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Cost Containment in a School Deworming Programme Targeting over 2.7 million Children in Vietnam

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Abstract

Vietnam is one of the countries in the world most affected by Soil Transmitted Helminthiasis. Large areas of the country, like the Northern uplands or the North and Central Coast, are reported as having 75- 85% of infection for *Ascaris lumbricoides*, 38-40% infection for *Trichuris trichiura* and 27-28% for hookworm infections. Periodical de-worming of schoolchildren is therefore strongly recommended.

The managers of the Helminth Control Programme decided to apply a number of measures to improve cost-efficiency in order to deworm as many schoolchildren as possible with the availability of limited financial resources.

This low-cost intervention targeted over 2.7 million schoolchildren. Coverage was estimated at over 95% and the cost for each treated child was 0.03 USD, which represents a saving of about 50% of costs presently reported in literature. The article describes the measures applied that resulted in cost containment but maintained high treatment coverage.

Keywords

School deworming; cost containment; Vietnam

Introduction

In many tropical countries, infections caused by Soil Transmitted Helminthiasis (*Ascaris lumbricoides*, *Trichuris trichiura* and hookworms) represent a major health burden yet they are controllable by simple and cheap interventions (WHO 2002). Vietnam is one of the countries most affected by these infections: out of a total population of approximately 80

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Conflict of Interest

The authors have not conflict of interest concerning the work reported in this paper

million, over 33 million are estimated as being infected by *A. lumbricoides*, 17 million by *T. trichiura* and 21 million by hookworms (Van der Hock et al. 2003). This situation is due to the high population density, the lack of sanitation infrastructure, the humid and hot climate (General Statistical Office of Vietnam 2002) and the habit of using fresh faeces as fertilizer in agriculture (Phuc et al. 2006). Periodical deworming of school age children is one of the WHO recommended measures to reduce morbidity in endemic countries (WHO 2002). The financial cost of drug distribution, has been estimated at between 0.024 USD in Myanmar (Montresor et al. 2004) and Cambodia (Sinuon et al. 2005) and 0.06 USD in Ghana and Tanzania (PCD 1999). This article reports an intervention conducted in the school year 2005-06 in Vietnam (covering over 2.7 million children) aimed at reducing these costs by 50% but simultaneously maintaining high coverage.

Material and Methods

The intervention took place in November – December 2005 in 27 provinces. The average number of schoolchildren in each province was 100 000 (range 28 000 – 136 000). In each province the Malaria Centre and the Education Department were appointed to conduct the school deworming. The following measures were applied that resulted in cost-containment:

- Baseline survey was not conducted. In the last 10 years, 339 published and unpublished surveys including parasitological data of over 220 000 individuals were conducted in Vietnam. The data were summarized in a single document showing to decision makers the urgent need of intervention. (Soil Transmitted Helminths in Viet Nam Prevalence and Need for Intervention, WHO internal document)
- The estimated amount of drugs for each province was provided in containers of 100 tablets to reduce time for repackaging.
- Specific transport of drugs to each school was not organized. Drug delivery was organized by the MoH and “piggy-backed” on the regular drug transport to the communal health stations.
- Formal teachers’ training on drug administration was not conducted. Included in each drug container was a single sheet of “Instructions for drug administration in schools”.
- Health education material was not developed. Included in each drug container was a single sheet of instructions on how to organize a question-answer session in the classroom and how to reinforce the correct answers from the pupils.
- There is no incentive for teachers to distribute the treatment. The teachers did not receive monetary incentives for drug administration activities, but each of them was provided with four tablets of anthelmintic to treat themselves and their families
- A parasitological evaluation of the programme was not conducted. Only the coverage was monitored.

- A fixed amount of money was provided to each province to organize distribution support activities and to allow the province to use the funds according to the local needs and practices.

Together with the drugs and the funds, the Provincial Malaria Centres and the Provincial Education Departments received instructions on how to cooperate in the organization of the deworming day in each province.

Costs Evaluation

Our cost estimation is based only on an analysis of direct financial costs (i.e. drug procurement, quality control testing, travel of personnel for drug distribution and monitoring, petrol used for transport). These costs were evaluated summarizing bills from drug producers and Quality Control laboratories, cost sustained for transport and per-diem for supervision/support teams. The monetary value of the time consumed by health and school workers during the deworming campaign (i.e. for drug distribution and reporting) was not considered in the cost evaluation because all operations were conducted during “working hours” and covered by the regular salary of the personnel.

Coverage Evaluation and Side effects

Two separate methods were used to evaluate the treatment coverage and the magnitude of side effects:

- On the day of drug administration teachers completed report forms detailing the number of children treated. These reports were then collated and summarized, in internal documents, at district, provincial and national levels.
- A central team (WHO-NIMPE) visited 91 randomly selected schools in 7 provinces in the week following the distribution of the drugs. A total of 2 323 children were investigated, using a questionnaire, on the treatment received and occurrence of side effects. The complete description of this study, the methodology used and the full analysis of the results are summarized in the WHO document. “Monitoring of the Deworming Intervention in Vietnam” (2006).

Satisfaction evaluation of receiver and provider

A household survey was conducted in one province (Ha Giang) to evaluate the opinions of the families of schoolchildren and of schoolteachers on the acceptability, suitability and effectiveness of the school programme. Information from 81 households and 25 teachers was collected through completion of structured questionnaires.

In Ha Giang Province, where the deworming activities started in 2003, it was also possible to compare the opinions of the teachers that administered the drug to children after receiving one-day training (as was the standard in the pilot phase of the intervention) with the opinion of the ones that did not received it (as is the present standard).

The complete description of the methodology used and the full analysis of the results are summarized in the WHO internal document “Perception towards school deworming in Ha Giang Province” (2006).

Results

Costs

The third part of Table 1 summarizes the financial costs occurred during the first round of deworming in 2005-06. The main cost of the programme is represented by the cost of the drug (2 900 000 tablets of mebendazole) locally produced (Pharbaco, Hanoi). The price of a tablet of mebendazole was negotiated at 250 VND (0.016 USD). The drug quality of each batch of drug produced was checked by an independent laboratory (Bureau of Food and Drug, Manila, Philippines) and found to be compliant with international standards.

Every province received 16 000 000 VND (= 1 004 USD) for the organization of distribution activities. Each province was given complete discretion on the selection of the most appropriate support measures: most of the funds were spent for school visits of health staff during the distribution day. Some provinces conducted additional activities to inform and mobilize the population (banners and posters printing, community meetings organization and message distribution with megaphones or local radio). Given the broad variability of selected support measures, it was impossible to analyze them in detail.

A MoH/WHO team from Hanoi conducted supervisory visits in 7 provinces, transport was organized by plane (on two occasions) or by car according the distance of the province from Ha Noi. On average 1 000 USD (range 400-2000 USD) were spent for a team of 4 persons during each supervisory visit.

Coverage

The forms compiled during the deworming campaign accounted for a total of 2 710 570 children treated, the mean coverage was 98.2% (range 86.5 %– 99%). The monitoring visits estimated a coverage of over 95% (range 91- 100). The discrepancies between the data reported by regular form filling and by the school visits never exceeded 4%.

Side effects

The total number of side effects reported by form filling was 4 140 (0.15%). The percentage of side effects reported by survey was 0.4 % and therefore over twice that reported through from filling. In all of the cases, the reported symptoms were mild and transient and did not require a pharmacological intervention after the child was left to rest for one hour (a measure that was recommended in the instructions provided to the teachers).

Satisfaction of receiver and provider (conducted only in Ha Giang Province)

The household survey showed that 98% of the families were satisfied by the intervention. In addition, 96.1% of the parents reported an improvement of children's health (more active child, increased appetite) and 36% noticed worms in the child faeces the day following the drug distribution. The great majority of teachers considered that the drug distribution took a

short time and that the provision of four tablets of mebendazole was a fair compensation for their time spent in the activity. However, about 20% of the teachers in Ha Giang Province complained that insufficient numbers of tablets were provided because of a misunderstanding on the calculation of the number of tablets required).

All teachers, whether they had received training or not, considered the drug distribution exercise to be very simple. They also considered the written instructions accompanying the drugs be simple to follow. On average, two hours was sufficient for conducting drugs administration per school.

Discussion

Table 1 summarizes the cost of deworming campaigns conducted in three different school years. The total number of children treated in the school year 2005-06 was 2 710 000, corresponding to the 11% of the estimated schoolchildren population.

The number of children covered in 2005-06 was over 20 times higher when compared to those treated in the 2000-01 campaign, but with a similar budget. In 2000-01 a more expensive imported anti-helminthic was used and a large amount of funds was spent on teacher training, printing of health education material, provincial, district and communal meetings.

In term of coverage, the cost-containment approach permits a significant expansion in the number of children receiving deworming treatment. Under this low cost strategy, no effort was made to motivate the teachers in conducting broader health education activities. Therefore, a possible negative consequence would be a lower efficacy of health education. However, whilst we consider the health education an important component of the deworming programme, in the case of very high prevalence, like in Vietnam, and limited availability of funds, we consider the maximum coverage of deworming as a more immediate imperative.

The consistently positive view of teachers supporting the simplicity of the intervention in this way, combined with the absence of a need for formal training is important because it allows a significant saving of resources that can be reinvest in treatment with the result of extending the treatment coverage.

The fact that teachers, health workers, families and children did not report difficulties in drug administration and in dealing with side effects, confirms that school deworming is so simple that it can be conducted by teachers without training. We interpret the higher number of side effects evaluated by survey compared to the one reported by forms as an effect of the active searching in no case the side effects were reported as severe.

Approximately 800 000 USD would be sufficient to treat the total schoolchildren population of Vietnam (over 18 million children) for one year with this low-cost method.

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Table 1

Comparison of the costs incurred for one round of school deworming in three different school years in Vietnam

Programme component	Total cost (USD)		
	2000-01	2002-03	2005-06
Drug Procurement	3 000	15 000	46 400
Drug Quality control	-	-	600
Survey	30 000	-	-
Laboratory material	18 000	-	-
Health education material and radio broadcast	20 000	18 000	-
National Workshops and exchange of visits	-	19 000	-
Support visits from Provincial teams (during the distribution activities)	-	-	27 000
Supervisory/monitoring visits from Central team (after the distribution activities)	-	-	7 000
Provincial Workshops and teacher training	14 000	17 000	-
Research	-	6 000	-
Total	85 000	75 000	81 000
<i>Number of children treated</i>	<i>120 000</i>	<i>700 000</i>	<i>2 710 000</i>
Cost per child	0.70	0.11	0.03