

Characteristics of School-Age Children Infected with *Schistosoma japonicum*

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ABSTRACT

This study focused on investigating *Schistosoma japonicum* infection and the school performance of school age children infested with the disease in selected endemic schools in Northern Samar. The study aimed to document the characteristics of the pupils infected with *Schistosoma japonicum*, describe the environment conditions pupils infected with *Schistosoma japonicum*, determine the participation of the pupils infected with *Schistosoma japonicum* in school-related activities, and design school-based Schistosomiasis Prevention and Control Program.

The subjects under study were five school-age children who were highly infected with schistosomiasis during the last focal survey for schistosomiasis.

This study made use of a case-control evaluative design with emphasis on retrospective method aided with quantitative data collection method.

With the use of interview technique with the subjects, their parents, and teachers, coupled with a focused group discussion with the key informants in the community, the following salient findings emerged:

The ways and means of living of the subjects were culturally traditional. There had been unavailable potable water supply and the water supply at home is very limited. The subjects were insensitive to the environment and it was clearly observed that the subjects had no knowledge about the disease. It was clearly noted that the health facilities at home are unavailable which influenced the subjects to defecate anywhere and also influenced by friends/playmates to play in the streams because of the unavailable recreational facilities. The nature of work of the subjects was observed to have significant effect in the prevalence of the infection.

The subjects were totally unaware of schistosomiasis, while their parents having no

knowledge on schistosomiasis, its causes, and prevention and curative measures. Likewise, their teachers had inadequate knowledge of it. Subjects were greatly predisposed of being contaminated with the infection in the highly hyper endemic environment they are exposed to.

All the subjects belonged to the marginal socio-economic level of the society. Their parents were poorly educated and whose income was below the poverty threshold, and some of the subjects were made to help their parents with the household chores and to assist in the farm to augment the income of the family.

The subjects reside in places near the streams and rivers which are infested with schistosomiasis, not to mention the fact that their parents are farming in schistosomiasis infected rice lands where the subjects would occasionally go to assist in farm work.

The most common complaints of the subjects who were severely infected with schistosomiasis included headaches, abdominal pains, and bloody mucoid stools.

The school performances of the subjects were greatly affected as a result of their ailments. They are oftentimes absent from their classes or had to go home before the classes end when the symptoms of the disease would attack them. As a result, their grades suffered.

Keywords: School-age children, *Schistosoma japonicum*, schistosomiasis

1. INTRODUCTION

Schistosomiasis or snail fever is one of the neglected tropical diseases and one of the most widespread parasitic infections in developing countries. An estimated 779 million people are at risk, with 240 million infected cases and more than 280,000 deaths occurring each year worldwide. It remains to be a

leading cause of morbidity in many parts of the world (US Global Health Policy, 2009).

In the Philippines, schistosomiasis is caused by *Schistosoma japonicum*. It is a disease of poverty that still remains as a major public health problem in the poorest provinces. To date, it is endemic in 28 provinces in 12 regions, 14 cities, 203 municipalities and 1,593 barangays. More than 12 million people are at risk of the disease and approximately 2.5 million people are directly exposed. Children ages 1-15 years old have the highest prevalence and intensities of schistosome infection (Belizario, 2005).

Transmission and infection requires contact of humans and other animal hosts with waters that serve as breeding sites for snails. Direct sources of transmission are snail infested bodies of water and snail sites. About 1,512 snail sites in Region 8 are found in Leyte, 711, in Western Samar, 251, Eastern Samar, 216 and Northern Samar 334 (DOH- RHO 8 Report, 2013).

In Northern Samar, endemic areas are found in 16 municipalities and 168 barangays with a prevalent rate of 2.45% (Leonardo et al., 2008). According to Belizario et al. (2005), as cited by DOH, these endemic areas comprises predominantly as rice growing areas, which maximize contact between humans and fresh water snails vector, *Oncomelania hupensis quadrasi*.

Schistosomiasis distribution is influenced by factors that affect the occurrence and frequency which include poverty, the presence of the snail intermediate and reservoir hosts, environmental sanitation, and access to safe water, health services and local infrastructure (WHO Report, 2004). Sources of livelihood also affects distribution with fishermen and farmers having the greatest risk of infection in the Philippines (Zhou et al., 2008). Exposure to contaminated water, whether for economic activity or recreation, can also explain similarities and differences in rates of infection between gender and age groups.

With the data above, undeniably schistosomiasis is still a public health problem on a varying degrees of high to low prevalence (2%-30%) in the region. Although there is an increasing coverage for mass treatment there is still the risk of resurgence of infection (Olimba, 2014). Infection is one of the major public health problems

with school age children at greatest risk. It causes significant delay in growth and development in children and may later lead to hypertension and esophageal varices.

Over the past 20 years, many studies have examined the impact of *S. japonicum* infection on growth, nutrition, hemoglobin levels, and cognitive functions in Filipino children. It was demonstrated that the intensity of infection was associated with decreased fat, muscle, and long bone growth in adolescents than non-infected adolescents in the same community (McGarvey et al., 1992). In other studies, *S. japonicum* infection in children was associated with malnutrition, anemia, and lower cognitive performance, such as learning, memory, and verbal fluency (Amara et al., 2005).

In a very recent focal survey conducted in the province, results showed that barangay Camparanga in Pambujan, Northern Samar, has the highest prevalence rate to infection of about 85 or 40.48%. About 36.47 percent of this are school-age children. As of the moment, there are no local or school interventions done yet on this aggregate population group particularly the heavily infected as regards to the effect of the infection to their school performance.

With the aim of attaining the Nation's Millennium Development Goals, schistosomiasis control is coming to be seen as an essential part of the health agenda. However, the effect of these diseases on the performance of school-age children remains to be determined, hence this study.

2. Objectives of the Study

This study intended to investigate *Schistosoma japonicum* infection and the school performance of school age children heavily infected with the disease in two endemic schools in Northern Samar. The study aimed to attain the following objectives:

1. To document the characteristics of the pupils infected with *Schistosoma japonicum*
2. To describe the environmental conditions of pupils infected with *Schistosoma japonicum*
3. To determine the participation of the pupils infected with *Schistosoma japonicum* in school-related activities
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3. Methodology

Study Design

A purely qualitative research design was used in this study with the end in view of thickly describing the characteristics of the school age children heavily infected with *Schistosoma japonicum*. The environmental conditions was also deeply described. It further described the school participation in terms of school activities and academic performance of children heavily infected with schistosomiasis. Outcome of the assessment was an input to design a school-based schistosomiasis prevention and control program for school children specific to the locality.

In selecting the sample this utilized a purposive sampling technique. The samples were those found out to be heavily infected with schistosomiasis based on the latest parasitologic assessment conducted by the Department of Health.

This study was conducted using in depth documentation of the characteristics of the pupils infected with *Schistosoma japonicum*. It described the environmental conditions of pupils infected with *Schistosoma japonicum* and determined the participation of the pupils infected with *Schistosoma japonicum* in school-related activities. Particular emphasis was on their academic performance in terms of grades and attendance in school-related activities. It involved assessment of all subjects for the last grading periods of this school year 2014-2015.

A questionnaire guide in the thorough documentation and assessment of the subject was employed.

Other qualitative approach used to collect the data was through focus group discussions. Focus groups were used in this study to learn about children's, teachers' and communities understanding of schistosomiasis transmission and infection.

The focus group discussions were conducted concurrently with in-depth interviews with key people in the community such as, community leaders, teachers, BHWs, and healers. Focus group discussions was facilitated by using the local vernacular language with the aid of the tape recorder. The two methods of collecting data through recording responses and handwritten notes increased

data content validity and reliability and helped the researcher in comparing between audio recordings and handwritten notes.

The Variables

Qualitative as the research in its type, there was no predetermination of specific variables along characteristics of the school age children heavily infected with *Schistosoma japonicum*. Likewise, there were no pre-identified environmental conditions and sub-factors related to the participation of the subjects in the school-related activities.

The Subjects

The target population of the survey were the school-age children who were heavily infected with schistosomiasis during the last focal survey for schistosomiasis commissioned by the Department of Health. These are the age group that has the highest intensity level of the disease and may have suffered much from the disease affecting their cognitive abilities in terms of their school performance. More specifically only 5 subjects were considered as they were the heavily infected learners.

The data collected from this age group can be used to assess not only whether schistosomiasis threaten the health of school-age children, but also as a reference for evaluating the need for school-based or community intervention.

To document the characteristics of the subjects heavily infected with *S. japonicum*, parents of school-age children were asked on some pertinent data. Significant data came from the five school-age children identified to have heavy infection with schistosoma. The teachers of the children identified and their neighbors who know best about them were also interviewed

Population and Sampling

To obtain reliable data, the sampling was carried out using a list of school age children infected with schistosoma in the school involved in the study (Table 1). This were those pupils who turned out positive for schistosomes with heavy infection level based on the 2014 focal survey sampling for schistosomiasis control program in the province. They were chosen based on the degree of intensity of infection and were used as subjects.

All five pupils identified to be heavily infected was purposively chosen as key informants in coming up with the description of the characteristics of the child

heavily infected with *Schistosoma japonicum*. The environment conditions of the children infected with *Schistosoma japonicum* was also described and their participation in school-related activities in terms of grades and attendance in school-related activities in all subjects as reflected the last grading periods of this school year 2014. The outcome of the process and the data gathered was now the basis for designing a schistosomiasis prevention and control program for Northern Samar.

Research Instrument

An interview questionnaire survey guide was used in this study to document the characteristics of the first five pupils heavily infected with *S. japonicum*. After gathering insights during the conduct of data gathering, free flowing observations, interview with the subjects, parents, playmates, teachers and other community members were then done for a thick data of the other samples.

4. Interpretation of Data

Five pupils found to be heavily infected with *Schistosoma japonicum* served as the subjects of the study. Their personal characteristics, family circumstances, environmental situation at home and in the community, as well as health condition were gathered by the researcher through intensive interview with the subjects, their parents, teachers, classmates, and neighbors. The researcher had also done a close observation of the subjects in their natural environment as they mingled with their peers in their routinary activities. Likewise, she had conducted a routine physical examination of the subjects' health condition at the time of the investigation.

Characteristics of Pupils Highly Infected with *Schistosoma japonicum*

Documentation started with the gathering of their ages which ranged from 8 to 15 years old; two were males and three were females; one was a first grader, two were fourth graders, one sixth grader and an eighth grader. Four were born in Barangay Camparanga, Pambujan, Northern Samar a stayed in the place since birth to the present. One was born in Bacolod City but was reared in Camparanga just three years ago. None of the subjects have similar birth placement/ordinal rank with their siblings; two of whom were third

children in the family, one was a first child, one a second child, and another a fourth child.

Age, sex, grade level, birth place and the ordinal rank of subjects were categorized as indicators and/or variables of characteristics.

On the other hand, both parents of all the subjects were still living at the time of the investigation. All of them have parents who reached up to the elementary level only. The fathers of three of the subjects were farmers and at the same time baggage carriers, while two have fathers who were hired laborers. This is understandably so since all of the fathers did not acquire formal education that would lead them supposedly land to better-paying jobs. The mothers of all five were housewives, who claimed that they sometimes do additional jobs, like helping their husbands in the farm and other errands for pay. The income of the fathers of the five subjects ranged from 1,000 Php to 5,000 Php a month. The contribution of the mothers to the family coffers was very negligible and undetermined. The mean income of the families of the 5 subjects as calculated was 3,000 Php a month, which is far below the threshold or poverty income level of 8,000 Php in Northern Samar (NEDA 2002) (NSO Report, 2008). Considering the household size of the subjects which ranged from 6 to 9, it can be said that their parents can hardly afford to provide them with adequate physical nourishment to keep them healthy and resistant to diseases. This partly explains why the subjects had been so predisposed to the disease at an early age. These to the research are but the indicators of the economic and social circumstances of the family had also been the reason why the subjects were not given immediate and proper medical attention to arrest their infection with *Schistosoma japonicum* that early. This could be attributed to the parents' ignorance about the disease and what to do and where to go or perhaps because of their being busy in making a living. Hence, the subjects were already at the point where their infection had reached to a very severe and critical stage. If treatment had come earlier, they would not have reached this stage of infection since schistosomiasis can easily be arrested with proper attention and medication.

Though the peak of prevalence of schistosome infection is between ages 55-59 years/25-29 years, the findings of this study confirms the

findings of Olimba (2014) that the intensity of infection is highest among children ages 5-14 years and so with the survey results of the 2014 World Health Organization on Schistosomiasis: A major public health problem; however, it disconfirms the findings of both studies that it is prevalent among males.

This also confirms that findings of Uneke (2006) that individuals aged 5-10 years old were more likely to be infected and the intensity of the infection was higher among the males.

The researcher, being a registered and experienced nurse, conducted routine physical examination to each of the five subjects using a stethoscope, thermometer, visual observation, inspection, palpation, auscultation, and percussion to determine their physical condition as another characteristic. By just one look, the researcher noted that the subjects were undernourished considering their pale countenance, stunted and weak bearings. All of them were small for their ages, with their weights ranging from 15 to

35 kilograms and heights ranging from 116 to 144 centimeters. With their respective ages, their heights and weights were below normal.

The researcher also observed that hair of all the subjects was thin and dry and they had dry scalp indication of being in an unhealthy state. All of these were found to have mucous discharges, common symptoms of colds at the time of the examination. In fact, most of them had bouts of unproductive coughs at that time, with one admitting to have had asthma episodes two times for the past days. Fortunately, there were no significant abnormalities found in their cardiovascular and lymphatic conditions. All, except one, had dental cavities, with one having lost his two frontal teeth. When asked whether they have been examined or treated by a dentist, their unanimous answer was negative. Not one of them, in fact, had gone to the dentist since birth. This maybe because of the financial incapacity of the family. As regards their eyes and neck, the researcher was not able to detect any specific or significant abnormalities and so with their lymphatic condition. This means that they are experiencing *Schistosoma japonicum* symptoms of infections as what the findings about symptoms of the prevalence of *Schistosoma japonicum* and heightening of infections enumerated by

patient.co.uk in an article on Schistosomiasis. The article elaborated that children who are repeatedly infected with schistosomiasis can develop anemia, malnutrition, and learning difficulties which is similar to the findings of this study. Most of the subjects were observed to have skin rashes, pruritus and skin lesions. In fact, one of them had a burn on the sole of his right foot. Three of them reported that they had diarrhea in the past week and had stool which was bloody and with mucus accompanied by abdominal cramps which according to Olveda (1986) an acute phase of a moderate to a severe morbidity syndrome due to *Schistosoma japonicum* infection.

All five of the subjects reported and were observed to have the physiological characteristics such as, nausea or dizziness, intermittent headache and abdominal pains, weakness, mucoid bloody stool, and muscles and a body weakness. One reported that she experienced chills in the morning upon rising from bed which body's reaction to the presence of fluke/schistosomes in the body. She complained of dizziness, nausea, headache, abdominal cramps and which further resulted to mucoid bloody stool. Apparently, these discomforts were ignored both by the subjects and their parents since the sensations would disappear even without medication as long as they can rest and sleep. Nobody said they were brought by their parents to the doctor for consultation or treatment. They admitted aside from rest and sleep they would take over the counter drugs like Biogesics if pains progresses. Nevertheless, all of them were found to have high level of consciousness. It was either due to ignorance or lack of money that deterred the parents from bringing their children for consultation and treatment.

As to psychological condition of the subjects, not one had demonstrated a sign of depression. However, one of them could not have eye contact with the researcher and another one was noticeably irritable during the examination. In spite of the sickly appearance of the five subjects and recurrence of discomforting symptoms, they seemed to be happy and normal children.

The categorization goes with what was posited by the biopsychosocial model which is used in the field of nursing stating that health is best understood by considering not just biological terms but the combination of the biological, psychological and social factors.

Furthermore, the same model believed that social factors as socio-economic status, culture, poverty, technology and religion can influenced health. However, technology in the present study is meant as the facilities at home and school which are health related like the comfort rooms and recreational facilities as well as clinic.

Finally, the characteristics of the pupils highly infected with *Schistosoma japonicum* goes with was the findings of Olimba (2014), 2014 World Health Organization survey result, Olveda (1986) and patient.co.uk had identified. These characteristics were personal, economic, social, physical, physiological, psychological parameters.

Environmental Conditions of Infected Pupils

The environmental conditions surrounding subjects under study were documented by the researcher through an interview with the subjects and their parents. The researcher was able to personally talked and observed the immediate environment as well as the various factors surrounding the subjects.

Based on a thorough analysis, the research had come up with an observation on the environmental conditions of the subjects under study to be culturally tradition as they were all born and delivered by a “hilot” through normal delivery. Seeking the help of a “tambalan” (faith healer) when ailments cannot be remedied at home is culturally traditional in nature passed down to generations.

On water aspect, it had been noted that the water supply at home is very limited which was evidently proven when the subjects stipulated that the water source is about 150 meters away from their house and would bathe in irrigated canals, rivers and streams which significantly implies that there is unavailable potable water supply. This situation epitomizes the knowledge of the subjects regarding the adverse effect of bathing in the river as they could be infected with schistosomiasis as one subject said “*nabatian ko na gad iton nga sitom pero wara man ak siton aram kon nano iton basta sugad nira yaon siton sa pasakay*” and further elaborated about how often they saw snails in the rice fields along the streams not knowing these are carriers of infectious *Schistosoma japonicum*. Analyzing the responses of the subjects, it could be thematically entails the insensitiveness of the subjects to the environment and how it plays a significant role in the spreading of the infectious

disease that could also be heightened by lack of knowledge regarding the disease.

In this study, the researcher operationally referred health facilities at home to the ways and means how laundry was done, fetching water for flushing the toilet, and washing dishes. The research had found out based on the interview and observations of the surrounding environment relative to the above-mentioned factors that the subjects needed to travel long distance to fetch water that sometimes resulted by not using the comfort room and would defecate in the surrounding grasses as one subject said “*katanglay pag alog tubig kay kaharayo sanglit sa kabanwaan nala ak na-uro tapos deretso dalagan sa salug para mag hugas*”. Because of the unavailability of health facilities at home, the subjects would do laundry and wash other utensils used for domestic chores in the river or stream.

It has been noted also by the researcher that peer pressure or peer influences contribute to the prevalence of the schistosome infection as the subjects were influenced to bathe and play in the stream or river and so in the rice fields. Due to the limited space, subjects preferred to play in the streams and river which put the subjects at risk of the schistosome infection. The unavailability of recreational facilities observed to be significant in the prevalence of the infection among children.

The subjects at early age were responsible in helping parents to earn for living thereby contributed in augmenting the income. The subjects would work in the farm with their parents and sometimes in other farms. The nature of work of the subjects triggered the Schistosome infection.

The streams and rivers where plants abundantly grow surrounding the homes of the subjects contributed to the schistosome infection as it is a good habitat for the snails (*Oncomelania quadrasi*), an intermediate host for *Schistosoma japonicum*, the parasite causing schistosomiasis confirming the findings of Jia (2007) individuals become infected with schistosomiasis through contact with water contaminated with schistosome parasites while bathing, swimming, or performing daily chores, such as washing laundry, fetching water, and herding animals. Thus, patterns of sanitation, water supply, and human water use are crucial elements in determining the risk of infection and the findings of Department of Health

that schistosomiasis infection is usually acquired in childhood when children tend to spend time swimming or bathing in water containing the larval form of the parasite. Prevalence and intensity of infection increase with age, peaking in the 5 to 14 year age group.

The prevalence of the schistosomiasis in the area where the subjects are living could be attributed to the habitat of the schistosome parasites as a bridge was observed connecting Barangay Camparanga to the next barangay in Lao-ang, Barangay Rawis. This makes the residents believe that schistosome and snail will not thrive in the river due to salty sea water reaching most part of the rivers making the water brackish. They do not realize that streams in the upland connect to the river and is a good habitat for the snails.

The subjects are also psychologically affected due to unhealthy conditions of where they are residing noting the unsecured houses made of light materials which is also prone to accidents and hazards as well as natural calamities like typhoons, heavy rains and winds.

When it comes to the basic health services, there is the presence of the Rural Health Unit located in the barangay proper which is approximately 4-5 kilometers away from Barangay Camparanga. It is very much accessible through public utility bus, public utility jeep, or by a motorcycle ride. However, services are inadequate.

With the aforementioned highlights thematically squeezed from the data, the researcher found out relative to the environmental conditions are the traditional ways of delivering birth, the practice of seeking the help of "tambalan" to cure ailments, unavailable potable water, insensitive to the physical environment, lack of knowledge and awareness of the subject, unavailability of health-related facilities at home, influence of friend, lack of safe recreational activities, unavailability of recreational facilities, and the nature of work. These are the environmental conditions prevailing at home.

This confirms the findings of Ligabaw Worku, et al., on *Schistosoma mansoni* infection and associated determinant factors among school children and swimming in the river, washing clothes and utensil using river water, crossing the river with bare foot, and fishing activities showed significant association with the occurrence of Schistosome infection.

This does not agree with the findings of Ekanem (2011) that other regular water contact activities such as swimming and bathing in cercariae infested streams and rivers are male dominated; besides, females in the area are usually restricted from swimming and bathing in the rivers on religious and socio-cultural grounds as the parents due to lack of knowledge regarding the infection allow the subjects to be exposed in the infected area without knowing the adverse effects of the exposure.

Environmental Conditions and the Community

Population. As of the 2013 survey done by Barangay Healthcare Workers, the total population of the community where the five subjects reside is 2,229. Majority (1175 or 51.71 percent of the total population) are males and 1124 (48.89 percent) are females. The place which has only .060 sq. meters for residential lot is congested. There is a high risk or hazards such as fire because the houses are mostly made of light materials. The transfer of communicable diseases like schistosomiasis prevalent in the area is high.

Occupation. Camparanga is a rural community. Majority are engaged in rice farming and copra making that exposes them to frequent contact with the snails abundant in the area. Other supplemental income is planting of root crops and crab fattening. With vast agricultural lands around 8,596,557 sq. meters, the area is endowed with these natural resources. It is surrounded by waters from river and streams. A wide portion of swampy areas is a good area for nipa plant which could be a source of the community's livelihood.

Animals are fed freely in the field. Carabaos are tied to a certain area to feed grasses. They are sometimes brought in the streets where they are freely allowed to defecate thinking it is not unsanitary because they only eat grasses. What they do not know that ova of parasites like schistosome could be possibly transmitted through the animal stool.

Educational Level. In an interview with some key informants (BHWs and community leaders) during a focused group discussion, it was found out that majority of the people have low level educational attainment. Majority had reached elementary level only. There are even some part of the population that do not have formal schooling as reported by them.

Knowledge of the Infected Children, Parents and the Community

When the subjects of the study were asked what they knew about schistosomiasis, not one of them said they have prior knowledge or awareness of the disease. They claimed that they heard the word before but had no clear idea about it since it was not taught in the school. When the mothers were asked the same question, three said they do not know anything about it, while two claimed they have heard of it only that they have a very vague idea about it. Their mothers admitted that they have heard about the disease but have vague idea about it. On the other hand, three of the teacher claimed they have heard about it but did not have complete information regarding the disease. Mother and teacher said that the disease is known to be “**sistom**” in the vernacular.

All five of the subjects did not know anyone who has the infection. Only one of the mothers claimed she knew someone who was suffering from the disease, while all the teachers knew and have heard about people who were infected with schistosomiasis. When asked if they knew someone who was hospitalized due to the disease, only one answered in the positive.

They were also asked about the common health problems encountered in their families, the subjects and their mothers had more or less the same answers: headache, stomach ache, fever, and diarrhea. On the other hand, the teachers had reported hypertension, diabetes, and heart ailment.

Three of the teachers claimed that the cause of schistosomiasis is a worm or microorganism which found in the rice fields and streams or rivers, but no one had any idea how it looks like. Nobody among the subjects had any idea of it. Most of the teachers and mothers interviewed believed that the infection could be acquired in dirty water, streams or river and they associated the worm to be the transmitter of the disease.

When asked whether they knew something about the biomedical treatment of the disease and where did they come to know about it, four of the mothers and their children claimed they came to know about it when they were made to visit the health center lately this year where they were given the drug. However, one mother and her child admitted that she did not know where to go until now. As member of the

4Ps she can get information on health-related matters during meetings. This is once source of information for them. However, she used to be absent from the meetings because of the work in the farm. One mother reported that she would give his child Paracetamol for headache and rub *efficacent oil* to the belly for abdominal cramps. All the teachers interviewed, except one claimed they knew and heard about it and that a drug for treatment is given free at the Barangay Health Center

As regard the symptoms of the infection, the subjects claimed that they know nothing about it. Some mothers and teachers said headaches, abdominal pains, enlargement of the stomach, mucoid, and bloody stools. Their reply was now based on what their children had been complaining of as their experience to the disease.

One claimed that it could be cured with anthelmintic but had never thought it to be a serious disease until a neighbor was diagnosed of. She said she realized it is a scary disease which causes seizure spells on the patient when the “**sistom**” had already reached the brain.

One teacher of the subjects claimed to have heard about “**sistom**” but she did not know how exactly what it is all about and how it is transmitted and its signs and symptoms. What I know is it could be acquired in the rice fields and so it is most common among rice farmers, although she claimed she knows some who have the disease but it did not occur to her that it was that serious and that it could lead to death.

When the teachers were asked if they knew that their pupils were suffering from schistosomiasis, most of them said they were not aware. They thought the headaches and abdominal pains their pupils complained about in school were just ordinary illnesses which could be cured by ordinary medication. Most of them, however, admitted that the performance of their pupils in classes suffered.

The pupils did not have any idea at all how the snail carrying the infection look like and so with the mothers. Some of the teacher claimed that they know about it but have not seen them with their naked eye.

All three groups of respondents, however, had similar answers when asked what discomforts are

being experienced by one who has the disease. They all agreed that the symptoms include headaches, abdominal pains, bloody stools, and body weakness.

In focused group discussion with the key informants of the community who included barangay officials, teacher, and parent, the researcher found out that the community had common beliefs with respect to the cause of the disease.

They associated schistosomiasis transmission with water contact activities such as washing clothes and utensils, bathing, playing, or swimming in a dirty and contaminated stream. They all agreed that transmission occurs when eating unwashed fruits and vegetables, eating fish from a contaminated stream, kissing or touching someone who has schistosomiasis, eating raw pork meat, or walking without slippers in dirty places. A few children thought that mosquitoes transmit the disease because they fly around garbage, dirty areas, and contaminated places. All these beliefs were related in general to lack of sanitation/cleanliness and to the transmission of other common intestinal parasitic diseases, such as soil-transmitted helminthes.

Schistosomiasis is known by some of the people in barangay Camparanga as “**sistom**” but was not perceived as a significant health problem. Most of the participants knew someone who had the disease. When asked about the main health problems in their families and community, participants usually referred to heart disease, diabetes, hypertension, and neurological problems, but no one mentioned schistosomiasis.

Participants perceived schistosomiasis as a disease caused by a “worm” but many of them did not know what it looks like. Some participants described the carrier as parasite. Some knew about biomedical treatment for schistosomiasis because of the healthcare program of the government for 4Ps members. However, they complained about the side effects of the drugs, especially dizziness.

Barangay Camparanga has no clinic, but residents use the health clinic in the Rural Health Center in Pambujan town proper, approximately 4 km away. People interviewed complained that neither the clinic nor the hospital in Catarman, the capital town have much to offer, especially medicines. There is also a medical laboratory in the hospital, equipped for checking blood, urine, and stool samples but the people has to pay for

the laboratory charges. Because of the difficulty of going to the center due to lack of money to spend for fare, they would use the health services only when they have serious gastrointestinal problems or bloody stools.

Most of the focus groups participants believed that the disease is curable with modern medicine and that it only reaches a life-threatening situation if patients do not treat it in time. Some of them know people with schistosomiasis who had had serious gastrointestinal problems with bleeding, and some who had died. Some participants knew that schistosomiasis is a disease that could be fatal if untreated; they did not give much attention to it and did not take measures to prevent infection. Some other participants said that it is not a serious disease like AIDS or cancer because it is curable with chemotherapy. However, some of them claimed that they adopted traditional curative herbal medicines given by “**tambalan**” in addition to biomedical treatment. Others would just resort to “bahala na system” of mentality where they just offer to God everything and God will just do everything for them, they said.

The “**tambalan**” who were present claimed that they do not have any prayers or special remedies for “**sistom**”. They only advise their patients to consume “tuba”, taken from the sap of coconut tree, which is thought to kill intestinal worms in general. When patients have problems that are more serious and healers are unable to cure the disease, they refer them to the hospital.

Participation of Infected Children in School Activities

The school community is a significant factor in determining the performance of a child in school activities. It will make or unmake the enthusiasm of children in participating. Four subjects of the study were studying at Camparanga Elementary School. The school is located in a rural area. The site is strategically located along the national highway. Unfortunately, it is low lying area. Pupils, students and teachers complain when there are heavy rains, the surrounding area is flooded with water. Water coming from higher elevation where most of the families have no toilets and practice open field defecation. Surely enough the water is contaminated with schistosomiasis from which the children may get the infection.

Only one subject was studying at Cababtoan Elementary School. The school lies in a lowland area and so when there is heavy rains, its immediate surrounding is flooded with water coming from the high lands where residential settlement is located. Since the people there mostly do not have toilets and defecate in the rice fields, couple with their unsanitary practices, the water coming there is infected with schistosomiasis.

Commonly observed by the researcher that the subjects are not performing well in class considering the grades they have ranging from 79-84. The researcher interviewed the teachers handling the subjects under study. One teacher stipulated that one of the subjects is attentive and interested to learn which significantly mean that there enthusiasm towards education; however, this healthcondition of the subjects delimits them to get higher performance rating as they often experienced abdominal pains, headache and fever. One subject said during interview *“danay ak nasarit pag-uli sa balay pag diri ko na kaya a suol sa ulo or danay tiyan”* supported by the statement of another subject that *“diri nala ak nasulod pag malain ak pamati kay mao ta mauili ta ak pag masuol na ura- ura”*. These statements confirmed the comment posed by the teachers regarding the performance of the subjects that though they have the motivation towards learning but this is being distracted by the health condition that was beyond the knowledge of the teacher. Though there was a plan of visiting parents, it has been noted that there had been no home visitation conducted. One teacher said that parents are busy in farming so they did not conduct home visitation.

The concentration of the subjects in their studies is very low as they oftentimes feel the discomfort caused by the headache and stomach ache.

This findings agree with the findings of World Bank2003 that school-age children typically have the highest intensity of worm infection of any age group, and chronic infection negatively affects all aspects of children’s health, nutrition, cognitive development, learning, and educational access and achievement.

This confirms the findings of Olimba (2010) that agricultural farmers, fresh water fishermen, irrigation workers and women doing domestic work

are also at high risk to infection; less among the professional groups.

This, however, disconfirms that findings of Ekanem (2011) that there was no significant impact of the disease could be demonstrated regarding anthropometric parameters, school attendance and academic performance among the infected children.

The findings of this study agree with the findings of Nazel (1999) and De clerq (1998), Mostafa (1998) that there was a significant decline in academic performance and in school attendance with increasing intensity of infection. Absenteeism was the main factor explaining the variation in academic performance, although a significant effect of infection remained.

4. Conclusions

Based on the findings of the study, it may be concluded that children of families who belong to the marginal socio-economic status are more prone to schistosomiasis infection. Since the families do not have income adequate enough to sustain life’s basic needs, the children cannot be given the nourishment, care and attention that would be a risk factor in the acquisition of a disease.

This is aside from the fact that the recreational activities that they can afford to indulge in is to play in the nearby rivers and streams and in the rice fields which without their parents’ knowledge are contaminated with schistosomiasis. Obviously, it is subject poverty that makes children and even adults predisposed to schistosomiasis coupled with the complete or inadequate knowledge about the disease.

The surrounding in which people reside contributes largely to the prevalence of the disease. Those who live in schistosomiasis infested places are more prone to the infection than those who live in the main lands. Perhaps, if the parents and teachers would have had good access to education and information regarding the disease, their children and pupils would have been prevented from acquiring the disease or at least would have had an early detection of the infection before it got to a highly severe stage.

The school condition can also contribute to the prevalence of the disease. Teachers are supposed to be the best source of information and education on how to prevent being contaminated with the disease.

Unfortunately, this is not the case since teachers also lack knowledge about the disease.

The lack of safe recreational activities for children and even their adult counterparts attributes to the prevalence of the infection among the poor sector of the society. The only recreational activities available to the children included playing and swimming in the rivers of streams and in the rice fields. The predisposition to the ailments may also include the quality of housing with no defecation facilities and lack of safe water for drinking and washing can highly be predictive of the spread and contamination of schistosomiasis infection. Persistence of high *S. japonicum* infection rates in the areas could be also associated with the spread of intermediate host snails and the place is a good habitat for the parasites.

Schistosomiasis is a dreadful disease which can cause death. This is one hard fact that people should know especially those in high prone places. Sad to note, if people are unaware of this and do not know how it is transmitted, how to prevent its transmission, and how it is treated, more children and even adults will get the disease and may come to a point where it becomes serious that could lead to death.

5. Recommendations

On the basis of the conclusion of the study, the following recommendations are forwarded:

1. Intensive and extensive education, information and dissemination campaigns should be done unabatedly in the area and areas prone to schistosomiasis should continue until there is an assurance that everybody, young and old, is fully informed about the disease. This should not only be the job of the Rural Health Center personnel but also teachers and barangay officials. This should become a regular topic during PTA meetings, barangay meetings, and other gatherings in the community. It may also be included in the lessons of the pupils in school.
2. The barangay officials should actively be involved in spearheading cleanliness and sanitary practices among the residents in the areas highly infected with schistosomiasis. Community meetings and for a should be conducted regarding this and its benefits. Perhaps incentives may be offered to motivate residents to maintain clean and sanitary surroundings.
3. The Rural Health Center of every barangay should be mobilized to find out who among the residents are infected with the disease. Once detected of having the disease, treatment should immediately be administered to prevent it from elevating to a severe case. To do this, a survey may be conducted regularly among the households. Home and school visitations may also be done by the health workers in the barangay.
4. Transmission control through improvement of environmental sanitation by promoting the use of sanitary toilets. Barangay officials should allocate funds for the construction of public toilet facilities. The barangay or municipal as well as provincial government should look into the provision of safe water and water sources as well as recreational facilities avoiding contact with snail infested areas.
5. Provision and building of foot bridges as waterway crossing in contaminated bodies of water like streams should be addressed by LGUs and Department of Highway in collaboration with Department of Agrarian Reform.
6. Promotion of modern way farming should be the task of the Department of Agriculture. Modern method of farming can destroy the habitat of the snail.
7. The National Irrigation Administration (NIA) should give priority in this agricultural areas in construction irrigation systems and irrigation canals in proper places to minimize spread of snails.
8. Livelihood projects which are home bound may be introduced to the housewives to augment the income of the husbands from farming. This way, they and their children may not be forced to help in the farmlands where possibility of exposure to the schistosomiasis infection is great. This will also somehow restrain them from child-labor practices.

A follow-up study on the same aspect increasing the number of subjects under study. Laboratory exams are recommended as part of the diagnosis for the signs and symptoms.

7. References

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