Intestinal Parasitic Infestation in Urban and Rural Xhosa Children
A Comparative Study


SUMMARY
Evidence of helminthic intestinal parasites was found in 97.0% of stools of 544 Xhosa schoolchildren living in Cape Town. The commonest parasite was *Trichuris trichiura*, which infested 89.9% of the children.

In contrast, only 9.8% of 387 Xhosa children living in the Tsolo district, Transkei, had evidence of intestinal parasites in their stools, *Hymenolepis nana* being the commonest.

In spite of the unsatisfactory sanitary conditions in the Tsolo area compared with those in Guguletu, Cape Town, where all sewage is waterborne, few rural children were infested. The high prevalence of infestation in the Guguletu children suggests extensive contamination of the soil in the area by parasitic ova.

In view of the magnitude of the extent of parasitic infestation in the Guguletu children, a vigorous and sustained programme of medication and education will have to be undertaken if the problem is to be resolved.


Infestation by helminthic intestinal parasites is very common in Southern Africa. It occurs in children and adults and may result in significant morbidity and even mortality.

Various factors, including poor sanitary conditions and sandy soil, have been suggested as causes of the high incidence of parasitic infestation in children in Cape Town.

During a recent study to ascertain the prevalence of asthma in urban and rural Xhosa children, it became necessary as part of the study to examine stool specimens. This was done in order to exclude parasitic infestation as a cause of eosinophilia. At the same time it gave us an opportunity to determine the extent of the problem of helminthic infestation in both these groups.

SUBJECTS
Xhosa children aged 6-9 years were studied. One group lived in Guguletu, a Black township in Cape Town, and the other in the Tsolo district, a rural area in Transkei.

Although the children were primarily selected and examined to establish the prevalence of asthma, stool specimens were also collected from as many of the children as possible.

Guguletu extends over an area of 627 hectares. Each house in the township has piped water and waterborne sewage provided by the municipality. All roads, main and subsidiary, have cement surfaces. The soil is sandy, and open areas set aside as recreational fields are scattered throughout the township.

The people of the Tsolo district live mainly in mud huts and no water is laid on. Water for drinking and domestic purposes is collected from nearby streams. Each individual homestead provides its own sewage facilities. In many cases a pit toilet is used, but in a few cases no facilities are available and indiscriminate use is made of the surrounding fields. The soil in this area is loamy.

METHODS
Each child was provided with a non-sterile plastic container with a clip-on lid, into which a faecal specimen was to be collected. The children were requested to bring the specimen with them on the day they were to be examined for evidence of asthma.

The specimens were examined using a modified flotation method with zinc sulphate (ZnSO₄) with a specific gravity of 1,180, as used for the concentration of parasitic ova. These were identified microscopically from the *Atlas of Medical Helminthology and Protozoology*.

The formal ether concentration flotation method for parasites is superior to the ZnSO₄ flotation method for the demonstration of *Schistosoma* and *Fasciola* ova. It was not anticipated that these ova would be found, and as the ZnSO₄ flotation method is better suited to field work it was decided to use this method. In view of the large number of specimens, no attempt was made to do egg counts of the different parasites in the stools.

RESULTS
Stools were collected from 544 children from Guguletu and 387 children from the Tsolo district (Table I).

<table>
<thead>
<tr>
<th></th>
<th>Guguletu</th>
<th>Tsolo district</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stools collected</td>
<td>544</td>
<td>387</td>
</tr>
<tr>
<td>Parasites present</td>
<td>528 (97.0%)</td>
<td>38 (9.8%)</td>
</tr>
<tr>
<td>Parasites absent</td>
<td>16 (3.0%)</td>
<td>349 (90.2%)</td>
</tr>
</tbody>
</table>
The findings of the stool examinations for each group of children are given in Table II.

**TABLE II. HELMINTHIC PARASITIC OVA IN GUGULETU AND TSOLO DISTRICT CHILDREN**

<table>
<thead>
<tr>
<th>Ova</th>
<th>Guguletu</th>
<th>Tsolo district</th>
</tr>
</thead>
<tbody>
<tr>
<td>Trichuris trichiura (total)</td>
<td>485</td>
<td>13</td>
</tr>
<tr>
<td>Sole parasite</td>
<td>143</td>
<td>7</td>
</tr>
<tr>
<td>Plus Ascaris lumbricoides</td>
<td>316</td>
<td>2</td>
</tr>
<tr>
<td>Plus Ascaris and Hymenolepis nana</td>
<td>17</td>
<td>2</td>
</tr>
<tr>
<td>Plus H. nana</td>
<td>9</td>
<td>1</td>
</tr>
<tr>
<td>Plus Taenia</td>
<td>—</td>
<td>1</td>
</tr>
<tr>
<td>A. lumbricoides (total)</td>
<td>372</td>
<td>10</td>
</tr>
<tr>
<td>Sole parasite</td>
<td>38</td>
<td>5</td>
</tr>
<tr>
<td>Plus H. nana</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Plus others (see above)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>H. nana (total)</td>
<td>27</td>
<td>23</td>
</tr>
<tr>
<td>Sole parasite</td>
<td></td>
<td>19</td>
</tr>
<tr>
<td>Plus others (see above)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Taenia species</td>
<td>—</td>
<td>1</td>
</tr>
<tr>
<td>Hookworm</td>
<td>—</td>
<td>3</td>
</tr>
</tbody>
</table>

**DISCUSSION**

Helminthic infestation was exceedingly common in the sample of 6-9-year-old Xhosa children living in Guguletu. Only 3% had no evidence of infestation, as judged by one stool examination. This group of children represents the normal childhood population of Guguletu for this age group, which would suggest that nearly all such children are infested by helminthic intestinal parasites.

*Trichuris trichiura* has been shown to be the most common parasite in man in some parts of the world. Our findings are similar (Table II). Heavy infestation can result in cases of bloody diarrhoea, anaemia, prolapse of the rectum and loss of weight. In an undernourished population, with an iron-deficient dietary intake, infestation may lead to profound anaemia.

*Ascaris lumbricoides* ova were present in the stools of 372 of the 524 Guguletu children (71.0%). Serious consequences of roundworm infestation ranging from intestinal obstruction to obstruction of the common bile duct and pancreatitis, have been seen at the Red Cross War Memorial Children's Hospital.

In contrast, only 38 of the children in the Tsolo district (9.8%) had evidence of helminthic infestation, which differed from that in Guguletu. *Hymenolepis nana* was present in 23 of the children (46%), *T. trichiura* in 13 (26%) and *A. lumbricoides* in 10 (23%). Three children had evidence of hookworm infestation.

This study shows helminthic intestinal parasitic infestation to be as common in Black as in Coloured children in Cape Town. The high incidence in Coloured children has been attributed to poor housing and sanitary conditions and to the sandy soil found in the area.

The houses in Guguletu are built of brick, water is laid on and sewage is waterborne. The high incidence of intestinal infestation suggests heavy contamination of the soil with parasitic ova. This could have occurred by means of fertilization of the region with sewage before the development of the area. It is, however, most unlikely; the most likely cause is that small children who are infested defaecate on the soil in the area and thus spread the infestation.

The people of Tsolo live in mud houses. In some instances there is no provision for sanitation and water has to be collected from open streams. In spite of these unsatisfactory conditions, helminthic infestation among these children is uncommon. Sandy soil is less likely to keep the parasitic ova alive than clay soil, which maintains moisture for longer periods. Since Cape Town is a coastal city, a possible explanation for the high incidence here is the high relative humidity which may keep the ova alive in spite of the sandy soil. The loamy soil of the inland Tsolo district often becomes very hard during the dry season.

This high incidence of helminthic infestation in Guguletu children is distressing and poses a major hazard to children in the area. Only by a vigorous and continual medication and sanitation programme for each child and by education will this problem be resolved.

It should also be stressed that, when treating any child from Guguletu for helminthic intestinal parasitic infestation, it is mandatory to choose a drug that is effective in the elimination of *T. trichiura*.

We wish to thank the Wellcome Trust and the South African Medical Research Council for support for the Asthma Study of which this report forms part.

**REFERENCES**