

KNOWLEDGE, ATTITUDES AND PRACTICES AMONG PARENTS AND TEACHERS ABOUT SOIL-TRANSMITTED HELMINTHIASIS CONTROL PROGRAMS FOR SCHOOL CHILDREN IN GUIMARAS, PHILIPPINES

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Abstract. We determined the attitudes toward and practices regarding soil-transmitted helminthes (STH) control among parents and school teachers to identify reasons behind attitudes and practices that do not promote STH control. Written knowledge, attitudes and practices surveys were distributed to parents ($N = 531$) and teachers ($N = 105$) of students at 11 elementary schools in Guimaras Province, the Philippines. The survey addressed attitudes about mass drug administration (MDA), knowledge about STH control, hygienic practices, and acceptability of distributing deworming tablets among teachers. More than 90% of parents and teachers held favorable attitudes towards MDA. Sixty-nine percent of parents and 75.5% of teachers believed stool exams were necessary before MDA. Thirty-seven percent of parents stated they would not allow teachers to administer deworming tablets and 91.5% of parents feared teachers would not detect side effects of the medication. Forty-eight percent of teachers felt they could safely give deworming tablets and 81.4% of teachers were afraid of managing the side effects of deworming tablets. Forty-seven point eight percent of parents and 42.2% of teachers stated defecation in the open occurred in their community. Although attitudes toward STH control were largely favorable, misconceptions about the MDA strategy, lack of support for teachers giving deworming tablets, and the practice of open defecation still exist as barriers to STH control efforts. The next step to achieve effective STH control will be to clarify misconceptions in education campaigns, to train teachers about medication administration, campaign to improve sanitation and hygiene and begin targeted mass treatment in Guimaras, the Philippines.

Keywords: soil-transmitted helminthiasis, neglected tropical diseases, mass drug administration, knowledge, attitudes, practices, Philippines

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INTRODUCTION

Soil-transmitted helminthiasis (STH) is a worldwide problem despite major initiatives to control its transmission (DOH, 2006). In the Philippines, the prevalence of

STH infections among elementary school children is 54.1%, with 23.1% of infections being classified as being heavy in intensity based on World Health Organization (WHO) guidelines (Montresor *et al*, 1998; Belizario *et al*, 2009).

To control this infection, the Philippines has been using the guidelines on the control of STI by the WHO, which includes guidelines for mass drug administration (MDA) and water/sanitation and hygiene (WASH) (WHO, 2002; DOH, 2006; Crompton, 2006).

MDA is defined as the distribution of medication to an entire group of people regardless of their infection status (WHO, 2002; DOH, 2006). Because children experience the greatest morbidity and intensity of infection, the program targets public elementary schools for MDA (Crompton and Nesheim, 2002). Pilot studies in the Philippines have shown this program successfully reduces the prevalence of STH (Belizario *et al*, 2009). In addition to MDA, elimination requires the improvement of WASH and behavioral practices (Urbani and Palmer, 2001; WHO, 2002; DOH, 2006; Belizario *et al*, 2009). It also requires education campaigns to increase public support for the program (DOH, 2006; Talbot *et al*, 2008; Cantey *et al*, 2010).

For successful implementation of an effective STH control program, it is extremely important this program is acceptable to stakeholders (Amarillo *et al*, 2008). Using a knowledge, attitudes and practices (KAP) survey, misconceptions toward and harmful practices about STH control can be identified and an education program may be developed to increase public awareness (Msyamboza *et al*, 2010). This education has been shown to positively influence acceptance of treatment (Kamunvi and Ferguson, 1993; Mascie-Taylor *et al*, 2003).

Therefore, we determined the KAP regarding STH and STH control among parents and elementary school teachers and identified reasons behind those attitudes and practices that do not promote STH control using a survey.

MATERIALS AND METHODS

Study sites

Three school districts in the Guimaras Provinces (Jordan I, Jordan II and San Lorenzo), were chosen as sentinel sites for the study. These school districts were selected because together, they cover a full range of socioeconomic levels and both urban and rural living on the island. The schools were chosen by the Guimaras Provincial Health Office and the Department of Education Office.

Sample size calculation

Parents and teachers of elementary students in these districts were chosen for the survey. The following formula was used to calculate the sample size for each group:

$$n = \frac{Z^2PQ}{d^2}$$

where: n = sample size, Z = Z-score, P = proportion of an event, Q = proportion of non-event, $(1 - P)$, d = margin of error.

Since no data was available regarding the proportion of the event, it was set at 50.0%. The Z-score for a 95% confidence interval was 1.96, and the standard margin of error used was 10.0%. Accounting for a 10% non-response rate from the teachers and a 20% non-response rate from the parents, the final sample sizes were 107 teachers and 122 parents.

Survey forms

Survey forms were written and edited in order to make the meanings of the ques-

tions as clear as possible and to minimize survey bias. Most questions had answers using a Likert scale, some were written with a "Yes/No/Don't know" format, and a few were written as open-ended questions. The survey was translated into the local language and back-translated into English to verify the accuracy of the translation.

One thousand surveys were distributed to parents of students in grades three and four and 150 forms were distributed to school teachers in grades one through six. The parents of children in grades three and four were surveyed, since these children were the ones included in the parasitologic assessment. The teachers for grades one to six were surveyed since these are the grade levels targeted for school-based MDA. The survey forms were collected and returned to the research team.

Data processing and analysis

Answers were translated into English for analysis. Likert scale answers were encoded numerically. A minimum Cronbach's α value of 0.60 was used to determine adequate consistency within domains. The domains were summed per respondent and the mean and standard deviation were calculated for the sums of each domain. One-way ANOVA tests were run to determine correlation between demographic variables and summed using $p < 0.05$ as the cut-off for significance. Results from the "Yes/No/Don't know" questions were encoded in binary form with "Yes" coded as "1," and "No," and "Don't know," coded as "0." Frequency distributions were obtained for these answers. The open-ended questions were qualitatively analyzed and grouped into common themes. Statistical analyses were done using OpenOffice Calc 3, Microsoft

Excel 2011, and Minitab 16.

Ethical considerations

The surveys were distributed with a cover letter which explained the purpose of the study and that participation was voluntary. No personal identifiers were asked from any participants. This study was part of a Filipino government program and was therefore subject to federal ethical regulations. This study received an IRB waiver from the University of Pittsburgh (IRB #: PRO11070478).

RESULTS

Demographics

Of the 1,000 survey forms distributed to parents, 669 were returned. Of these, 118 were answered by respondents under the age of 20 years. Since it was highly unlikely these respondents were the parents of children in grades 3 and 4, they were removed from the analysis (Table 1). Most parents fell into the age groups of 31-40 years old or 41-50 years old (Table 2). Primary and secondary level education were the most common levels of education attained by parents. Of the parents who responded, 84.9% reported having children at home. Of the parents who had children at home, the number ranged from 1 to 13 children.

Of the 150 survey forms distributed to teachers, 103 were returned (Table 1). Most respondents were female (96.1%) and in the age group 31-40 years old or 41-50 years old (Table 2). All teachers had a college level education. In both parents and teachers, one-way ANOVA tests for correlation between demographic variables and attitudes about the MDA program, and correlation between demographic variables and attitudes about the teachers delivering the medication

Table 1
Number of responses obtained from parents and teachers.

School district	Parents (%)	Teachers (%)
Jordan I ^a	124 (23.4)	29 (27.6)
Jordan II ^b	152 (28.6)	29 (27.6)
San Lorenzo ^c	255 (48.0)	47 (44.8)
Total	531 (100)	105 (100)

^aSchools included Hoskyn ES, Jordan CS, Morubuan ES.

^bSchools included Lawi ES, San Miguel CS, Sta Teresa ES.

^cSchools included Constancia ES, Doña Lucia Locsin MS, San Enrique ES, Silvestra Melgar MS, Suclaran CS.

Table 2
Demographic characteristics of parents and teachers.

Demographic characteristics	Parents Number (%)	Teachers Number (%)
Gender		
Female	380 (73.5)	99 (96.1)
Male	137 (26.5)	4 (3.9)
Total	517 (100)	103 (100)
Age group (years)		
21-30	62 (12.4)	1 (1.0)
31-40	244 (48.8)	11 (10.7)
41-50	145 (29)	35 (36.0)
51-60	37 (7.4)	40 (38.8)
61 or older	12 (2.4)	11 (10.7)
Total	500 (100)	103 (100)
Level of education		
No education	2 (0.4)	n/a ^a
Elementary	146 (28.8)	n/a ^a
Secondary	204 (40.2)	n/a ^a
Vocational	25 (4.9)	n/a ^a
College	107 (21.1)	n/a ^a
Graudate school	23 (4.5)	n/a ^a
Total	507 (100)	n/a ^a

n/a^a, not applicable

did not yield any significant results (data not shown).

Factors that could aid STH control efforts

Most parents (92.1%) and teachers (88.8%), stated they had received prior information about STH (Fig 1). The three

most common sources for both groups were health workers, school and television. The majority of parents (92.8%) and teachers (97.0%) believed STH were a major problem. When asked about how to prevent transmission of STH, most parents (93.2%) and teachers (98.7%) wrote

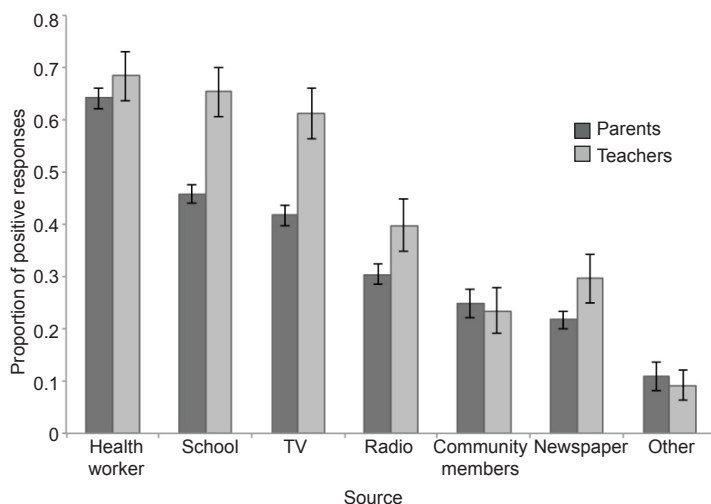


Fig 1—Sources of prior information about STH. Parents: $N=479$, 92.1% of respondents had received prior information. Teachers: $N=98$, 88.8% of respondents had received prior information.

comments that demonstrated correct knowledge about STH prevention.

Both parents and teachers had favorable attitudes towards MDA (Fig 2A) as well as an overall favorable attitude towards teacher involvement in MDA (Fig 2B). Most parents (80.0%) felt teachers could administer medication without supervision if they received training. Most teachers (91.4%) felt their participation in administering medications would be worthwhile. Most teachers (85.0%) showed an interest in learning about STH and the MDA strategy. Regarding health behavior, most parents (93.3%) and all teachers (100%) wrote comments that supported stopping open defecation and showed faith in the government's capability to accomplish this goal.

Factors that could impede STI control efforts

Confusion about the MDA strategy was identified in this survey. When asked about conditions under which they would not allow their child to receive

deworming medication, some parents (30.3%) and teachers (12.3%) gave reasons based on inaccurate information. The majority of parents (69.0%) and teachers (75.5%) believed stool exams were necessary before treatment under the MDA strategy.

Although overall support was shown for teacher involvement in MDA, many of the responses showed concern about this idea (Table 3). Most parents (91.5%) feared the teachers would not be able to detect side effects in the

children. Some parents (37.0%) stated they would not allow a teacher to give deworming medication to their children. Common reasons the parents gave were: 1) they did not trust the teachers, and 2) they believed the teachers did not know what to do. Some parents (27.9%) believed deworming was the obligation of health workers, not teachers. Some teachers were fearful about giving deworming medication, especially in regard to the side effects (Table 4).

Some parents (47.8%) and teachers (42.2%) stated open defecation occurred in their communities. Some respondents misinterpreted the question, as noted by their responses in an open-ended follow up question, and were removed from the analysis of this section.

DISCUSSION

This study is an important step in the effort to control STH in a high-risk area of the Philippines. The majority of parents and teachers believed STH were a major

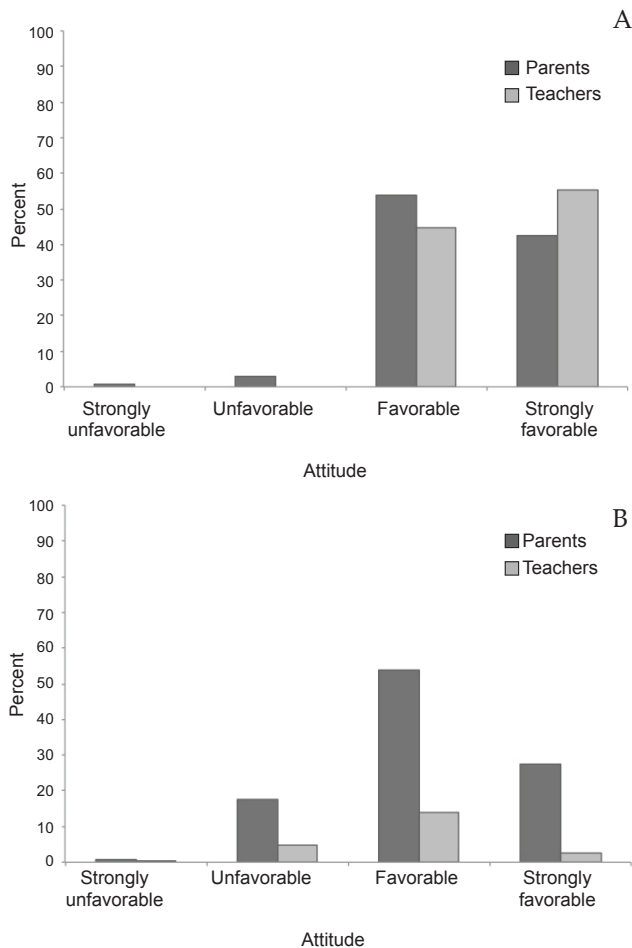


Fig 2—Attitudes towards MDA. Results from Likert scale where: strongly unfavorable=8-15, unfavorable=16-23, favorable=24-31 and strongly favorable=32-40. Parents, N=441; teachers, N=94.

problem, had an adequate knowledge regarding STH prevention, held a favorable attitudes toward MDA, were open to the option of treatment by teachers and supported stopping open defecation. There were no statistically significant associations between these attitudes and demographic factors. These results suggest education programs about STH conducted prior to this study were beneficial.

Health workers, school and television were the most common sources of information; therefore, future education

campaigns should utilize these resources.

Parents and teachers had some major misconceptions about the MDA strategy. Of most concern was the opinion that children should not be treated unless they have had a stool exam, which goes against the concept of mass treatment without checking infection status. The respondents also had misconceptions about the indications and contraindications for treatment with deworming medication. These misconceptions should be addressed through education campaigns, which have been shown to decrease barriers to treatment and improve compliance (El-Setouhy *et al*, 2007; Cantey *et al*, 2010). Based on the misunderstandings identified in this study, future education programs should include the principles of the MDA strategy and basic information about the deworming medication.

They should also dispel fears about the less common side effects of the deworming medication, such as erratic migration of worms, which have recently gained attention in the community.

Although the majority of respondents had an overall favorable attitude towards teachers administering medication, a concept that would greatly improve the efficiency of deworming, both groups had concerns about managing the side effects of the medication. Most parents agreed that if teachers were trained, they could administer medication without

Table 3
Opinions among parents and teachers.^a

Statement	Agree (%)		Disagree (%)		No opinion (%)	
	Parents	Teachers	Parents	Teachers	Parents	Teachers
MDA would be more efficient if teachers administer medication.	272 (63.1)		150 (34.7)		10 (2.3)	
Teachers should be able to give medication to students.	264 (61.0)	38 (37.3)	156 (36.0)	60 (58.8)	13 (3.0)	4 (3.9)
Teachers would be able to administer medications safely.	236 (54.5)	45 (44.1)	179 (41.3)	49 (48.0)	18 (4.2)	8 (7.8)
Students would be willingly to take deworming tablets from teachers.	202 (46.6)	37 (39.3)	186 (43.0)	59 (57.8)	45 (10.4)	6 (5.9)

^aParents: *N*=433; teachers: *N*=102. Parent data on first line, teacher data on second line.

Table 4
Concerns of teachers about side effects of deworming medication.

Statements	Yes (%)	No/Don't know (%)	Total (%)
I know what the side effects are.	34 (33.0)	69 (67.0)	103 (100)
I know what to do if th student experiences side effects.	22 (21.4)	81 (78.6)	103 (100)
I am afraid of the side effects.	83 (81.4)	19 (18.6)	102 (100)

supervision; therefore, a training session for the teachers will likely help improve acceptability of MDA for the parents as this improves the confidence of the teachers (Cantey *et al*, 2010; Krentel and Aunger, 2011).

Of greatest concern for effective STH control is the widespread prevalence of open defecation in this community. Sanitation is an important control strategy for STH (DOH, 2006; Hong *et al*, 2006). MDA without improvement in sanitation is not sufficient for effective control. A recent meta-analysis of studies from the past 30 years showed without proper sanitation, reinfection rates exceeded 50% by 6 months after MDA and nearly returned

to baseline prevalence by 12 months (Jia *et al*, 2012). A systematic review of 36 studies showed latrine use can halve the likelihood of STH infection, highlighting the impact sanitation has on STH control (Ziegelbauer *et al*, 2012). It is encouraging to note both teachers and parents knew open defecation increases the risk of STH infection and supported improved sanitation. Future efforts should focus on encouraging local government units (LGU) to improve public sanitation, which will require substantial community action and sustained LGU involvement.

Further steps in this program will be to clarify misconceptions with education campaigns, train teachers to administer

deworming medication, campaign for improved water and sanitation facilities, and begin mass treatment in all municipalities in Guimaras. In order to achieve effective control of STH, these strategies must be implemented in synchrony, which will require cooperation from LGU, health workers, teachers and increased public support (Hong *et al*, 2006). Unfortunately, government support for neglected diseases, such as STH, is difficult to maintain in developing nations, but will be essential for effective control, since it is the major contributor to long-term control strategies, such as water and sanitation facilities. Maintenance of public support will also be a challenge, but can be achieved with effective education efforts.

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