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Prevalence of Tinea Capitis, Mycotic infection among Primary School Children in Erbil city

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Abstract

Tinea capitis is a worldwide public health problem that generates specific therapeutic challenges. Tinea capitis is dermatophytosis or ringworm of the scalp and hair. Tinea capitis is the most common superficial mycosis in school children, in developed and undeveloped regions. To the best of our knowledge there is currently no review on prevelance of Tinea capitis in study area, so this study was undertaken to determine the prevelance and intensity of Tineacapitis as well as identify the causative fungal agents of dermatophyte infection among five primary school childrens scattered in three quarters in Erbil city (Zanko1, Zanko 2 and new Zanko village. The study population composed of (180) school children aged (6-13) years who had important clinical signs of scalp dermatophytosis. Out of this number (68.33%) were males, while (31.7%) were femels. Tinea capitis infection was higher in age group(8-9) years and lower in age group(11-12)years.Cultures of hair samples were done, then macroscopical and microscopical examination were performed for dermatophyte isolates, direct microscopy and culture was positive in(78.33%) and(6.66%) of the cases were positive in direct microscopy and negative culture. The invasion of hair was Ectothrix type, forming masses of arthroconidia on the outside of the hair shaft in 117 (76.47%) specimens, while the invasion of hair was Endothrix type, and abundant sporulation inside the hair shaft causes breakage of the hair near the surface of the scalp in 36 (23.52%)

specimen. Predominant isolates in the study were T. mentagrophytes (34.52%) and Microsporumspeacies (26.19%), Candida albicans and other Candida species were also isolated from five school childrens.

انتشار الاصابة الفطرية بسعفة الراس بين أطفال المدارس الابتدائية في مدينة أربيل

فيان بدر الدين البرزنجي

الخلاصة

تمثل الاصابة بالفطر تينيا كابتس(سعفة الرأس) مشكلة صحية عالمية والتي تمثل تحديا خاصا للعلاج .تينيا كابتس هي واحدة من الاصابات الجلدية للديدان الحلقية لفروة الرأس والشعر، كذلك هي احدى اكثر الاصابات شيوعا من الاصابات الفطرية السطحية بين اطفال المدارس في الدول المتقدمة وغير المتقدمة. لحد الان الدراسات عن هذه الاصابة تعتبر محدودة في المنطقة التي تمت الدراسة بها ،لذلك جاءت هذه الدراسة لتبين نسب الاصابة ،وتحديد المسبب لهذه الاصابات الفطرية لهذه الامراض الجلدية في خمس مدارس في منطقة زانكو في اربيل. تشمل الدراسة (180) طالب بأعمار (6-13) سنة ممن ظهرت لديهم اعراض اصابات في فروة الرأس. من هذه النسبة كان هناك (68.33%)ذكور و (31.66%) من الاناث .ظهرت أعلى الاصابات بهذا الفطر عند أعمار (8-9) واقلها بأعمار (11-12) أجريت زراعة لشعر المصابين وتم فحصها مجهريا وظاهريا للكشف عن الاصابات الفطرية ،اظهر الفحص المباشر والزرع نتائج إيجابية في (78.33%) وبينما (6.66%) من العينات كانت موجبة للفحص المجهري فقط وسالبة للزرع .اظهرت النتائج غزو للنوع أكتوثركس مكونا كتل من الكونيديات على السطح الخارجي من بصيلة الشعرة في 117(76.47%) من العينات بينما تمثل الغزو بالاندوثركس ونسب قليلة من الابواغ ظهر في الداخل من البصيلة الشعرية مسببا تكسر الشعرة بالقرب من سطح فروة الرأس في 36(23.52%) من العينات .أظهرت الدراسة سيادة الانواع *T.mentagrophytes*(34.52%)، *T.Microsporum*speacies(26.19%)، *Candida albicans*،وانواع اخرى من المبيضات عزلت من خمس اطفال مدارس .

Introduction

Tinea capitis (scalpdermatophytosis) is a highly contagious infection with world wide distribution (Mikaieili, 2019) usually caused by membersof genera*Microsporum* and *Tricophyton*. Scalp dermatophytosis is the mostcommon of all mycoses in children and is regarded as an important public health problem in children globally, also has been reported as the most frequent skin infection affecting primary school children (EL.Said, 2001). Tinea capitis (tinea means:" ringworm" capits means head or scalp). (Weitzmanand Summerbell, 1995). Easily spreads among sibilings and family members by direct contact from other people (anthropophilic organisms), animals (zoophilic organisms) and soil (geophilic organisms). It can also be promoted by sharing of contaminated hats, combs, hair brushes, pillows, playing with domestic animals and other inanimate objects, overcrowding, poor personal hygiene (Khlifa, 2011). Both the skinsurface and hairs are involved, infection of hair may be Ectothrixor Endothrix (Kadhum, 2015).The most important consequence of this infection is permanent hair loss, especially in untreated cases, as a result of delay in treatment, inappropriate treatment (Woldemanuel, 2055). Regardless of great advances in preventing and treating the disease tinea capitis is still a public health problem in the world, and important that in some studies it is concluded that any scalp lesion should be regarded as tineacapitis unless otherwise

proven through direct examination and culture tests (Zarrin, 2011).Tinea capitismore frequent in males than female and most common between 6-10 years of age (Hainer, 2003). The non-dermatophytes fungal species that were implicated in the study include *Candida albicans* other *Candidaspecies* (Ameneh, 2010). This study therefore investigate the prevalence ,intensity and causative fungal agents among five primary school children inthree quarters in Erbil city (Zanko1, Zanko 2 and new Zanko village.

Materials & Methods

Screening for Tinea capits among sample population

Primary school children of ages 6 -12 years were screened randomly ,during of March – June, 2017(wet months) for fungal infections consistent with dermatophytosis on the skin of the scalp from five selected primary schools scattered in three quarters inErbil city (Zanko1, Zanko 2 and new Zanko village. Total of 180 students(123 male and 57 females) the age ranged from six year to twelve years.That showed visble clinical signs of scalp fungal infection are selected and studied.

1- Sample Collection:

Specimens were collected according to (Weitzman and Summerbell, 1995) .Dull or short broken hairs from the scalp were plucked with sterile forceps after cleaning of area with alcohol, epilating hair from folicle is better than cutting, since the high amount of spores is seen in the root.Scrapingmade with scalp then collected into sterile envelops which were labeled consequently and transferred to the laboratory accompanied by questionnaire involving name of the patient, age, sex, address, presence of the lesion in other body sites,duration of illness, similar infection in their family or friends in the school, previous exposure or contact with animals, history of and time elapsed from previous medications taken and date of sample collection.

A-Direct Microscopic Examination:

Broken and plucked hair ,crusts from scraping scalp lesion were placed on the clean glass slide,then a drop of 10% KOH was added, covered with cover slip and then subjected to slight heat for one minutes to aid rapid penetration and complete maceration of tissues.The slides were examined for presence of hyphea and spores around(Ectothrix) or within hair(Endothrix)by using low (X10) and high(X40)power of simple lighte microscope.

B- Culture Examination:

The other portion of each sample cultivated on Sabouraud dextrose agar (SDA)medium with cycloheximide and Chloramphenicol (250mg/L)(Kwon-Chung and Bennett, 1992).Incubated at room temperature and hold for 3-4 weeks.

C-Identification of isolated Dermatophytes.

Fungi which isolated were identified according to macroscopical and microscopical morphology of the isolates(Kwon-Chung and Bennett ,1992).

C.1 -Macroscopical examination of the cultures: Involves number of examination rate of growth, colour, texture of the colony or consistency (Cottony, fluffy and suede-like), its surface (flat, folded and plicate) and reverse side of colony, margins and elevation from the agar surface (Clyton and Midgely, 1985).

C.2-Microscopical examination of the cultures:

A small portion of fungal colony was gently teased on the slide with a drop of stain [lactophenol cotton blue] using a flamed inoculating needle. A cover slip was applied with gentle pressure then examined by low and high power (Carter and Johhn,1990)

D-Other examination used in the study:

The isolates were also tested for their ability to produce Urease enzyme and hair perforation testes to distingushing *Tricophytonspecies* .Slide culture technique was also carried out to examine the presence of macro and microconidia of *Tricophyton verrucosum.* The production of Chlamydoconidia on Cornmeal agar (Difco,UK), Germ tube testand API used for non-Dermatophytes (*Candidaspecies*) which isolated in five cases (Kwon-Chung and Bennett, 1992).

Results

In the present study a total of (180) clinical samples were collected from suspected cases of Tinea capitis,of which 123(68.33%) from males and 57(31.7%) from females.The age of study group ranged from 6 to 13 years, with the maximum rate of infection falling in the 8-9 years age group(28.33%) followed by 6-7 years (23.33%).(Table 1).

Table (1):- Age ranges and sex of school childrens with Tinea capitis

Age groups(years)	Male(N)	Female(N)	Total(N=) N%
6-7	27	15	42(23.33)
7-8	16	12	28(15.55)
8-9	34	17	51(28.33)
9-10	21	8	29(16.11)
10-11	19	2	21(11.66)
11-12	6	3	9(5)
Total	123(68.33%)	57(31.67%)	180

One hundred and fourty one cases(78.33%) were positive in both the microscopic examination and culture, 12cases(6.66%) were positive in microscopy but culture negative,27 cases (15%) were negative in microscopy and positive in culture, thus the culture is more accurate than the microscopic examination in our study (Table 2).

Table (2):- Correlation of direct Microscopy and Culture (N= 180)

Test procedure	Number of cases	Percentage %
KOH(+ve), Culture(+ve)	141	78.33
KOH (+ve),Culture(-ve)	12	6.7
KOH (-ve),Culture(+ve)	27	15.00
Total	180	100

The study also revealed that the arthroconidia which forming mases around the hair shaft(Ectothrix) found in 117(76.47%) specimens, while 36(23.52) Endothrix cases show invasion of hair shaft with arthroconidia Figure(**1**).

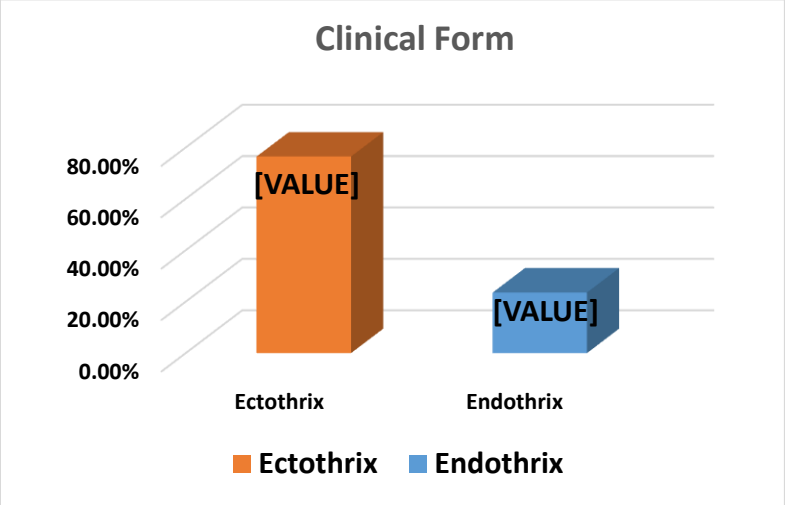

Figure (1):- Ectothrix and Endothrix clinical form of TineaCapitis in percentages.

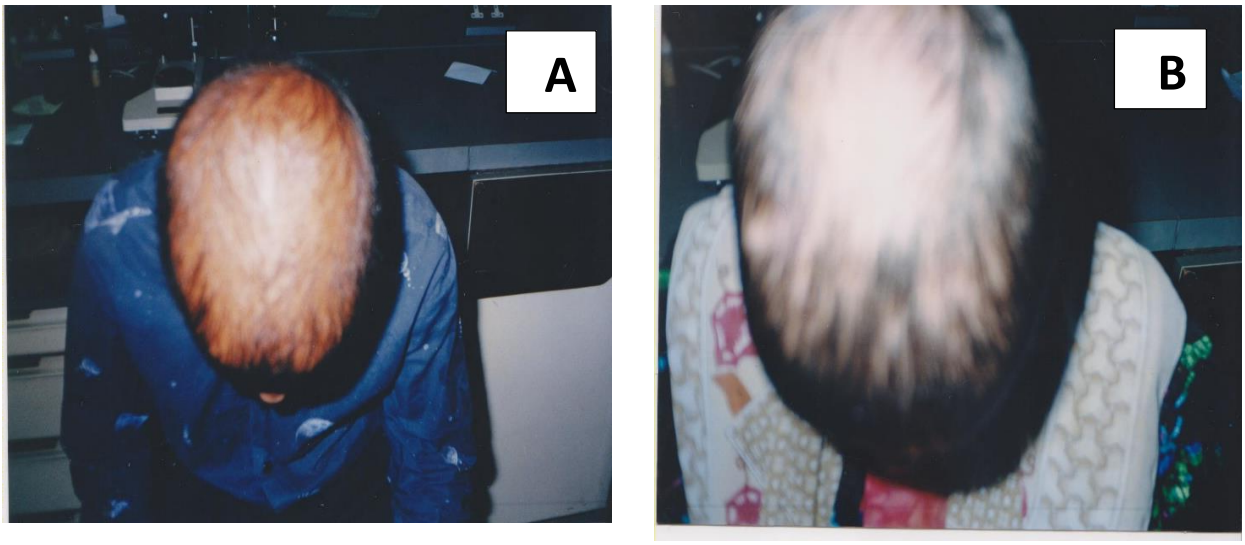

Figure (2):- Clinical appearance of Tinea Capitis among Primary SchoolChildren.

A total of 163 isolates of dermatophytes was identified by both microscopical examination and macroscopical morphology,the isolates belonged to two genera: *Tricophyton*(119 cases) the most prevalent causes of Tinea capitis in our study, accounting for 70.83% ofisolates and *Microsporum species* (44 cases; 26.19%). The isolates included three species of *Tricophyton*: *T. mentogrophytes* 58 (34.52 %) , *T. rubrum* 35(20.83 %) and *T. verrucosum*26 (15.47

%), while foure *Candida albicans* and one *Candida species* were the representative non-dermatophytic isolates recorded from the study (Table 3).

Table (3):- Percentage of different dermatophytes and non- dermatophytes isolated from scalp of infected cases.

Species	No. of isolates	Percentage
Microsporum spp.	**44**	**26.19**
Tricophytonverucosum	**26**	**15.47**
Tricophytonmentagrophytes	**58**	**34.52**
Tricophytonrubrum	**35**	**20.83**
Candida albicans	**4**	**2.38**
Candida sp.	**1**	**0.59**
Total	**168**	**100**

Discussion

Tinea capitis, also known as Herpes tonsurans is a superficial fungal infection of the hair, scalp, eyebrows and eyelashes with a propensity for attacking hair shafts and follicles(Bolognia, 2007). Scalp ringworm can affect people of all ages, but this condition is more likely to affect kids under the age of 10. According to the American Academy of Dermatology (Klaus and Johnson, 2009). The infection is primarily caused by dermatophytes, belongs to genera*Trichophyton* and *Microsporum* that invade the hair shaft.The present study higlights the clinical pattern of T.capits, its prevalence and results revealed that T.capits is primarily a diseas in young children, and this results is consistent withWoldemanuel, (2005) which recorded in his study that Tinea capits is an important dermatological problem and health issue among children in Ethiopia (Khlifa, 2011) also reported that the majority of cases occur in younger children under 10 years of age, this has been mainly attributed tothe sensitivity of dermatophytes to certain secretions of sebaceous gland secretions that first appear at puberty(Rippon, 1988), also the reasonfor highe prevalence of tinea infection may be linked to several factors such as host socioeconomic characteristics, over crowding in classroom, level of hygiene practice, nature of school infrastructure and amenities, climate, affinity for contact sports,contact with domestic animaland natire of health care system (Nweze, 2010 ;Khosravi and Mahmoudi, 2003). Our study showed that the more frequent occurence of tinea capitis observed among male children in(Table 1) with rate 123 (68.33%), while females rate of infection 57(31.66%)these results was near that found by (Mikaieili, 2019: Shalaby, 2016 and EL. Said, 2001). The physical engagement of male children in contactsports such as increased outdoor physicall activity,wrestling, football, boxing, increasing sweating, male short hair condition (easy implantation of spore) visit the barber's shop more subjugate that male more promoteto infection than femal which reported by (Ndako, 2012) while girls appear to pay more attention to their outlook,especially as they approach teenage age. As universally reported by most of workers, Tinea capitis is an infection of child hood, in the present study a total of 180

school children with Tinea capitis, The highest rate of infection occure in age group (8-9)years, as shown in table (1) similar results werereported by earlier reserches Al Shekh (2009): Sarma andBothakur (2007), the probable reson for higher prevalence in this age group could be that the children are oftenmost active or may be due to lack of fugistatic secretion by scalp in childhood(Nermin, 2001). The results proved that 141(78.33) speciemens were positive in both direct and culture examination, however we see that some cases shown KOH mount negative or culture negative although the children have clinical signe of Tinea capitis,this variation could be due to inadequacy in sampling due to wery small lession or due to non-viability of fungal elementsin some cases, or some cases treated with antifungal and non reported, this finding concurred withShalaby, *et al*(2016). The foregoing results in figure(1) showed the Ectothrix hairinvasion was the prevalence type of hair infection, and this result is in agreements with the results recorded in(Kadhum, *et al*.,2015 and Al-Hamadani,*et al*., 2012), while some studies have reported that Endothrix hair type to be more common (Kakourou, 2010; Afshar, 2016). This result is in harmony with the finding of (EL. Said, 2001: Azab, 2012), that *Tricophyton* and *Microsporum* were the two main dermatophytes found in Tinea capitis sample and five species of *Candida* isolated as non- dermatophyte recorded in our study, similarly *Candida albicans* has been documanted in many studies (Al Shekh, 2009: HavlickovaandFriedrich, 2008)

References

1-Mikaieili, A.; Kavoussi, H.; Hashemian,A.; Gheshtemi, M. S. andKavoussi, A.(2019). Clinico-mycological profile of Tinea capits and its comparativeresponse to grisofuvin versus terbinafine.Current Medical Mycology. 5(1):15-20.

2-EL.Said, A. H. M. (2001). Mycological and Physiological studies on fungi, isolated from skin diseases. Pakistan J. of Biological Sciences. 4(11):1432-1436.

3- Weitzman, I. and Summerbell, R. C. (1995). The dermatophytes. Clin MicrobiolRev., 8(2): 240-259.

4-Khlifa, K.A., Al-Kaseer,A.; AL-Diwan,J.K.and AL- Lami, F. H. (2011). Prevalenceof Tinea capitis among primary School children in Baghdad Governorate, Iraq.Iraqi J. Comm.Med.(1).

5- Woldemanuel, Y.; Mengistu, Y.; Chryssanthou, E. And Petrini, B.(2005). Medical Mycology. 43:79-82.

6- Zarrin, M.; Poosashkan, M.; Mahmoudabadi. A. Z .andMapar, M. A(2011). Prevalence of superficial fungal infection in primary School children inAhvaz, Iran. Macedonian J. of Medical Sciences. 4(1):89-92.

7- Hainer, B. L., (2003). Dermatophyte infections. *Am. Fam Physicians*.67:108-8.

8- Ameneh, Y. (2010). Tinea capitis in primary school children in Hamedan West Iran. *Int. J.Med. and Medic. Sci*. 2(2):29-33.

9- Nweze, E.I. and Eke, I.E.(2018). Dermatophytes and Dermatophytosis in the eastern and southern parts of Africa. ISHAM. 56(1): 13-28.

10- Kwon-Chung, K.J. and Bennett, J.E. (1992): "Medical Mycology. Lea and Febiger, Malvern, Pennsylvania, USA.".

11-Bolognia, J.,Jorizzo, J.L., Rapini, R.P. (2007). Dermatology (2nd Edition). St. Louis, Mosby Elsevier. P1135.

12-Klaus Wolff, Richard Allen Johnson (2009). Fitzpatrick's color atlas andsynopsis of clinical dermatology; sixth edition; McGraw Hill; 713.

13-Sarma, S. And Bothakur Ak(2007). A clinico-epidermatological studyof dermatophytosis in Nortthest India. Indian J of dermatol venereol leprol73(6): 427-428.

14- Al Shekh,H. (2009) “Epidemiology of dermatophtes in the eastern

provinceofSaudiArabia,"ResearchJournal ofMicrobiology,vol. 4, pp. 229–234.

15- Havlickova, V. A. Czaika, andM. Friedrich, (2008) "EpidemiologicalTrendsinskinmycosesw orldwide, "Mycoses,vol. 51,supplement 4,pp. 2–15,.

16- Nermin, H., Ibrahim, 2001. Prevalence of dermatophytosis in Beni Suif Governorate. M.D. Thesis, Fac. of Med. (Medical Microbiology and Immunology), Cairo Univ.

17- Kakourou T, Uksal U(2010). European Society for Pediatric Dermatology. Guidelines for the management of tinea capitis in children. Pediatr Dermatol. 27(3): 226-8.

18- Afshar P, Vahedi L, Ghasemi M, Mardanshahi A. Epidemiology of tinea capitis in northeast Iran: a retrospective analysis from 1998 to 2012. Int J Dermatol. 2016; 55(6):640-4.

19-Rippon JL. (1988) Medical mycology. Philadelphia, Saunders Co.

20-Al-Hamadani, A.H., Muhsin A. and Muhammad M.A.(2012). Phenotypic and Molecular Identification of Some Dermatophytes from Clinical Specimens (Compartive Study). PhD. Thesis, College of Sciences,Univ. of Kufa.

21-Khosravi AR, Mahmoudi M (2003). Dermatophytes isolated from domestic animals in Iran. Mycoses 46: 222-225.

22- Nweze EI (2010). Dermatophytosis among children of Fulani/Hausa living in Southeastern Nigeria. Revista Iberoamericana de Micol. 27(4): 191-194.

23- Shalaby, M.F.M; Nasr El-din, A. and Al- Hamd, M. (2016). Isolation, Identification and in vitro antifungal susceptibility testing of dermatophytes from clinical samples at Sohag UniversityHospital in Egypt.http:// www.ephysician.ir.8(6):2557-2567.

24- Ndako,J.A. ; Osemwegie,O.O.; Spencer T.H.I.;Olopade,B.K.; Yunusa,G. A. And Banda J.(2012). Prevalence of dermatophytes and other associated fungi among school children.Global advanced research journal of Medicine and medical science.1(3):049-056.

25- Azab,M.M.; Mahmoud,N.F.; Abd Allah, S.; Hosny, A.M.; Shehata,A.S.and Mohamed, R.W.(2012). Dermatophytes Isolated From Clinical Samples of Children Suffering From Tinea Capitis In Ismailia, Egypt. 6(3):38-42.

26-Kadhum,O.H.; Naher, H.S.; AL-Hattab, M. K. (2015). Prevalenceof Dermatophytes Skin Infections in Babylon ProvinceJournal of Natural Sciences Research.5, (15): 182-186.

27-Carter, G. John, R.(1990). Diagnostic procedure in veternary Bacteriology and Mycology, 5th Ed., Appendix C,P 565. Academic Press, Inc., SanDiego,California.

28-Clyton, Y. Midgely, G. (1985). Medical Mycology (pocket picture guides). Gower Medical publishing, London, New York.