigo nodularis: Beyond the skin. *Pediatr Allergy Immunol.* 2023;34(1):e13912. <https://doi.org/10.1111/pai.13912>
PMid:36705041
6. Huang AH, Roh YS, Sutaria N, Choi J, Williams KA, Pritchard T, *et al.* Real-world disease burden and comorbidities of pediatric prurigo nodularis. *J Am Acad Dermatol.* 2022;86(3):655-7. <https://doi.org/10.1016/j.jaad.2021.02.030>
PMid:33600911
7. Qureshi AA, Abate LE, Yosipovitch G, Friedman AJ. A systematic review of evidence-based treatments for prurigo nodularis. *J Am Acad Dermatol.* 2019;80(3):756-64. <https://doi.org/10.1016/j.jaad.2018.09.020>
PMid:30261199
8. Thai NQ. Study on the association between prurigo nodularis and metabolic diseases at the department of Dermatology, Thai Nguyen hospital. *Vietnamese J Dermatol Venereol.* 2012;2:8-16.
9. Zeidler C, Yosipovitch G, Ständer S. Prurigo nodularis and its management. *Dermatol Clin.* 2018;36(3):189-97. <https://doi.org/10.1016/j.det.2018.02.003>
PMid:29929592
10. Kwon CD, Khanna R, Williams KA, Kwatra MM, Kwatra SG. Diagnostic workup and evaluation of patients with prurigo nodularis. *Medicines (Basel).* 2019;6(4):97. <https://doi.org/10.3390/medicines6040097>
PMid:31561504
11. Yosipovitch G, Reaney M, Mastey V, Eckert L, Abbé A, Nelson L, *et al.* Peak pruritus numerical rating scale: Psychometric validation and responder definition for assessing itch in moderate-to-severe atopic dermatitis. *Br J Dermatol.* 2019;181(4):761-9. <https://doi.org/10.1111/bjd.17744>
PMid:30729499
12. Zeidler C, Pereira MP, Augustin M, Spellman M, Ständer S. Investigator's global assessment of chronic prurigo: A new instrument for use in clinical trials. *Acta Derm Venereol.* 2021;101(2):adv00401. <https://doi.org/10.2340/00015555-3701>
PMid:33236125
13. Maridet C, Perromat M, Miquel J, Chiaverini C, Bessis D, Lasek A, *et al.* Childhood chronic prurigo: Interest in patch tests and delayed-reading skin prick tests to environmental allergens. *J Allergy Clin Immunol.* 2018;141(2):797-9.e9. <https://doi.org/10.1016/j.jaci.2017.07.049>
PMid:28943471
14. Iking A, Grundmann S, Chatzigeorgakidis E, Phan NQ, Klein D, Ständer S. Prurigo as a symptom of atopic and non-atopic diseases: Aetiological survey in a consecutive cohort of 108 patients. *J Eur Acad Dermatol Venereol.* 2013;27(5):550-7. <https://doi.org/10.1111/j.1468-3083.2012.04481.x>
PMid:22364653
15. Pereira MP, Lüling H, Dieckhöfer A, Steinke S, Zeidler C, Ständer S. Brachioradial pruritus and notalgia paraesthetica: A comparative observational study of clinical presentation and morphological pathologies. *Acta Derm Venereol.* 2018;98(1):82-8. <https://doi.org/10.2340/00015555-2789>
PMid:28902951
16. Hughes JDM, Woo TE, Belzberg M, Khanna R, Williams KA, Kwatra MM, *et al.* Association between prurigo nodularis and etiologies of peripheral neuropathy: Suggesting a role for neural dysregulation in pathogenesis. *Medicines (Basel).* 2020;7(1):4. <https://doi.org/10.3390/medicines7010004>
PMid:31936197