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PREVALENCE OF HEAD LICE INFESTATION IN PRIMARY SCHOOL CHILDREN IN PORT HARCOURT
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ABSTRACT

***Background*: Head lice infestation affects mainly school-aged children and prevalence varies from region to region. Head lice infestation is of public health concern and screening is integrated into the School Health Programme.**
***Objective*: To determine the prevalence of head lice infestation in primary school – aged children in Port Harcourt, Nigeria.**
***Design*: Cross-sectional descriptive study.**
***Subjects*: A stratified multi-staged sampling technique was used to recruit pupils between six and 12 years of age, from thirteen primary schools located in three School Districts in the area. The heads of the pupils were inspected for head lice and nits with the aid of a battery operated Robi lice comb, magnifying glass and a torch as light source.**
***Results*: A total of 1350 pupils were studied, 743 (55%) females and 607 (45%) males giving a female to male ratio of 1.2:1. Ten (0.7%) of the pupils had head lice infestation while five (0.4%) had evidence of past head lice infestation. The number of infested pupils among the younger age group (six to nine years) was seven (0.8%) and is higher, though not statistically significant, than that in the older age group (ten to twelve years) which was three (0.6%) (p = 0.453). No male was found to be infested while ten (1.3%) females were infested and the observed gender difference was statistically significant (p = 0.002).**
***Conclusion*: Head lice infestation still exists in Primary School children in Nigeria, therefore, screening for head lice infestation should still remain a part of the School Health Programme.**

INTRODUCTION

Lice are obligate parasites of the human host. The three types include the head lice (Pediculus humanus capitis), body or clothing lice (Pediculus humanus corporis) and pubic or crab lice (Phthirus pubis) (1). The head louse is the most common of the three species and is a public health concern. It affects all, transcending social status. Healthy children between the ages of three and ten years are primarily affected (2). Worldwide prevalence of Pediculosis capitis ranges from 0 – 59% in various regions (3) Prevalence of more than 5% has been considered to be an epidemic.4 Various studies done in Nigeria have shown prevalence rates of 16.7%,5 12.7%,6 1.5 – 5.7%7 and 0.1 – 3.1%8 in primary school children in Ibadan in 2006, Ile-Ife in 1985, rural and urban areas of Ibadan in 1984 and Ilorin in 1988 respectively. Studies done outside Nigeria have shown prevalence rates of 8.6%,9 3.95%,10 33.7%,4 35%11 and 46%12 in primary school children in South Africa, Tehran, Australia, Brazil and Pakistan respectively.

The primary mode of transmission is head to head contact. In children, contact is common during play, while riding the school bus, and during classroom activities in which children sit in groups close to each other. The school environment therefore, makes children vulnerable to cross-transmission of head lice, which can then be passed on to family members (13).

The hallmark of Pediculosis capitis is pruritus (1). Excoriation and secondary pyoderma, following trauma due to scratching, may result in matting together of the hair, cervical and occipital lymphadenopathy. Severe cases may result in group A Streptococcal impetigo with the risk of developing rheumatic heart disease and glomerulonephritis (14). Head lice infestation in some individuals may be asymptomatic and thus go unnoticed (1). Such individuals may

however present a disease-transmission-risk for others who may develop symptoms, if infected. This therefore, necessitates the need for routine screening for head lice in children. The School Health Programme incorporates screening for head lice as part of the control of communicable diseases under the major component of School Health Services (15).

Pediculosis may detrimentally influence school children's learning performance by negatively affecting concentration, or through stigmatization by peers following detection (9). Head lice infestation also poses an economic burden, based on the direct and indirect costs of diagnostic and treatment practices (16). Added to the direct costs of treatment are indirect costs because of lost school days and lost productivity and wages of parents who must stay home to care for children who are sent home from schools. Another serious problem associated with head lice is from well-intentioned but misguided use of caustic or toxic substances to eliminate the lice. The social and psychological impact on infested children and their parents can lead to restraint in seeking advice from healthcare providers, which will lead to underestimation of the magnitude of the problem (5).

Head lice infestation is better investigated regionally because its prevalence may vary according to the social situation, genetic and cultural characteristics of a population (11). A number of studies (3,4,17) on head lice infestation have been conducted within and outside the country but most of the local studies were done over two decades ago. This study determines the present prevalence of head lice infestation in primary school children in Port Harcourt and compares it to that observed in the previous studies.

MATERIALS AND METHODS

Participants: A stratified multi-staged sampling technique was used to recruit pupils between 6-12 years of age, from thirteen primary schools located in the three school districts in Port Harcourt. The schools were first stratified into three school districts. They were also stratified according to school proprietorship into private and public. The thirteen schools were then selected by simple random method from the three school districts according to the ratio of schools in these districts. Six (three public and three private) schools were selected from Diobu, five (three public and two private) from Township and two (one public and one private) from Trans- Amadi school districts. In schools with more than one arm of a class, one arm was selected randomly to represent the others, while in schools with only one arm of a class, that arm was chosen. Arms were selected from all six classes in all the selected schools. In each selected school an average of 105 pupils aged six to twelve years were recruited. Fifteen to twenty pupils were selected randomly from each class using the class register. A total of 1350 pupils (743 females and 607 males) participated in the study.

Instruments: Battery-operated Robi lice combs, model number ME 400-01, were used for the study. The lice comb emits a light buzzing sound when switched on and the buzzing stops once lice are detected. Magnifying glasses and a torch, as light source, were used to inspect pupils' hair, scalp and white sheets unto which hair particles were combed. A simple 30cm wooden ruler was used to measure the distance of observed nits on hair shaft from the scalp.

Procedures: The children's heads were inspected and hair thoroughly combed from base to tip using a battery operated Robi lice comb, model number ME 400-01. The comb was afterward, inspected for lice and nits which were cleaned off the comb unto a white sheet of paper which was also inspected, using a magnifying glass, for the presence of lice and nits. A total of four lice combs were used. They were cleaned after use on every child by removing the combing unit and cleaning same with methylated spirit. The lice comb was then re-assembled after the combing unit had dried completely.

When nits were found on strands of child's hair during inspection, their distance from the scalp was measured using the wooden ruler and classified as either less than or equal to 0.6 cm, or greater than 0.6 cm from the scalp. Each child's hair was examined for a period of five minutes, timed with a stop-clock, by an assistant.

Data Analysis: Data was collated and analysed using the Epi-info 3.5.1 statistical software. In this study, a child was said to have head lice infestation if there was visualization of nits less than or equal to 0.6cm from the scalp on inspection (18) or visualisation of at least one head louse on inspection and/or following combing (19). The association between means was determined using the Student's t-test while the Chi Square ($\chi 2$) test was used to determine the association between proportions. A p value of less than 0.05 was regarded as significant when testing for significance between means and proportions.

Ethical clearance: Ethical clearance was obtained from the Ethics Committee of the University of Port Harcourt Teaching Hospital. Permission was obtained from the Rivers State Ministry of Education, the Head teachers of the index schools and the parents/guardians of the pupils. Parents of children that were found to have head lice infestation were invited to the respective schools where they were counseled and given a prescription for a pediculicide shampoo. Treated children had their hair inspected again for head lice to ensure cure.

RESULTS

Of the 1350 pupils, 616 (45.6%) were from Diobu School District, 511 (37.9%) were from Township School District and 223 (16.5%) were from Trans-Amadi School District giving a ratio of 2.8:2.3:1 respectively. There were 743 (55.0%) females and 607 (45.0%) males, giving a ratio of 1.2:1.

Table 1 shows the age and sex distribution of the study subjects. The age of the pupils ranged from six to twelve years with a mean age of 8.82±1.93 years and mode of nine years. The mean age of 8.86±1.97 years for females was higher than the mean age of 8.78±1.87 years for males. This difference was not statistically significant (t = 0.83, df = 1, p = 0.404).

Table 1
Age and sex distribution of the study subjects

Age (Years)	Female No. (%)	Male No. (%)	Total No. (%)
6	119 (56.9)	90 (43.1)	209 (15.5)
7	98 (53.6)	85 (46.4)	183 (13.6)
8	115 (52.5)	104 (47.5)	219 (16.2)
9	125 (53.0)	111 (47.0)	236 (17.5)
10	116 (55.5)	93 (44.5)	209 (15.5)
11	64 (51.2)	61 (48.8)	125 (9.3)
12	106 (62.7)	63 (37.3)	169 (12.5)
Total	743 (55.0)	607 (45.0)	1350 (100.0)

None of the 1350 pupils examined had live lice, while 15 (1.1%) had nits in their hair. Of the 15 pupils that had nits, 10 (0.7%) had nits found less than or equal to 0.6cm from the scalp (signifying a current infestation). Table 2 shows the distribution of head lice infestation in relation to age. The highest prevalence of head lice infestation of 1.9% was found among the six year old pupils. No head lice infestation was found in any nine and 12 year old pupil. Overall, the difference in the prevalence of head lice infestation in the different age groups was not statistically significant ($\chi 2 = 7.62$, df = 6, Fisher exact = 0.267). The mean age of 7.7±1.95 years for the pupils that had head lice infestation was found to be lower than the mean age of 8.83±1.93 years of those that were not infested. The observed difference was not statistically significant (t = 1.84, df = 1, p = 0.066).

Table 2
Distribution of head lice infestation in relation to age

Age	Head lice infestation No. (%)	No Head lice infestation No. (%)	Total
6	4 (1.9)	205 (98.1)	209
7	2 (1.1)	181 (98.9)	183
8	1 (0.5)	218 (99.5)	219
9	0 (0)	236 (100)	236
10	2 (1)	207 (99)	209
11	1 (0.8)	124 (99.2)	125
12	0 (0)	169 (100)	169
Total	10 (0.7)	1340 (99.3)	1350

$\chi 2 = 7.62$, df = 6, Fisher exact = 0.267

The study subjects were further grouped into two age groups; a younger age group consisting of non-adolescents aged six to nine years and an older age group consisting of adolescents ten to twelve years of age. Seven (0.8%) out of 847 of those in the younger age group were infested. This was higher than the three (0.6%) out of 503 of the older age group that were infested. This observed difference, however, was not statistically significant ($\chi 2 = 0.23$, df = 1, Fisher exact = 0.453).

All the 10 pupils that had head lice infestation were females consisting 1.3% of the 743 female subjects, while none of the males were infested (Table 3). This observed difference was statistically significant ($\chi 2 = 8.23$, df = 1, Fisher exact = 0.002).

Table 3
Distribution of head lice infestation in relation to gender

Gender	Head lice infestation No. (%)	No Head lice infestation No.(%)	Total
Female	10 (1.3%)	733 (98.7%)	743
Male	0 (0.0%)	607 (100.0%)	607
Total	10 (0.7%)	1340 (99.3%)	1350

$\chi 2 = 8.23$, df = 1, Fisher exact = 0.002

DISCUSSION

The 0.7% prevalence of head lice infestation of primary school children found in the present study is higher than the 0.1% found in rural school children by Ebomoyi8 in an earlier study in Ilorin, Western Nigeria. Ebomoyi's (8) study included two rural communities near Ilorin, where overcrowding is assumed to be less than in the urban setting, such as Port Harcourt City, where the present study was conducted. With overcrowding, there is increased physical contact with an increased risk of head lice transmission and therefore, infestation. This may account for the higher prevalence seen in the present study. The prevalence of head lice infestation found in the present study is also higher than the 0% prevalence found in an all black school in South Africa (9). The fact that thorough combing, as done in this study, was only done when there was a suspicion of head lice infestation in the South African study, may account for possible missed cases, and the consequent zero prevalence they recorded.

The prevalence in the present study is lower than some studies (10,20,21) done in Iran. This study also contrasts sharply with higher prevalence rates observed in other areas outside Nigeria (4,11,12). The fact that head lice infestation has been reported to be less prevalent in the black race (22) due to the relative difficulty of the head louse to attach to the hair shaft of blacks, may account for this difference as all the pupils in the present study were of the black race, unlike the above mentioned studies. The prevalence of head lice infestation has been noted to vary with varying locality, seasons and times (3,17,23).

The highest age-specific prevalence rate of 1.9% of head lice infestation seen among the six year old pupils in the present study, though not statistically significant, is similar to trends observed by Boyle (24), Mumcuoglu *et al* 25 and Nazari and Saidijam (23). They found the highest prevalence of head lice infestation among six to eight year, six and nine years and grade 1 (predominantly six year old) pupils in their respective studies. Boyle (24). attributed this finding to increased frequency of interpersonal contact in this younger age group. Similarly, in a pilot study in Saudi Arabian children (24), prevalence ranged from less than 2% in the first year of life, rose rapidly to around 30% in ages six to eight years and thereafter declined steadily to about 16% by age ten years. This could be explained by the fact that most children less than a year have not started school and therefore have less physical contact from other school children, where transmission is said to be highest (13). The finding in the present study appears to contrast with that of Ebomoyi (8) who found the highest prevalence rate of 0.8% among eight to nine and 12 to 13 year old children in Ilorin, Kwara State. This however was not statistically different from the prevalence of 0.7% he found among six to seven year old children in the same study.

The higher prevalence of head lice infestation of 0.8% in the younger age group (six to nine years) compared with that of 0.6% in the older age group (ten to twelve years) observed in the present study contrasts with that seen in Tabriz, Iran (20). In that study the age group of 10 to 14 years had the highest prevalence rate (6.5%) when compared with the five to nine (5.7%) and 15 to 19 (1.6%) year age groups and the difference was statistically significant. However, the difference between the prevalence rates observed between the five to nine and 10 to 14 year age groups alone was not statistically significant. This could be

explained by the high proportion of females that study had in the 10 to 14 year age group, which is a risk factor for head lice infestation (11,20,26). Over half of the females in that study were in the 10 to 14 year age group, while about a quarter were in both the five to nine, and 15 to 19 age groups each.

The statistically significant higher prevalence of head lice infestation in females than in males observed in the present study compares favourably with findings of other studies (4,8,11,17,20,21,23,26). This may be because females are more likely to share hair accessories, combs, clothing and hats. Females, unlike males use combs and hair accessories more frequently as they attend to their longer hair more frequently, hence the higher tendency to share these hair accessories. The present study however contrasts with some previous studies (5,25) in which females were not more infested than males. Mumcuoglu *et al* (25) found a similar prevalence of 11.2% and 11.3% in girls and boys respectively in Israel. Their methodology did not take the extra precaution of combing through every subject's hair – a factor which may have also contributed to the observed difference compared to this study.

LIMITATION

Due to the stigmatisation associated with head lice infestation, parents and guardians having been informed about the study in advance could have treated their wards that may have had possible infestation, before actual examination during the study.

CONCLUSION

The study found that the prevalence of head lice infestation in primary school children aged six to twelve years in Port Harcourt of 0.7%, is lower than that observed in previous studies, probably due to less overcrowding and better hair-care now than in past years. The younger age group (six to nine years) had a higher prevalence of head lice infestation than the older age group (ten to twelve years) in the study population, possibly as a result of the increased inter-personal contact known to occur in the younger age group. No male in the study group had head lice infestation. It is recommended that head lice screening using the head lice comb should be a part of the School Health Programme (SHP). Screening children before admittance into schools, and periodically while in school, would reduce the rate of transmission and infestation of non – affected children. Also, health education should also be offered to children and parents on the risk factors for head lice in school-aged children.

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