

# Schistosomiasis and Soil-transmitted Helminthiasis Morbidity Control in Selected Communities in Eastern Visayas, Philippines: Post-Haiyan

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## ABSTRACT

**Objective.** As part of the evaluation of control programs recommended by WHO, this study describes the local implementation of schistosomiasis (SCH) and soil-transmitted helminthiasis (STH) morbidity control as well as water, sanitation, and hygiene (WASH) interventions post calamity. It likewise determines the challenges, areas for improvement, and good practices in SCH and STH morbidity control strategies in Haiyan-stricken areas in Eastern and Western Samar, the Philippines.

**Methods.** Twenty key informant interviews and eight focus group discussions documented the implementation of SCH and STH control strategies in Eastern Visayas. Data analysis was done manually by a multi-disciplinary team.

**Results.** Mass drug administration (MDA) in schools and communities was conducted for morbidity control. MDA for STH for pre-school-age children was integrated into the *Garantisadong Pambata* program, while a school-based teacher-assisted approach was used for school-age children. WASH facilities, such as sanitary toilets, were constructed through the initiatives of the local government units (LGUs) and other private sectors. Partnerships with Plan International Philippines helped in the implementation of WASH through the conduct of Community-led Total Sanitation. Health advocacies helped instill behavioral change in the community. SCH surveillance was conducted annually while STH surveillance was irregularly implemented. Data on MDA coverage were validated through Rapid Coverage Assessment before final reporting. Discrepancies were observed due to typographical errors and the inclusion of teachers and transient migrants in the reports submitted. Challenges in the implementation of MDA include delays in drug delivery, lack of human resources, non-compliance of participants, and drug unpalatability. Challenges in WASH included the lack of hand washing facilities, inaccessibility to safe water, as well as non-utility of sanitary toilets. Strengthening health advocacy and education may help address these challenges.

**Conclusion.** The involvement and partnership of various stakeholders such as LGUs, WASH, and veterinary sectors, together with the academe are needed to strengthen and enhance the implementation of SCH and STH control activities. An integrated approach may contribute to improvements in SCH and STH prevention and control of the communities in selected Haiyan-stricken areas.

**Keywords:** *schistosomiasis, soil-transmitted helminthiasis, Haiyan, Philippines*



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## INTRODUCTION

Schistosomiasis (SCH) and soil-transmitted helminthiasis (STH) are neglected tropical diseases disproportionately affecting impoverished and marginalized areas.<sup>1</sup> They remain endemic in areas with poor access to safe water, sanitation, and hygiene including communities in the Philippines.<sup>1,2</sup> Chronic or heavy intensity infections are associated with malnutrition, and poor physical and cognitive development among children, while it causes decreased productivity in adults, leading to economic losses.<sup>1,3,4</sup>

The World Health Organization (WHO) recommends preventive chemotherapy through mass drug administration (MDA) of anthelmintics among high-risk groups living in endemic areas for SCH and STH morbidity control. Early and regular administration of anthelmintics reduces the occurrence, extent, severity, and long-term consequences of morbidity.<sup>5</sup> Prevention, control, and eventual elimination of SCH and STH, however, are also dependent on improved access to safe water, sanitation, and hygiene (WASH).<sup>6,7</sup> The Philippine Department of Health (DOH) launched the Schistosomiasis Control and Elimination Program (SCEP) and the Integrated Helminth Control Program (IHCP) for prevention and control of SCH and STH respectively, through MDA, improving WASH, together with health promotion, among others.<sup>8,9</sup>

As SCH is strongly associated with ecological factors, challenges in SCH control remain due to changes in the natural environment brought about by different calamities such as typhoons.<sup>10</sup> For example, flooding following a typhoon contributes to the expansion of snail habitats, therefore, spreading the endemicity of SCH as seen in some regions of China.<sup>11,12</sup> Natural disasters not only affect the control of SCH but also STH since it also affects the implementation of control programs disrupting routine morbidity control strategy and damaging sanitation and hygiene facilities.<sup>13,14</sup> On 8 November 2013, Typhoon Haiyan, a category five typhoon caused considerable damage in the Visayas.<sup>15</sup> In Eastern and Western Samar, the prevalence of STH in PSAC and SAC was 50.2% and 43.3%, respectively.<sup>16</sup> Considering the effects of climatic events on the spread of infections, Typhoon Haiyan may have triggered alterations in the distribution of disease vectors and intermediate hosts of SCH.

To complement the research on the burden of STH, SCH, undernutrition, and poor sanitation by Belizario et al.,<sup>16</sup> this study describes the local implementation of SCH and STH morbidity control and WASH interventions post calamity. It likewise determines the challenges, areas for improvement, and good practices in SCH and STH morbidity control strategies in Haiyan-stricken areas in Eastern and Western Samar, the Philippines. Looking into the implementation and intervention including the advantages and barriers in Haiyan-stricken areas will considerably contribute to response preparedness in areas post calamity.

**Table 1.** FGDs conducted in selected municipalities, Eastern and Western Samar

Province	Municipality	Focus Groups	Number of participants
Eastern Samar	Llorente	RHMs	6
		School Teachers	3
		Parents of PSAC enrolled in CDCs	12
		Parents of PSAC enrolled in ES	5
	Oras	RHMs	9
		School Teachers	5
		Parents of PSAC enrolled in CDCs	13
		Parents of PSAC enrolled in ES	8
Western Samar	Daram	RHMs	4
		School Teachers	7
		Parents of PSAC enrolled in CDCs	7
		Parents of PSAC enrolled in ES	7
	Gandara	RHMs	4
		School Teachers	7
		Parents of PSAC enrolled in CDCs	12
		Parents of PSAC enrolled in ES	12

## METHODS

### Study sites

The municipalities of Oras and Llorente in Eastern Samar, as well as Daram and Gandara in Western Samar, were included in the study as recommended by the DOH Eastern Visayas - Center for Health Development (EVCHD) and the local government units (LGUs). Aside from known SCH endemicity and open defecation (OD) status, study sites were selected based on Plan International Philippines' typhoon Haiyan-affected coverage areas. Accessibility of communities, peace and order situation, and the willingness of the LGUs to cooperate were likewise considered.

### Informants and participants

Key informant interviews (KIIs) and focus group discussions (FGDs) were conducted by trained research staff to document the implementation of SCH and STH control strategies. Challenges, areas for improvement, and good practices in the program implementation were noted.

Twenty key informants were composed of key officers and staff from DOH-EVCHD, DepEd Division Offices, and LGUs. Eight FGDs were done separately with rural health midwives (RHMs), public school teachers, and parents of enrolled PSAC in selected child development centers (CDCs) as well as SAC in selected public ES in each municipality as shown in Table 1.

### Analysis of Qualitative Data

Interviews and FGDs were transcribed and analyzed by a multi-disciplinary team with training in public health, medical technology, medical anthropology, and biology. Software was not used to analyze the qualitative data.

In general, the extent and nature of the analysis ultimately depended on the goals of the study. Topics for analysis were generally dictated by those included in the guide questions. Analysis was broken down into more manageable subsets of topics such as the local implementation and monitoring of SCH and STH control as well as the challenges, areas for improvement, and good practices without being selective in the use of data from different sources. Rather, all categories of opinions were taken into account. Lastly, quotes from interviewees were included to emphasize an important point of view.

### Ethical Considerations

The study protocol was reviewed and approved by the University of the Philippines Manila Research Ethics Board (UPMREB-2017-088-01). Individual informed consent was obtained before the conduct of KIIs and FGDs.

## RESULTS

### Local implementation of SCH and STH control

#### Local implementation of SCH and STH control in Eastern Samar

Only known SCH-endemic *barangays* were provided with PZQ. The rural health unit (RHU) staff visited schools to administer PZQ to SAC depending on their weight. A master list of students with their respective weights and corresponding PZQ dose was prepared by the public health nurse before the scheduled MDA, making drug administration easier. For PSAC, selective treatment was provided for SCH diagnosed only.

For purposes of health education, RHU staff distributed flyers about SCH. According to parents, flyers were their primary source of information. Neither seminars nor orientations have been conducted. There were still parents who refuse to deworm their children. Furthermore, some children do not take PZQ because of the tablet's big size and bitter taste, and parents did not force them to do so.

According to the key informants, MDA for STH in PSAC was conducted by RHU staff twice a year as part of the *Garantisadong Pambata* (GP) program. The schedule of MDA in SAC has been harmonized with the implementation of National School-based Deworming Month every January and July. The Municipal Social Welfare and Development Officer of Oras claimed that RHU staff was already conducting deworming in some CDCs, assisted by child development workers (CDWs) before the start of classes, while others were asked to go to the *barangay* health centers.

SAC parents preferred the conduct of MDA in schools. Health workers from the RHU and school nurses, trained by the DOH, administer anthelmintics. For absentee children, the school nurses administered it when they report. Teachers' role was focused on MDA advocacy and dissemination of information to both students and parents.

In partnership with the LGUs, Plan International Philippines was conducting CLTS activities in their covered areas. The importance of having and using a toilet and its impact on the health of the community was advocated. LGUs in Oras provide low-cost construction materials for toilets and septic tanks to lessen the financial burden on the household owners. In addition, orientation on hygiene, proper hand washing, and proper use of toilets were also conducted by rural sanitary inspectors (RSIs) in *barangays* and schools.

An unannounced quarterly evaluation of toilets and water was conducted and the top 10 *barangays* were awarded monetary compensations. Lastly, local chief executives provided support to these programs and advocate for the achievement of ZOD status.

#### Local implementation of SCH and STH control in Western Samar

Local health workers from the DOH and RHU administered PZQ in schools. Social mobilization conducted by teachers was highlighted:

*"If the parents have not anticipated the deworming activity (through social mobilization), they usually don't let their children take the medication. The children don't usually take the medicine... we have good deworming in school because the children trust the teachers. However, in the community, the children don't trust the health workers that give the medicine, so the social mobilization is very vital."*

– Infectious Disease Cluster Head, DOH-EVCHD

Health workers from the RHU and school nurses brought and administered the anthelmintics. In Daram, the *purok* system was utilized wherein each BHW handles 50 or fewer households. BHWs, oriented by the nurses or RHMs, distributed anthelmintics and ensured that the members of her *purok* will receive PZQ.

Parents were well aware of the advantages of deworming for their children and supported the GP program in their community. They agreed with a CDC-based MDA scheme. RHMs of Gandara agreed that CDWs can assist in the administration of anthelmintics to PSAC. The MHO and some RHMs in Daram expressed doubts about the implementation of CDC-based MDA due to the low enrolment rate in CDCs which could lessen the coverage.

The LGU's main WASH intervention was the provision of toilets as well as the construction of a water system. It provided materials for toilet construction and low-cost septic tanks while Plan International Philippines provided support for the construction of tap stands and water tanks. The LGU prioritized the *barangay* with low sanitary toilet coverage but with a strong commitment to the utilization and maintenance of the sanitary facility. Another WASH intervention was the conduct of CLTS activities in selected *barangays*. Plan International Philippines staff together with the LGU provided information on the importance of ownership and

utilization of a toilet, as well as usage's effects on community health. Orientations on good hygiene, proper hand washing, and proper use of toilets were likewise conducted by RSIs.

### Monitoring and evaluation of SCH and STH control implementation in Eastern and Western Samar

For monitoring and evaluation, a focal survey was conducted yearly for SCH while surveillance for STH was irregularly implemented. Data on deworming coverage submitted by provincial coordinators from the PHO to DOH were validated through Rapid Coverage Assessment before final reporting. The DOH-EVCHD IHCP/SCEP Coordinator mentioned discrepancies between reported and validated data due to typographical errors and the inclusion of teachers as well as transient migrants in the reports submitted by RHUs and/or schools.

### Challenges, areas for improvement, and good practices in the implementation of SCH and STH control in Eastern and Western Samar

Challenges in the implementation of SCH and STH control strategies included prioritization as well as conflicts in schedule with other programs of DOH together with LGUs. As suggested by DepEd Medical Officer, programs should be based on children's needs thus making the program successful and sustainable. The delay in supply of PZQ and lack of human resources slackens program implementation compromising MDA coverage. Deworming services to far-flung communities likewise required additional time and transportation expenses as described below:

*"...drug supplies don't arrive on time, so people don't start the deworming on time as well... schedules for the deworming are within a month and it's allocated by the respective LGUs, so, we at the technical services don't have any control... But even the other LGUs don't do it within the prescribed month because of some local factors. For example, if they have far-flung barangays... they have to ask funding from the LGU, and sometimes the LGU doesn't grant it on time, so that's a delaying factor as well... There are even times when the local health workers have to abandon (deworming)... because they don't have their travel expenses covered by the local municipalities... some of the far-flung barangays may be about 3, 4, 5 hours away from where the RHUs are located... that's probably around PhP4,000 to PhP5,000 [transportation cost] which the health worker cannot actually shoulder and they're not actually expected to shoulder it anyway."*

– Technical Services Division Head of PHO

Some parents refused due to fear of “worms passing out of the mouth, nose, or ears of the child,” and other adverse events such as abdominal pain. As mentioned earlier, some children did not take PZQ because of the tablet's big size as well as bitter taste, and parents did not force them to do

so. Moreover, according to some teachers including parents, the deworming drugs provided by the government were ineffective and caused side effects. Parents who can afford preferred to buy commercially available anthelmintics. Teachers said that some parents initially refused, but were later convinced to submit their children for deworming after receiving an orientation.

Teachers were involved when the school nurse could not attend to all schools. In such cases, the school nurse brought deworming drugs and oriented the teachers on how to administer anthelmintics to the children. Some teachers did not participate for fear that pupils might suffer from adverse events, while other teachers refused to cooperate during MDA without the presence of a physician even if a nurse was present.

*"We encountered problems in a certain school. We pity the nurse. Nurses stated that teachers refused to deworm the children. The nurse seemed insulted because of additional conditions. They were requesting for their own physician."*

– Medical Officer, DepEd

Areas for improvement included the provision of additional anthelmintics as a backup supply for walk-in untreated patients. Intensified social mobilization combined with health promotion and education is needed to increase participation as well as an understanding of the community on deworming. Regular monitoring of infection rates may be done by DOH to track the outcomes of the mass treatment. Training of local chief executives together with the MHOs on health governance through the Municipal Leadership Governance Program, provided an in-depth understanding of the health problems and intervention programs to address the situation.

According to the key informants, good practices included the conduct of training or capacity building for local health workers although priority is given to those assigned in known SCH-endemic areas. Health workers deployed by the DOH provided valuable support in the promotion and implementation of deworming, however, not all local health workers were well-trained, especially the new graduates. *Barangays* also had different initiatives, such as feeding before the administration of anthelmintics. Some *barangay* captains demonstrated the safety of deworming by taking the anthelmintic themselves. Community participation, such as those of parents and BHWs, was also beneficial. High MDA coverage for SCH was awarded a monetary prize by DOH.

Challenges in WASH included the lack of hand washing facilities, access to safe water in CDCs and schools, as well as non-functional sanitary facilities. For example, in Vallesbello ES, toilets and sinks were provided in every classroom. However, the pupils did not use them due to lack of water. The pupils needed to fetch water and brought it to the facility.

Even with the availability of toilets, some HH owners still did not utilize them because they were made of plastic.

In some cases, the people did not build their own toilet facilities because they did not own the land where their houses were built. In Llorente, only five out of 33 *barangays* had been declared ZOD status. In Oras, 14 out of the 42 *barangays* had ZOD status. OD could still be observed in some *barangays* situated near rivers. There were people who, despite being provided with sanitary toilets, still practiced OD, including elders who had been doing it for a long time. LGUs also provided water disinfectants, however, some residents rejected them as they caused them abdominal pain. They preferred boiling the water before consumption.

In Daram, only one out of 58 *barangays* had been declared ZOD status with two having a status of near ZOD. In Gandara, no *barangay* had been declared ZOD status. Informants unanimously agreed that OD can still be observed in some *barangays*; in Daram, especially those living near the coasts of the island.

The lack of human resources for WASH activities resulted in difficulties in the delivery of materials and monitoring of all *barangays*. RSIs requested HH owners to provide pictures of areas where the toilets will be constructed and photographs after they have been constructed. Lastly, there was a lack of surveillance of water sources, such as water refilling stations.

Good practices in the implementation of WASH interventions included the conduct of health promotion and education activities such as orientation on proper hand washing as well as tooth brushing for children, and on CLTS for health workers and parents. School teachers specifically mentioned that DOH and other non-government organizations (NGOs) also provided grooming kits for children containing toothbrushes, toothpaste, soap, comb, including towels.

The major WASH interventions were the provision of toilets to selected HHs, as well as the construction of water systems by the LGU with the help of NGOs; however, not all HHs were provided toilets due to insufficient funds. The LGU prioritized the *barangay* with low sanitary toilet coverage and those who committed to using and maintaining them. Non-government and international organizations (i.e., *Kabit Bisig Laban sa Kahirapan*-Comprehensive and Integrated Development of Social Services, Plan International Philippines), as well as political entities, assisted with the purchase of toilets and construction of water systems. HHs provided counterpart support by providing manual labor. After the provision of toilets, LGUs conducted monitoring to ensure that the toilets were constructed and utilized.

## DISCUSSION

Post-Haiyan, the implementation of SCH and STH control in Eastern and Western Samar was still focused mainly on MDA despite the evidence of a high burden of infections. Insufficient or delayed delivery of anthelmintic supply, lack of human resources, and misconceptions about

deworming contributed to continuing challenges. Deworming alone, however, will not break the transmission of SCH and STH. Transmission is dependent on ending OD through improving access to WASH in endemic communities.<sup>6,7</sup> The WHO and DOH-IHCP recommend complementing PC with improvements in WASH as well as health promotion and education.<sup>8,9,17,18</sup> Poor WASH conditions may contribute to STH reinfection due to continuous exposure. Reinfection, which occurs rapidly for *Ascaris* and *Trichuris* infections, may contribute to high STH infection prevalence despite high MDA coverage.<sup>19</sup> People with safe water and adequate sanitation had significantly lower odds of having SCH.<sup>20</sup> Improvements in sanitation by increasing access to sanitary toilets and safe water as well as efforts toward influencing health behaviors including proper personal hygiene can address most, if not all, these helminths altogether.<sup>21</sup>

In this regard, access to WASH facilities and targeted environmental management have to be strengthened especially after a typhoon. WASH interventions in Eastern and Western Samar are focused on the provision of materials for the construction of sanitary facilities and the conduct of CLTS activities. However, adopting the use of improved sanitation facilities requires behavioral change not merely the provision of toilets. SCH and STH control require eliminating OD achieved by ensuring the utilization of sanitary toilets. To sustain effective control of STH, community interventions such as CLTS may be intensified so that the WASH sector would improve parasitologic status in high-risk groups, as well as sustain behavior change. LGUs working with WASH organizations should formulate clear policies toward a sustainable system for monitoring and evaluation of ZOD outcome indicators.

The areas for improvement include the increase of human resources, intensified health education to parents, as well as additional sanitary including hand washing facilities in schools and CDCs. The advantages and disadvantages of maintaining good hygiene as well as sanitation in HHs should be advocated to parents by the LGUs. Social mobilization is also vital in achieving high deworming coverage as it builds trust between the people in the community and the health workers.

The most important cross-cutting strategy in the success of SCH and STH control programs is the multi-sectoral collaboration of different agencies. Japan and China have successfully eliminated SCH through integrated approaches involving preventive chemotherapy, snail control, health education, provision of sanitary facilities, environmental modification, and improved farming methods.<sup>22,23</sup> In China, cattle were removed from grasslands where snail inhabits for 80% of all snail infections originate from cattle. Also, sanitation was improved to decrease the amount of human excreta discharged into the lake and grasslands, thereby reducing the human source of snail infection.<sup>24</sup>

Following a model of effective SCH and STH control, the above-mentioned challenges can be addressed through

War on Worms (WOW) Campaign developed by UP Manila. Its components are advocacy, capacity building, social mobilization, MDA, multi-sectoral collaboration, as well as monitoring and evaluation. WOW Campaign is being implemented in support of the IHCP of the DOH. Consequently, the sustainability of deworming programs would be improved by placing greater emphasis on the prevention of transmission through intensified WASH interventions in addition to MDA.

In a devolved health system where the health outcomes are entrusted to LGUs, collaboration among different sectors is vital towards effective helminth control. Effective multi-sectoral collaboration in helminth control has been demonstrated in areas such as in Western Visayas and Davao del Norte where the WOW Campaign is being implemented. The best practices on helminth control in these sites may be replicated in the province. Monitoring and evaluation of parasitological status assess existing strategies on the helminth control program. A parasitological assessment may be conducted every two years as proposed by WHO.<sup>25</sup> The different indicators for the success of WASH programs must also be improved. Reliable data could guide policymakers in implementing programs to address SCH and STH as public health problems.

## CONCLUSION

Led by DOH, the involvement of various stakeholders such as DepEd, LGUs, WASH, and veterinary sectors, together with the academe can strengthen and enhance the implementation of SCH and STH control activities. A comprehensive strategic plan for SCH prevention, control, and elimination formulated with the cooperation of these stakeholders is highly recommended.

To stop the cycle of SCH and STH reinfection, integration of SCH and STH morbidity control with WASH interventions is recommended following the WOW components. An integrated approach, WOW-A-WASH may contribute to improvements in SCH and STH prevention and control, nutrition, including WASH status of the communities in the selected Haiyan-stricken areas.

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## Statement of Authorship

All authors contributed in the conceptualization of work, acquisition and analysis of data, drafting and revising, and approved the final version submitted.

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