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Scabies infestation: the effect of intervention by public health education

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SUMMARY

The objectives of this study were to determine the prevalence of scabies in an infested village; to educate the residents on self-treatment and prevention by the use of 5% monosulfiram soap; to evaluate the short term effectiveness of this intervention by determining, 2 weeks later, the compliance to self-treatment and prevention; and to determine the prevalence rate on the second visit. In 59 households (96·7% of the village) containing 313 persons, an educational session was held and a leaflet distributed on the use and availability of the soap. Thirteen persons (4·2%) from eight households (13·6%) had scabies. After 2 weeks, 7 persons (2·2%) (2 persisting and 5 new cases) from 5 households (8·5%) were infested. Thus a cure rate of 85% was obtained though the prevalence rate showed no statistically significant difference. Among the under 15 year olds, the numbers infected decreased from 10 to 3 while among the over 15 year olds, the numbers infected increased from 3 to 4, neither reading significance at the 5% level.

INTRODUCTION

The increasing intensity of the scabies epidemic continued into its third year in Trinidad [1]. Simultaneously, increasing streptococcal isolates from skin lesions and increasing numbers of cases of post-streptococcal acute glomerulonephritis have been recorded [2]. Hence, in Trinidad, scabies infestation poses a serious public health problem and, therefore, must not only be treated effectively, but followed up to ascertain the effect of treatment and to reduce the risk of reinfections and possible sequelae. Secondarily infected lesions with nephritogenic streptococci can lead to post-streptococcal glomerulonephritis [1–3] and, subsequently, chronic renal disease [4]. Various treatment regimens for scabies have been suggested and tried but more recently, the favoured drugs are aqueous 0·5% malathion [5] and 5% monosulfiram soap, the efficacy of which has been recently recommended for use in children and for lactating women [6]. In May 1988, during a study of rapid antigen detection in the diagnosis of group A streptococcal pyoderma in school children [7], a rural school, County Caroni, was found to have

children infested with scabies (13·8%) and infected skin lesions secondary to scabies infestation.

With this in mind, the present study was designed, the objectives of which were to determine and record the prevalence of scabies in the village; to educate the residents on self treatment and prevention of scabies; and, 2 weeks later, to follow up to determine the compliance to self treatment and prevention and to record the prevalence of scabies on the second visit.

This paper reports the effective reduction in the number of cases of scabies due to intervention by public health education and compares the prevalence of the disease during the first visit with that of the second.

MATERIALS AND METHODS

Characteristics of the study area

The area studied included 59 (96·7%) households in the village. There were two households of which the occupants were absent on both visits. This rural village was surrounded by an abandoned cocoa estate on the north, by swamps on the east and west, and by grassland to the south. A few houses which bordered the main road were in excellent condition and had a good supply of tap borne water. However, houses away from the main road varied in size and in condition from good to dilapidated and depended on rain water or an infrequent truck borne supply.

Procedure

At each household, the purpose of the visit was explained to the parents and/or grandparents and each child of the household was examined for the presence of scabies on the hands, elbows, knees, axilla, feet, buttocks and groin. A history of symptoms was recorded and an inquiry and examination, if necessary, of other sites (areolar, navel, anterior thighs) in adults where itching was present was conducted. The premises were inspected for signs of poor hygiene, overcrowding, and the presence or absence of infected dogs. In every household visited, an educational session was conducted on the use of 5% monosulfiram soap for the treatment and prevention of scabies. A copy of the instructions was left at each household. It was stressed that the 5% monosulfiram soap could be bought at the local pharmacy or could be obtained free of charge from the Health Centre (to which the County Medical Officer of Health had ordered the soap to be sent). Everyone in the household should use the soap either as treatment for or protection from scabies, according to the following procedure:

After bathing, do *not* dry the skin. Instead, lather the soap on to the skin until the entire body is covered from the neck down. *Do not wash off the soap.* Allow to dry on the body when whiteness will disappear. Leave the soap on whether you bathe in the morning or at night. Do this daily until all the soap is used. The following instructions were also given in order to improve their hygiene, e.g. wear clean clothes after application; wash all soiled clothes in soapy hot water; boil all bed linen; spray the mattress with an insecticide; clean the house thoroughly. They were advised that if the pet animal was badly infected with mange to get rid of it; if it was moderately infected, to bathe it every day with diluted black

disinfectant (a coal tar distillate containing tar acids which, when added to water, goes milky white) (300 ml to 9 litres of water). They were *not to leave the dog untreated.*

Two weeks later, a follow up visit was made, the presence of scabies determined and the villagers questioned regarding compliance with the suggested self-treatment or protection. The dogs were again inspected.

Diagnosis

During the epidemic of scabies in Trinidad [3, 8], it was seen that the skin scrapings from infected persons yielded *Sarcoptes scabiei* which, microscopically, were indistinguishable from those found on dogs with sarcoptic mange. The diagnosis of scabies was made by the criteria previously established [9, 10], namely, the characteristic distribution of the lesions; intense itching in these areas, especially at night; recognition of the primary lesion, i.e. the burrows common on the webs of the fingers, wrists, elbows, axilla, buttocks, penis and groin, the soles of infants; small erythematous papules especially between the digits; the presence of characteristic lesions or symptoms in close associates or in family members.

RESULTS

Age/sex distribution of the study population

Three hundred and thirteen persons were seen and examined during the first visit. This number does not include those children who were treated at school. There were 157 males and 156 females. Figure 1 shows that the 0–15 year old group comprised 129 children (41·2%) of the study population and that the 5–9 age group comprised 57 (18·2%) individuals of the study population. Two hundred and fifty-three (80·8%) of the population were under the age of 40 years.

Age/sex distribution of those with scabies on first visit

Figure 2 shows that there were 13 persons with scabies on the first visit comprising 6 males and 7 females and represents a prevalence rate of 4.2%. The age group most affected was the 5–9 year olds with 5 cases. There were only 3 cases (0·96%) occurring in individuals over 15 years while there were 10 cases (3·2%) in the under 15 year olds.

Compliance to treatment and preventative measures

Of the 51 households in the village which were unaffected with scabies, 14 (27·4%) complied with the instructions while 37 (72·6%) did not. The 8 households yielding the 13 cases of scabies on the first visit contained a total of 51 occupants, 38 of whom had no evidence of scabies. Of these 38, 26 (68·4%) did not comply with the treatment and preventative measures. There were 10 households with mangy dogs on the first visit of which 7 complied. Of the other 3 households, one gave the dog away; one did not bathe the dog sufficiently often (only twice) with the disinfectant and hence, sarcoptic mange persisted. The third household preferred the use of discarded motor oil for treatment and the dog died.

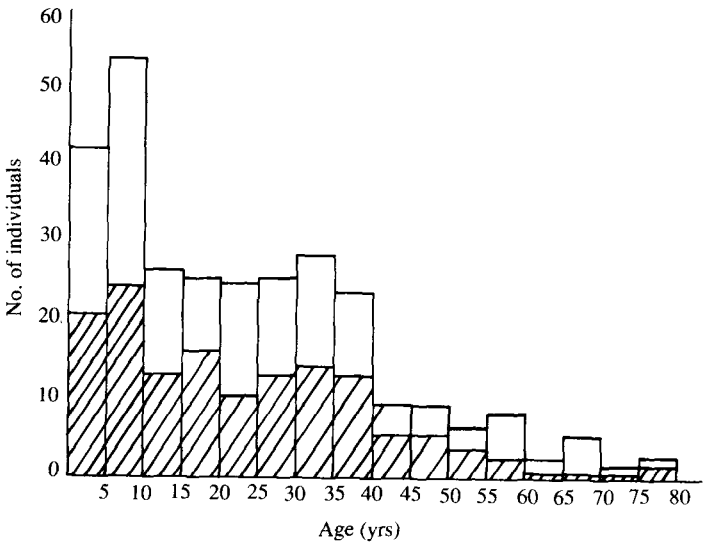

Fig. 1. Age and gender distribution of the study population. □, Female; ▨, male. The majority (81·8%) of the population surveyed was under the age of 40 years. The male/female ratio was 1:1.

Age/sex distribution of those with scabies on second visit

Of the original 13 cases with scabies on the first visit, there were only 2 (15·4%) with persisting scabies on the second visit (marked P) as shown in Fig. 2 and Table 1. The reduction was therefore 84·6%. The two who had persisting scabies were:

(a) A 39-year-old mother of five children. On the first visit, the mother, two sons and two daughters had scabies. The soap was bought and used as directed. The two sons and two daughters were completely healed on the second visit. The mother who had to do all the chores could not possibly keep the soap on her hands as was required. Hence, the scabies persisted.

(b) A 2-year-old male. The mother did not obtain nor use the 5% monosulfiram soap, i.e. she did not comply.

Interestingly, five new cases of scabies (Table 2) arose between the first and second visit (Fig. 2). They comprised one male and four females. A 36-year-old mother and two daughters, 10 and 4 years old, in the same household (five occupants) developed the disease. They did not use the soap as a protective agent. There was a dog in this household but it showed no overt evidence of mange. In another household, the mother who had scabies on the first visit obtained the soap, used it, and was clear on the second visit. Her 16-year-old daughter, however, did not use the soap as a protective agent and developed scabies by the second visit. In yet another household, the soap was bought and used as directed by the one who had scabies. Her 34-year-old nephew who did not use the soap developed scabies by the second visit.

The total number of cases of scabies on the second visit was 7 comprising 2 male and 5 female. Thus, the prevalence of scabies on the second visit had fallen to 2·2%.

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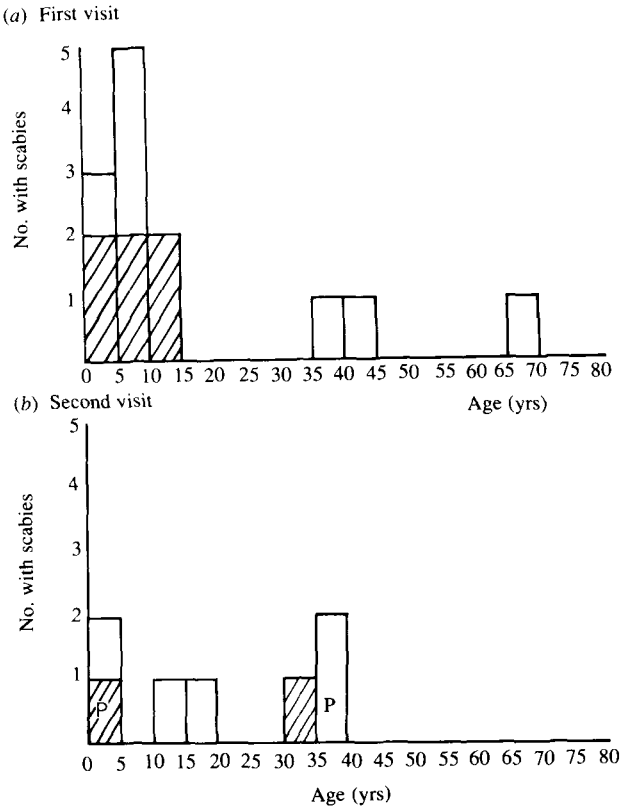

Fig. 2. Distribution of scabies in the study population by age and sex. □, Female; ▨, male; P, persisting cases. (*a*) First visit. The 13 cases of scabies according to age group are shown; 77% were under 15 years of age. There were 6 males and 7 females. The prevalence rate was 4·2%. (*b*) Second visit. The 2 persisting cases of scabies (marked P) and the 5 new cases are shown according to age group. There was a reduction (84·6%) in the number of cases (13 to 2). The prevalence rate (7/313) fell to 2·3%.

Table 1. *Cases identified at second visit which persisted from first visit.*

Sex (M/F)	Age (yrs)	Non-compliance
F	39	Non-compliance Extensive housework; could not keep soap on hands.
M	2	Mother did not obtain soap.

The other 11 patients who were 'cured' complied with the preventative measures.

Distribution of households by number of occupants and occurrence of scabies

The number of households examined was 59 (96.7%). Figure 3 shows that the number of households with scabies on the first visit was eight (13·6%). Six of the 8 households accounted for 11/13 cases of scabies and had 6 or more occupants with 1 of the 6 households having as many as 9 occupants. As shown in Fig. 3, the number of households with scabies on the second visit was reduced to 5 (8·5%), 1 household with scabies having 4 occupants. Two of the 5 households accounted

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Table 2. *Cases identified at second visit which were absent from first visit*

Sex (M/F)	Age (yrs)	Non-compliance
M	34	Thought soap was for those with scabies only.
F	16	Thought soap was only for those with the itch.
F	36	Mother did not obtain the soap. Hence, the children were not treated.
F	10	
F	4	

The message that the soap was for the treatment of scabies was well established. The message of prevention had to be reinforced.

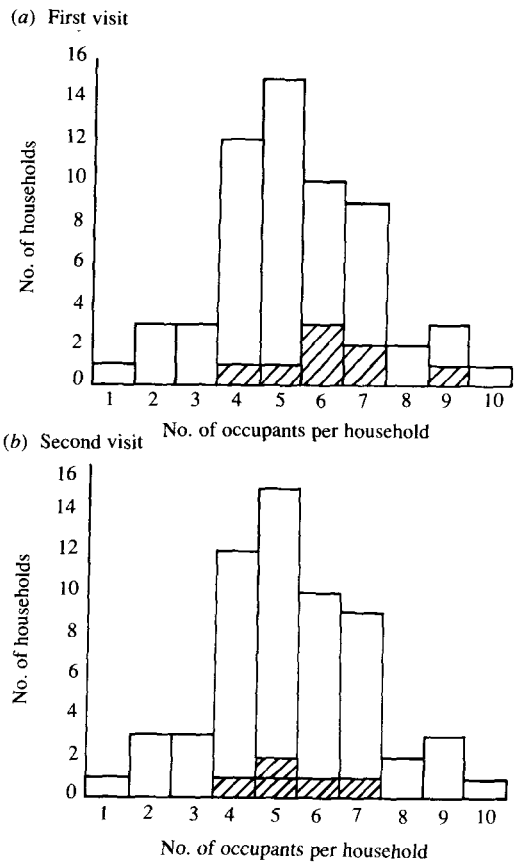

Fig. 3. Distribution of households by number of occupants and occurrence of scabies. ▨, Households with scabies. (*a*) First visit: The households with 6 or more occupants accounted for 11/13 (84·6%) of the cases of scabies. (*b*) Second visit: The 2 persisting cases of scabies were found in households with 6 or more occupants.

for 4/7 scabies cases and had 5 occupants while 2 households with 6 or more occupants included the 2 persisting cases of scabies. The average number of occupants per household was 5 (range 1–10).

There were 33 (55·9%) households with dogs and 10 (17·0%) with mangy dogs. Thus, 10/33 (30·3%) had mangy dogs.

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Comparison of the prevalence rates between first and second visits

The health education sessions were conducted at each household. Since 8/59 households had scabies on the first visit which decreased to 5/59 on the second visit, a comparison of the prevalence rates yielding Mc Nemar's test for matched samples was performed using a χ^2 value of 0·8 with one degree of freedom which shows no statistically significant difference ($0{\cdot}30 < P < 0{\cdot}50$). In the under 15 year olds, the prevalence rate decreased from 7·8% on the first visit to 2·3% on the second visit ($P = 0{\cdot}0654$) but this difference was not statistically significant.

DISCUSSION

An increasing number of cases of scabies continues to be reported to the National Surveillance Unit of Trinidad and Tobago [2]. In 1988, there were 8439 cases reported compared with 7110 in 1987, an increase of 18·7%. That the epidemic should continue unabated for 3 years suggests that a concerted effort has not yet been undertaken on a national scale. The results presented here, taken as a whole, demonstrate the value of a combined treatment and health education programme in achieving a reduction in the number of cases in a short time. Furthermore, by public health education, the cost of supporting a national programme can be greatly reduced. From the experience gleaned during this project, villagers preferred to purchase the soap rather than 'sit at the Health Centre all morning only for a bar of soap'. Nonetheless, the soap must be available at the Health Centre for those who are unable to purchase it.

From the study, it was shown that though the message for the use of the soap as an effective treatment for scabies was established, the concept of its use as an appropriate means of prevention was not readily appreciated; hence, scabies among those who did not comply.

Ideally, another village with scabies infestation should have been identified and studied in exactly the same manner but without the use of the soap. However, this was not done for two reasons. Firstly, because this study arose, partly, from a pilot project in which it was demonstrated that 5% monosulfiram soap was effective in the treatment of scabies, such action could not be justified ethically. Secondly, the time frame allotted for the work on this project would have been greatly over extended.

It is not suggested that the use of the 5% monosulfiram soap is the most effective scabicide. In 1971, the treatment regimen for the scabies epidemic was a combination of 5% monosulfiram soap followed by the application of 1% lindane (gamma benzene hexachloride) and the epidemic was controlled in 8 months [3]. Gamma benzene hexachloride (1% lindane), more commonly used in Trinidad for the treatment of pediculosis, has recently been recommended for the treatment of scabies [11]. It is important, therefore, to draw attention to the fact that reports of neurotoxicity after the use of 1% lindane involved children under the age of 10 years [7]. It was thought that this occurred after repeated applications or accidental ingestion. However, a single application produced seizures in an underweight infant in whom the plasma lindane levels were found to be 20 times higher than was expected [7]. Moreover, a single application was found to induce

liver microsomal enzymes and could reduce the effect of other drugs metabolized in the liver [7]. More recently, it was shown that evidence of the toxic effect of lindane to the central nervous system is accumulating and that its use may be associated with aplastic anaemia [12]. Further, it was estimated that a single application may approximate a total body dose of 8 mg which, in infants and children, correlates with possible adverse effects [12]. The 5% monosulfiram soap with no recorded contraindications is relatively inexpensive; will serve a whole family if used as instructed and hence, it is recommended for use in villages removed from immediate health care and in socially depressed areas.

In conclusion, the observations revealed by this study were that the disease was most prevalent in the younger age group (0–15 year olds); that high prevalence of the disease was associated with overcrowding; that when 5% monosulfiram soap was used as instructed, a cure rate of 84·6% was obtained in 2 weeks; that compliance by non-infected members of households was poor, with the result that a statistically significant reduction in the prevalence rate was not achieved.

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