

## A Comparative Survey of the Prevalence and Pattern of Skin Infections and Infestations Between Urban and Rural Nigerian Primary School Pupils

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**Abstract:** In a prospective study undertaken to determine the prevalence and pattern of Skin Infections and Infestations (SII), among 554 urban and 566 rural Nigerian pupils, SII were found in 168 [30.3%] urban and 285 (50.3%) rural pupils. The greater percentage of the rural compared to the urban pupils is statistically significant.  $\chi^2 = 46.63$ ,  $p < 0.05$ . The pattern of SII among the rural and urban pupils was similar. Impetigo, Dermatophytosis (tinea or ringworm infections), Pityriasis versicolor and Scabies the most prevalent SII, were found in 68 (12.3%), 67 (12.1%), 20 (3.6%) and 21 (3.6%) 554 urban pupils, respectively. Among the rural pupils, Impetigo, Dermatophytosis, Pityriasis versicolor and Scabies were found in 149 (26.3%), 101 (17.8%), 48 (8.5%) and 27 (4.8%) 566 pupils, respectively. Four hundred and thirty two (76.3%) of the 566 rural pupils and 271 (48.9%) of the 554 urban had unsatisfactory hygiene. Of the 432 rural pupils with unsatisfactory hygiene, 229 (53%) had SII compared with 56 (41.8%) of the total 134 pupils with satisfactory hygiene.  $\chi^2 = 4.710$   $p < 0.05$ . Also, of the 271 urban pupils with unsatisfactory hygiene, 116 (42.8%) had SII compared with 52 (18.4%) of the 283 pupils with satisfactory hygiene  $\chi^2 = 38.00$   $p < 0.05$ . To reduce the prevalence of SII among school children, appropriate interventions to improve the standard of living and hygiene of the affected populace especially the rural dwellers, should be instituted.

**Key words:** Skin infections, infestations, comparisons, pupils, urban and rural

### INTRODUCTION

Infections and infestations of the skin are common occurrences among school age Nigerian children (Ogunbiyi *et al.*, 2005). Differences may exist in the prevalence of Skin Infection and Infestation (SII) between urban and rural settlements children because of the variance in living conditions. Most rural settlements are farms or huts with the majority of the populace engaged in agricultural or related professions and poorly educated. The rural settlements often lack facilities such as electricity, potable water supply, hospitals and all but the simplest educational institutions, which are found in urban regions (Cecilia, 1998). Most of the urban dwellers are elites and the majority of them are engaged in non-agro allied jobs.

The relative differences in prevalence and pattern of SII among the urban and rural located African children have never been studied. The world health organization has stated that studies carried out among the school age

group in any locality are a good reflection of what obtains in the community (World Health organization, 1993). The aim of the present study therefore, is to determine, compare and discuss the differences in the prevalences and pattern of SII among Nigerian pupils dwelling in urban and rural localities.

The Ijesa people among whom this study was carried out live in 2 urban, 2 semi urban and 2 rural local government areas of Western Nigeria. Children from the semi-urban local governments were excluded in order to compare urban and rural primary schools strictly.

### MATERIALS AND METHODS

By the process of stratified random sampling, 600 pupils each were selected from a sampling frame consisting of 50 urban primary schools with 14, 871 pupils and 114 rural schools with a total of 14,239 pupils, between February and July 2003. The techniques of stratified random sampling were adopted for school

location, class, sex and age selection. Out of the total 52 urban and 14 rural located schools, 10 urban and 20 rural schools were randomly selected. Of these urban and rural schools, 60 and 30 pupils, respectively, were selected randomly from each school. Each school has 5 classes (classes 1-5) and the class registers were used to randomly select the pupils in numbers which took cognisance of equal proportions for the classes, ages and sexes of the pupils. Data was obtained by means of a structured questionnaire. This included age sex, domiciles, presence of SII, occupation and education of parents. Data was obtained by means of a structured questionnaire. The social classes of the parents were assessed according to the method used by (Oyedemi *et al.*, 1996).

Physical examination was carried out in a well-lit room and aided by the use of magnifying glasses, with the subjects undressed. The presence of SII was noted and recorded. Mycological, bacteriological and mite identification were also carried out in order to confirm the diagnoses and identify the underlying agents. Swabs of impetiginous lesions and furuncles were taken aseptically and subjected to bacteriological microscopy culture and sensitivity. Also skin scrapings were taken from the lesions in all the pupils with dermatophytosis and the scrapings were visualized under the microscope after application of 5% potassium hydroxide. Also, scrapings were cultured in sabouraud's containing chloramphenicol and cycloheximide to inhibit bacterial growth. The skin burrows and fresh papules were scrapped with a new size 15 blade and then observed microscopically for the mite, ova and scybala of the *sarcoptes scabiei* mite after application of a drop of mineral oil on the selected lesion. Appropriate treatment and instruction for disease care were given immediately after diagnosis to the individuals affected.

Hygiene was assessed by the researcher using his knowledge of the general appearance of children in this community to classify them as having average, above average and below average status. The assessment was based on the scores derived from examining the state of the pupils' clothes, skin, nails, teeth and hair. Appropriate

treatment and instruction for disease care were given immediately after diagnosis to the individuals affected.

The results were analysed with the Pearson chi-squared ( $\chi^2$ ) tests using the SPSS for Windows software version 11.0 (SPSS Inc., Chicago, IL). Yates correction was applied when necessary and p values < 0.05 were considered statistically significant.

## RESULTS

**Age and sex distribution of pupils studied:** Of the 1,200 selected pupils, 1,120 completed the study. This 1,120 were studied and consisted of 554 urban and 566 rural pupils. The 554 urban pupils consisted of 268 (48.4%) boys and 286 (51.6%) girls, thus giving a male to female ratio of 1:1.1. Of the 566 rural pupils studied there were 278 (49.1%) boys and 288 (50.9%) girls, giving a male to female ratio of 1:1. The age and sex distribution of the children studied are shown in Table 1.

**Prevalence of Skin Infections and Infestations (SII):** A total of 191 SII were found among 168 (30.3%) of the 554 urban pupils while 353 SII were found among 285 (50.4%) of the rural pupils. Three hundred and eighty six urban and 281 rural pupils had no SII. The pattern of SII was similar among the urban and rural pupil. The greater percentage of children with SII from the rural settlements is statistically significant  $\chi^2 = 46.63$ ,  $p < 0.001$ .

**Pattern of skin infections and infestations:** Impetigo, dermatophytosis, pityriasis versicolor and scabies were the leading SII found among the urban pupils with prevalence rates of 12.3, 12.1, 3.6 and 3.6%, respectively. Amongst the rural pupils the corresponding prevalence figures obtained for Impetigo, dermatophytosis, pityriasis versicolor and scabies were 26.3, 17.8, 8.5 and 4.8%, respectively. There was a statistically significant difference in the greater percentage of rural pupils with these SII compared with the urban pupils. Altogether impetigo, dermatophytosis, pityriasis versicolor and scabies constituted more than 89.5% of the SII found in both the urban and rural pupils. The remaining minority of

Table 1: Age and sex distribution of the children studied

| Age groups<br>in years | Urban |        | Rural |        | Total           |
|------------------------|-------|--------|-------|--------|-----------------|
|                        | Male  | Female | Male  | Female | Urban and rural |
| 6-7                    | 46    | 51     | 42    | 53     | 192             |
| >7-8                   | 34    | 38     | 45    | 47     | 164             |
| >8-9                   | 48    | 50     | 51    | 53     | 202             |
| >9-10                  | 36    | 37     | 49    | 47     | 169             |
| >10-11                 | 47    | 58     | 41    | 43     | 189             |
| >11-12                 | 57    | 52     | 50    | 45     | 204             |
| Total                  | 268   | 286    | 278   | 288    | 1120            |

Table 2: Numbers, percentages and prevalence of sii among the pupils in rural and urban settings

|                       | Urban       |              |            | Rural       |              |            | $\chi^2$ | p     |
|-----------------------|-------------|--------------|------------|-------------|--------------|------------|----------|-------|
|                       | No of cases | (%) of Total | Prevalence | No of cases | (%) of Total | Prevalence |          |       |
| Infestation           |             |              |            |             |              |            |          |       |
| Impetigo              | 68          | (34.4)       | 12.3       | 149         | (41.2)       | 26.3       | 35.38    | <0.01 |
| Dermatophytosis       | 67          | (33.8)       | 12.1       | 101         | (27.9)       | 17.8       | 7.38     | <0.01 |
| Pityriasis versicolor | 20          | (10.1)       | 3.6        | 48          | (13.2)       | 8.5        | 1.65*    | <0.01 |
| Scabies               | 21          | (10.6)       | 3.6        | 27          | (7.5)        | 4.8        | 0.27*    | 0.60  |
| Viral warts           | 9           | (4.6)        | 1.6        | 12          | (3.3)        | 2.1        | 0.15*    | 0.70  |
| Furuncle              | 2           | (1.0)        | 0.4        | 7           | (1.9)        | 1.2        | 1.71*    | 0.10  |
| Creeping eruptions    | 3           | (1.5)        | 0.5        | 5           | (1.4)        | 0.9        | 0.11*    | 0.75  |
| Mulloscum contagiosum | 1           | (0.5)        | 0.2        | 4           | (1.1)        | 0.7        | 0.76*    | 0.38  |
| Total                 | 198         | (100.0)      | 35.7       | 362         | (100.0)      | 63.9       |          |       |

Key: Figures with asterisk (\*) indicate chi-square ( $\chi^2$ ) with Yates correction applied.  $\chi^2$  = chi square. p = p value. [Degree of freedom was one in all cases]. prevalence= number of pupils infected or infested with the SII divided by the 554 urban or 566 rural number of children multiplied by 100. Note-some pupils had more than one infection or infestation, so that number of SII cases exceeds the number of pupils

Table 3: Educational status of the parents of the pupils

| Parental Educational Status  | Urban                   |                         | Rural                   |                         |
|--|-------------------------|-------------------------|-------------------------|-------------------------|
|  | Mothers No (%) of Total | Fathers No (%) of Total | Mothers No (%) of Total | Fathers No (%) of Total |
| 1. Graduate and postgraduate   | 19(3.4)                 | 40(7.2)                 | 0                       | 3(0.5)                  |
| 2. School certificate plus professional training                                   | 83(15.0)                | 92(16.6)                | 12(2.1)                 | 31(5.5)                 |
| 3. School certificate Or grade II teachers Certificate completed                   | 254(45.8)               | 249(45.0)               | 79(14.0)                | 84(14.7)                |
| 4. Primary 181(32.7) VI completed plus modern III, or school certificate attempted | 155(28.0)               | 260(45.9)               | 275(49.5)               |                         |
| 5. Below primary VI completed  | 17(3.1)                 | 18(3.2)                 | 215(38.0)               | 173(30.6)               |
| Total  | 544(100)                | 544(100)                | 566(100)                | 566(100)                |

the SII, consisted of viral infections such as warts, mulloscum contagiosum and the bacterial infection furunculosis Table 2.

**Hygiene status of pupils and SII prevalence:** Four hundred and thirty two (76.3%) of a total 566 pupils in the rural areas had unsatisfactory levels of hygiene compared with 271 (48.9%) of a total 554 pupils in the urban settlement. Thus, level of hygiene was better among the urban pupils in comparison with the rural. Of the total 432 rural pupils with unsatisfactory hygiene, 229 (53%) had SII compared with 56 (41.8%) of the total 134 pupils with satisfactory hygiene;  $\chi^2 = 4.71$  p < 0.05. Also of the 271 urban pupils with unsatisfactory hygiene, 116 (42.8%) had SII compared with 52(18.4%) of the 283 pupils with satisfactory hygiene;  $\chi^2 = 37.96$  p < 0.05.

**Educational status of the parents:** Table 3 gives the information concerning the educational status of the

parents of the pupils studied for both the urban and rural settings. Parents having university or post graduate education were a minority in both settlements; in fact only 3 rural parents (all fathers) had university education, whilst 40 urban located parents had university education. Majority of the urban located parents had as their highest level of educational attainment, the school certificate or equivalents. Majority of the rural located parents however had as their highest level of educational attainment the primary six certificates.

**Maternal educational status and SII prevalence in their children:** Infections and infestations of the skin were found more commonly amongst children whose mothers were illiterates or poorly educated (mothers with below primary 6 completed) compared with children of better-educated mothers (primary 6 completed and above education). Thus, among the urban pupils, 10 (58.8%) of the total 17 pupils of poorly educated had SII compared

Table 4: Education levels attained by mothers and numbers or rates of sii in their children

| Educational level of mothers  | Urban   |                                | Rural   |                                |
|---|---|--------------------------------|---|--------------------------------|
|   | No. of pupils with SII and % of mothers in the category | No. of mothers in the category | No. of pupils with SII and % of mothers in the category | No. of mothers in the category |
| Postgraduate and graduate   | 4 (21.1%)   | 19                             | 0   | 0                              |
| School certificate plus Professional training                       | 20 (24.1%)  | 83                             | 5 (71.4%)   | 12                             |
| School certificate or grade 2 teachers certificate                  | 81 (31.9%)  | 254                            | 37 (46.8%)  | 79                             |
| Primary six completed plus modern 3 or School certificate attempted | 53 (29.3%)  | 181                            | 134 (51.5)  | 260                            |
| Below primary   |   |                                |   |                                |
| Six completed   | 10 (58.8%)  | 17                             | 109 (50.7)  | 215                            |
| Total   | 168   | 554                            | 285   | 566                            |

with 158(29.4%) of the 537 pupils of better educated mothers.  $\chi^2 = 5.42$ ,  $p = 0.02$ . On the other hand for the rural pupils, 109 (50.7%) of the total 215 pupils of poorly educated had SII compared with 176(50.1%) of the 351 pupils of better educated mothers  $\chi^2 = 0.02$ ,  $p < 0.90$  Table 4.

## DISCUSSION

The results of the present study have established that SII are common among Nigerian primary school pupils. Our prevalence figures for the urban and rural localities are similar to those of previous studies conducted in Africa (Ogunbiyi *et al.*, 2005; Dagnew and Erwin, 1991). This is to be expected because of the similar climatic, hygienic and socio-economic factors obtaining in the places of the studies. The prevalence rates of SII in the present study are higher among rural, compared with the urban pupils and these differences are statistically significant. Previous studies on SII have not documented the disparities between urban and rural settlements because of the nature of their design, which basically is not comparative (Ogunbiyi *et al.*, 2005; Oyedeji *et al.*, 1996).

The increased rates of infection found among pupils with unsatisfactory hygiene in the present study is as expected. It is conceivable that poor hygiene could lead to infection because microbes, parasites and other pathogens thrive best in dirty and unwholesome environments. The high prevalence of unsatisfactory hygiene status found among the urban and rural pupils may be a reflection of the level of sophistication and quality of the general care and health supervision obtained from their parents and teachers, since all of the pupils studied spend most of their time under their care and authority. The disparity in the prevalence of SII between urban and rural pupils documented in this

research may therefore be partly due to the differences in care and supervision obtainable in the two settlements.

A greater proportion of the parents living in the urban settlement are better educated compared to the rural parents (Cecilia, 1998) as documented in this research. Thus, it can be inferred that the urban parents are likely to get better-paid jobs and therefore have a higher socio-economic status compared with the rural dwellers. In general well educated persons are unlikely to reside in rural communities, where services or facilities such as good transportation system, housing, hospitals, pipe borne water and electricity are scarce or non-existent. Urban setting parents are therefore more favourably placed to provide good quality care. The salutary effect of maternal education on the prevalence of SII in their children has been shown by our results for the urban communities. That the same effect was not shown to any significant level with the rural data may be due to other confounding factors in that locality such as unsatisfactory water supply, sanitation and environmental health rubbing off in the rural area, the beneficial effects of maternal education which have been clearly shown in previous studies (Saxena *et al.*, 1999; Cleland and Van Ginneken, 1998).

Our results showing impetigo and dermatophytosis as constituting more than two thirds of the diseases here recorded are confirmatory of Oyedeji *et al.*'s finding in a general survey in the same area (Oyedeji *et al.*, 1996). Trauma breaches the normal protective surface of the skin and predisposes to bacterial skin infections (Behrman *et al.*, 2000). Nigerians, like other school children are prone to injuries especially, as some of them, notably in the rural areas are co-opted to assist in farming. Other activities, which may predispose children to injury, are hawking, running errands and sport. Other predisposing factors to both bacterial and dermatophyte skin infections include ignorance, malnutrition, overcrowding

and humidity (Oyedeji *et al.*, 1996; Somorin *et al.*, 1997). Some of these factors are more applicable to rural areas, thus explaining the preponderance of bacterial and dermatophytosis among the rural pupils.

The high prevalence of SII can also be linked to the poor supply of satisfactory water in both urban and rural communities. Less than 30% of Nigerians presently has access to potable water supply (Rabiu and Kyari, 2000). Furthermore the situation is worse in the rural areas where streams constitute the source of water supply for most domestic purposes. The amount of effort expended in obtaining water from streams compels economy in usage and results in sub-optimal hygiene and health. This becomes worse in the dry seasons when most streams dry out and the remaining pockets become muddy and dirty. Transmission of viral warts and *Mulloscum contagiosum* has also been linked to swimming in water containing infected particles or communal baths which is often the practice in rural areas (Alan, 1987; Alan, 1988). It is therefore not surprising that the prevalence of viral infections was higher in the rural areas.

### CONCLUSION

It is concluded that infections and infestations of the skin are common problems among Nigerian primary school children. It is very important that adequate and urgent steps are taken to control these skin infections and infestations due to the fact that most of these infection and infestations of the skin are infectious and they can give rise to life threatening complications. The school health programme which embraces provision and/or promotion of health instruction, health services, control of communicable diseases and healthful environment has been said to be largely at policy level in Nigeria (Akani *et al.*, 2001) Yet this may be a means of promoting and inculcating hygienic habits thereby, controlling SII among school pupils. It should be fully implemented. The government and other philanthropic organisations should institute measures to raise the standard of living in the local communities such as provision of pipe borne or bore hole water. Studies have shown that supply of good water is a key intervention. It promotes personal hygiene and reduces skin colonization, infections and infestations (Alex, 2003; Penzer, 2004). The standard of education of the parents especially, the mothers should also be raised by making education free to secondary level with effective legislation to back it up. Health facilities should be provided for the prompt treatment of SII to reduce the risk of transmission.

### REFERENCES

- Akani, N.A., K.E.O. Nkanginieme and R.S. Oruamabo, 2001. The school health programme: A situational revisit. *Nig. J Paediatr.*, 28: 1-6
- Alan, B.S., 1987. Skin Problems in Childhood. *Postgraduate Doctor.*, 9: 294.
- Alan, B.S., 1988. Skin Problems in Teenagers. *Postgraduate Doctor.*, 10: 5-9.
- Alex, V., 2003. Water and Sanitation, the Target and Challenges. *Student BMJ.*, 11: 94-96.
- Behrman, R.E., R.M. Kliegman and H.B. Jenson, 2000. *Nelson's Textbook of Pediatrics* W.B Saunders Company, Philadelphia, U.S (16th Edn.), pp: 2028-2046.
- Cecilia, T., 1998. Rural- Urban Interactions: A Guide to Literature, Environment and urbanization., 10: 147-52.
- Cleland, J.G. and J.K. Van Ginneken, 1998. Maternal education and child survival in developing countries: The search for pathways of influence. *Soc. Sci. Med.*, 27: 259-572.
- Dagnew, M.B. and G. Erwin, 1991. Epidemiology of common transmissible skin disease among primary school children in North-West Ethiopia. *Trop. Geog. Med.*, 43: 152-155.
- Ogunbiyi, A.O., E. Owajoje and A. Ndahi, 2005. Prevalence of skin disorders in school children in Ibadan, Nigeria. *Pediatr Dermatol.*, 22: 6-10.
- Oyedeji, G.A., S.K. Olamijulo, A.I. Osinaike, V.C. Esimai, E.D. Odunusi and T.A. Aladekomo, 1996. Secular trends in the growth of children aged 0-6 years in a rural Nigerian community. *Ann. Trop. Paediatr.*, 16: 11-17.
- Penzer, R., 2004. Skin Care and Skin Health. *Postgraduate Doctor Africa*, 26: 37-39.
- Rabiu, M.M. and F. Kyari, 2000. Vitamin A deficiency. *Niger. J. Med.*, 11: 6-8.
- Saxena, S., A. Majeed, M. Jones, 1999. Socio-economic differences in childhood consultation rates in general practice in England and Wales. *Br. Med. J.*, 318: 624-626.
- Somorin, A.O., I. Nwabudike, A.I. Adetosoye and O.O. Hunponu-Wusu, 1997. Dermatophytosis in School Children. *Nig. J. Pediatr.*, pp: 439-441.
- World health Organization, 1993. The Second Report of W.H.O. Expert Committee on Shistosomiasis. W.H.O/T.D.R: pp: 1-26.