Creating health-promoting schools in rural China: a project started from deworming

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SUMMARY
Intestinal helminth infection is highly endemic in rural areas of China. This project was implemented to determine if deworming efforts through schools could reduce helminth infections and successfully serve as an entry point for developing a more comprehensive approach to school health, i.e. the components of ‘health-promoting schools’. Six primary and junior secondary schools with 6188 students were involved in the project. Major interventions in four experiment schools included: examination and treatment of helminth infections; health education; improvement of school physical environment; establishment of relevant school policies and regulations; and strengthening relationship between school and community. The only intervention taken by the other two schools as controls was deworming. After 1 year of implementation, helminth infection in students and environmental contamination by helminth eggs in experiment schools decreased by ~80%, significantly higher than that in control schools. Remarkable improvements in students’ knowledge, behaviour and skills of health protection, in school physical facilities, in school/community relationship, and in relevant policies and practices, were also observed in the experiment schools. The conclusions are that the concept of the health-promoting school has been well accepted by the students, teachers, parents and local government officers, and that helminth reduction is an effective and feasible entry point for establishing health-promoting schools in rural areas where helminth infection has been an important public health problem.

Key words: China; deworming; health-promoting school; helminth

INTRODUCTION
The health of school-age children can play a major role in determining the successful development of a nation. Schools serve as an ideal setting to positively affect children’s health because they reach young people at a critical age of development in which lifestyles are tested, developed and adapted through social interactions between students, teachers, parents and others. In China, where a high enrolment in primary and junior secondary schools has been achieved (State Statistical Bureau of China, 1997), schools have the potential to positively influence children’s health, but they are responsible for many education and development goals. In order to activate a school’s potential to improve health, it is essential for the community to understand the importance and feasibility of improving health through schools. It is also important to prioritize health problems that can be addressed in schools and to develop effective strategies to reduce them.

In 1995 the World Health Organization (WHO) launched the ‘Global School Health Initiative’ which offers a vision for the development of comprehensive school-based efforts to improve health. That vision is manifested by the creation of health-promoting schools (World Health Organization, 1997). A health-promoting school is a school that strives to constantly

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strengthen its capacity as a healthy setting for living, learning and working.

In order to effectively address important health concerns in the context of a health-promoting school, WHO suggests that various health problems or risks be identified and prioritized. A priority health concern, e.g. malnutrition, tobacco use, HIV/AIDS infection, parasitic infection, etc. is then suggested to be used as an entry point for the development of health-promoting schools.

A nationwide survey conducted in China between 1988 and 1992 revealed that in most rural areas of southern provinces, the prevalence of roundworm, whipworm and hookworm infections in school-age children is over 70%, and that the highest prevalence and heaviest intensity of helminth infections occur in the 5–14 years age group (Xu et al., 1995). Intestinal helminth infection is therefore identified as an important health problem among school-age children in China. With WHO’s support, a deworming project was proposed to reduce this important problem and to serve as an entry point to the development of health-promoting schools. It was started in late 1996 in selected townships of Fujian and another three provinces. This paper reports the results of this goal effort in Fujian province.

**METHODS**

**Project area and subjects**

In most provinces of China, agriculture is the primary source of income. People have a relatively low standard of living. Human night-soil is still used as fertilizer for farming which contributes to the transmission of intestinal helminth infections. The average prevalence of helminth infection in children under 15 years of age in Fujian was 82.6% in 1992 (Lin et al., 1993). There are ~5 200 000 students in 17 882 primary and secondary schools in the province. About 80% of them live in rural areas.

Lianjiang county, located on the eastern coast of the Fujian province, was chosen as the pilot area. Two townships were selected as experiment areas within the county: Dongdai and Danyang. The Pandu township was chosen as the control area. One primary school and one junior secondary school were involved in the project in each township. These schools serve 6188 students in total. The average age for primary school students and junior secondary school students is 6–12 years and 12–15 years, respectively. All students at identified schools were targeted, though faecal examination was carried out only for students of selected grades (see ‘Baseline data collection’).

These schools were divided into three groups each receiving different combinations of interventions.

**Group A:** Students from Danyang Primary School and Danyang Secondary School. Deworming, health education, improvement of physical environment and other efforts to strengthen components of a health-promoting school, plus health education and one treatment for all the community members.

**Group B:** Students from Dongdai Primary School and Dongdai Secondary School. Deworming, health education, improvement of physical environment and other efforts to strengthen components of a health-promoting school.

**Group C:** Students from Pandu Secondary School and Guian Primary School. Deworming for students only.

**Project organization and preparation**

**Organizational structure**

The project was guided and managed through two groups.

- A Steering Group consisting of responsible officers from the identified county and townships, representing the education and health sectors, provided overall direction and management for the project. The county vice-magistrate served as the Director of the group.
- A Working Group, headed by the Director of the Provincial Centers for Disease Control, consisting of professional workers from the provincial and county epidemic prevention stations and township health centres, provided motivational and technical support for the project.

**Training and mobilization**

In order to initiate the project, the following training activities took place.
Workshop on health-promoting schools. In August 1996, a workshop was conducted in the province for government health and education officers, school headmasters, heads of town health centres and working group members. Responsible officers for school health were also invited from the central Ministries of Health and Education. Staff members from the World Health Organization and international and domestic experts presented information and materials on the WHO Global School Health Initiative, the concept of the health-promoting school, the rationale of school-based interventions to reduce helminths, and the regional guidelines on the development of health-promoting schools. A work plan was finalized at the workshop.

School and community mobilization. After the workshop, the project Working Group held a series of mobilization meetings in the identified townships. Participants included students, parents, teachers, local officers and community leaders. The meetings helped participants understand the concept of the health-promoting school and the objectives of the project. The meetings also encouraged their support for school-based interventions to promote health beyond efforts to reduce helminth infections, and their support was evident by the community’s participation in the meetings.

Technical training. Technical seminars were held for the heads of the identified schools, as well as for teachers and others responsible for health education and health care in schools. Students were appointed and trained to serve as ‘health inspectors’ in each class. Duties of ‘health inspectors’ included check-ups of students’ personal hygiene and of the physical class environment. Both activities were conducted daily during school hours.

Baseline data collection
In order to establish a base for implementation and future evaluation, the following examinations and assessments were conducted.

Prevalence of helminth infections. Health officials examined first grade students in junior secondary schools and first–third grade students in primary schools. Helminth examinations were performed before and after interventions were implemented in October 1996 and October 1997.

In order to determine the infection rate and intensity of infection (egg count), stool samples (41.7 mg each) were examined with the Kato–Katz thick smear method (World Health Organization, 1985). Anal cellophane swabs were used to examine pinworm eggs (Department of Disease Control, 1996).

Environment contamination by helminth eggs. In order to detect egg contamination in the school environment, soil/dust samples were collected from the ground of latrines, classrooms and bedrooms (at boarding schools), and from straw bed mats. The soil/dust samples (3 g each) were collected and examined for helminth eggs by routine methods (Yu et al., 1993; Department of Disease Control, 1996).

Students’ health knowledge and behaviour. By using a questionnaire, students were surveyed in September 1996 for their basic knowledge about worm morphology, transmission routes, prevention and control of worm infections, and on their health behaviours including hand-washing, washing or peeling fruits before eating, hand-to-mouth contamination (finger-sucking), etc.

Scoring: students who answered correctly over 60% of the questions on the knowledge of worms are counted as having passed the test. Students who practised over 75% of recommended healthy behaviours are counted as ‘good’, those who practised less than 25% are counted as ‘poor’, and as ‘fair’ for those in between 25 and 75%.

Chi square test (SPSS for Windows package) was used for the statistical significance of the data from experiment and control schools before and after interventions.

Intervention measures
Health education
A certificate plate of ‘Pilot School of WHO Health-Promoting School’ was mounted in each school from groups A and B. The certificate plate served to stimulate the students’ and teachers’ enthusiasm and responsibility, and extended a message on the event to community members.

Health education classes were added to the teaching agenda and given once every 2 weeks.
Teaching materials for the health education classes consisted of: the *Text Book on Health Education for Secondary Schools* and the *Text Book on Health Education for Primary Schools*, provided by the Provincial Education Department. The materials contained prevention information about common diseases including helminth infections.

In addition to the class sessions, supportive communication efforts were prepared by teachers and students and were used to enhance information taught at school. Communication projects included the monthly wall newsletters and broadcasting messages throughout the school campus. Colourful pictures on ‘Parasitic Diseases and Health’ and ‘The Control of Common Parasitic Diseases in Humans’ were distributed to every student, and the students were encouraged to share the pictures with their parents and siblings at home. A video on the control of parasitic diseases was also shown in class, and a demonstration of adult worms and eggs under a microscope helped students and teachers enhance their knowledge of worms.

**Deworming**

Deworming was carried out twice (October 1996 and May 1997) in all identified schools for students and school personnel. One treatment was also given in October 1996 to the community members of the Danyang township, covering 25,162 people to see if this would help reduce helminth prevalence in children more significantly. Single doses (400 mg) of albendazole (Zentel, product of SmithKline & Beecham) were used for most students and community members. The routine 3-day treatment of mebendazole (Vermox, product of Jensen) was used for students with whipworm infection.

**Improvement of physical environment**

Adequate sanitary facilities and a safe water supply are essential elements of a health-promoting school. However, the hygienic status of school latrines was poor in almost all the pilot schools, and an inadequate number of seats in the latrines in some schools meant that the students had to rush and queue up for latrine during the break. There were no hand-washing facilities in the schools before the project. It was therefore suggested to establish or improve the latrines and water supply facilities. Improvements of other aspects of the physical environment in schools were also proposed.

**School policies**

At the start of the project, it was evident that policies or regulations relating to the development of health-promoting schools needed to be established or improved. The helminth project provided opportunities for the development of policies relevant to the creation of health-promoting schools, including policies for cleanliness of sanitary facilities, regular deworming, food safety and food hygiene.

**Relationship between the school and community**

The helminth project helped strengthen communication between the school and parents, interested social groups and township officers, especially those dealing with education and health. Efforts included: teachers’ regular visits to students’ families, participation of local officers in school activities, and meetings between school headmaster/teachers, parents and community leaders.

**Health services for students and school personnel**

In addition to examination and treatment for helminths, the project provided opportunities for students and school personnel to receive additional physical/clinical examinations. For example, students were administered physical examinations every semester as part of the helminth evaluation and/or treatment process. School personnel were served with similar physical/clinical examinations once a year at the township health centre or county hospital.

**Evaluation**

The methods of evaluation included: documentation of results by the provincial project co-ordinators; reviewing the data collected before and after interventions; interviewing local officers and school headmasters; meetings and discussions with representatives of students, teachers and parents; and on-the-spot inspections at schools.

In addition to reviewing the biomedical data collected during the year, group discussions and interviews were organized to address the following questions.

1. Have the interventions for helminth reduction been acceptable and efficacious?
2. Has the intersectoral co-operation been improved/strengthened in the project implementation?
(3) Have the schools made and implemented any new policies/practices for establishing health-promoting schools?

(4) Has health information been provided to students, teachers and through them to parents and community members effectively?

(5) Have health services been provided to the school population in addition to deworming?

(6) Has the concept of a health-promoting school been well understood and accepted?

(7) Would this kind of project be sustainable and expandable?

RESULTS

After 1 year of implementation, the project was reviewed and evaluated. The results showed not only the direct impact on aspects related to helminth infections, but also the progress made by schools in improving various components of a comprehensive school health programme, which provide useful insights into using specific health issues as entry points for the development of health-promoting schools.

Students’ knowledge and behaviour improved

Three groups of students received different types of intervention and each group was evaluated to determine the results: Groups A and B received deworming, health education and other interventions; Group C received deworming only.

The pre-intervention survey showed that only 10.9% of the students had a basic knowledge about helminth infection and relevant health behaviours; among students, 29.6% demonstrated recommended or ‘good’ health behaviours which are related to worm infections, 65.4% had ‘fair’ and 5.0% ‘poor’ health practices.

The post-intervention questionnaire, administered after 1 year intervention in September 1997, showed that the students’ knowledge had improved markedly in students who attended schools where health education was provided. The passing rate on health knowledge in students of schools in Groups A and B increased from 10.9 to 82.7% \((p < 0.01)\). The percentage of students who were practising recommended or ‘good’ health behaviours changed from 29.6 to 43.8%. However, Group C (deworming only), where health education was not given, did not show a significant difference in health knowledge and healthy behavioural practice after the helminth interventions (Table 1). The difference between Groups A and B, and Group C is highly significant for knowledge improvement \((p < 0.005)\) and for behaviour change \((p < 0.005)\).

Prevalence of helminth infections in students reduced

Baseline data showed that the overall prevalence of intestinal helminth infections in the experiment schools was 78.8%, with ascaris infection 28.1%, trichuris 64.8%, pinworm 55.0% and hookworms 0.7%. Among the egg-positive students, 42% were infected with two–three kinds of helminths.

After 1 year intervention with two treatments for children in each group, the prevalence of helminth infections in all groups was reduced. However, the reduction rates in Groups A (81.3%) and B (77.5%) were greater than in Group C (35.7%). The reduction in Groups A and B was more significant than that of Group C \((p < 0.01)\). Furthermore, multi-parasitism (mixed infection with more than one species of helminth) decreased from 42.8% to 7.3% in the schools.

Table 1: Health knowledge and behaviour among students

<table>
<thead>
<tr>
<th>Group</th>
<th>Before or after implementation</th>
<th>Knowledge</th>
<th>Behaviour</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No. surveyed</td>
<td>Passing rate (%)</td>
<td>No. surveyed</td>
</tr>
<tr>
<td>A and B</td>
<td>Before</td>
<td>1437</td>
<td>10.9</td>
</tr>
<tr>
<td></td>
<td>After</td>
<td>559</td>
<td>82.7</td>
</tr>
<tr>
<td>C</td>
<td>Before</td>
<td>379</td>
<td>5.0</td>
</tr>
<tr>
<td></td>
<td>After</td>
<td>180</td>
<td>1.7</td>
</tr>
</tbody>
</table>
in Groups A and B; while in Group C, multi-parasitism decreased only from 38.4% to 34.6%.

In Group A, where health education and deworming were provided to the community in addition to students, the worm reduction rate in students was not significantly higher than that of Group B.

Environmental egg contamination in schools lowered

The baseline survey showed that the egg-contamination rate on the ground of latrines was the highest (40.8%), followed by bedrooms (30.4%), classrooms (20.6%) and straw bed mats (13.7%).

One year after the implementation, the egg-contamination rate in school environments of Groups A and B changed from 22.4 to 4.3%, declining by 80.7%. The rates in latrines, classrooms and on straw mats declined by 78.2, 78.7 and 75.1%, respectively. Moreover, no eggs were found in the samples from the ground of the bedrooms. In Group C, however, the contamination rate declined by only 27.7%, considerably less than Groups A and B ($p < 0.01$, Table 2).

School health education established on a regular basis

For several years, the Ministry of Education has recommended the provision of health education in primary and secondary schools. However, it was not provided regularly in most schools due to lack of teachers and/or textbooks. With the initiation of the project, the education authorities at provincial and county levels reiterated that health education must be on the teaching agenda of every school. The four experiment schools (Groups A and B) provided health education in classes once every 2 weeks from the beginning of the project. Additional messages on worms were given to children in special ways, e.g. video shows and pictures.

School physical environment improved

By mobilizing funds and labour forces from the local government and the community, the following improvements to the physical environment were identified and brought about by all experiment schools.

- Improvement or establishment of latrines.
- Water supply for hand-washing by tap water or by digging a well.
- Improvement of kitchen facilities and dining room.
- Extension of school building and/or playgrounds.

The following were also performed in some schools depending on needs and the availability of resources.

- Replenishment of sports equipment.
- Tree planting in and around school.
- Improvement of school roads and fencing.
- Establishment of garbage cans, bathrooms and garbage disposal sites.

Health-related school policies established

The following essential policies or regulations were established or improved in all experiment schools. Policies and regulations were posted on the campus or in appropriate places in the schools.

<table>
<thead>
<tr>
<th>Place</th>
<th>Before or after implementation</th>
<th>Groups A and B</th>
<th>Group C</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No. samples examined</td>
<td>Positive rate (%)</td>
<td>No. samples examined</td>
</tr>
<tr>
<td>Latrine</td>
<td>Before</td>
<td>121</td>
<td>37.2</td>
</tr>
<tr>
<td></td>
<td>After</td>
<td>74</td>
<td>8.1</td>
</tr>
<tr>
<td>Classroom</td>
<td>Before</td>
<td>93</td>
<td>20.4</td>
</tr>
<tr>
<td></td>
<td>After</td>
<td>92</td>
<td>4.4</td>
</tr>
<tr>
<td>Bedroom</td>
<td>Before</td>
<td>47</td>
<td>25.4</td>
</tr>
<tr>
<td></td>
<td>After</td>
<td>40</td>
<td>0</td>
</tr>
<tr>
<td>Straw mat (on bed)</td>
<td>Before</td>
<td>150</td>
<td>11.3</td>
</tr>
<tr>
<td></td>
<td>After</td>
<td>71</td>
<td>2.8</td>
</tr>
<tr>
<td>Total</td>
<td>Before</td>
<td>411</td>
<td>22.4</td>
</tr>
<tr>
<td></td>
<td>After</td>
<td>277</td>
<td>4.3</td>
</tr>
</tbody>
</table>
• The Health-Promoting School Charter.
• Regulations on food safety and food hygiene for school kitchen and canteen.
• Regulations for a tobacco-free school yard.
• Regulations for cleanliness of the school environment.

School psychosocial environment improved
Also noted in the project schools were improvements in the psychosocial environment. Reported changes included the following.

• Enhanced mutual solicitude and respect, self-esteem and self-confidence between school personnel and students and among students.
• Improved compliance by school personnel to the ‘Regulation on Teachers’ Professional Ethics’ which was formulated by education authorities.
• Increased restraints on physical punishment of students and reduced discrimination.
• Initiation of student-friendly atmosphere campaigns through extra-curricular activities, e.g. the cultural recreation on June 1st International Children’s Festival, sports and summer camps.

Relationship between school and community strengthened
The activities, communications and relationships between schools and their respective communities were greatly strengthened. As a member of the Steering Group of the project, the head of the township worked closely with the headmasters of the schools, providing support to the project and co-ordinating health and education sectors at township level. Parents and other community members were actively involved in the project activities. Education became a greater priority for families and they were supportive of the establishment of health-promoting schools, as evidenced by the creation of a foundation with the first contribution of 280,000 Chinese Yuan (US$ 35,000) donated by the community and local non-governmental groups in Dongdai primary school to support the development of physical facilities and partly to encourage and reward those teachers who made prominent contributions to the health-promoting school project.

Family health behaviour positively affected
One of the important effects of the project’s efforts in encouraging the development of health-promoting schools was health-related behaviour changes among students’ family members. Parents were initially informed about the importance of helminth interventions through a consent form that they were requested to sign. In addition, health-related messages were passed on from students to their parents and siblings. Although the changes were not quantitatively surveyed, in the discussions with students and their parents it was found that some new behaviours had been developed and accepted by families, e.g. washing hands before meals and after using the latrine; drinking only boiled water; and quitting or at least reducing smoking among fathers.

DISCUSSION
As part of the advocacy strategy of its ‘Global School Health Initiative’, WHO has developed guidelines for establishing health-promoting schools by using important health issues as entry points. The first published document in the advocacy series is: ‘Strengthening interventions to reduce helminth infections—as an entry point for the development of health-promoting schools’ (World Health Organization, 1996). In the WHO Western Pacific Region, the development of health-promoting schools is part of its overall strategy to improve health as documented in its regional guidelines for the development of health-promoting schools (WPRO, 1996). These documents elaborated directions and approaches for planning, implementing and evaluating this project.

Why should helminth reduction be carried out through schools?
Over one quarter of the world’s population are infected by intestinal helminths. These worms are not randomly distributed among people but tend to be highly aggregated: most worms occur in a small proportion of hosts and these hosts are also the most likely to be diseased. The highest rates and the heaviest infections typically occur among children aged between 5 and 14 years (Xu et al., 1995; Hall et al., 1997). It is well recognized that these infections negatively affect children’s nutrition, physical development and learning potential (Nokes et al., 1992; Connolly and Kvalsvig, 1993; Stephenson, 1994). Studies have shown improved growth and micronutrient status, and high scores in tests of cognitive function when
infected children are treated with anthelmintic drugs (Stephenson, 1987; Nokes and Bundy, 1994). Studies have also shown that treating children can reduce infections in untreated members of the community, hence reducing the overall transmission, because children contribute egg contamination to the environment (Cabrera and Cruz, 1982; Bundy, 1990).

Schools are settings through which children assemble daily and can be easily reached. The school system in many countries offers an existing and comprehensive means of delivering interventions to children, as well as much of the rest of the community. Schools provide a particularly efficient means of reducing health problems in helminth-endemic countries where high enrolment has been achieved in primary and junior secondary schools, e.g. in China. This was the reason why the officials responsible for school health from the Ministries of Health and Education attended the workshop when the project started, and why the local governments made resources available, though relatively limited, to sustain the activities at the pilot schools and to expand their efforts to other schools in the whole county (Xu, 1999, personal communication).

**How can the helminth reduction interventions help establish a health-promoting school?**

A health-promoting school strives to improve the health of the total school population and community members, and to develop students' learning potential. The intervention measures designed for this project addressed the major components that a school needs to become a health-promoting school, which include a healthy school environment, school health education, appropriate school health services, along with school/community projects and outreach, health promotion for staff, and nutrition and food safety (World Health Organization, 1996; Taylor et al., 1999). The results of this project show that the schools which adopted and implemented the concept of a health-promoting school achieved gains that went beyond reduction of helminth infections. Helminth interventions served as a catalyst for activities that helped to create health-promoting schools.

As there is inadequate knowledge among rural schools and communities regarding risk factors for helminth infection, health education plays an important role. Assessment proved that related knowledge/attitudes/practices in students of the experiment schools were improved. Activities on worm examination and treatment provided a unique opportunity to educate people to promote the required behaviour change in addition to classes, because information alone is insufficient for behaviour change. During evaluation, a mother said:

*I was totally convinced for the worm project. When I saw worms expelled in the faeces, I knew that my boy was feeding them every day.*

The provision of sanitation and safe water is a basic requisite not only for general hygiene as a healthy school but specifically for worm prevention. In the identified schools, the latrines available were in poor condition, and there was no water and facilities for hand-washing before the intervention. Supported by the communities during the year, this situation was considerably changed at the experimental schools by improving/building latrines and developing hand-washing facilities. Relevant regulations ensured the proper use, cleanliness and maintenance of the sanitation facilities.

The results achieved after 1 year of intervention showed an 80% decrease of the worm infection rate in school children, which is not a surprise because it is widely known that the existing drugs work well. The most interesting thing, however, is that the egg contamination of the school environment had also reduced by 75–100% which means fewer opportunities for the students to become re-infected. At the control schools where no health education and environment improvement were provided, however, the egg-contamination rate was reduced by only 28%. This is significant because frequent re-infection is the major obstacle for a successful helminth control programme, and school children are in a group of the community that bears the greatest burden of worms. It is logical to assume that other measures alleviated the contamination: health education helped the change of children’s unhygienic behaviour, and the improvement of school physical facilities (sanitation and water supply) provided basic conditions for better practice in health.

The establishment of school policies provides clearly defined directions which guide and influence the school’s actions and resource allocation in areas which promote health. Here is the
comment made by the headmaster of the Dongdai Primary School:

With the Charter of Health-Promoting Schools and other regulations established, everybody, from the headmaster, teachers to students, feels that he/she has the responsibility for making the school a healthy place for living, learning and working. Practising the professional ethics, teachers help build the school a student-friendly environment which makes students mentally healthy as well.

Another example is the tobacco-free policy on the school campus, with no smoking on the premises for all staff, students and visitors. The headmaster of the Danyang Secondary School was a heavy smoker—two packets of cigarettes a day. To be a model for his staff and students, he said:

I had to follow the smoke-free regulation and I believe tobacco is harmful. I made up my mind to stop smoking and asked all staff members to do so, or at least not to smoke in the school yard.

Relevant messages were passed on to parents and other members of the community through students and other channels. A teacher told the evaluation team:

In my class, there were 33 fathers who smoked. Four months after health education classes established for students, three of these fathers gave up smoking, and in the second semester five more stopped smoking as children told their parents that smoking can cause cancer and is also harmful to family members as passive smokers.

The project developed and sustained successful intersectoral co-operation and co-ordination, especially between health and education sectors. As mentioned above, the Project Steering Group was led by a vice-Magistrate and consisted of responsible officers in relevant sectors of the country government, the leaders of township, health centre, women and youth groups, and school headmasters. The project co-ordinator noted:

It is extremely important for a school health programme to have both health and education sectors involved. From the very beginning, the provincial departments of health and education both offered their support to the project. This also happened at the county and township levels, which made a full implementation of the project possible.

With the development of control strategies and successful practices in a number of countries, intestinal helminth infection is becoming a soluble public health problem (Savioli et al., 1992). It has been clearly proved that the anthelmintic drugs developed in recent decades are highly effective, safe, easy to administer and inexpensive. Together with other school-based interventions, worm control targeted at school children is effective and feasible. This project tried to target the whole community in Group A for chemotherapy. Although no significant difference was revealed on the prevalence reduction in students comparing to Group B, as only one treatment was delivered to the community members due to limited resources, it is imperative to involve the community in a successful helminth control programme, which is also an essential strategy for developing a health-promoting school.

CONCLUSION

Children of school-going age form a large percentage of the population of all countries. The increasing number of children attending school suggests that targeting school for health interventions could result in large-scale health and education benefits. The project evaluation revealed a significant impact on helminth reduction and improvements in school health promotion. The key elements for the success include active participation of students, headmasters and teachers, commitment and co-operation by government sectors, community involvement, and contribution of health professionals.

The project has shown that helminth intervention is an excellent entry point for the development of health-promoting schools in rural and semi-urban schools where helminths are highly endemic. It also showed that the concept of the health-promoting school is acceptable to government officials and community members.

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