

Risk Factors in the Transmission of Scabies among School Children in Zaria

LI Audu*, WN Ogala⁺, AM Yakubu⁺

Summary

Audu LI, Ogala WN, Yakubu AM. Risk Factors in the Transmission of Scabies among School Children in Zaria. *Nigerian Journal of Paediatrics* 1997; 24:35. One thousand subjects randomly selected from local Qur'anic and public primary schools in Zaria, were studied to determine the prevalence rate of scabies as well as to identify risk factors associated with its transmission among these groups of children. The subjects were initially clinically screened and those who satisfied the clinical criteria for diagnosis had their skin lesions scraped for microscopic confirmation. The overall prevalence rate was 6.6 percent with a significantly higher prevalence rate ($p < 0.05$) in the local Qur'anic schools than the public primary schools. Both sexes and all age groups were equally affected. Overcrowding as evidenced by the large number of the subjects who slept together, was closely associated with scabies transmission. Subjects with scabies took their bath much less often than the controls. The use of soap and sponge to bath was less common with those who had scabies, whose laundry practices were also significantly poorer than those of the controls. Exchange of clothes among the subjects was not significantly associated with scabies transmission. A significant proportion of the children with scabies were not living with their parents. It is suggested that a comprehensive school health programme with emphasis on maintenance of good personal hygiene and regular school inspection, should be instituted in these schools to minimize the morbidity resulting from the disease.

Introduction

AN estimated 300 million people in the world are infected with scabies,¹ with a wide variation in its prevalence rates; it is a significant cause of morbidity, but rarely a life threatening disease. Although all age groups are vulnerable to scabies infestation,²⁻⁴ available data suggest a higher susceptibility in the younger than in the older age group,⁵⁻⁷ which may be due to development of herd immunity from previous exposure to the sarcoptes mite.⁸

While the role of fomites in the transmission of scabies is doubtful,⁹ there is a consensus of opinion on the significant role of close personal contact in the spread of this disease.¹⁰⁻¹² However, opinion differs on the role of personal hygiene in its transmission,^{2,5,13,14} Effective control measures against

scabies depend largely on a thorough understanding of its epidemiology. There is to our knowledge, no studies on the epidemiology of scabies in Zaria. The present study was thus undertaken in order to determine the prevalence rate of the disease and also to identify risk factors in its transmission among elementary school children in Zaria, who attended either the local Qur'anic schools (LQS) or the Public primary schools (PPS). LQS are private schools operated exclusively in the northern part of the country to provide fundamental background to Islamic religious teaching for muslim children. The schools are owned and financed solely by individual Islamic teachers. Children attend these schools from their homes which may be several kilometres away. It is unusual to find children attending these schools within their own locality, the concept being that the farther away the children are from their homes, the stronger their enthusiasm to study Islam. Most of the children are therefore, accommodated within the school premises where accommodation facilities are poor, with large numbers of the subjects

**Ahmadu Bello University Teaching Hospital,
Zaria**

Department of Paediatrics

* Lecturer

+ Professor

Correspondence: LI Audu

sleeping in single and poorly ventilated and non-spacious rooms.

As a result of inadequate funding, the children are left to fend for themselves and to pay for their teaching. These schools are inevitably characterized by overcrowding and poor personal hygiene of the subjects who are thus exposed to several health hazards. By contrast, PPS admit children with no special religious affiliation and therefore, represent the traditional community of Zaria city. Unlike the LQS, PPS do not provide boarding accommodation for the children who attend the schools from their homes.

Subjects and Methods

Children attending the local Qur'anic and public primary schools in Zaria comprised the subjects of the present study which was conducted between June and December 1993. The choice of these two types of schools was based on knowledge of the distinct characteristics of the institutions. Seven LQS, and three PPS were randomly selected from a list of these schools in the study area. Predetermined sample sizes of 700 and 300 subjects were then randomly selected from the PPS and LQS, respectively. All the selected subjects were screened for scabies using a structured questionnaire to elicit relevant symptoms such as pruritus, presence of erythematous papules, vesicles, nodules or burrows and positive history of contact with persons with similar skin rashes. The distribution of the skin rashes was also carefully noted. A general physical examination was then carried out with emphasis on the identification of pallor, peripheral lymphadenopathy and oedema. The blood pressure (BP) of all the subjects was measured and recorded.

Assessment of personal hygiene of each subject was carried out, using the following criteria as defined for the purpose of this study: (a) cleanliness of clothes worn and (b) when last a subject took a bath. The outcome of this assessment was graded as follows:

- i) Good personal hygiene = clean clothes; has taken bath on the day of examination.
- ii) Fair personal hygiene = dirty ragged clothes; has taken bath on the day of examination
- iii) Poor personal hygiene = dirty/ragged clothes; has not taken bath in the past two days.

Fresh lesions (non-excoriated papules, vesicles and burrows) were scraped for microscopic examination using the method described by Muller, Jacob and Moore.¹⁵ The presence of adult mite, ova or scybala confirmed the diagnosis of scabies. Additionally, swabs of infected skin lesions (pustules) were also subjected to microscopy, culture and sensitivity. Urine was obtained from all the scabietic subjects and tested for protein (*alburstix*) and red blood cells (microscopy).

To assess the role of factors such as personal hygiene, overcrowding, laundry services and exchange of clothing materials in scabies transmission, age and sex matched controls were selected from among the sampled pupils who did not satisfy the clinical and laboratory criteria for the diagnosis of the disease. Relevant demographic and clinical information was also obtained from the controls.

All the patients were treated with parental consent, by daily topical application of 25 percent benzylbenzoate emulsion for two days. They were reviewed two weeks later and those whose lesions had not disappeared, or in whom fresh lesions had erupted, were given a second course of benzylbenzoate topical application.

Data obtained were analysed, using the student's 't' and chi-square tests as appropriate, to test the significance of age and sex-related differences in prevalence rates as well as the significance of investigated-risk factors.

Ethical approval was obtained from the Ahmadu Bello University Teaching Hospital, Zaria, Ethical Committee.

Results

Sixty six (48 from LQS and 18 from PPS) of the 1000 pupils (300 LQS and 700 PPS) satisfied the clinical and microscopic criteria for the diagnosis of scabies, giving an overall prevalence rate of 6.6 percent. The prevalence rates from the LQS and PPS were 16 percent and 2.6 percent respectively; the difference in the prevalence rates was significant ($P < 0.001$).

Table I shows the age and sex distribution of all the subjects. The prevalence rate was highest in patients aged between three and eight years (7.4 percent) and lowest in patients aged between 15 and 20 years (4.9 percent). The difference in the age specific prevalence rates was however, not significant ($X^2 = 2.015$, $P > 0.05$). Except for the age

group 9-14 years where the prevalence rate for the males (8.6 percent) was significantly higher than that of the female pupils (3.1 percent; $P < 0.05$), both sexes were equally affected in the other age groups.

Table I
Age Groups and Sex of the Patients

Age Group (yr)	Sample size (No.)			Number with Scabies (%)			P value
	Male	Female	Total	Male	Female	Total	
3-8	220	52	272	15(6.8)	5(9.6)	20(7.4)	NS
9-14	325	98	423	28(8.6)	3(3.1)	31(7.3)	<0.05
15-20	242	63	305	12(5.0)	3(4.8)	15(4.9)	NS
Total	787	213	1000	55(7.0)	11(5.2)	66(6.6)	NS

Figures in parenthesis represent percent of Total
NS = Not significant

Table II
Variables in the Risk Factors in Scabies Transmission

Variable	No of Patients	No of Controls	P value
Sleeping partner present	44(66.7)	34(51.5)	>0.05
Mean number of sleeping partners	4.2 ± 3.2	2.4 ± 0.7	<0.001
Mean number of days clothes are worn before they are washed	5.1 ± 1.6	2.9 ± 1.7	<0.001
Mean number of baths/week	4.1 ± 1.6	5.9 ± 3.7	<0.001
Use of sponge and soap (positive response)	45(68.2)	60(90.9)	<0.001
Exchange of clothing materials	10(15.2)	6(9.1)	>0.1
Living with biological parents	19(28.8)	40(60.6)	<0.001
Personal hygiene			
Poor	34(51.5)	8(12.1)	<0.05
Fair	27(40.9)	34(51.5)	>0.05
Good	5(7.6)	24(36.4)	<0.05

Figures in parenthesis represent percent of total

In Table II, a comparison of the various suspected risk factors in scabies transmission between pupils with scabies and the controls is shown. While the mere presence of a sleeping partner did not seem to affect the acquisition of scabies among the pupils, the number of sleeping partners was significantly higher among the scabietics than the controls. Pupils with scabies washed their clothes less frequently and took their bath less regularly than

the controls. Furthermore, a significantly lower percentage of the scabietic pupils made use of sponge and soap for bathing compared with the controls. Exchange of clothing materials was an uncommon practice among both the scabietic and non-scabietic pupils. While about 60 percent of the controls lived with their parents, only about 29 percent of scabietic pupils were staying with their parents. The table also shows that poor personal hygiene was more characteristic of the pupils with scabies than the non-scabietic pupils.

Discussion

While the overall prevalence rate of 6.6 percent as shown in the present study was close to the 6.4-7 percent reported from East Africa,¹⁶ it was higher than the 4.2 percent reported by Reid and Thorn¹⁷ and much lower than the 31.0 percent and 59.2 percent reported from Tanzania⁵ and India,¹⁸ respectively. The wide variation in the prevalence rates from different parts of the world may be due partly to variations in the study population. For example, while the present study involved two different types of elementary schools, other studies were based on the general population either in the community,⁵ or within the household.¹³ The British study by Church and Knowledge⁶ showed that scabies was a disease of the household and that the schools did not play a significant role in its transmission. The Qur'anic school setting is similar to that of the family, with a high degree of personal contact caused by overcrowding. The variation in the prevalence rates may also be partly attributed to the strictness of diagnostic criteria with higher rates being expectedly obtained from studies in which diagnosis was based on clinical criteria alone.^{12,18} In the present study, the absence of microscopic confirmation was used to exclude some pupils from the final analysis. The significantly higher prevalence rate for male pupils compared to the female pupils in the age group 9-14 years, could not be easily explained. The absence of sex related difference in the prevalence rates in the other age groups is however, similar to findings by other workers.^{5,13,18}

In contrast to several other studies which have shown significantly higher prevalence rates in the younger age group,^{13,18} the present study did not show any difference in the age specific prevalence rates. These findings however, need to be interpreted with caution, since there was no uniformity in the

age stratification for the various studies. For example, Nair, Joseph and Kandamu¹⁸ grouped their patients into three thus: 0-14 years, 15-53 years and 55 years and above, while Gulati *et al*¹³ used the following groupings <5yr, 5-14yr, 15-24yr, 25-39yr, 40-54yr and 55yr and above. A seemingly plausible explanation for the decreasing prevalence rate of scabies with advancing age as reported from previous studies may be the presence of acquired immunity to previous clinical and sub-clinical infestation, whereas the uniform age specific rates in the present study may reflect a predominant role for socio-cultural factors like overcrowding and poor personal hygiene.

In the present study, pupils with scabies were more likely to have sleeping partners than the controls and more importantly, the mean number of sleeping partners was significantly higher among the scabietics than the controls. This sleeping arrangement ensures close personal contact for long enough to facilitate transfer of the sarcoptes mite from one pupil to another. The therapeutic implication of this finding is that emphasis should be laid on the treatment of all scabietic patients since the principle of management demands that all contacts be synchronously treated.^{10,19}

Apart from the clinical assessment, cloth washing, bathing frequency and the use of soap and sponge to bath were assessed as additional indicators of personal hygiene. It was obvious that poor personal hygiene was associated with a higher risk of scabies transmission. The role of poor personal hygiene had been highlighted by Masawe and Nsamzuhire⁵ as well as Rigatos and Kappos.²⁰ It should however, be noted that good personal hygienic practices do not confer absolute immunity against scabies as previously noted^{21,22} and as shown in this study where 7.5 percent of scabietic pupils had good personal hygiene.

Particularly noteworthy is the lower rate of soap and sponge use among pupils with scabies. While certain types of soaps such as *Tetmosol* (monosulfiran soap)²³ may be scabiecidal, the sponge may aid the mechanical removal of the sarcoptes mite.²⁴ The present study has also shown that living away from home was a significant risk factor in scabies transmission among these pupils. In the absence of parental care, children are more likely to be dirty and less likely to be offered medical care when the need arises. These pupils may be likened to refugee and foreign-born adoptees who

have been reported by other workers to be at high risk of being infested with scabies.^{21,25}

As a result of the small number of pupils (scabietics and controls alike) who exchanged their clothings, it was difficult to ascribe a role to fomites in scabies transmission from this study. While some workers have clearly shown that fomites facilitated the spread of scabies,^{12,26} others have reported no relationship between fomites and scabies transmission.¹⁴ Despite the existence of this controversy, it is still generally recommended that the patient's clothing materials be thoroughly washed in hot water during the course of treatment.

Scabies is an important public health problem among LQS pupils in Zaria. Its transmission is associated with poor hygienic practices, intimate personal contacts and inadequate parental care. A re-organization of the schools, in addition to specific public health education on scabies and its transmission are required to reduce the morbidity resulting from scabies infestation in this group of children. Regular school inspection programmes should be put in place to ensure early detection and treatment of scabies. There is also a need for similar studies among other segments of the community to ensure a better understanding of the disease and to enable the formulation of a comprehensive long term control programme.

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