ORIGINAL ARTICLE

Prevalence of dermatological lesions in hospitalized children at the University College Hospital, Ibadan, Nigeria

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Abstract

Objective: Skin disorders constitute a significant proportion of consultations in children's clinics; however, there is a paucity of data on the prevalence of dermatological lesions in hospitalized children in Nigeria. This study determines the prevalence of dermatological lesions in hospitalized children.

Materials and Methods: In this cross-sectional study, 402 children aged three months to twelve years admitted in the Pediatric wards of the University College Hospital, Ibadan, were enrolled over a six-month period. Examination of the skin and its appendages was done for each patient. Data on the socioeconomic status, hygiene, and health-related factors were also obtained using a structured questionnaire.

Results: Over 96% of the children had at least one identifiable skin lesion. The five leading skin lesions were post-inflammatory hyperpigmentation (49.5%), BCG scar (28.4%), Mongolian spots (27.1%), junctional melanocytic nevi (20.1%), and café-au-lait macules (18.4%). The leading infectious skin disease was pyoderma (13.4%), followed by tinea capitis (6.7%). Scarification marks (P=0.001), tinea capitis (P=0.014), plantar fissuring (P=0.001), and impetigo (P=0.016) were associated with low socioeconomic classes, while the presence of BCG scar (50.0%) was associated with the high socioeconomic class.

Conclusions: This study shows that dermatologic lesions are common in hospitalized children. Identifying them will provide an opportunity for pediatricians to educate parents on the various causes as well as prevention of lesions.

Key words: Dermatologic lesions, prevalence, hospitalized children

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Introduction

Skin diseases are one of the three common causes of morbidity in the developing countries of sub-Saharan Africa, along with malaria and diarrhea.[1] Skin diseases are particularly significant in children when they contribute to the risk of other life-threatening illnesses. The development of acute glomerulonephritis following skin infection with Group A β-hemolytic streptococcus has been demonstrated to be a risk factor for albuminuria and hematuria in adult life.[2-4] It is essential, in the light of this, to pay attention to bacterial skin infections complicating scabies and insect bites.[5]

Skin diseases do not feature prominently in the pediatric morbidity and mortality trends reported from many hospitals

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in Nigeria.[6-9] Hospital-based studies may be biased by patient accessibility to healthcare and other social factors,[10,13] but the findings offer the opportunity to begin to determine the magnitude of the health problems in the community. Furthermore, routine and deliberate examination for skin lesions in hospitalized children improves the diagnostic accuracy, as they sometimes occur as part of the signs of more serious diseases, which may not have concerned the caregivers. In addition, the knowledge of the pattern of dermatological conditions in children admitted into the pediatric wards of the University College Hospital, Ibadan, will improve the desired holistic approach to patient care and patient satisfaction. Therefore, the present study was carried out to determine the prevalence and pattern of dermatological lesions among hospitalized children.

Materials and Methods

This cross-sectional study was carried out between December 2006 and May 2007 in the pediatric wards of the University College Hospital, Ibadan, which has the capacity to admit about 3000 children annually. The University College Hospital provides a tertiary level of care, and serves as the referral center for the region. It is located in Ibadan, a city in the southwestern part of Nigeria with an estimated population of 2.5 million.

This study protocol was reviewed and approved by the joint University of Ibadan / University College Hospital Ethical Committee. During the study period, children aged three months to twelve years, hospitalized for various medical conditions, were recruited within 48 hours of admission after a written informed consent was obtained from the patient's guardian. Children who had sustained trauma and had ongoing cytotoxic or antiretroviral therapy were excluded.

Detailed history was obtained and a complete physical examination, including that of the skin and its appendages, was carried out in all patients by one of the investigators and documented in a structured questionnaire. The information obtained included the demography and detailed health data related to the main diagnosis. The socioeconomic status was determined using the parents' educational and occupational status, as previously described by Oyedeji.[14] The parents of the patients were then stratified into five socioeconomic classes based on this score with social class I being the highest, while social class V the lowest.

The data was analyzed using SPSS 11.0 for Windows (USA, Inc.). The categorical variables were compared using Chi square and Fisher's exact tests where necessary. Continuous variable estimates were expressed as mean ± SD, while categorical variables were expressed in proportions and percentages. The statistical significance level was set at $P<0.05$.

Results

A total of 402 hospitalized children, 231 males and 171 females participated in this study. The age and gender demographics are as shown in Table 1. The age of the subjects ranged from three months to twelve years, with a median of 25 months. There was no significant difference in the age distribution of males compared to the female subjects, ($P = 0.77$). The distributions of the patients by social class are as shown in Figure 1. About two-thirds of the children belonged to social class III (34.6%) and class IV (35.3%).

Overall, 385 (96%) of the patients had an identifiable skin lesion. The leading lesions were post-inflammatory hyperpigmentation (49.5%), the BCG scar (28.4%), Mongolian spots (27.1%), junctional melanocytic nevi (20.1%), café-au-lait macules (18.4%), and fluffy hair (17.2%), Figure 2. Pyoderma with a cumulative percentage of 13.4% comprised of infected ulcers (6.2%), impetigo (2.2%), and folliculitis and carbuncles (5%), were the most commonly observed infectious skin lesions. The second most prevalent infectious skin disease was tinea capitis, which was seen in 27 (6.7%) subjects.

Gender-specific prevalence of skin lesions were as shown in Table 2. Males had significantly higher proportions of hypertrophic scars (3.9 vs. 0.6%), tinea capitis (10.8 vs. 1.2%), and scarifications (16.8 vs. 8.8%). Significantly higher

Table 1: Age and gender distribution of 402 subjects

Age (months)	Male		Female		Total	
	N	%	N	%	N	%
3 – 11	57	24.7	47	27.5	104	25.9
12 – 59	107	46.3	74	43.3	181	45.0
60 – 143	67	29.0	50	29.2	117	29.1
Total	231	100.0	171	100.0	402	100.0

$\chi^2 = 0.504$, $P = 0.777$, P — significant at < 0.05

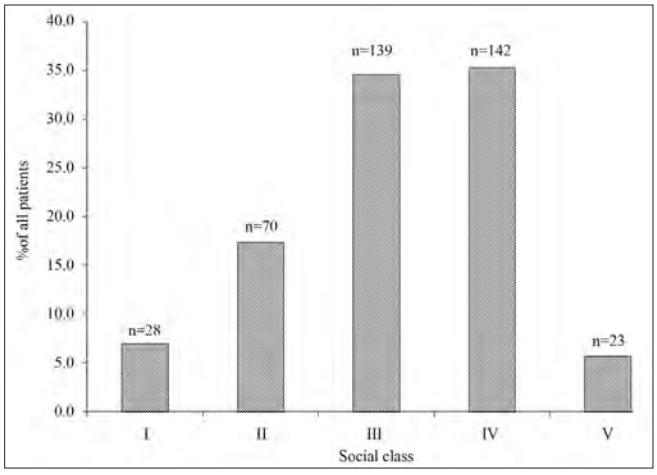

Figure 1: The distribution of patients into five different social classes I is ranked as the highest and V is the lowest socioeconomic classs

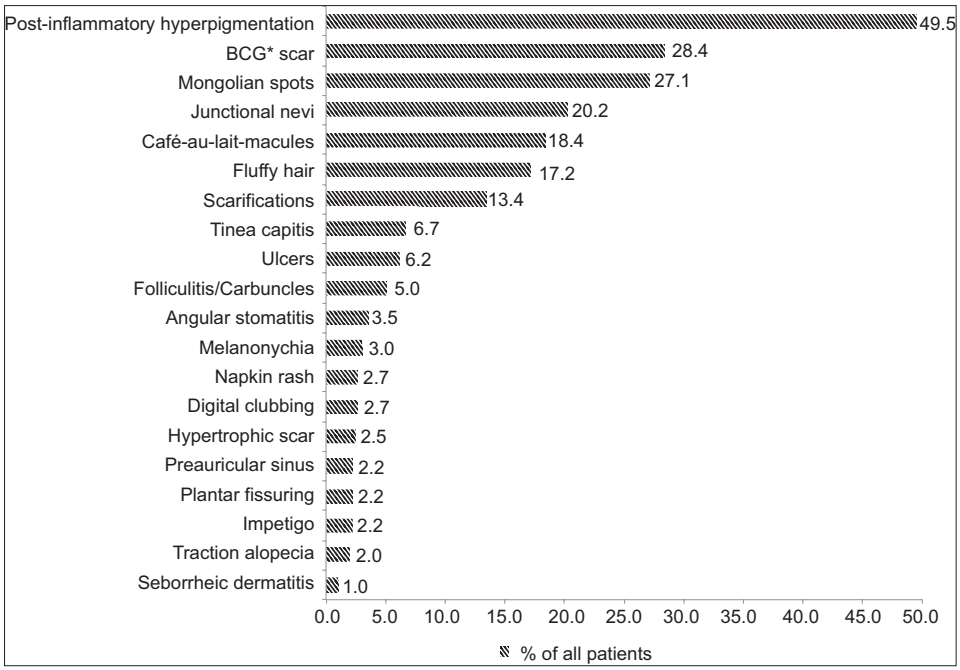

Figure 2: Prevalence of common skin lesions

Table 2: Gender-specific prevalence of common skin findings in 402 subjects

Lesions	Male (*n*=231)		Female (*n*=171)		OR	CI (0.05)	*P* value
	n	%	*n*	%			
Seborrheic dermatitis	2	0.9	2	1.2	0.74	0.10, 5.23	1.000
Traction alopecia	1	0.4	7	4.1	0.1	0.01, 0.84	0.012
Impetigo	4	1.7	5	2.9	0.58	0.16, 2.21	0.504
Plantar fissuring	6	2.6	3	1.8	1.49	0.37, 6.06	0.739
Preauricular sinus	8	5.3	1	0.9	6.22	0.77, 50.48	0.083
Hypertrophic scar	9	3.9	1	0.6	6.89	0.87, 54.9	0.049
Digital clubbing	6	2.6	5	2.9	0.89	0.27, 2.95	1.000
Napkin rash	5	2.2	6	3.5	0.61	0.18, 2.03	0.539
Melanonychia	9	3.9	3	1.8	2.27	0.61, 8.52	0.250
Angular stomatitis	10	4.3	4	2.3	1.89	0.58, 6.13	0.411
Folliculitis / Carbuncles	5	2.2	15	8.8	0.23	0.08, 0.65	0.004
Ulcers	18	7.8	7	4.1	1.98	0.81, 4.85	0.148
Tinea capitis	25	10.8	2	1.2	10.26	2.40, 43.92	0.0001
Scarifications	39	16.9	15	8.8	2.11	1.12, 3.97	0.018
Fluffy hair	35	15.2	34	19.9	0.72	0.43, 1.21	0.230
Cafe-au-lait macules	43	18.6	31	18.1	1.03	0.62, 1.72	1.000
Junctional nevi	46	19.9	35	20.5	0.97	0.59, 1.58	0.901
Mongolian spots	67	29	42	24.6	1.26	0.80, 1.97	0.364
BCG scar	58	25.1	56	32.7	0.69	0.45, 1.07	0.095
Post-inflammatory hyper-pigmentation	121	52.4	78	45.6	1.31	0.88, 1.95	0.191

P significant at < 0.05

proportions of females than males had traction alopecia (4.1 vs. 0.4%) and folliculitis / carbuncles (8.8 vs. 2.2%).

Table 3 shows the age-specific prevalence of skin lesions. Only 112 (29.9%) of the 374 children who had a history or evidence of BCG immunization had a BCG scar. Two of the children (7.4%) had a BCG scar, but the history of immunization could not be substantiated.

The prevalence of skin lesions in the various social classes are as shown in Table 4. Fifty percent of the children in social class I had BCG scars compared to 38.6, 23.0, 25.4, and 21.7% in social classes II, III, IV, and V, respectively ($P = 0.01$). Plantar fissuring was found in 2.9% of those in social classes II and III as well as 13.0% of those in social class V, but no fissuring was found in social class I and IV ($P = 0.001$).

Table 3: Age-specific prevalence of common skin lesions in 402 subjects

	Group I (3 – 11months), *n*=104			Group II (12 – 59 months), *n*=181			Group III (60 – 143 months), *n*=117			All ages, *n*=402	
	n	%/age gp	%/lesion	*n*	%/age gp	%/lesion	*n*	%/age gp	%/lesion	*N*	%
Hyperpigmentation	16	15.4	8.0	97	53.6	48.7	86	73.5	43.2	199	49.5
BCG scar	35	33.7	30.7	48	26.5	42.1	31	26.5	27.2	114	28.4
Mongolian spots	54	51.9	49.5	53	29.3	48.6	2	1.7	1.8	109	27.1
Junctional nevi	10	9.6	12.3	32	17.7	39.5	39	33.3	48.1	81	20.1
Cafe-au-lait macules	19	18.3	25.7	35	19.3	47.3	20	17.1	27.0	74	18.4
Fluffy hair	20	19.2	28.6	40	22.1	58.6	9	7.7	12.8	69	17.2
Scarification marks	7	6.7	13.0	25	13.8	46.3	22	18.8	40.7	54	13.4
Hypopigmentation	15	14.4	48.4	12	6.6	38.7	4	3.4	12.9	31	7.7
Tinea capitis	-	-	-	13	7.2	48.1	14	12.0	51.9	27	6.7
Ulcers	4	3.8	16.0	13	7.2	52.0	8	6.8	32.0	25	6.2
Both types (Hypo- and Hyperpigmentation)	4	3.8	17.4	11	6.1	47.8	8	6.8	34.8	23	5.7
Folliculitis / carbuncles	6	5.8	30.0	7	3.9	35.0	7	6.0	35.0	20	5.0
Desquamation	11	10.6	61.1	3	1.7	22.2	3	2.6	16.7	17	4.2
Angular stomatitis	2	1.9	14.3	9	5.0	64.3	3	2.6	21.4	14	3.5
Preauricular sinus	3	5.4	33.3	5	4.1	55.5	1	1.1	11.1	9	3.4
Melanonychia	-	-	-	-	-	-	12	10.3	100	12	3.0
Digital clubbing	1	1.0	9.1	2	1.1	18.2	8	6.8	72.7	11	2.7
Napkin rash	9	8.7	75.0	2	1.1	25.0	-	-	-	11	2.7
Oral thrush	5	4.8	50	4	2.2	40.0	1	0.9	10.0	10	2.5
Hypertrophic scar	-	-	-	3	1.7	30	7	6.0	70	10	2.5
Fissuring	-	-	-	1	0.6	11.1	8	6.8	88.9	9	2.2
Papular urticaria	-	-	-	6	3.3	66.7	3	2.6	33.3	9	2.2
Impetigo	4	3.8	44.4	3	1.7	33.3	2	1.7	22.2	9	2.2
Traction	1	1.0	12.5	4	2.2	50.0	3	2.6	37.5	8	2.0
Discoloration	1	1.0	20.0	4	2.2	80.0	-	-	-	5	1.2
Miliaria	3	2.9	60.0	2	1.1	40.0	-	-	-	5	1.2
Seborrheic dermatitis	1	1.0	25.0	2	0.5	50.0	1	0.9	25.0	4	1.0
Matted hair	-	-	-	2	1.1	66.7	1	0.9	33.3	3	0.7
Cradle cap	1	1.0	50.0	1	0.6	50.0	-	-	-	2	0.5
Salmon patch	2	1.9	100.	-	-	-	-	-	-	2	0.5

One subject each had pyogenic granuloma, molluscum contagiosum, palmar hyperlinearity, ichthyosiform erythroderma, tinea unguuim, and keratosis pilaris

Other hygiene practices studied included, the frequency of baths and other after bath practices. More than 80% of the study subjects had at least one bath in a day and more than half bathed at least twice a day. Soap, was used by all the respondents and this was mainly toilet soap (44.5%). However, more than a third (36.1%) of the patients used medicated soaps. Four hundred and one (99.75%) subjects used a sponge in addition to soap, the most prevalent type being a rubber type sponge. Three hundred and ninety six subjects (98.5%) used body creams and lotions after a bath, of whom 352 subjects (86.1%) used non-medicated creams, however, as many as 50 (12.4%) still used medicated creams. Forty five percent of the study patients used diapers (181 / 402) and a majority of them used more than one diaper type. The use of a mixture of diaper types was associated with the low socioeconomic classes ($P = 0.005$). The modal number of the diaper changes per day was two (30%). Diapers were changed once a day predominantly in those in social classes III and IV. In patients who used diapers, the prevalent barrier method for the diaper area was an oil based formulation (49%). Twenty eight percent, however, used talcum powder for the diaper area.

Discussion

This study found a high prevalence of skin lesions in hospitalized children, comparable to the findings of Hubert *et al.*,[15] among children in the United States. The most common skin lesion observed was post-inflammatory hyperpigmentation. These resulted from trauma, insect bites, and healed bacterial infections. These findings were similar to earlier reports in the same geographical area.[10,12] This finding, however, is contrary to that of Child *et al.*,[16] working with black children in London, and this disparity is attributable to the differences in geographical and environmental conditions.

Bacterial infections, impetigo, and folliculitis were the second most common group of disorders seen in our patients. This is consistent with the findings from the Gambia,[17]

Table 4: Social class and relation with selected lesions in 402 study subjects

Lesion	Social class						*P* value
	I	II	III	IV	V	χ^2	
	n (%)	*n* (%)	*n* (%)	*n* (%)	*N* (%)		
BCG scar	14 (50.0)	27 (38.6)	32 (23.0)	36 (25.4)	5 (21.7)	13.13	0.01
Digital clubbing	1 (3.6)	-	7 (5.0)	3 (2.1)	-	5.66	0.23
Fluffy hair	2 (7.1)	6 (8.6)	32 (23.0)	24 (16.9)	5 (21.7)	9.31	0.05
Oral thrush	-	-	3 (4.3)	3 (2.2)	4 (2.8)	2.36	0.67
Angular stomatitis	1 (3.6)	-	6 (4.3)	7 (4.9)	-	4.52	0.34
Plantar fissuring	-	2 (2.9)	4 (2.9)	-	5 (13)	16.54	0.001
Mongolian spots	6 (21.4)	23 (32.9)	43 (30.9)	31 (21.8)	6 (26.1)	4.67	0.32
Junctional nevi	5 (17.9)	14 (20.0)	37 (26.6)	24 (16.9)	1 (4.3)	8.21	0.08
Napkin rash	-	2 (2.9)	6 (4.3)	3 (2.1)	-	2.95	0.56
Hyperpigmentation	14 (50.0)	35 (50.0)	71 (51.1)	69 (48.6)	10 (43.5)	0.53	0.97
Ulcers	-	3 (4.3)	6 (4.3)	13 (9.2)	3 (13.0)	7.1	0.131
Cafe-au-lait macules	6 (21.4)	15 (21.4)	28 (20.1)	22 (15.5)	3 (13.0)	2.12	0.071
Folliculitis / Carbuncles	3 (10.7)	4 (5.7)	3 (2.2)	10 (7.0)	-	6.85	0.014
Impetigo	1 (3.6)	2 (2.9)	-	6 (4.2)	-	6.62	0.016
Tinea capitis	-	3 (4.3)	7 (5.0)	14 (9.9)	-	7.01	0.014
Scarifications	-	2 (2.9)	19 (13.7)	25 (17.6)	8 (34.8)	22.23	0.001
Papular urticaria	2(7.1)	1(1.4)	3(2.2)	2(1.4)	1(4.3)	4.21	0.379

P significant at < 0.05

Egypt,[18] and Turkey[19] and is attributable to poor hygiene and poorer living conditions.

Tinea capitis was the most prevalent fungal skin infection in this study and second to pyoderma, in the infectious disease category. The prevalence of tinea capitis in the children admitted on the wards was comparable with the findings in school children in Ibadan,[10] but lower when compared to that in school children in Cleveland in the United States[20] and Cote D'Ivoire.[21] There was a higher prevalence of tinea capitis in males. This is consistent with the findings from other parts of the world.[22-25] Tinea capitis was found to be associated with the lower socioeconomic group, similar to observation in other studies.[10,19]

Congenital pigmented lesions occurred in a quarter of the study participants. Of the three types of congenital lesions observed in this study, Mongolian spots had the highest prevalence, and there were no lesions in children > 6 years, corroborating the findings by Onayemi *et al.*,[26] in Ile–Ife, Nigeria. Most of the observed lesions were over the buttocks and in the lumbosacral region. The observed prevalence is clearly higher than in other races[27,28] and confirms the predisposition of Negroid infants for these lesions. The prevalence of junctional melanocytic nevi was about 20% and higher than the observations from other countries.[10,19,29,30] Café-au-lait macules have been associated with neurocutaneous syndromes such as neurofibromatosis, especially when they are numerous. Its prevalence in this study is similar to earlier reports,[31,32] The lesions did not exceed three macules and the associated neurological abnormalities were absent.

The prevalence of scarification marks is comparable to previous findings in school children in Ibadan.[10] Historically, the marks were made for three reasons; tribal identification, 'protection from evil spirits,' and for seizures. However, this is associated with significant health risk due to the high prevalence of tetanus, hepatitis B, hepatitis C, and HIV infections. There was more scarification in males than females. This finding confirms the well-known cultural preference for the male child as parents within the context of cultural belief systems do everything to ensure the survival of the male child.

Over 90% of the children enrolled in the present study had received the BCG immunization, but only a third of those vaccinated had visible BCG scars. This suggests low reactivity to the vaccine, poor quality vaccine or faulty techniques in its administration. However, the discussion on the presence of a BCG scar and its clinical implication is beyond the scope of this study as no further effort has been made to investigate this disparity.

Atopic eczema was rarely observed in this study. The majority of the subjects were in the lower socioeconomic classes, which have been associated with a low prevalence of atopic dermatitis.[10] This outcome is not consistent with Odueko *et al.'s*,[12] hospital-based study and Falade *et al.'s*,[33] school-based survey. This can be explained by the larger sample size in these two studies. Other lesions associated with low socioeconomic class were oral thrush, angular stomatitis, and plantar fissuring.

This study found a low prevalence of napkin dermatitis and did not observe any association of this lesion with

a primary diagnosis of diarrhea. This is because many mothers in this study could not afford to buy diapers for consistent use, which would cause occlusion and conditions that would favor the occurrence of napkin dermatitis.

Oil-based formulations were used to protect the diaper area in half of the subjects who used diapers, while a quarter used talcum powder only. However, talcum powder has been shown to be a poor barrier agent because of its abrasive properties and its use in these populations should be discouraged.[34]

Conclusion

In conclusion, hospitalized children in Ibadan had a wide variety of dermatological lesions. Most of the skin lesions were due to hyperpigmentation and pyoderma. This study established that the practice of scarifications is still prevalent. This emphasizes the need to intensify efforts at educating parents and the general public about the attendant health risks of scarification. The socioeconomic status is a major determinant of the presence of skin lesions in individuals, as demonstrated in this cohort of children. Improving public awareness and socioeconomic conditions will play key roles in modifying the trends observed in this study.

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