Prevalence of Tinea Capitis among pupils in East Nile locality, Khartoum State-2015

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2015
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العلق:
١-٥
صدق الله العظيم
Dedication

To my lovely family members
To my friends with much love and best wishes
To my teachers
# Table of contents

<table>
<thead>
<tr>
<th>Title</th>
<th>Page No</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dedication</td>
<td></td>
</tr>
<tr>
<td>Table of Contents</td>
<td>I</td>
</tr>
<tr>
<td>Acknowledgement</td>
<td>III</td>
</tr>
<tr>
<td>Abbreviations</td>
<td>IV</td>
</tr>
<tr>
<td>Abstract</td>
<td>V</td>
</tr>
<tr>
<td>Abstract in Arabic</td>
<td>VII</td>
</tr>
<tr>
<td>List of tables</td>
<td>IX</td>
</tr>
<tr>
<td>List of figure</td>
<td>XI</td>
</tr>
</tbody>
</table>

## Chapter one

1.1 Introduction               | 1       |
1.2 Justification              | 4       |
1.3 Objectives of the study    | 6       |
1.4 Literature                 | 7       |

## Chapter two

2 Materials and methods        | 41      |
2.1 Study design               | 41      |
2.2 Study area                 | 41      |
<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.3 Study population</td>
<td>43</td>
</tr>
<tr>
<td>2.4 Sample size</td>
<td>43</td>
</tr>
<tr>
<td>2.5 Methods of data collection</td>
<td>46</td>
</tr>
<tr>
<td>2.6 Ethical consideration</td>
<td>47</td>
</tr>
<tr>
<td>2.7 Data processing and analysis</td>
<td>48</td>
</tr>
<tr>
<td>Chapter three</td>
<td></td>
</tr>
<tr>
<td>3. Results</td>
<td>52</td>
</tr>
<tr>
<td>Chapter four</td>
<td></td>
</tr>
<tr>
<td>4.1 Discussion</td>
<td>79</td>
</tr>
<tr>
<td>4.2 Conclusion</td>
<td>84</td>
</tr>
<tr>
<td>4.3 Recommendation</td>
<td>85</td>
</tr>
<tr>
<td>4.4 Appendances</td>
<td>86</td>
</tr>
</tbody>
</table>
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# Abbreviations

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Full Form</th>
</tr>
</thead>
<tbody>
<tr>
<td>AAP</td>
<td>American Academy of Pediatrics</td>
</tr>
<tr>
<td>APHA</td>
<td>American Public Health Association</td>
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<td>BAD</td>
<td>British Association Dermatologists</td>
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<td>°C</td>
<td>Degree Centigrade</td>
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<td>CDC</td>
<td>Center for Disease Control and Prevention</td>
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<td>ENL</td>
<td>East Nile Locality</td>
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<td>FMOH</td>
<td>Federal Ministry of Health</td>
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<td>HIV</td>
<td>Human Immunodeficiency Virus</td>
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<tr>
<td>IDPH</td>
<td>Illinois Department of Public Health</td>
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<tr>
<td>KAP</td>
<td>Knowledge, Attitude and practice</td>
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<tr>
<td>Kh.</td>
<td>Khartoum</td>
</tr>
<tr>
<td>Km</td>
<td>Kilometer</td>
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<td>KOH</td>
<td>Potassium Hydroxide</td>
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<td>KSMOH</td>
<td>Khartoum State Ministry of Health</td>
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<td>MNT</td>
<td>Medical News Today</td>
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<td>NHS</td>
<td>National Health Service</td>
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<td>PHC</td>
<td>Public Health Care</td>
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<td>Spp.</td>
<td>Species</td>
</tr>
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<td>SPSS</td>
<td>Social Package for Statistical Science</td>
</tr>
<tr>
<td>T. capitis</td>
<td>Tinea Capitis</td>
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<tr>
<td>UK</td>
<td>United Kingdom</td>
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<td>UNISCO</td>
<td>United Nations Educational, Scientific and Cultural Organization</td>
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<tr>
<td>UOFLS</td>
<td>University of Iowa State</td>
</tr>
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<td>U.S.A</td>
<td>United State American</td>
</tr>
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<td>WHO</td>
<td>World Health Organization</td>
</tr>
</tbody>
</table>
Abstract

Background: Tinea capitis is one of the major communicable diseases of public health and of socio-economic importance in the developing countries. The prevalence of superficial mycotic infections has risen to such a level in the last decades that skin mycoses affects more than 20–25% of the world’s population. The number of people infected with fungal skin diseases in Sub-Saharan Africa was 78 million (2011). Descriptive cross sectional school based study was conducted in East Nile Locality (Khartoum State) the aim of study was to study the prevalence and factors associated with Tinea capitis among pupils in basic schools.

Methods: Six hundred pupils (basic schools) were obtained using statistical formula (three hundred males and three hundred females). Data were collected using: questionnaire, medical check, laboratory investigation. Pupils were checked medically by a dermatologist and then suspected cases were referred to laboratory test. Specimens were taken through brushing infected skin by a technician. Specimens were saved in a special container and then diagnosed (KOH diagnosis) in a laboratory examination at Dermatology and Venereal Diseases Hospital. The data were entered and analyzed using statistical package for social sciences program SPSS (version 23) and the association between different variables were checked using $x^2$–test.

Ethical clearance was obtained from Ministry of Health and consent was obtained from all pupils.

Result: The prevalence of Tinea capitis infection among pupils was (4.5%). The prevalence was high among males (7%) compared to females (2%), and the highest prevalence of infection was among the age group 7-10 years of both genders (11.9%). There was no relation between overcrowding and Tinea capitis infection ($P = 9.19$). The study revealed a statistical association between the residential areas (rural and urban), father education, family income and Tinea capitis ($P <0.01, 0.01, 0.05$).

The study revealed a statistical association between presence of pets at pupil’s homes, frequency of shower per week, knowledge of pupils towards the disease and Tinea capitis ($P <0.01$) for the three variables.
The main reasons of Tinea capitis infection were: unavailability of health services and poor personal hygiene.

**Conclusion:** The study revealed the prevalence of Tinea capitis infection among pupils were (4.5%). The results showed there were statistical association between residential areas (rural and urban), father education, family income, presence of pets at pupil’s homes, frequency of shower per week, knowledge of pupils towards the disease and Tinea capitis (P.v > 0.05). The study recommended raising awareness among the pupils regarding Tinea capitis through school based health education and also treatment of cases.
المستخلص

خلفية: مرض سعفة الرأس يعد واحد من أكثر الأمراض المعدية ذات الأهمية الاقتصادية والاجتماعية التي تؤثر على الصحة العامة في الدول النامية. إنشار العدوى الفطرية السطحية في العالم يقدر بحوالي 20-25%. عدد الأشخاص المصابين بالأمراض الجلدية الفطرية في أفريقيا جنوب الصحراء الكبرى يقدر بحوالي 78 مليون. أجريت هذه الدراسة الوضعية المقطعية في مسح شرق النيل (ولاية الخرطوم) لدراسة العلاقة بين البالغ والأمراض وسط التلاميذ في مدارس الأساس.

المنهجية: تم الحصول على عينة مقدارها 260 حالة تلقي من مدارس الأساس باستخدام معادلة إحصائية (ثلاثمائة ذكر وثلاثمائة إناث). تم جمع المعلومات باستخدام: الاستبيانات، الفحص الطبي والإختبار المعطري. تمت عملية الكشف الطبي للتلاميذ بواسطة أخصائي الأمراض الجلدية، وبعد ذلك الحالات المشتبه فيها حولت للفحص المؤمن. عينات الفحص تم اخذها من خلال حك الجلد المصاب للتلاميذ بواسطة فني معمل. العينات تم حفظها في وعاء خاص بها وبعد ذلك فحصت (باختبار هيروكسيد البوتاسيوم) في معمل مستشفى الأمراض الجلدية والتناسلية.

وتمت عملية إدخال البيانات وتحليلها بواسطة برنامج الحزمة الإحصائية للعلوم الإجتماعية (SPSS) النسخة 23 وتم اختبار العلاقات بين المتغيرات المختلفة بواسطة اختبار كاي السوين.

فيما يخص الاعتبارات الاختلافية تم الحصول على موافقة وزارة الصحة وموافقة جميع أعضاء التلاميذ.

النتائج: أظهرت نتائج هذه الدراسة أن نسبة الإصابة بسعفة الرأس (4%). الإصابة بين الذكور (7%) أكثر من الإناث (2%)، و تكون الإصابة في الفئة العمرية من 7-10 سنوات (11.9%). أظهرت الدراسة أنه لا يوجد علاقة بين الإزدهار و عدد سعفة الرأس وسط التلاميذ (قيمة احتمال الصدفة = 0.919). كما أوضحت الدراسة أنه توجد علاقة إحصائية بين المناطق السكنية (ريفي و حضري)، المستوى التعليمي للأباء و دخل الأسرة وإصابات التلاميذ بسعفة الرأس والقيم الإحتمائية (0.01, 0.05, 0.0, 0.05) إيجابياً.

وأوضحت الدراسة أنه توجد علاقة إحصائية بين وجود الحيوانات الأليفة بمنازل التلاميذ عدد مرات الاستحمام للتلاميذ في الأسبوع. معرفة التلاميذ تجاه المرض وإصابات التلاميذ بسعفة الرأس والقيم الإحتمائية أقل من (0.01, 0.01 و 0.1) إيجابياً.
لا halkf talasra: Ammellal nastarah Undusfaa asabbin tilamid (4.5%).

### Lists of Tables

<table>
<thead>
<tr>
<th>Table Title</th>
<th>Page No</th>
</tr>
</thead>
<tbody>
<tr>
<td>Table (1) The prevalence rate of Tinea Capitis among pupils in East Nile locality schools, 2014</td>
<td>52</td>
</tr>
<tr>
<td>Table (2): Socio-demographic characteristics of pupils in relation to Tinea Capitis in school pupils- East Nile Locality, 2014</td>
<td>53</td>
</tr>
<tr>
<td>Table (3) Type of health services and prevalence of Tinea Capitis - East Nile locality schools, 2014</td>
<td>58</td>
</tr>
<tr>
<td>Table (4) Way of arriving to school in relation to Tinea Capitis - East Nile locality schools, 2014</td>
<td>59</td>
</tr>
<tr>
<td>Table (5) Tools of shaving in relation to Tinea Capitis - East Nile locality schools, 2014:</td>
<td>61</td>
</tr>
<tr>
<td>Table (6) sharing wearing clothes in relation to the infection with Tinea Capitis - East Nile locality schools, 2014</td>
<td>63</td>
</tr>
<tr>
<td>Table (7) Presence of infected person with Tinea Capitis among families of pupils in relation to Tinea Capitis - East Nile locality schools, 2014</td>
<td>65</td>
</tr>
<tr>
<td>Table (8) Presence of infected person with Tinea Capitis among pupil’s friends in relation to Tinea Capitis - East Nile locality schools, 2014</td>
<td>66</td>
</tr>
<tr>
<td>Table (9) Presence of pets at home among the pupils in relation to Tinea Capitis - East Nile locality schools, 2014</td>
<td>67</td>
</tr>
<tr>
<td>Table (10) Presence of pets suffering from the wool loss in pupils homes in relation to infection with Tinea Capitis - East Nile locality schools, 2014</td>
<td>68</td>
</tr>
<tr>
<td>Table (11) types of pets at homes of pupils in relation to Tinea Capitis - East Nile locality schools, 2014</td>
<td>69</td>
</tr>
<tr>
<td>Table (12) Pupils in contact with pets in relation to Tinea Capitis - East Nile locality schools, 2014</td>
<td>70</td>
</tr>
<tr>
<td>Table (13) Types of contact with pets in relation to Tinea Capitis -East Nile locality schools, 2014</td>
<td>71</td>
</tr>
<tr>
<td>Table (14) frequency of shower in week for pupils in relation to Tinea Capitis -East Nile locality schools, 2014</td>
<td>72</td>
</tr>
<tr>
<td>Table (15) Hand washing for pupils in relation to Tinea Capitis -East Nile locality schools, 2014</td>
<td>73</td>
</tr>
<tr>
<td>Table (16) frequency of hand washing for pupils in relation to Tinea Capitis -East Nile locality schools, 2014</td>
<td>74</td>
</tr>
<tr>
<td>Table (17) Distance between health center and houses of pupils in relation to the infection with Tinea Capitis -East Nile locality schools, 2014</td>
<td>75</td>
</tr>
<tr>
<td>Table (18) Knowledge regarding to Tinea Capitis infection among pupils in relation to Tinea Capitis -East Nile locality schools, 2014</td>
<td>76</td>
</tr>
<tr>
<td>Table (19) knowledge of pupils toward the way for treating in relation to Tinea Capitis - East Nile locality schools, 2014</td>
<td>77</td>
</tr>
<tr>
<td>Table (20) Reasons behind using traditional treatment among pupils in relation with Tinea Capitis in East Nile locality schools, 2014</td>
<td>78</td>
</tr>
<tr>
<td>Table (21) Type of traditional treatment used by pupils to treatment Tinea Capitis in relation to Tinea Capitis in East Nile locality schools, 2014</td>
<td>79</td>
</tr>
</tbody>
</table>
## List of Figures

<table>
<thead>
<tr>
<th>Figure Title</th>
<th>Page No</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Figure (I)</strong> Availability of water source in pupils houses in relation to Tinea Capitis-East Nile locality schools</td>
<td>61</td>
</tr>
<tr>
<td><strong>Figure (II)</strong> Availability of health services among the region sof pupils in relation to Tinea Capitis-East Nile locality schools, 2014.</td>
<td>65</td>
</tr>
<tr>
<td><strong>Figure (III)</strong> Place of haircuts of pupils in relation to tineacapitis- East Nile locality schools, 2014.</td>
<td>72</td>
</tr>
<tr>
<td><strong>Figure (IV)</strong> Use of disinfectant during shaving in relation to pupil’s infection with tineacapitis-East Nile locality schools, 2014.</td>
<td>73</td>
</tr>
<tr>
<td><strong>Figure (V)</strong> sharing tools of combing hair among the pupils in relation to tineacapitis -East Nile locality schools, 2014.</td>
<td>84</td>
</tr>
</tbody>
</table>
1.1 Introduction:

Tinea capitis is a superficial fungal infection (dermatophytosis) of the skin or scalp also known as: Herpes tonsurans, Ringworm , Ringworm of the scalp. The disease is primarily caused by dermatophytes in the Trichophyton and Microsporum genera that invade the hair shaft. The clinical presentation is typically single or multiple patches of hair loss or appearance pale patches on the skin sometimes with a 'black dot' pattern (often with broken-off hairs), that may be accompanied by inflammation, scaling, pustules, and itching. Uncommon in adults, tinea capitis is predominantly seen in pre-pubertal children, more often boys than girls (Ronald et al, 2007).

Tinea capitis is a contagious disease that is endemic in many countries. Tinea capitis is a worldwide public health problem that poses specific therapeutic challenges. This dermatophytosis of the scalp is endemic in Africa (Menan et al, 2002).

It is the most frequent fungal infection in children under the age of adolescence. Human to human, animal to human and soil to human transmission can be involved (Feuilhade and Lacroix, 2001).

Affecting primarily pre-pubertal children between 6 and 10 years, it is more common in males than females; rarely does the disease persist past age sixteen (Richardson, 2003).

Spread of tinea capitis is thought to occur through direct contact with inflicted individuals, large outbreaks have been known to occur in schools and other places where children are in close quarters; however, indirect
spread through contamination with infected objects may also be a factor in the spread of infection (Richardson, 2003).

Fungal infections of the skin and nails form the most numerous and widespread group of all mycoses. The prevalence of superficial mycotic infections has risen to such a level in the last decades that skin mycoses now affect more than 20–25% of the world’s population (Richardson, 2003).

In 2005, Hay et al estimated the overall incidence of fungal skin infection in Sub-Saharan Africa to be 78 million notably, Humidity seems to favor this endogenic infection. Europeans travelling to Africa often develop this disease. Candida infections are also highly prevalent given the high incidence of HIV infections. (Havlickova et al 2008).

The study was conducted to evaluate prevalence of skin disorders in pupils of Sudan was 2.8 (FMOH, 2013).

The study was conducted to evaluate prevalence of skin disorders in pupils of Khartoum stat was 1.3 % (MOH, 2013).

The study was performed to evaluate prevalence of skin disorders in pupils of East Nile Locality was 3% (MOH, 2013).

Tinea capitis cannot be differentiated by ethnicity or socioeconomic status but, in high-prevalence areas, poverty and overcrowded living conditions are important underlying social determinants. Each is transmitted primarily through direct skin-to-skin contact, for many Indigenous children (Andrews et al, 2009).

From the site of inoculation, the fungus grows down into the stratum corneum, where it invades keratin. Dermatophytes are unique in that they
produce keratinase, which enables them to use keratin as a nutrient source (Andrews et al., 2009).

Infected hairs become brittle, and after three weeks, the clinical presentation of broken hairs is evident (Andrews et al., 2009).

There are three types of infection:

Ectothrix: Characterized by the growth of fungal spores (arthroconidia) on the exterior of the hair shaft. Infected hairs usually fluoresce greenish-yellow under a Wood lamp. Associated with Microsporum canis, Microsporum gypseum, Trichophyton equinum, and Trichophyton verrucosum (Denial, 2009).

Endothrix: Similar to ectothrix, but characterized by arthroconidia restricted to the hair shaft, and restricted to anthropophilic bacteria. The cuticle of the hair remains intact and clinically this type does not have fluorescence. Associated with Trichophyton tonsurans and Trichophyton violaceum, which are anthropophilic (Denial, 2009).

Favus: Causes crusting on the surface of the skin, combined with hair loss. Associated with Trichophyton schoenleini (Denial, 2009).
1.2 Justification:-

1.2.1 Topic selection:

Tineacapitis is a superficial fungal infection (dermatophytosis) of the skin or scalp. tinea is predominantly seen in pre-pubertal children, more often boys than girls (Ronald et al, 2007).

Tineacapitis is a contagious disease that is endemic in many countries. Affecting primarily pre-pubertal children between 6 and 10 years, it is more common in males than females; rarely does the disease persist past age sixteen. Spread of tinea capitis is thought to occur through direct contact with afflicted individuals, large outbreaks have been known to occur in schools and other places where children are in close quarters; however, indirect spread through contamination with infected objects may also be a factor in the spread of infection (Richardson, 2003).

1.2.2 Target selection:

Number of pupils examined for skin diseases in Khartoum State: 218,166 Number of cases (skin diseases):2, 929, Prevalence rate: 1.3 % (MOH, 2013). Number of pupils examined for skin diseases in east Nile locality Kh.St:47,185, Number of effected cases: 1,418, Prevalence rate: 3 % (ENL, 2013).

Tinea capitis is a major problem in east Nile locality for following reasons:

Lack of awareness about tinea capitis, spreading of poverty, existence of so many type of pets in contact to pupils, social factors such as culture, beliefs, traditions (ENL, 2013).
The epidemiological patterns of the tinea capitis need more emphasis to determine the frequencies, distribution and contributory factors that could lead to tinea capitis disease.

The importance of this study raise from the fact that:

- The study will provide information about the extent of the problem of the study area.

- According to my knowledge there is no sufficient data available to this topic in the area of study or the rest of the state.

East of the Nile locality semi-desert area, suffering from an acute shortage of safe water supply, consequently this affects a direct impact on the deterioration of personal health of the population and thus causes the spread of disease tinea capitis (ENL, 2013).

These represent an iceberg while the burden of disease in community is unknown due to miss diagnosis and poor health information system.

Detection of any infectious cases of skin by the accompanied medical team will give warning for pupils, teaching staff, health authorities and families about epidemiology of disease and hence will help in raising awareness towards prevention and treatment of cases. This study helps families to find out the reasons for tinea capitis disease and thus help them to the prevention of disease, prevention is better than treatment.
1.3 objectives:

1.3.1 General objective:

To study the prevalence of tinea capitis among pupils in East Nile locality.

1.3.2 Specific objectives:

- To estimate the prevalence rate of tinea capitis among pupils.
- To identify the most affected age group and gender.
- To investigate the possible risk factors associated with the tinea capitis among the pupils.
1.4 Literature:

1.4.1 Superficial fungal infections:

Superficial fungal infections (dermatomycoses) are very common and occur throughout the world. Most of these infections are caused by dermatophytic moulds (the terms tinea and ringworm are synonymous with dermatomycosis). Dermatophytic infections are contagious diseases caused by either a human (anthropophagic) or animal (zoophilic) species of dermatophyte fungi (Richardson et al, 2000).

A second group of superficial infections is caused by yeasts. *Candida* species cause infections of the mucous membranes, skin and fingernails (candidiasis or thrush) and *Malassezia furfur* (*Pityrosporum orbicular*) infects the skin, usually the trunk (pityriasis vesicular). Both organisms are commensals of humans (Richardson et al, 2000).

1.4.2 Dermatophytosis:

Is a common contagious disease caused by fungi known as dermatophytes. Dermatophytes belong to a group of organisms that are able to break down the keratin in tissues such as the epidermis, hair, nails, feathers, horns and hooves. Most of these fungi reside in the soil and are involved in decomposition; however, the dermatophytes can infect living hosts. Some dermatophytes (anthropophilic species) are adapted to humans, and are usually transmitted from person to person. Others (zoophilic species) are adapted to animals. A few (geophilic) species normally live in the environment, but occasionally act as parasites. The zoophilic and geophilic species are sometimes transmitted from animals to people. It is also possible
for humans to transmit anthropophilic dermatophytes to animals, although this seems to be uncommon (Ameen, 2009).

1.4.3 Skin disorder among children:

Skin disorders are among the most frequent ailments of schoolchildren in both developing and industrialized countries. The school environment makes children vulnerable to cross transmission of communicable skin diseases among themselves and their families. Among schoolchildren, it is considered a nuisance causing much morbidity and disability (Havlickova et al, 2008).

1.4.4 Definition of tinea capitis:

A group of fungal skin diseases caused by dermatophytes of several kinds. The condition is characterized by itching, scaling, and sometimes painful lesions. tinea capitis is spread by direct contact between humans and even domestic dogs or cats. Diagnosis is made by demonstrating fungus on smear or by culture. Also called ringworm (AAP, 2012).

A fungus infection (dermatophytosis) of the keratin component of hair, skin. Genera of fungi causing such infection are Microsporum, Trichophyton, and Epidermophyton. (Havlickova et al, 2008).

A superficial infection of the skin, hair, caused by a fungus and commonly known as ringworm. (Thappa, 2002).

Fungal infection of keratinized structures (i.e. skin, hair and nails) spread by contact transmission, especially in those living in a community with shared bathing facilities; susceptibility increases with age, diabetes,
atherosclerosis, metabolic and hormonal imbalance and dyshidrosis. (Ameen, 2009).

1.4.5 Children at greatest risk:

Children under age 10 have the greatest risk for tinea capitis. Tinea capitis is an infection caused by a certain type of fungus. The risk for developing tinea capitis is especially high among African children. Dermatologists say that may be due to the popularity of certain hair products in the African children (Ameen, 2009).

Any situation where people are in close contact, such as school or an overcrowded home, will enable the infection to spread more easily. Warm places, inadequate hygiene can be a major risk factor (Ameen, 2009).

1.4.6 Public health significance:

Fungal infections of the skin and scalp represent a relatively common problem especially in the tropical and subtropical regions of the world where the warm and humid climates provide a favorable environment for organisms causing superficial mycoses (AAP, 2012).

Tinea capitis are acquired through direct contact with infected animals, they form smaller conidia of approximately 1-3µm in diameter typically extending around the exterior of the hair shaft and are transmitted by contact with infected pets or animals such as cats, dogs or cattle (AAP, 2012).

Tinea capitis is most prevalent in the tropics and is a benign, superficial fungal infection and occurs from using infected clothes, towels and bed sheets, with autoinfection being a common occurrence. It is usually
characterized by hypopigmented or hyperpigmented macules and patches on the chest and the back and in patients with a predisposition, the condition may chronically recur (AAP, 2012).

1.4.9 Epidemiology:

The prevalence of superficial mycosis infections has risen to such a level that skin mycoses now affect more than 20-25% of the world's population, making them the most frequent form of infection (Bassiri-Jahromi and Khaksari, 2009).

Some dermatophyte species appear to be homogeneously distributed worldwide whereas others showed a geographic restriction (Havlickova et al., 2008).

Although the epidemiology of tinea capitis has changed over the past 30 years, the infection remains endemic in the developing world and mainly involves anthropophilic species (Richardson et al, 2000).

Tinea capitis is now relatively uncommon in the developed world as a result of improved social conditions and the development of effective treatments. Sporadic cases of tinea capitis infection occur worldwide and are difficult to eradicate, because domestic animals, such as cats and dogs, are the primary hosts (Richardson et al, 2000).

More recently, the prevalence of tinea capitis has increased significantly, particularly in poor urban communities. The infection is more common in individuals of African descent, though the reasons for this are unclear. It is likely that both hair-care products and genetic predisposition play a role in susceptibility to this infection (Richardson et al, 2000).
There is an impression that the frequency is increasing again in the last decade, probably due to emigration and immigration, and to the easiness of international travelling. In some urban areas in North America, Central and South America, tinea capitis is widespread and is still very common in parts of Africa and India (Degreer, 2008).

As is true for most infectious diseases, the epidemiology of tinea capitis is in a constant state of flux and varies considerably with respect to geography and specific patient populations (Chen et al., 2001).

**European countries:**

Microsporum canis, a zoophilic dermatophyte, is still the most common reported causative agent of tinea capitis in Europe. The countries reporting the highest incidence of M. canis infections are mainly in the Mediterranean but also bordering countries like Austria, Hungary, Germany and Poland. Besides the increase in Microsporum-induced tinea capitis, there is a shift towards anthropophilic tinea capitis mainly in urban areas in Europe. The largest overall increase with anthropophilic dermatophytes has been noted with Trichophyton tonsurans mainly in the UK and with Trichophyton soudanense and Microsporum audouinii in France (Hanselmayer et al 2007).

Studies in the UK, Spain and Finland report prevalence rates of tinea capitis varying between 3-8 % (Hanselmayer et al 2007).

The prevalence of tinea capitis among school children in turkey is 0.1% (balci et al, 2014).

The prevalence of tinea capitis among school children in Madrid is 0.33 % (Cuétara MS et al 2007).
**U.S.A and Latin America:**

In the USA, tinea capitis is thought to occur in 2-7% of the pediatric population; up to one-third of households with contact with an infected person may harbor the disease without showing any symptoms (Richardson et al, 2000).

A recent epidemiologic observation is a striking increase in the incidence of tinea capitis, particularly among African-Americans (Chen et al, 2001).

The prevalence of skin mycosis among school children in Brazil was 19.5 % (WHO, 2005).

The prevalence of tinea capitis among children and adolescent from 1-16 years old in Honduras was 1% (WHO, 2005).

**Asian Countries:**

The prevalence of tinea capitis among school children in Nepal was 2.5 %. (Banset et al, 2001).

The prevalence of tinea capitis among primary school children in west of Iran was 2.4% (Yazdanfar, 2009).

In Singapore, tinea capitis was rare, accounting for only 4 cases out of 12,903 study of superficial fungal infections seen over 5 years. These cases were mainly caused by M.canis. The possible reasons for the low incidence of tinea capitis include better hygiene and less overcrowded living conditions, both of which are essential for the spread of the dermatophytes (Ang and Tay, 2010).
In South-East of Iran, the prevalence of tinea capitis among primary and middle School children was 5.8 % (Adel et al, 2014).

The prevalence of tinea capitis among school children in Palestine was 27 % (Shtayeh et al, 2002).

The prevalence of tinea capitis among children > 5 years old in Pakistan was 1% (WHO, 2005).

The prevalence of tinea capitis among all ages in Tanzania was 1.2% (WHO, 2005).

The prevalence of tinea capitis among school children in Taiwan was 4.2% (WHO, 2005).

The prevalence of tinea capitis among children < 12 years old in Indonesia was 7% (WHO, 2005).

**Developing countries:**

Studies from developing countries reported high prevalence of skin disorders among school children, the spectrum of which has been highly variable. In a review of prevalence studies among children by WHO, the prevalence of skin diseases ranging from 21% to 87% has been documented (Komba and Mgonda, 2010).

In Africa, however, tinea capitis continues to be an important public health problem, where it has been reported to affect 10% to 30% of school-aged children (Carod et al., 2011).

In Nigeria the prevalence of tinea capitis among school children was 40.0% (sehu et al, 2014).
In Ethiopia the prevalence of tinea capitis among school children is 33.9% (Ali J et al, 2009).

In Gambia the prevalence of tinea capitis was 2.8% in wet reason, and 4.6% in dry reason (WHO, 2005).

In Mali the prevalence of tinea capitis among school children and adolescent < 18 years old was 9.5% (WHO, 2005).

In Kenya the prevalence of tinea capitis among children 3-17 years old was 7.8% (WHO, 2005).

1.4.10 Causative agents:

Pathogens responsible for skin mycoses are primarily anthropophilic and zoophilic dermatophytes from the genera Trichophyton (T.), Microsporum (M.) and Epidermophyton (E.). There appears to be considerable inter- and intra-continental variability in the global incidence of these fungal infections. Trichophyton rubrum, T. interdigitale (mentagrophytes var. interdigitale), M. canis, M. audouinii, T. tonsurans and T. verrucosum are the most common among the world (Havlickova et al, 2008).

Dermatophytes are keratinophilic fungi that can invade the stratum corneum of the skin and other keratin-containing tissues. They have 3 main reservoirs: humans (anthropophilic), animals (zoophilic), and the earth (geophilic or telluric). Although geophilic dermatophytes are found throughout the world, the anthropophilic and some zoophilic species may be geographically restricted. The predominant organisms vary according to the geographic region and it is often difficult to determine the precise distribution of a particular dermatophyte. Consequently, the causative agents
in tinea capitis have not been investigated in many parts of the world, and the agents responsible for dermatophytosis tend only to be identified in regions where there are laboratories to perform the mycologic studies. Tinea capitis is a classic example of the changing geographic patterns of dermatophytosis during the late 19th and early 20th century. Microsporum audouinii and M canis were the main causative agents of the disease in Western Europe and the Mediterranean, while Trichophyton schoenleinii predominated in Eastern Europe, and now both have almost disappeared. The geographic distribution and prevalence vary as a result of factors such as climate and migration, among others (Rebollo et al, 2008).

1.4.10.1 Life cycles:

Tinea capitis is skin fungal infection called Dermatophtes (they are fungi that cause, skin hair Dermatophytes infect the top layer of skin. They only live on places where they can eat dead cells, not living ones (Denial, 2009).

Dermatophtes enter the skin through cuts and tears. When they enter they begin to infect skin cells. They produce in the way of spores. These spores can live a few years on surfaces. Tinea capitis is very common because it very contagious and can be transmitted through direct contact with infected skin or non-direct contact, like socks bathroom floors and other floors where the fungus is present (Denial, 2009).

Tinea capitis like to live and grow in warm dark moist areas. These conditions let it multiply and infect the skin (Denial, 2009).
Tinea capitis produces asexual spores called conidia. As the skin cells slough off, they carry the conidia with them. The conidia are able to survive for years, waiting for new skin to infect (Denial, 2009).

1.4.10.2 Incubation Period:
- **Time of period in human:**
  Usually four to 10 days for the body; usually 10 to 14 days to appearance tinea capitis (IDPH.2002).
- **Time of period in pets:**
  Tinea capitis can appear on the wool within 7 days of exposure, and clinical signs can develop within 2 to 4 weeks (UOFLS, 2005).

1.4.10.3 Mode of Transmission:

Tinea capitis can transmitted by direct skin or scalp contact or indirect contact with items or materials contaminated with fungus from skin, scalp or hairs, e.g., theater seats, barber clippers, combs, brushes, hats, and clothing. The same fungi that infect humans can also infect animals such as dogs and cats and infections can be acquired from pets and farm animals(Yu et al, 2005).

It may be transmitted by the shared use of contaminated hairbrushes, by contact with fomites or by direct physical contact with an infected person (Yu et al, 2005).

However, animals account for less than 10 percent of cases; some animals, especially cats, may be unapparent carriers (AAP, 2012).

Anthropophilic organisms are responsible for most fungal skin infections. Transmission can occur by direct contact or from exposure to
desquamated cells. Direct inoculation through breaks in the skin occurs more often in persons with depressed cell-mediated immunity (AAP, 2012).

Once fungi enter the skin, they germinate and invade the superficial skin layers (Hainer, 2003).

Human infection caused by M.canis may occur by direct contact with infected animals or with their hair (Dobrowalska et al, 2011).

Microsporum canis infections were also reported in humans who did not have a history of exposure to animals, which suggests that the infection may be spread indirectly from other humans colonized with the fungus or by contact with arthrospores that have contaminated object such as grooming equipment, furniture or environment (Weitzman and Summerbell, 2005).

It is explained that the increase in M.canis infection resulted from buying domestic animals like cats, dogs, hamsters which can be a source of infection of this dermatophyte. The infection agents are arthrospores, which are asexual spores (present in the parasitic state of M.canis) formed by segmentation of the fungal hyphae. Sexual spores are absent in the parasitic phase (Sparkers et al, 2000).

However, these three groups are not always sharply demarcated. Species that are clearly geophilic may contaminate or infect the coats of animals, especially small rodents, and may thus infect humans through an intermediate animal host (Hay and Ashbee, 2010).

Similarly, animal species may shed infective material on to the soil and, although incapable of multiplying there, fungal elements may survive long enough to be isolated in a soil survey. In the case of species affecting farm animals, their environment, cow sheds and fences may be contaminated
by desquamated keratinocytes or hair containing fungal spores, just as the floors around swimming baths, school classrooms and the air of hospital clinics may be contaminated by anthropophilic species (Hay and Ashbee, 2010).

1.4.10.4 Pathology:

From the site of inoculation, the fungus grows down into the stratum corneum, where it invades keratin. Dermatophytes are unique in that they produce keratinase, which enables them to use keratin as a nutrient source. Infected hairs become brittle, and after three weeks, the clinical presentation of broken hairs is evident (denial, 2009).

There are three types of infection:

Ectothrix: Characterized by the growth of fungal spores (arthroconidia) on the exterior of the hair shaft. Infected hairs usually fluoresce greenish-yellow under a Wood lamp. Associated with Microsporum canis, Microsporum gypseum, Trichophyton equinum, and Trichophyton verrucosum (Denial, 2009).

Endothrix: Similar to ectothrix, but characterized by arthroconidia restricted to the hair shaft, and restricted to anthropophilic bacteria. The cuticle of the hair remains intact and clinically this type does not have florescence. Associated with Trichophyton tonsurans and Trichophyton violaceum, which are anthropophilic (Denial, 2009).

Favus: Causes crusting on the surface of the skin, combined with hair loss. Associated with Trichophyton schoenleini (Denial, 2009).

1.4.10.5 Early Signs and Symptoms:
**In human:**

Tinea capitis is a reddish, ring like rash that is often itchy or flaky but may be moist and crusted and may burn; the central area often clears as it progresses. Tinea capitis of the scalp may leave scaly, balding patches with broken-off hairs that can slowly spread; raised pus-containing lesions develop occasionally (IDPH.2002).

**In pets:**

Dermatophytes usually grow only in keratinized tissues such as hair, nails and the outer layer of skin; the fungus stops spreading where it contacts living cells or areas of inflammation. Mucus membranes are not affected (UOFLS, 2005).

Dermatophyte lesions in animals are characterized by areas with varying degrees of alopecia, scaling, crusts and erythema, and may or may not be pruritic. Hairs in the affected area are usually brittle and break near the skin surface, often giving the lesion a “shaved” appearance; truncated hair shafts may be seen through the scales and crusts. Occasionally, dermatophytes may die at the center of a lesion and that area resolves, leaving a circular lesion with central crusts or hair regrowth. Some degree of folliculitis occurs in most cases; papules or pustules involving the hair follicle or conical dilation of the hair follicle ostium are suggestive of dermatophytosis in small animals. Asymptomatic infections are also common, particularly in adult animals (UOFLS, 2005).

**1.4.11 Environmental factors:**

All fungi need warm, moist environments and tinea is no exception. This is why the hottest, most sweat-prone areas of the body are the most
likely areas for a tinea infection to occur. Communal showers and locker rooms are typical places where infection may be spread (Yu, 2005).

Superficial fungi can be classified according to their usual habitat into anthropophilic, zoophilic and geophilic organisms. Generally, anthropophilic fungi cause superficial dermatomycoses characterised by relatively low inflammatory activity because of an immunological arrangement that exists between the fungus and its human host (Havlickova et al, 2008).

Household dust may act as a reservoir of antropophilic dermatophytes, preserving dermatophyte spores for years (Havlickova et al, 2008).

Geophilic fungi grow in the soil and only sporadically infect humans. When they do, the result varies from high to low inflammation. Strains of Microsporum gypseum, the most common geophilic pathogen, cultured from humans are more virulent than those from the soil, accounting for occasional epidemic spread under appropriate conditions. There are approximately 100 000 species of fungi distributed worldwide. The majority of fungal infections seen in both temperate and tropical countries are superficial infections of the skin. The most common pathogens relevant in practice are dermatophytes, yeasts and moulds (Havlickova et al, 2008).

Tinea infections are contagious. Most common infections occur with certain species of fungi that grow in crowded living conditions and warm, damp environments. The fungus can contaminate hairbrushes, clothing, towels and the backs of seats. They can live for long periods of time in the environment and therefore infection can occur many months later. It can also occur due to direct contact with an infected animal, including household
pets, but these infections are not generally passed from one person to another (BAD, 2014).

1.4.12 Host agents:

- **Age:**

  The incidence of tinea capitis is still unknown, but it is most commonly found in children aged 3 to 14 years old. It is uncommon in adults (Richardson et al, 2000).

  Another study in west Iran showed that, the most mycologically positive cases with tinea capitis are among 7 year old and then 8 year old students, respectively (Yazdanfar, 2010).

  A study in Nigeria showed that, the prevalence of tinea capitis among children between the ages of 7-9 years have the highest percentage of 80.0% while children between the ages of 10-12 years of age have 20.0% of prevalence and children between the ages of 4-6 years shows no sign of the infection as the prevalence was 0.00% (Shehu et al, 2014).

- **Gender:**

  Tinea capitis may be common in boys due to shorter hair, allowing easy access for circulating spores (Friedlander et al, 2003).

  A study in India showed that, tinea capitis among males (61.8%) more than female (38.9%), which was statistically significant (P > 5) (WHO, 2000)
- **Affected species:**

  Tineacapitis is found in animals, but are also sporadically transmitted to humans by cattle’s, goats, sheep’s and cats. Tinea capitis can be referred to as cuddly toy mycoses (because of the mode of infection in children and adolescents) and have a high affinity to the skin and hairy head of a child. They are associated with highly inflammatory and potentially highly contagious skin infections (Richardson, 2003).

  There are approximately 40 different species of dermatophytes, characterised by their capability to digest keratin and divided among three genera: Trichophyton, Microsporum and Epidermophyton. A majority of superficial fungal infections of the skin are caused by five or six species of dermatophyte, of which Trichophytonrubrum is the most common (Richardson, 2003).

  All domesticated mammals are susceptible to dermatophytes. Wildlife can also be affected. The most common agents vary with the host and the geographic region, and may also be affected by management practices (e.g., whether animals can contact other species). Overall, the most common dermatophytes in domesticated mammals are M. canis, M. gypseum, T. mentagrophytes, T. verrucosum, T. equinum and (in pigs) M. nanum.

  Birds can also be affected by some organisms, such as M. gallinae and T. mentagrophytes(UOFLS, 2005).

  Reptiles are not usually affected by the dermatophytes of mammals or birds; however, rare clinical cases associated with Trichophyton spp. have been reported in lizards, snakes (green anacondas, Eunectes murinus) and an olive sea turtle (Lepidochelys olivacea). One case report in iguanas
identified the species as T. interdigitale, possibly of anthropophilic origin (UOFLS, 2005).

- **Susceptibility and resistance:**

  Tinea capitis can affect any person of any age but males are more susceptible to this condition as compared to females. Children aged 3 to 7 years are at the greatest risk as they are more prone to contact with others with the infection (Thappa, 2002).

  People with low immunity like those suffering from chronic diseases such as diabetes and HIV also have higher chances of getting this disease (Thappa, 2002).

  The dryness of the skin’s outer layer discourages colonization by microorganisms, and the shedding of epidermal cells keeps many microbes from establishing residence (Hirschmann, 2001).

  However, the skin’s mechanisms of protection may fail because of trauma, irritation, or maceration. Furthermore, occlusion of the skin with nonporous materials can interfere with the skin’s barrier function by increasing local temperature and hydration (Martin and Kobayashi).

  With inhibition or failure of the skin’s protective mechanisms, cutaneous infection may occur (Hainer, 2003).

- **Certain factors make pets more susceptible to tinea capitis infection:**

  1) Young animals are more easily infected for tinea capitis is unusual in sheep over one year of age.

  2) Poor nutrition increases the likelihood of tinea capitis infection.
3) Animals that have not had tinea capitis before are more likely to catch it.

4) Animals kept in the same pen with infected animals are more likely to catch tinea capitis.

5) Animals kept in dark, damp, warm, and poorly ventilated places become infected more easily.

6) The use of clippers, brushes, and blankets on different animals without disinfection will spread this disease.

7) Sheep in contact with infected cattle can get this disease.

8) Washing lambs frequently will remove normal skin bacteria and lanolin, and make these lambs more susceptible to ringworm.

9) It is likely that the increase in tinea capitis that we have experienced can be associated with extremely close shearing which causes skin irritation allowing the fungus a way to get into the skin.

10) Flies may spread tinea capitis (Hunt, 2009).

1.4.13 Risk factors associated with tinea capitis:

Factors affecting disease transmission are personal hygiene, overcrowding and low socioeconomic status. Organisms responsible for tinea capitis have been cultured from fomites such as combs, caps, pillowcases, toys and theatre seats. Even after shedding, hairs may harbor infectious agents for more than one year. Asymptomatic carriers are common, making tinea capitis difficult to eradicate (Pomeranz and Sabins, 2002).

- Education of parents:
WHO mentioned that the prevalence of tinea capitis was associated with education of parents, the prevalence high among those their parents had the low level of education or illiterate (WHO, 2000).

- **Occupation of parents:**

  Occupation of parents consider as factor associated with tinea capitis. Many studies confirm this fact. A study was carried out in South Nigeria shows that children with T. capitis were have farmers and fishermen as parent, while the parents of the control population were likely to be civil servants and self-employed individuals (Akinboro, 2011).

- **Overcrowding:**

  The study in Kansas United States shows that highly populated areas sustain a relatively high rate of tinea capitis infection (Abdel-Rahman et al., 2010).

  The high rates of infection observed among black children are reinforced in heavily populated, black communities where the organism is endemic (Abdel-Rahman et al, 2010).

  The study of WHO in Iran shows that slightly over half positive cases 67 (55.8%) were found in children live in crowded condition of more than three persons per room the remaining 53 (44.2%) lived in less crowding (WHO, 2000).

- **Pets:**

  The study of WHO in Iran showed that, history of animals contact was found in 99 (82.5%) of the clinically diagnosis positive cases of whom 49
(49.5%) had contact with more than one type of animals (cattle, sheep, dog, chicken)(WHO, 2000).

A study was carried out in Turkey among children, the study showed that the high prevalence of tinea capitis was higher among students have animal husbandry than those have not animal husbandry (Balci et al, 2014).

Another study was conducted in Nigeria among children shows that Majority of the children with T. capitis had significant animal contact, 166 (89.7%) than the children in the control group, 105 (56.8%). The existed difference was statistically significant. (P = 0.000). (Akinboro, 2011).

- **Poor Personal hygiene:**

  The study in south –East of Iran shows that taking frequent showers at least twice a week, and using healthy water demonstrated to have role in preventing Tinea capitis. (Adel at al 2011)

- **Low awareness toward tinea capitis:**

  The study in Nepal shows that a barbershop was the venue of haircuts for 71.1% of the urban children; while 71.4% of the rural population had haircuts at home. Statistical association was observed significantly between the place of haircut, and isolation of organism (P<0.01) (Basnet, 2001).

  The study of WHO in Iran shows that habit of hat sharing in customary was 30(25%) and cases and 86(71.7%) children has history of bed sharing(WHO, 2000).

- **Demographic, social factors related with tinea capitis:**
Studies in Europe, Asia and Africa indicate that anthropophilic agents of tinea capitis infections are being eradicated in developed nations and are now more typical of countries with low socio-economic status (Havlickova et al. 2008).

In tropical and subtropical countries, infectious diseases of the skin are not just more prevalent than in central Europe; they are more frequent and more distinctive. This is particularly true for certain areas in Asia (especially India) and for the whole continent of Africa. Socio-economic conditions tend to be poorer than in Europe and the Americas and there are more problems with diagnosis and therapy, but most of all, the humid and warm climatic conditions encourage the extensive skin mycoses. In Africa, a large number of HIV infections favour certain fungal infections by reducing the cellular immunity needed in the defence against Fungi (Havlickova et al. 2008).

The prevalence of tinea capitis is closely related to socioeconomic status and life style and commonly occur under poor hygienic conditions (Chen et al., 2001).

Living conditions, large family size and close contact, either directly or by sharing facilities, including combs and towels, is common between family members in low socioeconomic areas (Bassiri-Jahromi and Khaksar, 2009).

Tinea capitis has decreased in developed countries, while it presents a high prevalence in developing countries (Perez-Gonzalez et al., 2009).

A correlation between low socioeconomic status and the presence of tinea capitis has been suggested, although the disease can be present in every social class, sometimes at very high rates; while the mean duration of tinea
capitis in children in urban Bangladesh was significantly shorter in families with the highest income, prevalence in that group was still 26% (WHO, 2005).

Homeless people in developed countries have specific problems predisposing them to infectious diseases (Raoult et al. 2001).

Skin problems are the main reason the homeless seek medical attention, and these commonly include scabies, pediculosis, tinea capitis infections, and impetigo (Raoult et al. 2001).

The lack of personal hygiene and clean clothes often leads to infestations with funguses and the development of associated skin conditions (Raoult et al. 2001).

Skin diseases are very common in many tropical countries among adolescents, skin diseases in any community is influenced by genetic constitution, climate, socioeconomic status, occupation, education, hygiene, standards, customs and quality of medical care (WHO, 2013).

- **Climate and water factors:**

  Three main factors have been generally incriminated to explain the high prevalence and incidence of common skin diseases in developing areas: a low level of hygiene, including difficulties in access to water and climatic factors (WHO, 2005).

  A hot climate, especially if humid, is a classical predisposing factor to the development of tinea capitis. In Colombia, the prevalence of tinea capitis in children was 5.2% in the more temperate area, and was found to increase as the weather became hotter and more humid: 12.2% in the subtropical zone and 26.8% in the tropical zone (WHO, 2005).

  In rural India, the maximum incidence of tinea capitis in health centers was during the summer, where the number of cases nearly tripled compared to
winter. In rural Pakistan, the monthly incidence rate of tinea capitis was 2.1 during temperate months against 6.9 during the warm months (WHO, 2005).

In an economically deprived black population in southern United States of America, the incidence of tinea capitis in children aged 2-6 years was found to reach 15% during humid summer months vs 4% in winter (WHO, 2005).

In rural Gambia the examination of the same community showed a prevalence of tinea capitis of 8.9% during the wet season vs 7.2% in the dry season; this seasonal difference was much more marked in children under 10 years of age (WHO, 2005).

All skin disorders were generally grouped together in accordance with their classical “water-related” character, irrespective of eventual differences according to the type of skin disorder. According to one study, the individual amount of water used for washing might be more important than its quality, considering its role in tinea capitis (WHO, 2005).

More recently, a convincing study in Aboriginal Australian communities, where baseline prevalence and incidence of tinea capitis are known to be particularly high, found that providing access to swimming pools was followed by a marked decrease in the prevalence of tinea capitis in children under 17 years old (e.g. from 62% to 18% in one targeted community), which suggests that, like hygiene to which it is strongly linked, use of water plays a role mainly for this disorder (WHO, 2005).

1.4.14 Laboratory diagnosis:

Skin scraping – choose the active margin, collect scale with color paper, (dry up the oily or wet skin with alcohol or ether in the old days before scraping), then can send to laboratory (HKSID, 2008).

• Hair plugging (NOT cutting) – choose the short broken hair (mostly likely found in the margin of bald patch), can be guided by Wood’s light, sample with specific brush (HKSID, 2008).

• Nail clipping – scrape the subungual hyperkeratosis proximal as possible, maximum amount of disease nail material, may use a small punch biopsy needle to sample in proximal subungual onychomycosis, scraping of the nail surface in superficial white onychomycosis.

• Wet mount – dissolve the
keratin material with KOH, direct examination with or without stain (e.g. Parker stain) [Sn12% & Sp 93%](HKSID, 2008).

- Culture with Sabouraudagar (if mould [non-dermatophyte filamentous fungi] infection is suspected, culture without cycloheximide is required) (HKSID, 2008).

- Nail clipping for histology (with special stain) can be performed in those persistent culture negative cases (with clinical features of fungal infection) (HKSID, 2008).

Species identification is particularly important in tinea capitis: infection caused by zoophilic fungi will prompt an investigation on the pets whereas infection by anthropophilic fungi may prompt an investigation for human to human transmission (such as institutional outbreak) (HKSID, 2008).

Some laboratories have the tendency to report any positive results including non-dermatophyte filamentous fungi and other mold. Most non-dermatophyte filamentous fungi or mold are not pathogenic (innocent bystanders). Not all laboratories inoculate samples to agar with or without cycloheximide and therefore easy to produce positive results (may be reported as positive for fungal elements or nomenclature of fungal species) (HKSID, 2008).

### 1.4.15 Treatment:

Dermatophyte infections are treated with a variety of topical and oral antifungal drugs (like: fluconazole, iconazol, clotrazol, qreasol, qreafolvine).

In immunocompetent patients, topical agents are usually effective in cases that are limited to glabrous skin. Systemic (oral) antifungal drugs may be necessary in severe cases, or if the infection does not respond to treatment or reappears (Richardson et al, 2011).

Topical agents are ineffective against organisms that infect the hairs. These infections are usually treated with systemic antifungals, although topical lotions or shampoos are sometimes used concurrently to decrease shedding.
of fungi and spores, or to help treat kerions. Topical agents may also be used to treat asymptomatic carriers or prevent reinfection. Tinea is reported to be more difficult to treat when it is caused by M. canis than Trichophyton spp. and may not respond as well to some drugs (Richardson et al., 2011).

Treatment should consider sources of reinfection, such as pets, family members or other close contacts. Some authors suggest treating all family members when the case is caused by certain anthropophilic organisms (Richardson et al., 2011).

1.4.16 Prevention:

- **In human:**

  Prevention of tinea capitis involves avoiding contact with infectious material. Basic prevention measures include:

  - Wash hands after handling animals, soil, and plants.
  - Avoid touching characteristic lesions on other people.
  - Wear loose-fitting clothing.
  - Cover exercise equipment with a towel to prevent contact with exposed skin.
  - Practice good hygiene when participation in sports involves physical contact with other affected people or animals (Richardson, 2000).

- **In pets:**

  Controlling dermatophytes in animals can prevent some cases of zoonotic dermatophytosis in humans. Infected animals should be treated, and the
premises and fomites cleaned and disinfected as much as possible. (Some environments can be difficult to decontaminate.) Contact with infected animals should be limited, and gloves and protective clothing should be used if these animals are handled.

Better surveillance, improved living conditions and improved treatments can decrease the overall prevalence of anthropophilic dermatophytes, while hygiene, and prevention of contact are helpful in individual cases. Measures such as moisture control (e.g., in tinea) are important in reducing susceptibility to some forms of tinea capitis (UOFLS, 2005).

**1.4.17 Hand washing:**

**Why:**

Thousands of people die every day around the world from infections acquired while receiving health care.

- Hands are the main pathways of germ transmission during health care.

- Hand hygiene is therefore the most important measure to avoid the transmission of harmful germs and prevent health care-associated infections (WHO, 2009).

**Who:**

When hands are visibly dirty or after using the toilet.

- If exposure to potential spore-forming pathogens is strongly suspected or proven, including outbreaks of Clostridium difficult, hand washing with soap and water is the preferred means (WHO, 2009).

**1.4.18 Best Practices for Preventing Skin Infections in schools:**
What can schools do to prevent skin infections?

- Environmental surfaces should be cleaned and disinfected on a regular basis
- Repair or discard equipment with damaged surfaces
- Cover treatment tables
- Wash towels and clothing with laundry detergent and hot water (min 160 degrees)

What can student-athletes do to prevent skin infections?

- Report any skin lesions or sores to the appropriate adults
- Have rashes or sores examined by appropriate health care provider
- Wash hands, towels, uniforms, and clothing frequently
- Shower before and after practice
- Do not share deodorant, lotions, ointments, gels, or creams (APHA, 2008).

1.4.19 Role health education in control of tinea capitis:

Health education helps students to attain health knowledge and skills that are vital to success in school and the work place such as setting personal health goals, resolving conflicts, solving complex problem, and communicating effectively In the prevention and control of man-made disease, human behavior could be influenced by health workers, political or religious leaders in the community, school teachers, etc. by means of conversations, visual presentation, small theatre plays, and storytelling and so on(UNESCO, 2010).
The age group between 5 and 20 is especially important in health education. The children were easy to reach through schools' services and their ability and willingness to learn are better than in other groups (UNESCO, 2010).

Health education is an educational process from which participants of people positively in solving their health problems, because School is an educational institution that holds the community's task of education and raising up of pupils toward Perceptual, ability to save, observance of laws and regulations subsequently. Health education programs are so important to pupils in schools, this program must contain: Queue messages, health exhibition, wall newspapers, lectures, and viewing videos (MOH, 2013).

This study intended to evaluate the effect of health education programs on healthy behavior and tinea in Chabahar primary school-aged boys. Patients and methods: For this quasi-experimental (case–control) study, two primary schools were randomly selected in Chabahar, south-eastern of Iran. Initial data of 115 students were gathered using a well-prepared questionnaire, by means of a checklist and a thorough clinical examination. Meanwhile, scalp and hair samples (direct slide exam and culture) were assessed. Subjects of the experimental (case) group had received necessary educations for one month after which both groups were evaluated 2 months later. Results: Totally, 20% and 18.3% of cases and controls were infected before conducting the educational program, respectively, however, following the education only 5.5% of cases were remained infected (p=0.008). Pre- and post-education infection rate did not differ significantly. Conclusion: Our results showed that health education program had a positive effect on reduction of tinea capitis among prepubescent boys. (Sadat et al, 2010).
1.4.20 previous studies:

A study was conducted to determine the prevalence of tinea capitis in primary and middle schools students in Sistan and Bluchestan. The study showed the prevalence wad 5.3% (110/2060), also the study revealed that, the prevalence of tinea capitis in the rural schools students was significantly more than that in the urban students. The infection rate in male was also significantly more than that in female. Education level of parents, taking frequent showers at least twice a week, and using healthy water demonstrated to have role in preventing Tinea capitis (Adel et al, 2011).

Other study was carried out in Hamedan to determine the prevalence and etiologic agents of tinea capitis among school children. the cases were divided in three areas according to economic, social and cultural level in poor, medium and rich. the results showed the incidence rate of tinea capitis among these cases were 1.11%, the highest rate (1.82%) in poor area, the lowest rate (0.17%) in rich area. the study showed the highest incidence rate of mycologically positive cases was 7 years old then 8 year’s old. the incidence of tinea capitis in crowded families > 5 is more than uncrowded families < 5, it is proved that there is a direct relation between tinea capitis and the number of the family member’s (Yazdarnfar, 2010).

Another study conducted to evaluate the prevalence of tinea capitis in children, among the patients attending El-Sheikh Zaid dermatology center, Ismailia governorate, this has got an average new outpatient turnover of 2000-3000 per year. Methods: During the period of 2010–2011, a prospective cross sectional study was carried out in 56 children between the
age’s 2 and 10 years. Examination of the scalp was performed to identify lesions compatible with tinea capitis. Cultures of hair samples were done, then microscopical examination were performed for dermatophyte isolates. Dermatophytes isolated from collected samples were higher in male 43 (82.7%) than female 9 (17.3%). Demonstrated that the prevalence rate of T. capitis was higher in children with a low socioeconomic profile (low standard of living, poor hygiene, low level of parental education and overcrowded living Conditions) (M. Azab, 2012).

The Investigations were carried out on incidence of tinea capitis infection among primary school children in Runjin sambo area of Sokoto state, Nigeria. Two methods of identification were used for this study microscopy and culture method. The result from our finding showed that 40.0% of the children were found to be infected by the disease. the infection was common among the male than the females and found to be frequent among children between the ages of 7 - 10 years. The sources of infection among the school children in this area were found to be the soil and domestic animals. The children and their teachers were not aware of the existence of disease; hence infected children represent a persistent and hidden source of infection. Conclusively, personal cleanness and health education should be mounted in the study area as preventive measures (Shehu et al 2014).

Another study was conducted in Osogbo, South Western Nigeria to know the pattern, risk factors and clinico-aetiological correlate of tinea capitis among children. the study showed that among 370 children, tinea capitis was prevalent among the boys than the girls, the overall prevalence among the boys was (30.82%), and among girls was (12.7). the study showed that, the
highest prevalence among age group 5-8 years, followed by age group 9-12 year and least among age group 13-16 years. the study showed the , the frequent contact with goat and other animals being kept for commercial purposes was highest among children with tinea capitis. the majority of the parents of children with T. capitis group were predominantly farmers and fisher men (Akinboro et al, 2011).

A study intends to evaluate the effect of health education program on healthy behavior and tinea in Chabahar primary school-aged boys. Patients and methods: For this quasi-experimental (case–control) study, two primary schools were randomly selected in Chabahar, south-eastern of Iran. Initial data of 115 students were gathered using a well-prepared questionnaire, by means of a check list and a thorough clinical examination. Meanwhile, scalp and hair samples (direct slide exam and culture) were assessed. Subjects of the experimental (case) group had received necessary educations for one month after which both groups were evaluated 2 months later. Results: Totally, 20% and 18.3% of cases and controls were infected before conducting the educational program, respectively, however, following the education only 5.5% of cases were remained infected (P. value = 0.008). Pre-and post-education infection rate did not differ significantly. Conclusion: Our results showed that health education program had a positive effect on reduction of tinea capitis among prepubescent boys (Sadat et al, 2010).

This study Conducted to study the tinea capitis in Nepal, 428 children were selected, 102 had clinical features suggestive of tinea capitis however the organism was isolated in 11 cases. The prevalence of tinea capitis infection
confirmed both by clinical features and by hairbrush culture in the child population was 2.6%; 2.3% in urban and 3.0 % rural population. The mean age of the 102 sampled children was 9 years 9 months. There was no urban-rural difference in mean age. The number of family members and siblings and also the family set up did not vary so much in the two set ups. Nine out of the 11 total positive subjects were under the age of 12 years(Basnet et al 2001).

All the positive patients had more than 5 family members and larger families were strongly related with the presence of disease . Mothers were predominantly housewives in both the urban and rural settings. None of the urban mothers were farmers however 10 of the rural mothers were farmers by occupation(Basnet et al 2001).

In Nepal there is the traditional habit of using caps by males. None of the positive cases in our study used cap in their daily lives. Barbershop was the venue of haircuts for 71.1% of the urban children; while 71.4% of the rural population had haircuts at home. Statistical association was observed significantly between the place of haircut, and isolation of the organism (\(P<0.01\)) (Table 3). 100% of the urban school children combed their hair every day, however only 81.6% combed daily among rural school children(Basnet et al 2001).

Children who combed daily, 83.0% used a common comb among family members. Among the rural children, 59.2% shared the comb within the family. The sharing of comb was significantly associated with the culture positive cases associated (\(P<0.01\))(Basnet et al 2001).
Statistical association was observed between frequency (more or less than 3 times per week) of bathing and isolation (P<0.01). Tap water was the source of water for hair wash in 71.7% of the urban and 51.9% of the rural children (Basnet et al. 2001).

While 19.2% of the rural children used pond water for bathing purposes, pond water was not used at all by the urban school population. There was awareness of hair cleansing in 98.1% and 81.6% of urban and rural school children, respectively. Seven children out of the 102 did not use hair oil. Mustard oil was used by 54.7% of the urban children and 87.8% of the rural child population (Basnet et al. 2001).

A study was conducted in Turkey to study the prevalence and risk factors of tinea capitis pedis in school children. A total of 8122 elementary schools children including 4032 (49.6%) boys and 4090 (50.4%) girls. The study showed the prevalence of tinea capitis (0.1%). Of those 9 (.115) were diagnosed as culture-positive tinea capitis. The results showed the tinea capitis in children having unemployed fathers (5/1717) was higher than for those whose fathers were employed (4/5339 (p=0.003). Tinea capitis in male gender (9/4032) was higher than for those in female gender (0/4090) (p=0.003). Tinea capitis in students having animal husbandry (8/3400) was higher than for those no having animal husbandry (1/4722) (p<0.003). Children getting education in rural areas were more likely to present with tinea capitis (8/2643) than children in urban areas (2/54790 (p<0.004) (Balci et al. 2014).
2. Materials and methods:

2.1 Study design:

This is a descriptive cross-sectional community based study. It was conducted with an objective, to study the prevalence of tinea capitis among pupils in East Nile locality-Khartoum State, 2014.

2.2 Study area:

3.2.1 Location:
East Nile locality is located in Khartoum state. Bordered from the east with Gedaref state and from the west Bahry locality and from the south by Gezira State and from the north by the Nahr alnil State. (Appendix 4)

Size of area is $82 \text{ km}^2$. It has 7 administrative units (wadi soba, abodleg, alilafon, wadabsalih, omdwaban, alhajwosif, alisylate)

2.2.2 Climatic conditions:

Climate is Semi–desert. The rainy season starts in the middle July and ends in October. The winter season characterized by dry cool but in the summer season characterized by higher temperature may reach up to 45 degrees centigrade.

2.2.3 Types of buildings:

In East Nile Locality, bulks of houses are built up with local material as well as mud and sometimes are made of bricks and cement.

2.2.4 Populations:

Number of people residing in the area are (956030) people, from different parts of the country, most of them are from tribes of central Sudan, like Albatahen, Alshokrea, Almasalamia, Algaleen. Number of pupils in the area (109313).

2.2.5 Health services:

Health facilities are 6 hospitals, 16 health centers, 52 dispensaries, and sometimes mobile clinic, supported by national and international health organizations.

3-2-6 Educational services:
The educational services consist of 286 Basic Schools, 89 Secondary schools, 21 Khalwa, 441 Centres for pre-school education.

3-2-7 Environmental sanitation:

3-2-7-1 Solid waste:

Majority of the inhabitants disposed their waste in open areas and others thrown in the streets.

Rarely solid waste collected by donkey cars and then burned.

Urban areas sanitation being by Project cleanliness of Khartoum State.

3-2-7-2 Liquid waste:

The sanitation in the area depends, mainly on conventional pit latrines; they are use pit latrine for liquid waste.

3-2-8 Water supply:

The population of this area depends on boreholes for water supply.

3-2-9 Economic activities:

The main occupations among the population of this area include:

Unskilled labors, Labors, posters, farmers.

Very small percentages are employees in both public and private sector.

(East Nile Locality 2014)

3-3 Study population:-
The study populations were pupils in schools of East Nile Locality, Khartoum state -2014. Population sample covered 600 pupils from 109313 in East Nile Locality, Khartoum state -2014.

3-4 Sample frame:

The frame includes all pupils in schools of East-Nile locality, Khartoum state, June -2014

Sample size and technique:

The sample size was determined using the following formula:

\[ n = \frac{z^2 \cdot p \cdot q}{d^2 \cdot \text{deff}} \]

Where \( z \) is the value of the standard normal variable corresponding to 95% confidence level.

\( z = \) the value in normal curve corresponding to level of confidence 95% = 1.96.

\( P=0.03 \) (previous prevalence).
\( q=0.97(1-P) \).
\( d: \) is a margin of error (\( d = 0.02 \))

According to the above formula the sample size was 559 .

Three administrative units were selected from seven administrative units by Cluster sample using convenient method, in all stages the selection was by proportional allocation. The selection of the final sample was done by systematic sample.

The clusters were selected according to the following procedure

Firstly construct accumulative table as follows:
<table>
<thead>
<tr>
<th>Administrative unit</th>
<th>Number of population (pupils)</th>
<th>Accumulative table</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wadi soba</td>
<td>20.822</td>
<td>22.822</td>
</tr>
<tr>
<td>Om dawanban</td>
<td>7.675</td>
<td>28.497</td>
</tr>
<tr>
<td>Al-esylat</td>
<td>6.664</td>
<td>35.161</td>
</tr>
<tr>
<td>* Abo delaig</td>
<td>8.764</td>
<td>43.925</td>
</tr>
<tr>
<td>Al-Ailafon</td>
<td>11.876</td>
<td>55.801</td>
</tr>
<tr>
<td>*Alhaj yousif</td>
<td>43.863</td>
<td>99.664</td>
</tr>
<tr>
<td>* Wad ab salih</td>
<td>9.649</td>
<td>109.313</td>
</tr>
</tbody>
</table>

Secondly calculate a systematic factor as follows

\[ K = \frac{109.313}{3} = 36.437 \]

Then from a random digit table we selected the first five numbers which is 37.102

The first administrative unit enters the sample is Abo delaig administrative unit.

After the addition of constant \( K \) for 37.102:

\[ 37.102 + 36.437 = 72.539 \]
The second administrative unit enters the sample is Alhaj yousif administrative unit.

After the addition of constant K for 72.539:

72.539+36.437= 108.976

The third administrative unit enters the sample is Wad ab salih administrative unit.

After that selected two schools from each of Wad abo salih and Abo delaig administrative units (one for girls and one for boys) and selected eight schools from Alhaj yousif administrative unit by above process (cluster sample).

After that selected four classes from schools by cluster sample also.

After that selected pupils from classes by systematic sample.

3-5 Methods of data collection:
Data were collected using the following tools:

A. questionnaire:

A questionnaire was formulated and pre-tested in the study area to ensure full understanding of the questions by the target population.
The questionnaire include personal, social and economic situation pupil’s families in East Nile locality (Appendix 1)

B. Structured interview:
Interview was conducted with managers of schools to collect data regarding to health services toward the tinea capitis in schools, availability of health education program toward the tinea capitis in schools…et (Appendix 1)

C. Observational investigation:

An observation sheet was used to direct observation of pupils affected with tinea capitis e.g.: personal hygiene of pupils (clean of clothes, nails, hair….et)(Appendix 1).

D. Clinical examination:

Effected pupils in the sample were checked medically and then suspected case will be referred to laboratory test.

E. Laboratory investigation:

Specimens were taken by brushing infected skin of child by a dermatologist and a technician. These Specimens were diagnosed in a laboratory examination at dermatology and venereal diseases hospital through saved in a special container for fungal test.

Clinical microbiology method:

KOH was used.

If tinea capitis is suspected, specimens should be taken to confirm the diagnosis as systemic therapy will be required (Appendix 2).

Taking specimens:

Affected areas should be scraped with a blunt scalpel to harvest affected skin, Scrapings should be transported in a folded square of paper preferably fastened with a paper clip, It is easier to see affected hairs or skin on white paper rather than black then be sent in the container provided to the laboratory for culture (Higgins, 2000).
**Laboratory procedure:**
Microscopy provides the most rapid means of diagnosis, but is not always positive. Scalp scales containing the root section are mounted in a 10±30% potassium hydroxide solution and viewed under the light microscope. Positive microscopy (when the scales are seen to be invaded by spores or hyphae) Culture is more sensitive than microscopy results may be positive even when microscopy is negative, but may take up to 4 weeks to become available. (Appendix 3).

*(Higgins, 2000).*
This laboratory test is the same test used by dermatology and venereal diseases hospital.

**3-6-6 Ethical consideration:**
A copy of this the proposal was sent to Khartoum-State Ministry of Health and was approved by council of researches.(Appendix 5)

Approvals of every pupil parents were received before study starting.

Participants were informed that the procedure used did not pose any potential risk and their identities and personal particulars will be kept strictly confidential.

**3-7 Data analysis:**
Collected data were analyzed using a computer program SPSS version 16. The association between different variable, was checked by using x²test, was used to compare categorical data with P. value < 0.05.
2 Results:

This is descriptive across-sectional school based study was conducted in East Nile Locality with an objective to study tinea capitis among pupils in East Nile locality and represent as following Data which collected from pupils represent a following:

Table (1) The prevalence of tinea capitis among pupils in East Nile locality schools, 2014
Table (1): showed the prevalence rate of tinea capitis among the result show that (27/600) (4.5%) were infected.

Table (2): Socio-demographic characteristics of pupils in relation to tinea capitis in school pupils- East Nile Locality, 2014

<table>
<thead>
<tr>
<th>Features</th>
<th>Total (%)</th>
<th>Infected (%)</th>
<th>Non-infected (%)</th>
<th>P.value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age /year</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7&lt;</td>
<td>90(15)</td>
<td>7(7.8)</td>
<td>83(92.2)</td>
<td>0.000</td>
</tr>
<tr>
<td>7-10</td>
<td>118(19.7)</td>
<td>14(11.9)</td>
<td>104(88.1)</td>
<td></td>
</tr>
<tr>
<td>&gt;10</td>
<td>392(65.3)</td>
<td>6(1.5)</td>
<td>386(98.5)</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>600(100)</td>
<td>27(4.5)</td>
<td>573(95.5)</td>
<td></td>
</tr>
<tr>
<td>Gender</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>300(50)</td>
<td>21(7)</td>
<td>279(93)</td>
<td>0.003</td>
</tr>
<tr>
<td>Female</td>
<td>300(50)</td>
<td>6(2)</td>
<td>294(98)</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>600(100)</td>
<td>27(4.5)</td>
<td>573(95.5)</td>
<td></td>
</tr>
<tr>
<td>Family stability</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Stable</td>
<td>408(68)</td>
<td>11(2.7)</td>
<td>397(97.3)</td>
<td>0.002</td>
</tr>
<tr>
<td>Unstable</td>
<td>192(42)</td>
<td>16(3.8)</td>
<td>176(91.7)</td>
<td></td>
</tr>
</tbody>
</table>
Table (2) above shows the Socio-demographic characteristics of pupil’s in relation to the tinea capitis. The results showed that 11.9 % (14/118) of the infected pupils in ages group between 7-10 years, 7.8 % (7/90) in ages group < 7 and 1.5 % (6/392) in ages group > 10 years, and this strongly statistically significant (P. value = 0.000), showed that most infected gender, male is more infected than female 7 %.
21/300) male, and 2% (6/300) female and this statistically significant (P. value = 0.003), Showed that 2.7% (11/408) of the stable families were infected, while 8.3(16/192) % of the unstable pupils were Non-infected, and this statistically significant (P. value = 0.002), The statistics showed no significant relation between the pupil's infection with tinea capitis and family members (P value = 0.059), The statistics showed significant relation between the pupil's residence and infection with tinea capitis (P value = 0.000), Showed that the occupation of father relation to the tinea capitis whose the father are unemployed 10.7% (13/128), labor 4.1% (8/194) and employed 2.1% (6/284) and this statistically significant (P. value = 0.001), Showed that the occupation of mother relation to the tinea capitis whose the mother are unemployed 3.1% (11/360), labor 5.2% (10/191) and employed 12.2% (6/49) and this statistically significant (P. value = 0.012) The statistics in table (9) showed strongly significant relation between the pupil's infection with tinea capitis and their family monthly income (P value = 0.001), Table (10) shows Educational level among father of respondent in relation to tinea capitis most infected pupils as those whose fathers are 10.7% (15/140) primary, 5.3% (5/94), and university and above 1.9% (7/366) secondary and this statistically significant (P. value = 0.000), Table (11) shows Educational level among mothers of respondent in relation to tinea capitis most infected pupils as those whose mothers are 8.1% (12/148) primary, 3.2% (10/313) secondary, and 3.6% (5/139) university and above and this statistically significant (P. value = 0.000) and Table (12) shows family income among families of respondent in relation to tinea capitis most infected pupils as those whose family income are < 450 9.8% (13/132), 450-1000 5.3% (8/150) and > 1000 1.9% (6/318)

Figure (1) Availability of water source in pupils houses in relation to Tinea Capitis- East Nile locality schools:
\( X^2 = 17.654 \)

P. value = 0.000

Availability of water source as a factor is shown figure (3). The majority of pupils houses (9.5%) has water source, (2%) hasn’t water source, reflected that there was significant relation between the availability of water source and pupils infection P. value = 0.000

Figure (2) Availability of health services among the regionsof pupils in relation to Tinea Capitis- East Nile locality schools, 2014:

(n = 600)
Availability of health services as a factor is shown in figure (2). The majority of pupils hasn’t health services (13.4%) , but (2.5%) has water source, there was strong association between availability of health services and pupils infection P. value= 0.000

Table (3) Type of health services and prevalence of tinea capitis- East Nile locality schools, 2014

(n = 488)
<table>
<thead>
<tr>
<th>Services</th>
<th>Infection</th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Infected</td>
<td>Non infected</td>
<td>Total</td>
<td>Infected</td>
<td>Non infected</td>
</tr>
<tr>
<td></td>
<td>No</td>
<td>%</td>
<td>No</td>
<td>%</td>
<td>No</td>
</tr>
<tr>
<td>Health center</td>
<td>5</td>
<td>1.5</td>
<td>318</td>
<td>98.5</td>
<td>323</td>
</tr>
<tr>
<td>Dispensaries</td>
<td>7</td>
<td>4.2</td>
<td>158</td>
<td>95.8</td>
<td>165</td>
</tr>
<tr>
<td>Total</td>
<td>12</td>
<td>2.5</td>
<td>476</td>
<td>97.5</td>
<td>488</td>
</tr>
</tbody>
</table>

\[ X^2 = 3.306 \]

P. value = 0.069

Table (3) Shows that most infected children were those whose families near to dispensaries 4.2%(7/165), then those whose families near to health center 1.5%(5/323), the statistics in table (3) showed no significant relation between the pupil's infection with tinea capitis and type of health services P value = 0.069with df(1)

Table (4) Way of arriving to school in relation to tinea capitis- East Nile locality schools, 2014

(n = 600)
Table (4) Illustrate that the pupils arrive to schools by transportation were 5\%(6/119) and onfoots were 3.5\%(14/405) and by donkey were 9.2\%(7/76) the statistics showed no significant relation between the pupil's infection with tinea capitis and way of arriving to school P value = 0.081 with df(2)

Figure (3) Place of haircuts of pupils in relation to tinea capitis- East Nile locality schools:

<table>
<thead>
<tr>
<th>arriving</th>
<th>infection</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>Infected</td>
<td>No</td>
<td>%</td>
<td>No</td>
<td>%</td>
<td>No</td>
<td>%</td>
<td>No</td>
<td>%</td>
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<td>Transporta</td>
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<tr>
<td>On foots</td>
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<td>Donkey</td>
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<td>Total</td>
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</tbody>
</table>

\[X^2 = 5.031\]  
P. value = 0.081

\[(n = 600)\]
Figure (3) Illustrate that pupils shave in salon were (12.3%) and in house were (4.1%), the statistics the statistic showed association between place of haircut and pupils infection P. value = 0.040

Table (5) Tools of shaving in relation to tinea capitis - East Nile locality schools, 2014:

(n = 300)
Table (5) illustrate the prevalence of tinea capitis increase among pupils shave by shaver were 15.1 % (10/56), by scissor were 5.6 % (6/107), by razor were 3.9 % (5/127), there was strong association between the tools use for shaving and pupils infection P. value = 0.001 with df(2)

Figure (4) Use of disinfectant during shaving in relation to pupil’s infection with tinea capitis-East Nile locality schools, 2014:

(n = 300)
Figure (4) Shows that use disinfectant in relation to tineacapitis whose use disinfectant were (4.2%), don’t use were(9.6%), The statistics in table (9) showed no significant relation between the pupil's infection with tineacapitis and use of disinfectant during shaving P value = 0.069.

\[ X^2 = 3.301 \] P. value= 0.069

Table (6) Sharing wearing clothes in relation to the infection with tinea capitis -East Nile locality schools, 2014
Table (6) illustrate the prevalence of tinea capitis increase among pupils wear clothes of others people 8.3 %( 14/168), and 3 %( 13/432) were not, the result showed that there was significant relation between the wearing clothes of others and pupils infection P. value= 0.005 with df(1)

Figure (5) sharing tools of combing hair among the pupils in relation to tinea capitis -East Nile locality schools, 2014:
Figure (5) Shows that sharing tools of combing hair in relation to tinea capitis whose use general tools were (7.6%), whose use specific tools were (1.9%), the statistics in table (12) showed strongly significant relation between tools of combing hair among the pupils and infection with tinea capitis P value = 0.001.

Table (7) Presence of infected person with tinea capitis among families of pupils in relation to tinea capitis - East Nile locality schools, 2014:

\( X^2 = 11,367 \) P. value = 0.001
Table (7) Shows that majority of pupils infected with tinea capitis has infected person among their families 8.4 % (16/191) and 2.7 % (11/409) were not, table (7): the result reflected that there was significant relation between presence of infected person with tinea capitis in families and pupils infection P. value = 0.002 with df(1)

Table (8) Presence of infected person with tinea capitis among pupil’s friends in relation to tinea capitis - East Nile locality schools, 2014:

(n = 600)
Table(8) Shows that majority of pupils infected with tinea capitis has infected person among their friends 9.7% (21/219) compare to 1.6% (6/384) among those have not infected friends. the results showed there was strong statistical significant between infected friends and tinea capitis positivity (p = 0001)with df(1).

Table (9) Presence of pets at home among the pupils in relation to tinea capitis -East Nile locality schools, 2014

\(n = 600\)
Table (9) shows the prevalence of tinea capitis among pupils has pets at home was 9.4% (20/213), while 1.8% (7/387) among those has not pets. The results showed there was very strong statistical association between tinea capitis positivity and pets at home (p = 0.0001). with df(1).

Table (10) Presence of pets suffering from the wool loss in pupils homes in relation to infection with tinea capitis -East Nile locality schools, 2014:

\[ X^2 = 18.372 \quad \text{P. value= 0.000} \]
<table>
<thead>
<tr>
<th>Presence</th>
<th>Infection</th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Infected</td>
<td>Non infected</td>
<td>Total</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>No</td>
<td>%</td>
<td>No</td>
<td>%</td>
<td>No</td>
</tr>
<tr>
<td>Yes</td>
<td>14</td>
<td>38.9</td>
<td>22</td>
<td>61.1</td>
<td>36</td>
</tr>
<tr>
<td>No</td>
<td>6</td>
<td>3.3</td>
<td>171</td>
<td>96.7</td>
<td>177</td>
</tr>
<tr>
<td>Total</td>
<td>20</td>
<td>9.4</td>
<td>193</td>
<td>90.6</td>
<td>213</td>
</tr>
</tbody>
</table>

\[ X^2 = 44.310 \quad \text{P. value} = 0.000 \]

Table (10) Shows that majority of pupils infected with tinea capitis has pets suffering from the wool loss in their homes 38.9% (14/36) compare to 3.3% (6/177) among those were not, the statistics in table (10) showed strongly significant relation between Presence of pets suffering from the wool loss in pupils homes and pupils infection. P. value = 0.000 with df(1).

Table (11) types of pets at homes of pupils in relation to tinea capitis -East Nile locality schools, 2014

(n = 213)
<table>
<thead>
<tr>
<th>Type</th>
<th>Infected</th>
<th>Non infected</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No</td>
<td>%</td>
<td>No</td>
</tr>
<tr>
<td>Productive pet</td>
<td>15</td>
<td>11.4</td>
<td>97</td>
</tr>
<tr>
<td>Non-productive pet</td>
<td>5</td>
<td>6.2</td>
<td>96</td>
</tr>
<tr>
<td>Total</td>
<td>20</td>
<td>9.4</td>
<td>193</td>
</tr>
</tbody>
</table>

\[X^2 = 8.569\] \[P. value = 0.003\]

Table (11) shows that pupils has protective pet were 11.4% (15/112) and whose has non-protective pet were 6.2% (5/101), there was association between types of pets at homes of pupils and pupils infection P. value = 0.003 with df(1).

Table (12) Pupils in contact with pets in relation to tinea capitis -East Nile locality schools, 2014:

\[n = 213\]
Table (12) Illustrate that pupils contacts with pet were 23.7% (13/87) and 5.6% (7/126) there not contact, there was association between Pupils in contact with pets and pupils infection P. value = 0.045 with df(1).

Table (13) Types of contact with pets in relation to tinea capitis - East Nile locality schools, 2014
<table>
<thead>
<tr>
<th></th>
<th>Infected</th>
<th></th>
<th>Non infected</th>
<th></th>
<th>Total</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No</td>
<td>%</td>
<td>No</td>
<td>%</td>
<td>No</td>
<td>%</td>
</tr>
<tr>
<td>Animal feeding and</td>
<td>8</td>
<td>25.8</td>
<td>23</td>
<td>74.2</td>
<td>31</td>
<td>35.6</td>
</tr>
<tr>
<td>Cleaning dung</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Playing</td>
<td>5</td>
<td>8.9</td>
<td>51</td>
<td>91.1</td>
<td>56</td>
<td>64.4</td>
</tr>
<tr>
<td>Total</td>
<td>13</td>
<td>23.7</td>
<td>74</td>
<td>76.3</td>
<td>87</td>
<td>100</td>
</tr>
</tbody>
</table>

$X^2 = 10.246$ \hspace{1cm} P. value = 0.002

Table (13) Illustrate that pupils contact with pet for animal feeding and cleaning dung were 25.8% (8/31) and whose contact with pet for playing 8.9%(5/56), table (13): reflected that there was significant relation between types of contact with pets and pupils infection. P. value = 0.002 with df(1).

Table (14) frequency of shower in week for pupils in relation to tinea capitis -East Nile locality schools, 2014

(n = 600)
Table (14) shows the prevalence of tinea capitis increase mong pupils showered their hair once per week 13.5% (13/95) compare to those showered twice and dialy 7.5% (8/106) and 1.5% (6/399) respectively, table (14): reflected that there was significant relation between frequency of shower in week for pupils and T.capitis infection P. value= 0.002 with df(2).

Table (15) Hand washing for pupils in relation to tinea capitis -East Nile locality schools, 2014:

\[ X^2 = 29.272 \quad \text{P. value}= 0.000 \]
Table (15) Illustrate the prevalence of tinea capitis increase among pupils don’t washing their hand 12.8% (15/117) compare to 2.5% (12/483) among those washing their hands., the statistics in table (15) showed strongly significant relation between hand washing for pupils and pupils infection P. value = 0.000 with df(1).

Table (16) Frequency of hand washing for pupils in relation to tinea capitis - East Nile locality schools, 2014
<table>
<thead>
<tr>
<th>Times</th>
<th>Infected</th>
<th>Non infected</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No</td>
<td>%</td>
<td>No</td>
</tr>
<tr>
<td>Always</td>
<td>5</td>
<td>1.5</td>
<td>319</td>
</tr>
<tr>
<td>Sometimes</td>
<td>7</td>
<td>4.4</td>
<td>152</td>
</tr>
<tr>
<td>Total</td>
<td>12</td>
<td>2.5</td>
<td>471</td>
</tr>
</tbody>
</table>

$X^2 = 3.599$  
P. value = 0.050

Table (16) shows the prevalence of tinea capitis increase among pupils washing their hand sometimes $4.4\% (7/159)$, and whose washing their hand always were $1.5\% (5/324)$, the statistics in table (16) showed significant relation between times of hand washing for pupils and the infection with tinea capitis $P$ value = 0.050 with df(1).

Table (17) Distance between health center and pupils' residence in relation to the infection with tinea capitis - East Nile locality schools, 2014:

(n = 600)
Table (17) Illustrate that pupils has distance between health center and their houses >6 km 12.6 % (15/112), whose has distance between 3-6 km 3.7 % (7/188), whose has distance <3 km were 1.7 % (5/300), this is strong significant relation (P. value = 0.000) between the distance between nearest health center and infection with tinea capitis with df(2).

Table (18) Knowledge regarding to tinea capitis infection among pupils in relation to tinea capitis-East Nile locality schools, 2014:

\( X^2 = 26.478 \quad \text{P. value=0.000} \)
<table>
<thead>
<tr>
<th>knowledge</th>
<th>Infection</th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Infected</td>
<td>Non infected</td>
<td>Total</td>
</tr>
<tr>
<td>No</td>
<td>%</td>
<td>No</td>
<td>%</td>
<td>No</td>
</tr>
<tr>
<td>Yes</td>
<td>19 3.5</td>
<td>523 96.5</td>
<td>542 90.3</td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>8 13.8</td>
<td>50 86.2</td>
<td>58 9.7</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>27 4.5</td>
<td>573 95.5</td>
<td>600 100</td>
<td></td>
</tr>
</tbody>
</table>

$X^2 = 12.903 \text{ P. value} = 0.000$

Table (18) Illustrate that pupils hasn’t knowledge regarding to tinea capitis 13.8%(8/58) but whose has it were 3.5%(19/542),the statistics in table (18) showed strongly significant relation between knowledge regarding to tinea capitis infection and infection with tinea capitis P value = 0.000 with df(1).

Table (19) knowledge of pupils toward the way for treating in relation to tinea capitis- East Nile locality schools, 2014

(n = 600)
### Table 19: Illustrate knowledge among pupils regarding way of treatment from tinea capitis, most pupils don’t care 29.2% (7/24), whose said traditional mender were 6.9% (14/208) and whose said doctor were 1.6% (6/373), the statistics in table (19) showed strongly significant relation between way for treating and pupils infection P value = 0.000 with df(2).

### Table (20) Reasons behind using traditional treatment among pupils in relation with tinea capitis in East Nile locality schools, 2014

\[ X^2 = 43.949 \]  
\[ P \text{ value} = 0.000 \]

<table>
<thead>
<tr>
<th>Knowledge</th>
<th>Infected</th>
<th>Non Infected</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No</td>
<td>%</td>
<td>No</td>
</tr>
<tr>
<td>Doctor</td>
<td>6</td>
<td>1.6</td>
<td>367</td>
</tr>
<tr>
<td>Traditional Mender</td>
<td>14</td>
<td>6.9</td>
<td>189</td>
</tr>
<tr>
<td>Don’t Care</td>
<td>7</td>
<td>29.2</td>
<td>17</td>
</tr>
<tr>
<td>Total</td>
<td>27</td>
<td>4.5</td>
<td>573</td>
</tr>
<tr>
<td>Reason</td>
<td>infection</td>
<td></td>
<td></td>
</tr>
<tr>
<td>------------------------------</td>
<td>----------------------------</td>
<td>---------------</td>
<td>---------------</td>
</tr>
<tr>
<td></td>
<td>Infected</td>
<td>Non infected</td>
<td>Total</td>
</tr>
<tr>
<td></td>
<td>No</td>
<td>%</td>
<td>No</td>
</tr>
<tr>
<td>Remote of health services</td>
<td>9</td>
<td>7</td>
<td>119</td>
</tr>
<tr>
<td>Religious beliefs</td>
<td>5</td>
<td>6.7</td>
<td>70</td>
</tr>
<tr>
<td>Total</td>
<td>14</td>
<td>6.9</td>
<td>189</td>
</tr>
</tbody>
</table>

\[ X^2 = 0.010 \]  \[ P. value=0.921 \]

Table (20) shows reasons behind using traditional treatment among pupils for tinea capitis, some of pupils said remoteness of health services 7% (9/128), some of pupils said religious beliefs 6.7% (5/75), the statistics in table (20) showed no significant relation between the pupil's infection with tinea capitis and Reasons behind using traditional treatment P. value = 0.921 with df(1).

Table (21) Type of traditional treatment used by pupils to treatment tinea capitis in relation to tinea capitis in East Nile locality schools, 2014

\[ n = 203 \]
<table>
<thead>
<tr>
<th>use</th>
<th>infection</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Infected</td>
<td>Non infected</td>
</tr>
<tr>
<td>No</td>
<td>6</td>
<td>103</td>
</tr>
<tr>
<td>%</td>
<td>5.5</td>
<td>94.5</td>
</tr>
<tr>
<td>herbs</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Faeces of</td>
<td>8</td>
<td>86</td>
</tr>
<tr>
<td>camels</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>14</td>
<td>189</td>
</tr>
<tr>
<td></td>
<td>6.9</td>
<td>93.1</td>
</tr>
</tbody>
</table>

\[ X^2 = 0.710 \]

\[ P. value = 0.339 \]

Table (21) shows Type of traditional treatment used by pupils to treatment tinea capitis, some of pupils use faeces of camels 8.5\%(8/94), some of pupils use herbs5.5\%(6/109), the statistics in table (21) showed no significant relation between Type of traditional treatment used by pupils to treatment tinea capitis pupils infection P. value = 0.339 with df(1).

3.2 Result of interview:

According to interview with mangers of schools the results obtained were shown below:
Most of managers said that they haven’t health educational program toward tinea capitis.

8.3 % (1/12) of schools managers said have health education program for the tinea capitis disease, 92.7 % (11/12) they haven’t health education program toward tinea capitis.

16.6 % (2/12) of schools managers said haven’t health education program because they don’t interested in the topic and 75 % (9/12) from the managers of schools haven’t health education program because they weren’t professional of medical staff.

8.3 % (1/12) of managers of schools have health services toward the tinea capitis, 92.7 % (11/12) they haven’t health services for the disease.

8.3 % (1/12) from the schools have health education program toward the tinea capitis.

58.3 % (7/12) of schools having source of drinking water, 41.7 % (5/12) from the schools haven’t source of drinking water.

41.7% (5/12) of schools the source of drinking water was pipe, and 16.7% (2/12) from the schools source of drinking water for them is pump.

8.3% (1/12) of schools the overcrowding indicator inside the class is less than 1, 66.7 % (8/12) from the schools the overcrowding indicator inside the class is 1-1.5, 25 % (3/12) from the schools the overcrowding indicator inside the class is more than 1.5.

3.3 Result of observation:

The observation made during the study showed the following results:
64.5 % (387/600) of pupils wear clean clothes, 35.5 % (213/600) of pupils wear dirty clothes.

61.2 % (368/600) of pupils had not trimmed fingernails, 38.7 % (232/600) of pupils had trimmed fingernails.

49 % (294/600) of pupils their hair is dirty, 47 % (282/600) of pupils their hair is clean, 1.2 % (7/600) of pupils their hair is flurried, 2.8 % (17/600) of pupils their hair is flurried and dirty.

35.2 % (211/600) of pupils their skin is clean, 64 % (384/600) of pupils their skin is dirty, 0.5 % (3/600) of pupils their skin is pale, 0.3 % (2/600) of pupils their skin is pale and dirty.

4.1 Discussion:

This is descriptive school based study was conducted in East Nile locality with an objective to study prevalence of
tinea capitis disease among the pupils to identify the possible factors associated with tinea capitis infection. The data for this study were collected through techniques of interviews, questionnaire, observation, clinical examination and Laboratory test.

The study revealed that the prevalence of tinea capitis infection among the pupils was (4.5%).

This results was higher than prevalence of tinea capitis among primary and middle school students in Iran (5.4%) (Adel et al, 2011) also our result was lower than prevalence of tinea capitis among school children in Nepal (2.6%) (Basnet, 2001).

The study showed that tinea capitis was higher in males (7%) than females (2%).

The results showed there was statistical relationship between tinea capitis and gender (p=0.003).

This result was similar to that mentioned by Azab, he demonstrated that (microscopical examination was performed dermatophytes were isolated from collected samples were higher in male than females) (p.v<0.05).

Our results also agree with that mentioned by shehu, he stated that tinea capitis infection was common among males than females (Shehou, 2014).

The study revealed that the majority of the pupils infected with tinea capitis were between 7 -10 years (11.9%), This finding was strongly statistically significant P. value =0.000. this means that they infecting with tinea capitis were younger, this is similar with that found by
yazdanfar, he demonstrated that (the highest incidence rate of mycologically positive of tinea capitis cases were in 7 year old and then 8 year old) (Yazdanfar, 2010)

This also complied with that mentioned by Shehu, who stated that (the infection was common among children between the ages of 7 - 10 years) (Shehu, 2014).

The study showed there was association between living in rural areas and tinea capitis positivity, which was found to be statistically significant (P. value = 0.00001). The result agreement with findings that mentioned by Adel, he said that (The prevalence of tinea capitis in the rural school students was significantly more than that in the urban students) (Adel et al, 2011).

The study demonstrated that there was relationship between infected children with monthly the majority of the pupils infected with tinea capitis their monthly income <450Sudanese pound(9.8%), this result comply with study carried by (Azab, 2012), he mentioned (prevalence rate of T. capitis was higher in children with low standard of living).

The study disclosed that the majority of pupils infected with tinea capitis their fathers unemployed (10.7%) P. value = 0.001. This is similar with that found by Balci et al, they demonstrated that ((Tinea capitis in children having unemployed fathers (5/1717) was higher than for those whose fathers were employed (4/5339) (p=0.003)) (Balci et al, 2014).

The study demonstrated that there is a majority of the pupils their fathers and mother in the primary educational level (10.7%) and (8.1%)
respectively. This finding was statistically significant P. value = 0.000, P. value = 0.050 respectively

This finding complied study(Azab, 2012), who stated that (the prevalence rate of T.capitis was higher in children with a low socio economic profile such as low level of parental education).

The study demonstrates that there was relationship between place of haircut and infected with tinea capitis, the majority of pupils infected with tinea capitis shave their hair in common place (Salon)(12.3%), This finding is statistically significant, P. value = 0.040 and this agreed with(Banset, 2001) he mentioned that (a barbershop was the venue of haircuts for 71.1% of the urban children; while 71.4% of the rural population had haircuts at home. Statistical association was observed significantly between the place of haircut and isolation of the organism (p <0.01).

The study disclosed that the majority of pupils infected with tinea capitis they have pet animal in the their families(9.8%), P. value = 0.000, this is similar with that found by Akinboro et al, demonstrated that (prevalence of T. capitis in Ilie Community was 43.5% Frequent contact with goat and other animals being kept for commercial purposes) (Akinboro et al, 2011).

Our results also agree with that mentioned by shehu, he stated that (The sources of infection among the school children in this area were found to be domestic animals) (Shehou, 2014).
The study disclosed that the majority of pupils infected with tinea capitis they sharing tools of hair combing (7.6%), this finding was statistically significant $P. \text{value} = 0.001$ and this agreed (Banset, 2001) in the statement mentioned that (among the rural children, 59.2% shared the comb within the family. The sharing of comb was significantly associated with the culture positive cases ($p < 0.01$)).

The study exposed that majority of the pupils infected with tinea capitis they shower once in week (13.7%), This finding was strongly statistically significant $P. \text{value} = 0.000$ this means most pupils infected with tinea capitis dont care about personal hygiene, this matches with what is mentioned by (Adel et al, 2011), who stated that (taking frequent showers at least twice a week, and using healthy water demonstrated to have role in preventing Tinea capitis).

Our results also agree with that mentioned by Azab, he stated that (the prevalence rate of T. capitis was higher in children with poor hygiene) (Shehou, 2012).

This study noticed that not significant between infected children with tinea capitis and family size and this disagreed (Yazdanfar, 2010) in the statement mentioned that (incidence of tinea capitis in crowded families $>5$ is more than uncrowned families $<5$, It is proved that there is a direct relation between tinea capitis and the number of the family members).

This contradiction due to availability of contributing factors such as lack of personal hygiene, lack of water sources, lack awareness toward tinea capitis, lack of health services.
Knowledge of school pupils about tinea capitis, causative agent, mode of transmission and prevention and control of tinea capitis is associated with prevalence of tinea capitis distribution which is an adverse relationship. (13.8) from the infected pupils with tinea capitis they haven’t any knowledge about the disease, This finding was statistically significant P. value = 0.000. There was a strong relation between the knowledge of pupils toward disease and tinea capitis infected. This result comply with study carried by (Sadat et al, 2010)who stated that (two primary schools were randomly selected in Chabahar, south-eastern of Iran. Initial data of 115 students were gathered using a well-prepared questionnaire, by means of a check list and a thorough clinical examination. . Results: Totally, 20% and 18.3% of cases and controls were infected before conducting the educational program, respectively, however, following the education only 5.5% of cases were remained infected P. value =0.008. Pre-and post-education infection rate did not differ significantly. Conclusion: Our results showed that health education program had a positive effect on reduction of tinea capitis among prepubescent boys).

4.2 Conclusion:

A cross-sectional descriptive study was conducted at East Nile Locality, 2014-2015. The objective of the study the prevalence of tinea capitis among pupils in East Nile locality.

The study showed there tinea capitis prevalence was (4.5%).
The study revealed there was statistical association between tinea capitis positivity and (gender, age, father occupation, father education, mother education, residence) P. value (0.003, 0.000, 0.001, 0.000, 0.050, 0.000) respectively.

The study revealed there was statistical association between tinea capitis positivity and (haircut place, combing hair tool, pet animals at house, shower per week) P. value (0.040, 0.001, 0.000, 0.000) respectively.

majority of the pupils infected with tinea capitis they hasn’t knowledge regarding to tinea capitis(13.8%) this finding was strongly statistically significant (P. value = 0.000).

There is no relation between family size and prevalence of tinea capitis among the study population.

### 4.3 Recommendation:

From the study findings it was recommended that:

- More coordination between heath sectors and other related sectors are highly recommended.

- Health authorities are advised to increase health awareness of school pupils and parents including modes of transmission, and the importance of personal hygiene.
- Livestock keeping is a lifestyle of the East Nile Locality people, I therefore suggest the need for construction of animal’s pen by each household to reduce in-house contact with animals. This can be shouldered by the local health authority.

- There is a need for effective community veterinary services for prompt treatment of infected animals.

- Study of dermatophyte infections among animals in East Nile Locality and its correlation with human dermatophytes is suggested as a future study.

- Advocating environmental changes like provision of safe water supply as enabling factors to enhance health practice.

- Strengthening school health programs by doing routine investigation and examination for all students and early detecting and treating all pupils who already are positive for tinea capitis.

- Changing the knowledge, attitude and practice (KAP) of this community to the positive side.

- reduce the overcrowding in classes of schools in East Nile Locality.

- Social mobilization and commitment of active community participation are essential in controlling the disease.

- Encouragement of the research and studies in this field.

4.5 Appendix:

4.5.1 References:


College of veterinary medicine, university of Iowa state (2005), Dermatophytosis (Ringworm, Tinea). PP: 12.


Appendix (2)

جامعة الخرطوم
كلية الصحة العامة وصحة البيئة

المقابلة الشخصية للمدير حول مرض السعفة الجلدية لتلاميذ مدارس محلية شرق النيل الاساسيه

(Interview)

هل هناك برنامج تثقيفي تجاه مرض السعفة؟
1) (أ)نعم (ب)لا
2) إذا كانت الإجابه ولا ماهو السبب؟
(أ) عدم توفير كواذر طبيه (ب) عدم الإهتمام بالموضوع (ج) أخرى حدد...

هل لديكم خدمات صحية بالمدرسة تجاه المرض؟
3) (أ)نعم (ب)لا
(4) إذا كانت الإجابة بنّعم، مانعها؟
(أ) تنقّيف صحي (ب) علاج مجانى (ج) فحص دوري (د) اخرى حدّد...
(5) هل يوجد مصدر للطعام بالمدرسة؟
(أ) نعم (ب) لا
(6) إذا كانت الإجابة بنّعم، مانعها:
(أ) مضخة (ب) مواسير (ج) اخرى حدّد...
(7) ترتيب الفصل:

(8) مؤشر الإزدهام داخل الفصل؟
(أ) > 1 (ب) 1.5 - 1.5 (ج) <= 1.5

إستبيان حول المرض السعفي في مدارس محلية شرق النيل الأساسيه

(Questionnaire)

(أ) المعلومات الديموغرافية:

(1) عمر الطالب:
(أ) < 7 سنين (ب) 7-10 سنين (ج) > 10 سنين
(2) الجنس:
(أ) ذكر (ب) أنثى
(3) حركة الأسرة وترحالها:
(أ) مستقر (ب) مرحّلة
(4) حجم الأسرة:
(أ) > 6 أشخاص (ب) 6 أشخاص (ج) <= 6 أشخاص

92
(5)سكن الطالب حسب الوحدة الإدارية:
(أ) الحاج يوسف (ب) ود ابوايصالح (ج) ابودليق
(6)ماهي مهنة الوالد:
(أ) مزارع (ب) موظف (ج) راعي
(7)ماهي مهنة الوالدة:
(أ) غير عامه (ب) عامله (ج) موظفة
(8)مصروف الاسرة الشهري:
(أ) > 450 جنيه (ب) من 450-1000 جنيه (ج) < 1000
(9)مستوى تعليم الأب:
(أ) امي (ب) خلوه (ج) ابتدائي/اساسي (د) متوسط (ه) ثانوي
(10)مستوى تعليم الام:
(أ) امي (ب) خلوه (ج) ابتدائي/اساسي (د) متوسط (ه) ثانوي
(أ) معلومات عن الخدمات الصحية:
(1) هل يوجد مصدر للمياه بالمنزل؟
(أ) نعم (ب) لا
(2) إذا كانت الإجابه بنعم مانوعه؟
(أ) مضخه (ب) مواصلات (ج) أخرى حدده...
(3) هل توجد خدمات صحية بالمنطقه؟
(4) إذا كانت الإجابات بنعم متنوعة؟
(أ) مستشفى (ب) مركز صحي (ج) شفخانة (د) أخرى حدد...
(ب) معلومات عن عوامل الخطر للمرض:
(1) كيف تأتي إلى المدرسة؟
(أ) الواصلات (ب) ترحيل (ج) حمار (د) على الأرجل (ه) أخرى حدد....
(2) إن تقوم بعملية الحلاقة؟
(أ) في المنزل (ب) في الصالة (ج) أخرى حدد....
(3) بأي الطرق تقوم بعملية الحلاقة؟
(أ) موس (ب) مقص (ج) مكنه (د) كل مذكر (ه) أخرى حدد....
(4) هل يتم استخدام المطهرات أثناء الحلاقة؟
(أ) نعم (ب) لا (ه) أخرى حدد....
(5) هل تلبس ملابس غيرك؟
(أ) نعم (ب) لا (ه) أخرى حدد....
(6) إذا كانت الإجابات بنعم في (7) هل صاحب الملابس مصاب بمرض السعفة؟
(أ) نعم (ب) لا (ه) أخرى حدد....
(7) هل تلك الملابس تم غسلها وكويها؟
(أ) نعم (ب) لا (ه) أخرى حدد....
(8) معدات تصريح شعرك؟
(أ) خاصة (ب) مشتركة (ه) أخرى حدد....
(9) في حالة الإجابات بنعم في (8) هل الشخص مصاب بالمرض؟
(أ) نعم (ب) لا (ه) أخرى حدد....
(10) هل هناك شخص مصاب بالمرض من الأسرة؟
(أ)لا
(ب)نعم

هل هناك شخّص مصاب بالمرض من أصدقائك؟

(أ)لا
(ب)نعم

هل هناك حيوان أبيض بالمنزل؟

(أ)لا
(ب)نعم

إذا كانت الإجابة بنعم في (12) هل الحيوان يعاني من تساقط الصوف؟

(أ)لا
(ب)نعم

ما هو نوع الحيوان الأليف؟

(أ)الحيوانات المنتجة
(ب)الحيوانات غير المنتجة

هل من تقوم بمخالطة الحيوانات؟

(أ)لا
(ب)نعم

إذا كانت الإجابة بنعم في (14) حدد نوع المخالطة؟

(أ)حلب اللبن
(ب)تنظيف الرووث
(ج)الاثنين معا
(د)خرى

حدد...............حدد

عدد مرات الاستحمام للطالب؟

(أ) يوميا
(ب) كل يومين
(ج) كل ثلاثة أيام
(د) مرة في الأسبوع
(ح) أخرى

حدد.

هل تغسل يدك بالماء والصابون بعد الخروج من المرحاض وقبل الأكل؟

(أ)لا
(ب)نعم

إذا كانت الإجابة بنعم في (18)؟

(أ) دائمًا
(ب) أحيانًا
(ج) نادرًا

المسافة من المنزل لأقرب مركز صحي؟
(أ) 3 كيلومتر (ب) من 3-6 كيلومتر (ج) 6 كيلومتر

(ج) معلومات عن الوعي الصحي تجاه المرض:

(1) هل تعرف مرض السعفة؟

(أ) نعم (ب) لا (ج) لا أدرى

(2) إذا كانت الإجابة بنعم في (2) ما الإسم التقليدي الذي تطلقونه على مرض السعفة؟

(أ) القوب (ب) البهق (ج) الاثنين معاً

(3) ما هي أسباب الإصابة بمرض السعفة؟

(أ) الحلاقية بادوات غير معقمة (ب) ملامسة الحيوانات الأليفة (ج) عدم الاستحمام (د) أخرى حدده...

(4) هل أصيبت سابقاً بالسعفة؟

(أ) نعم (ب) لا

(5) إذا كانت الإجابة بنعم في (4) هل اتخذت العلاج؟

(أ) نعم (ب) لا (ج) لا أدرى

(6) هل يمكن الوقاية من مرض السعفة؟

(أ) نعم (ب) لا (ج) لا أدرى

(7) إذا كانت الإجابة بنعم في (8) كيف تتم الوقاية؟

(أ) الاستحمام (ب) عدم لبس ملابس غير مغسلة (ج) تجنب الحلاقية بادوات غير معقمة (د) أخرى حدده...

(8) إذا أصيبت بمرض السعفة إلى إين تذهب؟

(أ) الطبيب (ب) الطبيب والمعالج البلدي (ج) عادةً إسبوع

(9) إذا كنت تستخدم العلاج البلدي لماذا؟

(أ) نجح (ب) بعد المركز الصحي (ج) عادةً إسبوع
(د) اعتقاد ديني

(10) مانواع العلاج البلدي؟

(أ) شراب (ب) طين (ج) محاية (د) أخرى حدد

جامعة الخرطوم
كلية الصحة العامة وصحة البيئة
قائمة ملاحظات ما يتعلق بمرض السعفة البلدية لتلاميذ مدارس محلية شرق النيل الأساسي (Observation)

(1) مستوى نظافة ملابس الطالب:

(أ) تنظيفه (ب) متسخه

(2) الاظاهر:

(أ) مقلمه (ب) غير مقلمه

(3) الشعر:

(أ) تنظيفه (ب) متسخه (ج) متسبط (د) متسبط ومتساقط معا
Appendix (3)

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Investigation result
Prevalence of tinea capitis among pupils in East-Nile Locality – 2014

Results:

By KOH 20% preparation:

(4) Negative

(27) Positive

Appendix (4)

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Shape of tinea capitis in microscope
Shape (1)
Shape (2)
Appendix (5)

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Map of East Nile locality
Appendix (6)

University of Khartoum

Faculty of public and environmental health

Proposal Approval