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**PREVALENCE OF *TINEA* (RINGWORM) AMONG PRIVATE AND PUBLIC NURSERY AND PRIMARY SCHOOL PUPILS IN OYO WEST LGA OF OYO STATE.**

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***Abstract***

*Tinea capitis (ringworm) medically known as dermatophytosis is caused by dermatophytes which are a unique group of highly specialized fungi that use keratin to grow and therefore infect keratinous tissues of lower animals and humans. This infection is a common skin disorder that occurs across age and sex groups with high frequency occurring in pre-pubertal, nursery and primary school children aged between 6 and 13 years. This study was aimed at determining and comparing the prevalence of Tinea capitis among Private and Public Nursery and Primary School Pupils in the Oyo Metropolis. A descriptive, cross-sectional research involving 200 pupils from a randomly selected 5 private and 5 public nursery and primary schools in Oyo West Local Government Area, Oyo State, Nigeria. This is a cross-sectional study carried out among 200 school going children during the period between April and August 2019. Interview and direct body examination for dermatophytosis infection were conducted on the consented pupils. In a total of one hundred and twenty (120) children infected 50 (41.63%) were from private schools while 70 (58.33%) from public school. The overall prevalence rates of Tinea capitis infection was 60%). In the two categories of schools, the prevalence of infection was higher in male 72(60%) than in female 48(40%). This research work recorded a 58.33% prevalence rate of Tinea capitis infection among public schools understudied. This study scientifically substantiates the undocumented assertion that public schools have a high prevalence rate of infectious diseases than privates schools. The high prevalence rate was identified to be as a result of regular exposure to various predisposing factors to Tinea capitis infection.*

*Health promotion and health education interventions should be enhanced to promote good hygiene, better living conditions, early identification, and treatment of infection.*

**Keywords:** *Tinea capitis, Prevalence, Children, Dermatophytes, School, Dermatophytosi.*

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## **Introduction**

*Tinea capitis* (ringworm) infection is a common skin disorder ranked amongst the top five diseases seen at dermatology clinics across Nigeria. (Nelson, Martin, Heffernan, 2003; Ogunbiyi, Daramola, Alese, 2004; Nnoruka, 2005; Onayemi, Isezuo, Njoku, 2005; Olusola, Ayesha, Rita, Mobolanle, 2014 ). The characteristic name “ringworm” of *Tinea capitis* infection was derived from appearance of the rash that it causes, usually is ring-shaped but it is not caused by a worm.

*Tinea capitis* medically known as dermatophytosis are caused by dermatophytes which are a unique group of highly specialized fungi that use keratin to grow and therefore infect keratinous tissues of lower animals and humans ( Anosike, Keke, Uwaezuoke, Anozie, Obiukwu, Nwoke, and Amajuoyi, 2005; O, Cervetti, Albin, Arese, Ibba, Novarino, and Panzone, 2014) . Dermatophytes are keratinophilic, meaning that they mainly affect keratinized tissues of the body of human or animals, example they grow on nails, hairs and the outer layer of the skin of both man other animals (Wagini and Mahuta, (2016). They are characterized by their ability to invade the superficial layers of the epidermis, particularly, the stratum corneum and the high keratin-concentration containing appendages, the hair and nails of the living host (Adefemi, Odeigah, Alabi, 2011; Nilce *et al.*, 2018). Only under exceptional circumstances do they survive or proliferate in the deeper tissues or non-keratin containing parts of the body (Chastain *et al.*, 2001). Invasion of dermatophytes into hair follicles and keratinized layer of hairy skin leads to hair loss, scaling, black dot, grey patch type, erythema or impetigo-like lesions (Sarabi, 2008).

The infection originates from diverse sources which include human, animals and/or soil (Oguzkaya, Koc, Baykan, and Buldu 2013 ) with high frequency occurring in pre-pubertal, nursery and primary school children aged between 6

and 10 years of age. Nevertheless, this infection occurs across age and sex groups with high occurrence being reported among males (Oguzkaya, *et al.*, 2013). According to Olusola, *et al.*, (2014), a recent survey of dermatophytosis infections at the skin clinic of Lagos University Teaching Hospital (LUTH), revealed that *Tinea capitis* was found in all age groups and accounted for 72.2% of fungal infections between ages 0 and 9; while the frequency of presentation reduces with increasing age.

Variation in the distribution pattern of dermatophytes (*Tinea capitis*) infection among different countries of the world is evident, with most cases being detected in Africa, Asia, and Southern and Eastern Europe (Moto, Maingi and Nyamache, 2015) and at present, there are 40 recognized species in the dermatophyte genera. Of these, about 25 species belonging to the genera *Epidermophyton*, *Microsporum* and *Trichophyton* are presently known to infect man.

The distribution, frequency, and etiological agents of dermatophytosis vary according to the geographic region studied, the climatic variations, the socioeconomic level of the population, prevalence of immunodeficiency disease in the community, the presence of domestic animals lifestyle and age of the individual. Its prevalence has continued to have a dramatic increase in the last decades with more than 20–25% of the world's population being affected (Moto *et al.*, 2015). Africa, being among the settings mostly affected,

Transmission can be anthrophilic (contact with the skin of an infected person), zoophilic (contact with infected animals) and geophilic (contact with infected soil) as well as indirectly from fomites (objects or materials which are likely to carry infection, such as clothes, utensils and furniture ( Onayemi, *et al.*, 2005; Olusola, *et al.*, 2014 ). A local barber who used the same barbing equipment has been identified as the source of indirect infection among students (Olusola, *et al.*, 2014). Children are particularly susceptible to dermatophytic infections because of their poor personal hygiene habits and poor environmental sanitation. As human contact among children is more frequent between the ages of 4 and 10 years than in very early childhood, (Adefemi *et al.*, 2011 ) these age group is similarly at greater risk of contracting infectious diseases. Symptoms appear 10-14 days after contact with the fungus. The clinical features of ringworm on the different sites of infection include;

- **Ringworm of the scalp and hair:** red, scaly patches on the scalp that may be blister-like; brittle hair that break off easily; beard hair may have flakes looking like dandruff;
- **Ringworm of the skin:** itchy ring-shaped patches that have edges that are red and blistery-looking.
- **Ringworm of the feet (athlete's foot):** cracked, blistered, peeling areas between the toes, scaling over the sole of the foot; affect adults more than children, males more than females; common among schoolchildren, athletes and military personnel who share shower or bathing; incubation period before symptoms appear is unknown.
- **Ringworm of the groin and upper thighs (jock itch):** ring-shaped lesions with raised edge around it; very itchy lesions; may ooze clear fluid; males affected more than females.

### Statement of the Problem

Although *Tinea capitis*, like other dermatophytosis, is of public health importance, it is not a debilitating diseases and as a result, little is known on its prevalence in many endemic areas (Ayaya, Kamar and Kakai, 2000; Anosike *et al.*, 2005; Sidat, Correia, and Buene 2007; Moto *et al.*, 2015). Many research works on the prevalence of dermatophytosis have been carried out in Nigeria most especially in the Southwest (Nelson, *et al.*, 2003; Ogunbiyi, *et al.*, 2004; Nnoruka, 2005; Onayemi, *et al.*, 2005; Anosike *et al.*, 2005; Olusola, *et al.*, 2014). But there exist sparse or no record on the comparative prevalence of this infections among private and public nursery and primary schools pupils in Oyo Metropolis.

### Aim of the Study

The aim of this research is to document a scientific data on the comparative prevalence of *Tinea capitis* among private and public nursery and primary school pupils in Oyo metropolis.

This work is unique and important in that it searches into reasons why ringworm is common among pupils in Nursery and Primary Schools. And subsequently ascertained if any differences exist in the disease prevalence among pupils in the private and public schools. Therefore, this research is set to enlighten

government, parents, teachers and even students more on how to go about the occurrence of this infection.

### Materials and Methods

This is a descriptive, cross sectional research carried out in the period between April and August 2019 involving 200 pupils from a randomly selected five (5) private and five (5) public nursery and primary schools in Oyo West Local Government Area, Oyo State, Nigeria.

Informed consent was obtained from the local education authority and the parents and guardians. This was necessary because some keratinous external body parts of the participants will be critically examined. Interviewer administered questionnaire was used to obtain socio-demographic and clinical data from all pupils who had written parental consent. Exclusion criteria were non-consenting parents and non-assenting pupils. The socioeconomic status of the pupils were determined by parents' occupation, level of education and living conditions. Physical examination of each pupil was carried out in a well-lit room with adequate ventilation using various clinical diagnostic features of the infection. The scalp, hair, skin, groin and upper thighs were examined for dermatophyte infections. The clinical diagnosis of *Tinea capitis* was made using the following criteria: scaly patches on the scalp, with or without hair loss; partial hair loss with broken-off hairs, brittle and luster-less hair strands, annular lesions with fairly sharp margins, massive scaling, folliculitis, kerion and favus. The data collected from this investigation were statistically analyzed using percentage.

### Result

A total of two hundred (200) pupils aged between 3 and 13 years from both private and public schools were involved in the survey, all residing in Oyo town.

Table 1 : Demographic Data of the Respondents

SCHOOL CATEGORY	NO. OF FEMALE(%)	NO. OF MALE(%)	TOTAL NO.OF PUPILS
Private Schools	60 (54.56)	40 (44.44)	100 (100.00)
Public Schools	50 (45.45)	50 (55.56)	100 (100.00)
	110 (55.00)	90 (45.00)	200 (100.00)

Table 1 shows the demographic data of the respondents in both private and public schools. Out of 200 pupils involved in this study, 110 (55%) female and 90 (45%) male respondents were interview and examined for dermatophytosis infection. Only 120 (60%) of the participants were infected while 80(40%) were without any clinical symptoms of the infection. Out of 120 pupils infected, 50(41.67%) were drawn from private schools while 70 (58.33%) were from public schools.

Table 2 : Prevalence of *Tinea capitis* in Private Schools, Based on the Site Infection

SITE OF INFECTION	NO. OF FEMALE(%)	NO. OF MALE(%)	TOTAL NO.OF PUPILS
Scalp	08 (40.00)	13 (43.33)	<b>21 (42.00)</b>
Skin	05 (25.00)	10 (33.33)	<b>15 (30.00)</b>
Groin	02 (10.00)	01 (3.33)	<b>03 (6.00)</b>
Upper Thigh	02 (10.00)	03 (10.00)	<b>05 (10.00)</b>
Feet	03 (15.00)	03 (10.00)	<b>06 (12.00)</b>
	<b>20 (40.00)</b>	<b>30 (60.00)</b>	<b>50 (41.67)</b>

In table 2, the prevalence of *Tinea capitis* based on various sites of infection were shown from all private schools involved in the study. In all the 50 (41.67) pupil infected from private schools, 20(40%) were females while 30 (60%) were males. Majority of the pupils 21 (42%) have infection on the scalp while only 3(6%) of the pupil were infected on the groin.

Table 3 : Prevalence of *Tinea capitis* in Public Schools, Based on the Site Infection

SITE OF INFECTION	NO. OF FEMALE(%)	NO. OF MALE(%)	TOTAL NO.OF PUPILS
Scalp	10 (35.71)	17 (40.48)	<b>27 (42.00)</b>
Skin	08 (28.57)	10 (23.81)	<b>18 (30.00)</b>
Groin	01 (3.57)	02 (4.76)	<b>03 (6.00)</b>
Upper Thigh	05 (17.86)	07 (16.67)	<b>12 (10.00)</b>
Feet	04 (14.29)	06 (14.29)	<b>10 (12.00)</b>
	<b>28 (23.33)</b>	<b>42 (35.00)</b>	<b>70 (58.33)</b>

Table 3, shows the prevalence of *Tinea capitis* based on various sites of infection from all public schools involved in the study. In all the 70 (58.33) pupil infected in public schools, 28 (23.33%) were females while 42 (35%) were males. Majority of the pupils 27 (42%) have infection on the scalp while only 3 (6.00%) of the pupil were infected on the groin.

Table 4 : Predisposing Factors to *Tinea capitis* Infection in Private School

KNOWN PREDISPOSING FACTORS	NO.OF PUPILS	% FREQUENCY
Sharing of combs	12	24.00
Sharing of hair clippers/scissors	15	30.00
Sharing of towels/fomites	05	10.00
Sharing of caps/scarves	03	6.00
Keeping or playing with pets	09	18.00
Carrying objects on the scalp	04	8.00
	<b>50</b>	<b>(41.67)</b>

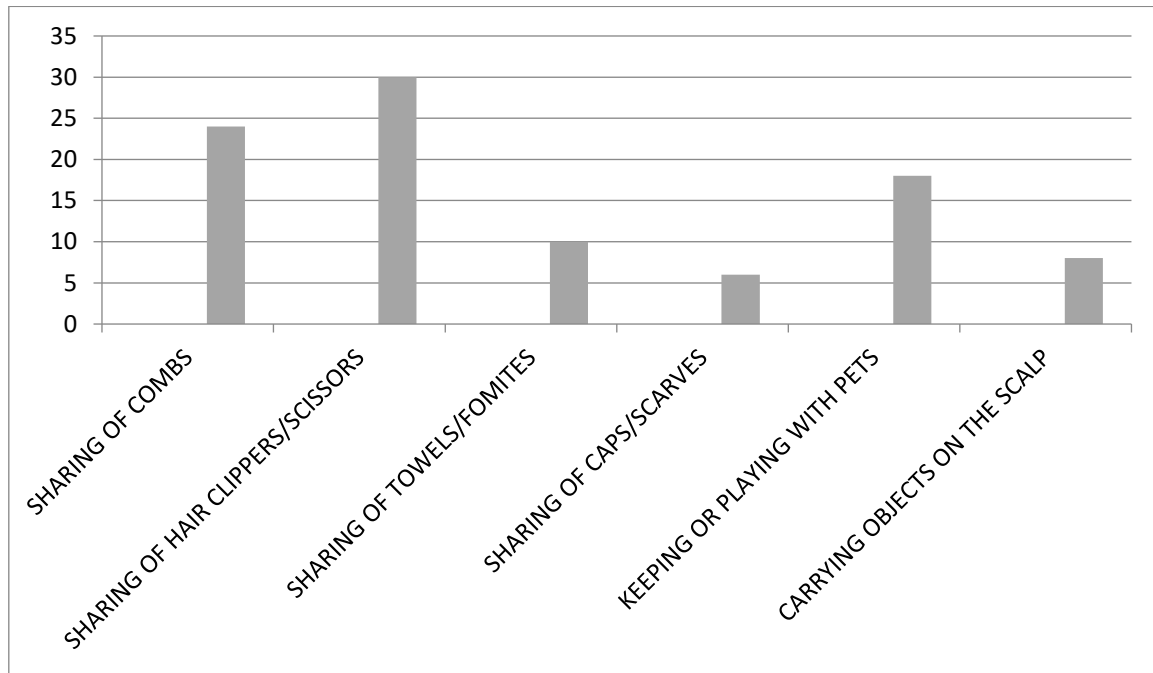


Figure 1: The Predisposing Factors to *Tinea capitis* Infections in Private Schools (Adapted from Olusola *et al.*, 2014)

Figure 1 shows the predisposing factors to *Tinea capitis* infection that were identified among the subjects in the private schools. They were mostly sharing

of hair clippers/scissors (30%) and sharing of combs (24%). With very few carrying object on their scalp (8%) or sharing caps /scarves (6%)

Table 5 : Predisposing Factors to *Tinea capitis* Infection in Public Schools

KNOWN PREDISPOSING FACTORS	NO.OF PUPILS	% FREQUENCY
Sharing of combs	10	14.29
Sharing of hair clippers/scissors	12	17.14
Sharing of towels/fomites	10	14.29
Sharing of caps/scarves	11	15.71
Keeping or playing with pets	10	14.29
Carrying objects on the scalp	17	24.29
	<b>70</b>	<b>(58.33)</b>

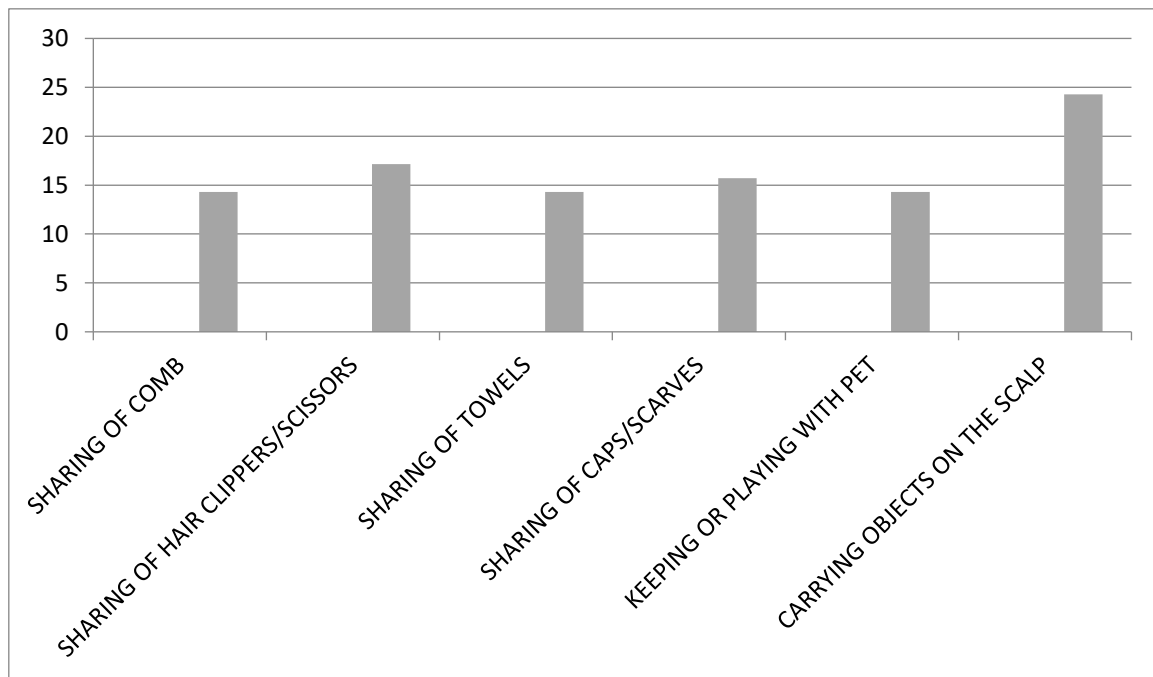


Figure 2: The Predisposing Factors to *Tinea capitis* Infections in Public Schools (Adapted from Olusola *et al.*, 2014)

Figure 2 shows the predisposing factors to *Tinea capitis* infection that were identified among the subjects in public schools. They were mostly carrying



object on their scalp (24.29%). All other predisposing factors to infection were almost equal in public schools understudied.

## Discussion

There have been several studies that reported a significant burden of *Tinea capitis* among school going children ( Nelson, *et al.*, 2003; Ogunbiyi, *et al.*, 2004; Onayemi, *et al.*, 2005; Anosike *et al.*, 2005; Olusola, *et al.*, 2014; Moto *et al.*, 2015). However, most of these studies have been conducted in rural areas, and also there are very few studies or none on the comparative prevalence of *Tinea capitis* among private and public nursery and primary schools. This study was carried out to fill this lacunar. Findings from this study revealed an overall prevalence rate of 60% from both private and public nursery and primary school. This rate was found to be higher than those obtained in Ethiopian Tanzania (4%) (WHO, 2005) and those previously conducted in Nigeria which varies widely: between 9.4% and 51.8% in the eastern part of Nigeria (Anosike *et al.*, 2005) and 51.7% among primary school children in a rural setting in south-west Nigeria (Olusola, *et al.*, 2014). But the rate was found to be lower than overall prevalence of 81.2% obtained among school going children from Mathare, informal settlement in Nairobi, Kenya (Moto *et al.*, 2015).

The high prevalence rates obtained in this study could be associated with high population growth, hence frequent contact with infected individuals. In relation to gender, 72 (60%) males were most infected with high prevalence rates, probably being associated with carrying objects on the scalp, sharing of combs, haircuts, and rough play as well as the heavy mingling with peers without consciousness on personal hygiene. The low prevalence rates in girls 48 (40%) could be associated with the facts that girls especially weave their hair, have high personal hygiene and do not normally involve in some forms of rough play and peers mingling. Nevertheless, these findings were contrary to those obtained in Egypt and some parts of Nigeria where girls had high prevalence rates of infection than boys (Omar, 2000; Anosike *et al.*, 2005).

In this comparative study, the prevalence of dermatophytosis infection was high among public schools (58.33%) (Table 3) compare with private schools (41.67%) (Table 2). This high prevalence rate in public schools could be associated with an observed overcrowding of pupil in class due to increased

students enrolment, poor personal hygiene, most pupils are engaged in regular petty trading and home chores after school carrying objects on their scalps (Fig.2), sharing of combs and barbing materials, as well as the heavy mingling with friends without consciousness.

### Conclusion

Several undocumented sources have placed prevalence of infectious diseases in public schools on the high side compared to private schools. This research work scientifically substantiate this undocumented assertion by recording a high prevalence rate of 58.33%, in *Tinea capitis* infection among public schools understudied. The high prevalence rate was identified to be as a result of regular exposure to various predisposing factors to *Tinea capitis* infection .

### Recommendation

*Tinea capitis* remains a common infectious disease among Nigerian school children. The following recommendations are hereby made;

- Health promotion and health education interventions should be enhanced to promote good hygiene, better living conditions, early identification and treatment.
- Carrying of objects on the scalp, sharing of hair clipper/ scissors, sharing of caps /scarves, combs, towels be discouraged among pupils
- Government should engage routing medical treatment of Fungi infections among school children.
- Workshop and routing health talk should be organized to educate barbers on the dangers attached to the use of single unsterilized clippers and other barbing material.

### Reference

- Abdel-Rahman SM, Herron J, Fallon-Friedlander S, Hauffe S, Horowitz A, Rivière GJ (2005): *Pharmacokinetics of terbinafine in young children treated for Tinea capitis*. *Pediatr Infect Dis J* 24(10):886–891
- Adefemi SA, Odeigah LO, Alabi KM. (2011): *Prevalence of dermatophytosis among primary school children in Oke-oyi community of Kwara state*. *Niger J Clin Pract*;14:23-8
- Anosike JC, Keke IR, Uwaezuoke JC (2005): *Prevalence and distribution of ringworm infection in primary schools in parts of Eastern Nigeria*. *J App Sci Environ Manag* 9:21–25

- Ayaya SO, Kamar KK, Kakai R (2000): *Aetiology of Tinea capitis*. East Afr Med J 78:531–535
- Chastain MA, Reed RJ, Pankey GA. (2001): *Deep dermatophytosis*. Report of 2 cases and review of the literature. Cutis; 67:457-62.
- Elewski, B (1996): *Tinea capitis is a fungal infection of scalp skin and hair characterized by erythema, scaling, pruritus and alopecia*. Dermatol Clin14:23–31
- Moto Jedidah Ndunge, John Muthini Maingi & Anthony Kebira Nyamache (2015): *Prevalence of Tinea capitis in school going children from Mathare, informal settlement in Nairobi, Kenya*. BMC Research Notes volume 8, Article number: 274.
- Nelson MM, Martin AG, Heffernan MP. (2003): *Superficial fungal infection: dermatophytosis, Tinea nigra, Piedra*. In: FreedbergIM, Eisen AZ, Wolff K, Austen KF, Goldsmith LA, Katz SI, eds. Fitzpatrick's dermatology in general medicine, 6th ed. New York: McGraw-Hill;. pp 1989-2005.
- Nilce M. Martinez-Rossi<sup>1</sup>, Tamires A. Bitencourt, Nalu TA. Peres, Elza AS Lang, Eriston V. Gomes, Natalia R. Quaresimin, Maíra P. Martins, Lucia Lopes and Antonio Rossi (2018): *Dermatophyte Resistance to Antifungal Drugs: Mechanisms and Prospectus*. Front. Microbiol., 29 May 2018 | <https://doi.org/10.3389/fmicb.2018.01108>.
- Nnoruka EN (2005): *Skin diseases in South-East Nigeria: a current perspective*. Int J Dermatol;44:29-33.
- Ogunbiyi AO, Daramola, OOM, Alese OO (2004): *The prevalence of skin diseases in Ibadan, Nigeria*. Int J Dermatol; 43:31-6.3.
- Oguzkaya Artan M, Koc AN, Baykan Z, Buldu H (2013): *Prevalence of Tinea capitis in primary school children*. Int J Med Investig 1 (2):104–110
- Olusola Ayanlowo, Ayesha Akinkugbe, Rita Oladele, and Mobolanle Balogun (2014): *Prevalence of Tinea Capitis Infection Among Primary School Children in a Rural Setting in South-West Nigeria*. J Public Health Africa. 5(1): 349.
- Onayemi O, Isezuo SA, Njoku CH, (2005): *Prevalence of different skin conditions in an outpatients setting in North- Western Nigeria*. Int J Dermatol;44:7-11.4.
- Omar AA (2000): *Ringworm of the scalp in primary school children in Alexandria: Infections and carriage*. East Afr Mediterr Health J 6(5):961–967
- Ornella Cervetti, Paola Albini, Veronica Arese, Federica Ibba, Manuela Novarino, Michele Panzone (2014): *Tinea Capitis in Adults*. Advances in Microbiology, 4, 12-14. (<http://www.scirp.org/journal/aim>) Clinica Dermatologica Torino, Torino, Italy
- Sarabi K (2008): *Tinea capitis: a review*. Dermatol Nurs 19(6):525–529
- Sidat MM, Correia D, Buene TP (2007): *Tinea capitis among children at one suburban primary school in the city of Maputo, Mozambique*. Rev Soc Brasl Med Trop J 40:473–475
- Silverberg NB, Weinberg JM, DeLeo VA (2002): *Tinea capitis: focus on African American women*. J Am Acad Dermatol 46:120–124
- Wagini NH and Mahuta, AU (2016): *Prevalence of ringworm infection among children in malumfashi community, identification of their etiological agents and the possible herbal therapy*. Katsina Journal of Natural and Applied Science 5 (2) , pp 167-173
- WHO (2005): *Epidemiology and management of common skin diseases in children in developing countries*. WHO/FCH/CAH/05.12 WHO/FCH/CAH/05.12, p 6.