DOI: http://dx.doi.org/10.18203/issn.2455-4529.IntJResDermatol20184771

Original Research Article

Hair loss in children in rural population

Vimala Manne[1]*, D. Subhash Reddy[2]

Department of Dermatology, Venereology and Leprosy, [1]Dr. V. R. K. Womens Medical College Teaching Hospital and Research Center, Aziznagar, R.R. District; [2]Osmania Medical College, Hyderabad, Telangana, India

Received: 06 October 2018
Revised: 17 November 2018
Accepted: 19 November 2018

***Correspondence:**
Dr. Vimala Manne,
E-mail: manne.vimala@gmail.com

Copyright: © the author(s), publisher and licensee Medip Academy. This is an open-access article distributed under the terms of the Creative Commons Attribution Non-Commercial License, which permits unrestricted non-commercial use, distribution, and reproduction in any medium, provided the original work is properly cited.

ABSTRACT

Background: Among children worldwide, dermatophyte infections are most common constituting a public health problem. The aim of the study is to determine the prevalence and causative agents of tinea capitis in school children attending primary school located in Hyderabad and to perform an analysis of risk factors associated with tinea capitis as the etiological factor.
Methods: This is a school based, cross sectional, prospective study which was conducted in July 2015. This study was conducted in a school located near Hyderabad.
Results: Out of 600 school children, 298 boys and 302 girls, 100 were diagnosed with a tinea capitis infection after clinical and microbiological examination, with an estimated prevalence rate of 15.0%. The most prevalent dermatophytes isolation in tinea capitis in children were *Trichophyton verucosum* (90), *Trichophyton tonsurans* (30), *Trichophyton mentagrophytes* (28), *Microsporum audiouium* (15), *Trichophyton soudanese* (9), *Trichophyton violaceum* (5), *Microsporum ferrugineum* (3), *Trichophyton schoenleineii* (3), *Microsporum gallinae* (2) and culture negative and KOH positive (10).
Conclusions: Commonest cause of hair loss in children of rural population is tinea capitis. The study concluded that the findings suggest that the practices resulting in entrenchment of dermatophyte infections and fungal infection. The promotion of public health action plan based on self hygiene education, which aimed to counteract the epidemiological burden specifically, and it should play an pivotal role in reduction of the prevalence in future of this common infection.

Keywords: Tinea capitis, Dermatophyte infection

INTRODUCTION

In dermatology, hair loss or alopecia is a common complaint.[1] Rarely hair loss is observed in children and mostly it occurs in adults.[2] The infections of tissues which are keratinized of lower animals and humans which are caused by a group of filamentous fungi. This is more prevelant in Africa, Asia, Southern and Eastern Europe. It is caused by genera of *Trichophyton*, *Epidermophyton*, and *Microsporum*. The dermatophytoses epidemiology differs according to the geographic regions, the socioeconomic status of population, the domestic animals presence, and the population age. The time is also a factor which effects the epidemiology, requiring the update of information from time to time. A significant role in hair loss is played by ethnicity, hair type, environmental and cultural factors.[3] Significant stress psychologically which results in affecting the growth and development of child is the main cause of hair loss in children.[4] Anamolies of systemic which are unexplored, deficiency in nutrition are the other causes of hair loss in children. Tinea capitis or ringworm of the scalp is caused by an dermatophytes invasion into hair follicles and keratinised layer of hairy skin, thus resulting in hair loss, scaling, kerion, agminate

folliculitis, favus, black dots, grey patches, erythema or impetigo like lesions. Few rare cases have shown that the dermatophyte invades the deep dermis, subcutis, or even internal organs.[5] Skin disease is highly prevalent due to climatic and economic factors. The aim of the study is to determine the prevalence and causative agents of tinea capitis in school children attending primary school located in Hyderabad and to perform an analysis of risk factors associated with tinea capitis as the etiological factor.

METHODS

This is a school based, cross sectional, prospective study which was conducted in July 2015. This study was conducted in a school located near Hyderabad.

Inclusion criteria

- Children who were complaining of hair loss and scalp disorders.
- The age range was from 4 to 12 years.

The main occupation of the local population was farming and animal husbandry. The dermatologists with the help of teachers and interpreters conducted lessons about skin hygiene that was about three hours. The dermatologists brought the children into examination room and examined the children during day time. The dermatologists performed clinical examinations, epidemiological data of children with tinea capitis were recorded. All areas of scalp, and the rest of the body for evidence of annular lesions with central clearance and activity of the edges, including crusting, scaling, inflammation of follicles, loss of hair and erythema were thoroughly examined. Epidemiological information included age, sex, weight, height , place and type of residence, number of cohabitants, number of siblings living at home, animals at home, hygiene habits, bathing frequency.

Laboratory investigations were done by taking the dull, lustreless hair and hair stubs using forceps from erythematous, peripheral and actively growing margins of skin lesions. A portion of hair was treated with 25 % KOH solution for 15-20 minutes, before being examined microscopically for fungal hyphae and remaining portion was inoculated in Dextrose agar and other was in cycloheximide and it was incubated at room temperature (22-25ºC). The cultures were examined periodically every day for total of 4 weeks for the dermatophytes growth. For identifying, cultures using potato dextrose agar and autoclaved rice was used. Only patients who were positive for KOH examination were diagnosed as having tinea capitis. In descriptive study, continuous variables were represented as the mean±standard deviation. The institutional ethical committee approval was taken. Informed consent was taken from all the parents of the children and children involved in the study.

Statistical analysis

The data was documented and was analyzed by the SPSS 22 version software. Chi-square test was used as test of significance for qualitative data.

RESULTS

Out of 600 school children, 298 boys and 302 girls, 100 were diagnosed with a tinea capitis infection after clinical and microbiological examination, with an estimated prevalence rate of 15%.

The proportion of children with tinea capitis who were boys was 75%, and only 25% were girls, a finding significantly different to that in children without tinea capitis (P<0.001). The average age of the children with tinea capitis was 6.7 years (range: 4 to 12 years).

Table 1: Epidemiological characteristics of the patients.

Factors	Total children (n=100)
Sex, male, n (%)	75 (75)
Mean age±SD	6.5±1.7
Age <7 years old	55 (55)
≤2 baths/week, n (%)	62 (62)
Use of soap, n (%)	98 (98)
Pets at home, n (%)	82 (82)
Bed sharing, n (%)	93 (93)
Clothes sharing, n (%)	28 (28)
Sleeping in bed, n (%)	88 (88)
Living in mud house, n (%)	37 (37)
Not wearing shoes, n (%)	32 (32)
Wearing plastic shoes, n (%)	66 (66)
Bathing in river, n (%)	36 (36)
Dirty skin, n (%)	18 (18)

Note: N: number; %: percentage; SD: standard deviation.

Table 2 shows the skin problems in the participants. Onchyodystrophy of foot were 30 (30%) which is common among diabetic patients with poor peripheral circulation and/or peripheral neuropathy, scar 22 (22%), pediculus capitis 20 (20%) is one of the most common ectoparasitic infestations, known since time immemoria, postinflammatory hyperpigmentation 15 (15%), has posed a substantial challenge for patients with skin of color, keratosis puntata 12 (12%), xerosis 6 (6%), scabies 6 (6%), warts 5 (5%), melanocytic nevus 3 (3%), scarring alopecia 3 (3%), calluses 2 (2%), infected wound 1 (1%), urticaria 1 (1%). There was no statistical significance between the factors associated with tinea infection and other specific skin problems and the presence of dermatophytes.

Table 3 shows the most prevalent dermatophytes isolation in tinea capitis in children were *Trichophyton verucosum* (90), *Trichophyton tonsurans* (30),

Trichophyton mentagrophytes (28), *Microsporum audiouium* (15), *Trichophyton soudanese* (9), *Trichophyton violaceum* (5), *Microsporum ferrugineum* (3), *Trichophyton schoenleineii* (3), *Microsporum gallinae* (2) and culture negative and KOH positive (10).

Table 2: Others skin problems in participants.

Skin problems	Number of cases (%)
Onchyodystrophy of foot	30 (30%)
Scar	22 (22%)
Pediculus capitis	20 (20%)
Postinflammatory hyperpigmentation	15 (15%)
Keratosis puntata	12 (12%)
Xerosis	6 (6%)
Scabies	6 (6%)
Warts	5 (5%)
Melanocytic nevus	3 (3%)
Scarring alopecia	3 (3%)
Calluses	2 (2%)
Infected wound	1 (1%)
Urticaria	1 (1%)

Table 3: Isolation of dermatophytes in tinea capitis.

Dermatophyte	Number of cases (n=100)
Trichophyton verucosum	90
Trichophyton tonsurans	30
Trichophyton mentagrophytes	28
Microsporum audiouium	15
Trichophyton soudanese	9
Trichophyton violaceum	5
Microsporum ferrugineum	3
Trichophyton schoenleineii	3
Microsporum gallinae	2
Culture negative and KOH positive	10

DISCUSSION

In present study**,** the most prevalent dermatophytes isolation in tinea capitis in children were T*richophyton verucosum* (90), *Trichophyton tonsurans* (30), *Trichophyton mentagrophytes* (28), *Microsporum audiouium* (15), *Trichophyton soudanese* (9), *Trichophyton violaceum* (5), *Microsporum ferrugineum* (3), *Trichophyton schoenleineii* (3), *Microsporum gallinae* (2) and culture negative and KOH positive (10). In Nasseri et al study, *T. violaceum* was 29%, *Trichophyton schoenleineii* was 15% and *Trichophyton verucosum* was 7%. In study done by Komba et al, *M. canis* was 46.7%, *T. violaceum* was 20%.[6,7] In Adefemi et al *T. mentagrophytes* was 63.3%, *M. audouinii* was 16.7%, *Trichophyton verucosum* was 10%.[8] In a study done by Oke et al, *M. audouinii* was 44%, *T. rubrum* was 25%, *T. mentagrophytes* was 17%.[9] In a study done by Moto et al *T. tonsurans* was 45.3%.[12] Kechia et al have conducted a study in which *T. soudanense* was reported as 56.8% and *T. rubrum* was 29.2%.[10] Tanoira et al reported in their study that the male to female ratio was 3:1.[11] A total of 88 of patients (89.9%) had a culture positive for dermatophytes. The species of *Trichophyton verucosum* was the most prevalent species (n=29 cases), followed by *Trichophyton tonsurans* (27), *Trichophyton mentagrophytes*, *Trichophyton soudanese*, *Trichophyton violaceum* (14), *Microsporum audiouium* (8), *Microsporum ferrugineum* (2), *Trichophyton schoenleineii* (3), *Microsporum gallinae* (1) and culture negative and KOH positive (11). Rajashekar et al conducted a study in which screening was done on 1574 patients who were less than 18 years, out of which enrolment was conducted on 75 children fulfilling the criteria for the study.[13] Equally affecting males and females, school going children (6-10 years) and adolescents (10-18 years) were commonly involved. Majority of the cases were acquired non- scarring alopecia. Malnutrition, poor grooming habits, associated systemic diseases and stress were common risk factors. The most frequent etiologies were tinea capitis, alopecia areata, telogen effluvium, trichotillomania, nevus sebaceous and scarring following infections.

CONCLUSION

This study concluded that the findings suggest that the practices resulting in entrenchment of dermatophyte infections and fungal infection. The promotion of public health action plan based on self hygiene education, which aimed to counteract the epidemiological burden specifically, and it should play an pivotal role in reduction of the prevalence in future of this common infection.

Funding: No funding sources
Conflict of interest: None declared
Ethical approval: The study was approved by the institutional ethics committee

REFERENCES

1. Bartels GN, Blume-Peytavi U. Hair Loss in Children. In: Blume-Peytavi U, Tosti A, Trüeb R, editors. Hair Growth and Disorders. Berlin: Springer; 2008: 273–309.
2. Nnoruka EN, Obiagboso I, Maduechesi C. Hair loss in children in South-East Nigeria: common and uncommon cases. Int J Dermatol. 2007;46:18–22.
3. Cortes AG, Felipe Mardones V, Viviana Zemelman D. Characterization of the causes of childhood alopecia. Rev Chil Paediatr. 2015;84:264-9.
4. Al-Refu K. Hair loss in Children: Common and Uncommon Causes, Clinical and Epidemiological study in Jordan. Int J Trichol. 2013;5:85–9.

5. Ljubojevic S, Skerlev M, Lipozencic J, Basta-Juzbasic A. The role of Malassezia furfur in dermatology. Clin Dermatol. 2002;20:179–82.
6. Nasseri A, Fata A, Najafzadeh MJ. Surveillance of dermatophytosis in northeast of Iran and review of published studies. Mycopathologia. 2013;176:247-53.
7. Komba EV, Mgonda YM. The spectrum of dermatological disorders among primary school children in Dar es Salaam. BMC Public Health. 2010;10:765.
8. Adefemi SA, Odeigah LO, Alabi KM. Prevalence of dermatophytosis among primary school children in Oke-Oyi community of Kwara state. Niger J Clin Pract. 2011;14:23-8.
9. Oke OO, Onayemi O, Olasode OA. The prevalence and pattern of superficial fungal infections among school children in Ile-Ife, South Western Nigeria. Dermatol Res Pract. 2014;842917.
10. Kechia FA, Kouoto EA, Nkoa T, Nweze EI, Fokoua DC, Fosso S, et al. Epidemiology of tinea capitis among school age children in Meiganga, Cameroon. J Mycol Med. 2014;24:129-34.
11. Perez Tanoira R, Marin I, Berbegal L, Prieto Pere Lz, Tisiano G, Cuadros J, et al. Mycological profile of tinea capitis in school children in rural southern Ethiopia. Medical Mycol. 2017;55:262-8.
12. Moto JN, Maingi JM, Nyamache AK. Prevalence of Tinea capitis in school going children from Mathare, informal settlement in Nairobi, Kenya. BMC Res Notes. 2015;8:274.
13. Rajashekar TS, Amulya R, Prasad KNV, Kumar S. A clinic-etiological evaluation of hair loss in rural Indian children. Indian J Clin Experimental Dermatol. 2018:4(2):132-6.

Cite this article as: Manne V, Subhash Reddy D. Hair loss in children in rural population. Int J Res Dermatol 2019;5:13-6.