Intestinal worm infestation in white primary school children in Umkomaas

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Summary

A low prevalence of worm infestation was found in children living in good socio-economic conditions, adequate housing, sanitation and clean water supplies. This raises the question of whether regular deworming in children from similar communities is cost-effective or even necessary.

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Curriculum vitae

Russell Kirkby obtained his MBChB from the University of Pretoria in 1974. While working on the Western Rand he succeeded in getting the Diploma in Anaesthetics in 1978 and a BSc Hons in Pharmacology from the University of Potchefstroom. He continued to study and was awarded the MFGP and the MPrax Med (Medunsa) in 1985. He and his wife Robin live in Umkomaas where he has been practising as a general practitioner for several years. He is an active leader in the Academy programme in Natal and has given some well received talks to CME groups.

During my first few years in General Practice in Umkomaas I was intrigued by the following requests:

Families from good socio-economic conditions frequently requested deworming medicine for their children and/or inquired into the necessity of doing so.

I could find only one reference pertaining to infestation in White school children[6] where 6,1% of these children were infected by parasites, but only 4,2% were infected by worms.

Watson[9] declares children of all ages to be particularly susceptible to worm infestation and suggests a practical regimen of deworming every three months.

WHO[7] states that prevention of 'parasitic' (worm) infection must take into account the natural cycle of the parasite and the peculiar ecological social and cultural circumstances that prevail in a community or social group.

In order to answer my patients' queries I first had to determine the prevalence of worm infestation in these children.

This study is the result.

Methods

All children who attended the Umkomaas Primary School were asked to participate in the study ie white primary school children from Class I to Standard V, ranging in age from 6 to 13 years.

Umkomaas is a small coastal village on the South Coast, 50 km south of Durban. The white population numbers approximately 3000. The school is an English medium school and all subjects studied had adequate housing, sanitation and water supplies.

The study was conducted in August 1984 when there were 222 scholars attending the school. Of these only 67 consented to join the study, completed the questionnaire and provided a stool sample for analysis.

Fresh stool samples free of urine were collected and placed in plastic containers containing 10% Formalin.

They were then transported to the Institute for Diseases in a Tropical Environment (SAMRC) where they were examined by Mrs JMG Van Deventer (medical technologist).

The technique of examination used was the Formol-ether concentration technique[5]. This technique was used in a previous study conducted in Northern Kwazulu and the same laboratory examined the stools.

Varying rates of Helminthic intestinal parasites in different areas of RSA have been recorded

Results

We examined 67 stools and scrutinised 67 questionnaires.

Worms

Only one subject had evidence of worm infestation viz Ascaris lumbricoides. Infertile ova of Ascaris were detected in the stool of a six year old girl who had never been dewormed. She had access to adequate sanitation, water and housing.

Discussion

Intestinal worms which are known to be a potential health hazard and could be found in this area are as follows:[7,8,9]

1. Roundworm – Ascaris lumbricoides
2. Hookworm – Ancylostoma duodenale, Necator americanus, Ternidens deminutus
3. Whipworm – Trichuris trichiura
4. Pin worm – Enterobius vermicularis
5. Tape worm – Taenia saginata, Taenia solium, Hymenolepis nana
6. Threadworm – Strongyloides stercoralis

Varying rates of Helminthic intestinal parasites have been recorded in different areas of South Africa.

Kohl[1] (1975) demonstrated a 96–100% incidence of intestinal helminths in children in the Athlone and Laviston community. The commonest worms found were Ascaris and Trichuris.

Van Niekerk et al[2] (1979) found evidence of Helminthic intestinal parasites in 97% of the stools of Xhosa children living in Cape Town – the commonest being Trichuris. Of the Xhosa children in Tsolo, 9,8% showed evidence of intestinal worms, the commonest here being Hymenolepis nana,

Trichuris and Ascaris. They postulate that contamination of the environment accounts for the high incidence in Black children in Cape Town as those studied had brick houses, purified water and water borne sewerage.

Freeman and Grunewald[3] (1978) discovered a high incidence of between 66 and 76% of intestinal Helminths in Black and Coloured children in the area served by the Livingstone Hospital, Port Elizabeth. Ascaris and Trichuris were the commonest Helminths found.

Gourevitch and Hadley[4] state that parasitic infestation of the bowel in Black children in Natal is so common as to be almost normal; 72% of their patients had both Ascaris and Trichuris infestations.

Schutte et al[5] studied scholars in Northern Kwazulu and recorded high rates of infestations of Trichuris, Ascaris and Hookworm.

Burger[6] (1968) showed a low rate of infestation in White children and a high rate in Coloured children in the Tygerberg area. He implicated poor housing, poor sanitation and preparation of foodstuffs as important factors in the high incidence of infestation amongst Coloured children.

Only one child out of 67 in this study showed evidence of intestinal worm infestation.

Prevention of intestinal Helminth infections

Prevention must take into account the natural cycle of parasites and the peculiar ecological, social and cultural circumstances that prevail in a community or social group.[7]

Most of the infective worms find their way to the mouth through dirty hands and contaminated food and water.

Contamination of the environment accounts for high incidence found in Black children in Cape Town

Prevention depends upon sanitation, health education and community participation ie water of an acceptable quality, latrine construction, waste disposal, general use of shoes, personal hygiene (with a great emphasis on hand washing) and adequate cooking of meat and fish.

Periodic mass chemotherapy (or concomitant treatment of all infected inhabitants) is an essential aspect of control of intestinal parasites.[7, 9, 10, 11, 12]

Our study was performed in a section of the population where all had adequate housing, water supplies and practised a good standard of hygiene. Latrines mostly had water borne sewerage disposal systems with only three pit latrines noted. No infections were noted in children from these homes.

The practice of "deworming"

For mass chemotherapy to be effective the drug used must be able to eradicate the worms found in the area under consideration.

Ideally, regular mass chemotherapy should take place at approximately three monthly intervals.[7, 10, 11, 12]

No infections were noted in children from homes where there was adequate housing, a good water supply and where good standards of hygiene was practised

It seems reasonable to suggest that if one is to recommend regular deworming to one's patients without knowing which worm infestations are prevalent, one must recommend a drug which will eradicate all the possible worms found in that area. The climactic conditions in Umkomaas make it possible for any of the above worms to be found here. Mebendazole would be the drug of choice in this area if mass chemotherapy were recommended on this basis in a dose of 100 mg bd x 6 days.

It is effective against all the worms mentioned as above. For Strongyloides and Taenia a 6 day course of 100 mg bd is recommended,[11] or 200 mg bd x 3 days in Strongyloides infections.[12, 13]

The costs of the above drugs at the Umkomaas Pharmacy on 24.7.85 were: Mebendazole for a 6-day course of 100 mg bd Tablets = R8,40 and Syrup = R11,20.

On the 24.7.85 the cost of a stool examination for parasites at the Pathology laboratory used in our area was R5,00. The cost would be negligible if the practitioner himself conducted a microscopic examination in his side room. However, I believe this to be more the exception than the rule.

Only 13 children (19,4%) in our study were dewormed within the last three months and only 10 (14,9%) had used Mebendazole. The dosages and duration of drug usage were not accurately recorded.

Thirteen (13) had never been dewormed and seventeen had been dewormed more than one year ago.

Conclusions

It seems that in the group studied:

There is a low rate of worm infestation – 1 out of 67.

There is a low rate of effective deworming (14,9%).

The low rate of infestation is more likely to be due to the adequate housing, water supplies, general hygiene and effective sewerage disposal than to effective deworming practice by drugs.

Where there is a low rate of infection it appears more cost effective to examine stools for parasites than to recommend mass chemotherapy.

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