

De-worming school children and hygiene intervention

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Helminths or worm infestations refer to worms that live as parasites in the human body and are a fundamental cause of disease associated with health and nutrition problems beyond gastrointestinal tract disturbances. Globally, over 3.5 billion people are infected with intestinal worms, of which 1.47 billion are with roundworm, 1.3 billion people with hookworm and 1.05 billion with whipworm. School children aged 5–15 years suffer the highest infection rate and worm burden that attributes to poor sanitation and hygiene. About 400 million school-age children are infected with roundworm, whipworm and hookworm worldwide, a large proportion of whom are found in the East Asia region (Cambodia, China, Lao PDR, Thailand and Vietnam). These parasites consume nutrients from children they infect, thus retarding their physical development. They destroy tissues and organs, cause abdominal pain, diarrhoea, intestinal obstruction, anaemia, ulcers and other health problems. All of these consequences of infection can slow cognitive development and thus impair learning. De-worming school children by anthelmintic drug treatment is a curative approach for expelling the heavy worm load. However, drug therapy alone is only a short-term measure of reducing worm infection and re-infection is frequent. Control measures through improved sanitation, hygiene and de-worming are needed to prevent infection and re-infection. UNICEF has supported many governments in this (and other) regions to assist in the provision of water supply and sanitary facilities and intensive hygiene education in many schools through the Water, Environment and Sanitation (WES) programme. The UNICEF supported school sanitation and hygiene education (SSHE) programme, and other programmes, could effectively enhance behaviour change in children to break the routes of worm transmission and other waterborne diseases.

Keywords: Helminth; hookworm; roundworm; whipworm; East Asia Region; de-worming; worm load; sanitation; UNICEF.

Introduction

Worldwide, more than 3.5 billion people are infected with intestinal worms, of whom 1.47 billion have roundworm, 1.3 billion have hookworm and 1.05 billion have whipworm. Children aged 5–15 years make up the group with the highest infection rate and highest worm burden, which contributes greatly to the contamination of the environment and poor sanitation and hygiene. It is estimated that about 400 million school-age children are infected with roundworm, whipworm and hookworm worldwide (Chan *et al.* 1994).

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Helminth or worm infestation refers to worms that live as parasites in the human body. They are one of the fundamental causes of disease and are associated with many health and nutrition problems that go beyond gastrointestinal tract disturbances (Fig. 1).

Prevalence of worm infection in countries of the East Asia Region

Roundworm, hookworm and whipworm infection rates in this region are quite high; the situation of some countries in the region are summarised below:

Cambodia

A national survey performed in 1997 by CNM/MSF in school-age children has shown that soil-transmitted helminth (STH) infection is highly prevalent in Cambodia. STH infection contributes to the overall morbidity in both rural and urban Cambodia.

De-worming programmes for school children have started in some provinces with treatment with mebendazole 500 mg coupled with health education. After treatment, the prevalence of

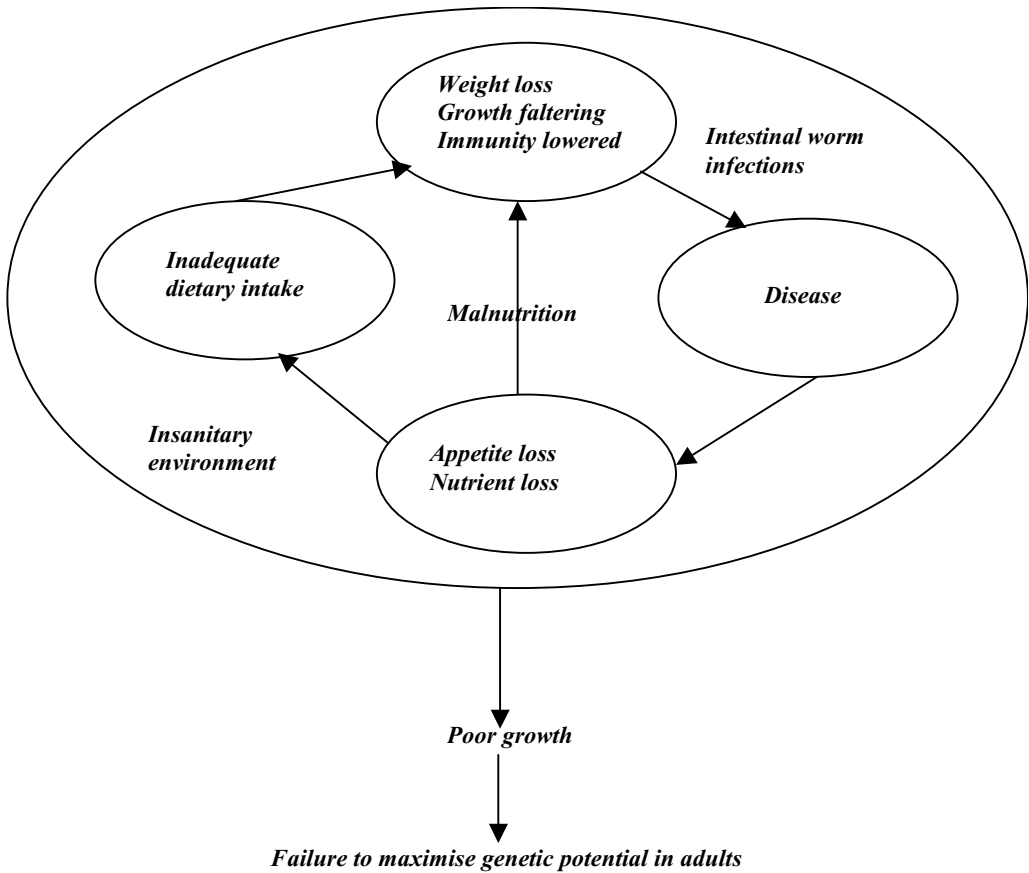


Fig. 1. Major public health problems/challenges: intestinal worm infections.

intestinal worms dropped to about one-third of the initial level, but re-infection occurs frequently because of a lack of access to adequate sanitation, safe water supply and unhygienic habits (Thavrin *et al.* 2001).

China

Based on a Chinese Government National Survey on Intestinal worms infection in 1992, it was reported that:

- Roundworm infected 44.9% children and affected about 190 million children under 14 years of age
- Hookworm infected 5.4% children and affected about 40 million children under 14 years of age
- Whipworm infected 12.6% children and affected about 70 million children under 14 years of age.

A nutrition survey in China reported that the rate of stunting in children under 5 years of age in 1995 was 34.5% in rural areas, which is about 35 million children. In 1998, the average body height of rural children under 5 years was 4 cm shorter than that of their urban neighbours (NPHCCO 1999).

Lao PDR

Helminth infection among the population of Lao PDR was found to be high based on surveys and studies performed by various institutions and government agencies in 2000. A survey of helminth infection among 12,558 school children in six provinces reported rates varying from 27.5 to 62%, of which roundworm infection ranged from 1.6 to 28%, hookworm 3–33%, whipworm 5.4–19.6%, *Opisthorchis viverrini* (liver fluke) 2.7–32% and *teania* (tape worm) 0.2–1.4% (Phommasack 2001).

Thailand

The countrywide STH control programme in Thailand started in 1980 with blanket treatment among primary school children. Since 1982, the control plan was included in the Five-year National Health Development Plans of successive governments. Activities cover stool examination, worm treatment, improvement of environmental sanitation, and health risk behaviour change through health education and the provision of safe water supply. These interventions are performed at a peripheral level by provincial health facilities with technical and specific logistical support from the Department of Communicable Disease Control.

Helminthiasis control in the current plan, the 9th National Health Development Plan (2002–2006), has set the target to reduce the magnitude of the problem to a level that would no longer constitute a public health problem. The management system for surveillance, prevention and control will be strengthened including networking and intersectoral co-ordination as some of the crucial elements.

Systematic countrywide survey in the past three decades revealed a declining trend of intestinal parasitic infection from 62.9% in 1957 to 41.7% in 1991 and 35.0% in 1996. In 1996 the most common helminths were hookworm (21.6%), whipworm (3.9%) and roundworm (1.9%). Hookworm was the most prevalent helminth in the southern part of Thailand compared with other regions of the country. However, hookworm infection in the

southern region was found to have decreased from 75.9% in 1981 to 34.1% in 1996 (Rugpao 2001).

Vietnam

Intestinal worm infections, such as roundworm, whipworm and hookworm, have been the major public health problems and are endemic in the northern, central and southern regions. Within regions, prevalence varies in coastal areas, plain, midlands and mountainous areas. The infection of roundworm is 10–95%, whipworm 0.5–89% and hookworm 30–69% (Daon *et al.* 2000). Children below the age of 15 years are the most highly infected group. STH in Vietnam represent a multiple infection at 60–70%. A nationwide estimation on roundworm infection is about 60 million people; whipworm is approximately 40 million and hookworm infection is also about 40 million (NIMPE 2000).

Health problems of worm infection

One of the major health problems faced by millions of school-age children is infection by roundworm, hookworm and whipworm. These parasites consume nutrients from children they infect. Thus, they aggravate malnutrition and retard children's physical development. They also destroy the tissues and organs in which they live, and cause abdominal pain, diarrhoea, intestinal obstruction, anaemia, ulcers and various health problems. All of these consequences of infection can lead to an impairment of learning and slower cognitive development, leading to poor school performance. Women and adolescent girls bear a particular burden of losing blood due to hookworm infections resulting in iron deficiency anaemia (Table 1). Heavy infection of hookworm causes anaemia among women, which is believed to be one of the factors contributing to maternal morbidity and mortality. Heavy or long-term intestinal worm infections frequently result in death if treatment is not given in time. It is important to note that the stunting of children's growth due to worm infections is not readily recognised, because it occurs almost imperceptibly over time. Thus, the full impact of helminth infections is often greatly under-reported or overlooked.

Intestinal worm infections in humans is a silent epidemic that destroys the health, well being and learning potential of millions of children in many developing countries today. It is time to take collective action to deal with this silent calamity among our children to ensure that they grow up healthy both physically and mentally.

Table 1. Anaemia and hookworm infection in non-pregnant women in Vietnam

	<i>Hookworm load Eggs/gramme</i>	<i>Anaemia (%)</i>
High	> 5000	48
Moderate	2600–4000	40
Low	1–2400	21
Uninfected	0	10

De-worming school children and education intervention

De-worming school children by anthelmintic drug treatment is a curative approach to expelling the heavy worm load in children. However, drug therapy alone is only a short-term measure for reducing worm infection in a target population. Re-infection is frequent within a short period. Control measures in schools and communities through improved sanitation and hygiene along with de-worming need to be ensured to prevent infection and re-infection (Fig. 2).

United Nations Children’s Fund (UNICEF) has supported governments for years in this and other regions to assist in the provision of water supply and sanitary facilities and intensive hygiene education in many schools through the Water, Environment and Sanitation (WES) programme. The UNICEF supported School Sanitation and Hygiene Education (SSHE) programme could effectively enhance children’s behavioural change to break the routes of worm transmission and other waterborne diseases. Therefore, for effective long-term improvement of health and well being of children and communities, de-worming school children should be linked with SSHE and the community-based WES programme as preventive interventions and not as an isolated activity. Furthermore, the availability of segregated

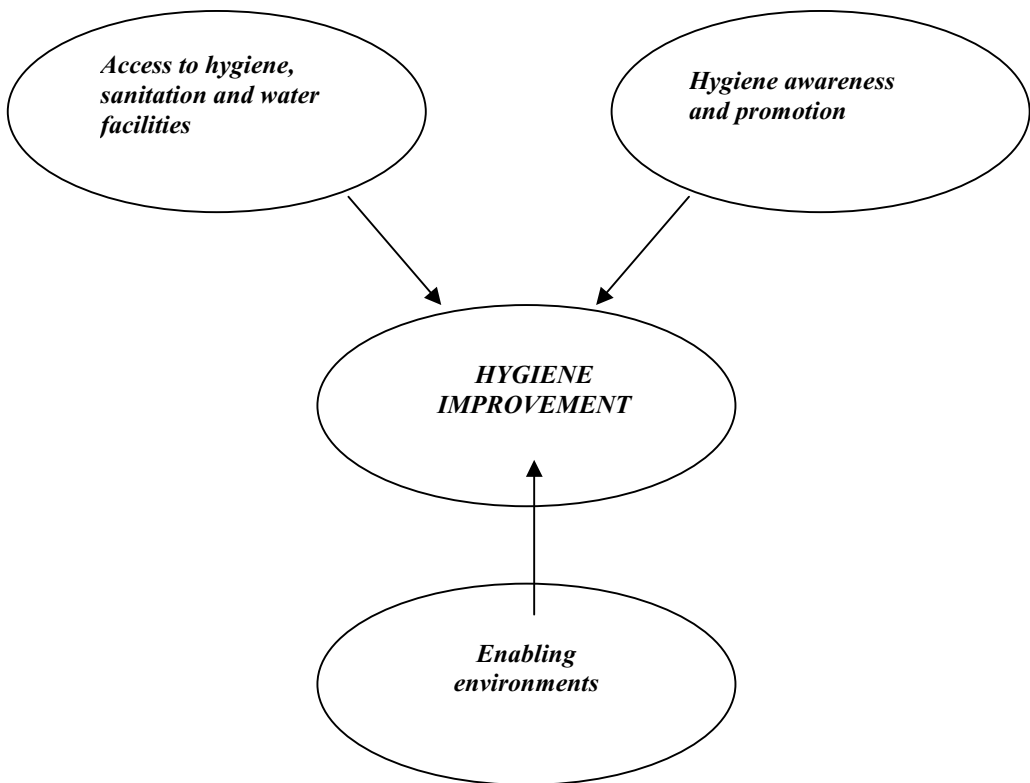


Fig. 2. Hygiene improvement framework (Bateman, M., 1999, Framework “The Unfinished Agenda”).

sanitary toilets in schools for boys and girls would enhance the enrolment of girls and help ensure completion of education in many rural areas.

The experiences of large-scale school de-worming activities in Ghana and Tanzania demonstrated that parents and children could realise the benefits in terms of improved health and school performances through de-worming. More than 90% of parents in the project schools in both Ghana and Tanzania indicated a willingness to pay for continuation of drug treatment (Brooker *et al.* 2000).

A children's de-worming programme has proven to be an effective entry point and educational tool to create the demand for household sanitary latrines, for use of safe water and improved hygiene behaviour change in communities based on some project experiences. One successful pilot project was implemented in ten villages in West Bengal, India to promote a package that consisted of de-worming young children, hygiene education, improved sanitation by building family toilets, and chlorination of drinking water at house level by housewives. On seeing worms coming out from their children bodies, parents were convinced of the need for a clean environment, for the use of sanitary toilets and for handwashing with soap. An 80% reduction of childhood diarrhoea was achieved within 12 months of intervention and many households had built and used simple sanitary toilets (Luong 1987). The project proved that hygiene education alone would not lead to behaviour change unless strengthened by the availability of safe drinking water and sanitary facilities in an enabling environment.

UNICEF East Asia and Pacific Regional Office is currently collaborating with the Asian Centre of International Parasite Control (ACIPAC; initiated and supported by Hashitomo Initiative for global Parasites and Malaria control programme), Japan International Co-operation Agency (JICA) the World Health Organization in supporting the implementation of school-based de-worming and improved sanitation and hygiene package programme starting in Lao PDR this year. The package programme links the anthelmintic drug treatment of school children and SSHE programme with the approaches of Focusing Resources on Effective School Health (FRESH). The formulation of such a package programme covers the components of social mobilisation, communication, hygiene education, provision of sanitary toilets, monitoring and assessment.

Focusing resources on effective school health (FRESH)

FRESH is an inter-agency initiative between UNICEF, United Nations Education, Scientific and Cultural Organization (UNESCO), WHO and the World Bank launched at the 'Education for All' Conference in Dakar, Senegal, in April 2000. The aims of FRESH were to raise the education sector's awareness of the value of implementing an effective school health, hygiene and nutrition programme as one of its major strategies to achieve 'Education for All'.

FRESH promotes four core interventions: (1) provision of safe water, hygiene and sanitation; (2) school-based health and nutrition services; (3) skills-based health education, and (4) health-related school policies. All core interventions should be made available *together*, in all schools adopting FRESH approaches. This is the only difference from the on-going school health programme. FRESH's supporting strategies adopt: (i) effective partnerships between WES, education and health sectors, and teachers and health workers; (ii) effective community partnership; and (iii) pupil awareness and participation.

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