ORIGINAL ARTICLE

Cost of Hospitalization of Different Types of Schistosomiasis Cases in Endemic Areas in the Philippines: Indicating the Need to Increase the Coverage of Government Health Insurance

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ABSTRACT

Background. Schistosomiasis is endemic in the Philippines. Currently, the financial and economic costs of hospitalization due to schistosomiasis have not been studied or analyzed. This will be essential to the review of health benefit package of PhilHealth for schistosomiasis.

Objectives. This study estimated the cost of hospitalization due to schistosomiasis and its complications in the Philippines.

Methods. This is a cross-sectional mixed-methods study. Nine (9) hospitals from schistosomiasis-endemic provinces were included in the study. Medical records and billing statements from year 2013 were retrieved and analyzed. Non-medical costs were calculated based on data from key informants and existing economic data in 2013.

Results. A total of 1,415 hospitalized cases were collected; 94% came from government hospitals. Fifty nine percent (59%) were classified under uncomplicated schistosomiasis. Overall hospitalization costs were PhP 8,489,524.39 (USD 200,006.70), with cases of hepatic complications having the highest costs among all types of cases. Combined non-medical costs and productivity losses for 5,005 days of hospitalization were PhP 13,019,363.75 (USD 306,726.25).

Conclusion. The estimated clinical cost burden and economic losses due to schistosomiasis in selected sites in the Philippines amount to PhP 21,508,888.14 (USD 506,732.95). Significant drivers of cost were the presence of schistosomiasis sequelae or complications, co-morbidities, and increasing length of stay. Estimated productivity losses and non-medical expenses of patients due to hospitalization were found to be more burdensome than the actual hospital bills. These costs stress the need for government to provide health coverage for patients diagnosed with schistosomiasis.

Key Words: costs and cost analysis, health expenditures, schistosomiasis

INTRODUCTION

Schistosomiasis is a chronic, debilitating disease caused by the blood fluke *Schistosoma japonicum*. It is present in the American, African, Eastern Mediterranean, Southeast Asian, and Western Pacific regions.[1] It has focal distribution that is dependent on a specific snail host (*Oncomelania* spp*)*, and on open defecation and other human activities that lead to infection.[2] Schistosomiasis remains a public health challenge in endemic focal areas in 28 provinces in the Philippines.[3-6]

Schistosomiasis disproportionately affects the poor, marginalized sectors of the Philippine society. The disease

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affects mainly school-age children and adults with high-risk occupations, such as farmers and freshwater fishermen.[3,5] The clinical picture of schistosomiasis includes an early phase characterized by dermatitis in the area where the cercariae penetrate the skin; a systemic acute phase caused by the migration of the juvenile worms through the circulatory system; and an organ-specific chronic phase produced by the eggs laid by adult female schistosomes in the intestine. In such organs, acute inflammation progressively becomes chronic, and hyperemia and abnormal growths such as polyps and internal hemorrhage are gradually replaced by fibrosis and thickening of the tissues. Embolization of eggs from the intestine to the liver through the portal system is typical and is responsible for progressive liver fibrosis, portal hypertension, and ascites.[7,8]

Current control efforts emphasize mainly preventive chemotherapy through mass drug administration (MDA) of praziquantel among residents from endemic areas.[1,3,9] In 2013, out of the 1.96 million residents in these endemic areas, only 44% or 862,346 individuals received mass treatment for schistosomiasis.[10] Due to this low coverage, several patients with schistosomiasis may end up chronically infected and getting hospitalized due to hepatic, neurological, and other sequelae. In 2011, around 2,500 hospitalized cases were reported due to schistosomiasis (WA Palasi, 2014). Majority of schistosomiasis patients who experienced hospitalization due to complications were indigents who had difficulty in shouldering out-of-pocket expenditures beyond the amounts covered by the National Health Insurance Program (NHIP).

This study estimated financial cost of hospitalized schistosomiasis in known schistosomiasis-endemic areas in the Philippines. This study also aimed to review schistosomiasis case reimbursements from the Philippine Health Insurance Corporation (PhilHealth) and to determine factors correlated with these reimbursements. The results of this study will help determine minimum costs of hospitalization and appropriate case rate per schistosomiasis case.

MATERIALS AND METHODS

This study's protocol, data collection tools, and informed consent forms were reviewed and approved by the University of the Philippines Manila - Research Ethics Board (UPMREB 2014-126-01) and the Department of Health Regional Office XI - Institutional Review Board (P14082201). Individual informed consent from key informants were obtained prior to participation in the study. Confidentiality of all information and anonymity were ensured through the assignment of codes to replace participant identifiers.

Hospitals were selected from highly endemic provinces. Highly endemic provinces were defined as those with 2% to 6% schistosomiasis prevalence in year 2012; and as per Philippine Department of Health (DOH) records, the provinces of Agusan del Sur, Bukidnon, Davao del Norte, Leyte, Northern Samar, and Sorsogon can be considered highly endemic. A total of nine (9) hospitals, six (6) of which are government hospitals, were included in the study. Selection of hospitals was done in consultation with the DOH - Disease Prevention and Control Bureau and DOH Regional Offices. Hospitals selected are listed in Table 1.

Table 1. Selected study sites

Province, Region	Hospitals	
	Government	Private
Agusan del Sur, Caraga Region	Hospital A	None
Bukidnon, Region X	Hospital B	Hospital C
Davao del Norte, Region XI	Hospital D	Hospital E
Leyte, Region VIII	Hospitals F & G	None
Northern Samar, Region VIII	Hospital H	None
Sorsogon, Region V	None	Hospital I

This study utilized a cross-sectional design and considered the patients' perspective in the analyses. Available summary statistics, medical records, and billing statements for schistosomiasis covering the period 1 January 2013 to 31 December 2013 were retrieved and reviewed. The costs determined from 2013 cases may provide better insight on actual costs of hospitalization since payment scheme of PhilHealth was still fee-for-service (FFS). If the years after 2013 were to be considered for this study, the ideal or actual costs of hospitalization may be affected by the change to all-case-rate (ACR) payment scheme. The ACR may induce healthcare providers to provide care amounting only to the applicable case rate, thus, estimates of costs using the ACR may be smaller than the FFS.

A standard data extraction form generated using Adobe Acrobat Pro 11 was used to encode the demographic, medical, and cost data. Patients' PhilHealth membership status was mined from the medical records and billing statements. This allowed for comparison of costs between members and non-members of PhilHealth. A pilot focus group discussion (FGD) with a panel of experts was conducted first to fine-tune the said data-gathering template. In preparation for the data collection, the study team was trained during regular team meetings and training sessions.

Length of stay was computed based on the day of admission and the day of discharge. Cases were classified into four groups: (1) "uncomplicated schistosomiasis," (2) "hepatic schistosomiasis," (3) "neuroschistosomiasis," and (4) "other schistosomiasis." Classification was based on the DOH Clinical Practice Guidelines for Schistosomiasis.[11] Diagnoses written on the patient records, hospital logbooks, and/or billing statements were utilized to identify the classification of cases. Patients diagnosed with schistosomiasis alone without mention of any organ involvement were classified as "uncomplicated schistosomiasis." Patients with diagnoses of cirrhosis, portal hypertension, hepatic encephalopathy, end-stage liver disease, and bleeding esophageal varices were classified under "hepatic schistosomiasis." Patients with seizure disorders, intracranial or spinal masses, and neurologic problems were classified under "neuroschistosomiasis." Cases where schistosomiasis was attributed to an organ problem

other than liver or nervous system were classified under "other schistosomiasis."

Costs data from four broad categories were obtained: (1) diagnostic tests, (2) medicines, (3) doctor's fees, and (4) room and other expenses. As per the clinical practice guidelines, the diagnostics usually consists of the Kato-Katz smear/aliquot, ultrasound for "hepatic schistosomiasis" or schistosomiasis in the gastrointestinal track, or CT-scan for "neuroschistosomiasis." Medicines given to patients depend on complications. Hospitals do not administer praziquantel because it is provided for free at the rural health units (RHUs). Room and other expenses included accommodations, medical supplies, and miscellaneous costs. Actual cost and cost per unit (e.g., diagnostic tests and drugs) were obtained from the bills. Costs were not adjusted for inflation. Conversion of Philippine Peso (PhP) to US Dollars utilized was USD 1.00 equals to PHP 42.4462 based on annual average exchange rate in 2013 from *Bangko Sentral ng Pilipinas*, the Central Bank of the Philippines.[12] Simple averages of all data from patients were computed to know the per-patient cost. To estimate the overall burden, the estimated per-patient costs were multiplied with the estimated number of patient per category of schistosomiasis cases.

Key informant interviews were conducted among regional and municipal schistosomiasis control program coordinators, hospital and public health physicians, and residents previously hospitalized due to schistosomiasis. Respondents were recruited through the assistance of Schistosomiasis Control and Elimination Program Coordinators (SCEPs).

Patients were interviewed to estimate the costs of transportation and meals of patients and their watchers for the duration of hospitalization. The following are examples of the open-ended questions asked (in the vernacular) during the patient interviews: (1) What mode of transportation do you take to be able to go to the health facility from your residence? (2) How much does each one-way fare cost? (3) Who accompanies you during the hospitalization? (4) In each hospitalization day, how many times do you and your watchers have a meal? And how much does a meal cost?

Daily labor productivity loss was computed by dividing the average 2013 labor productivity statistics of Regions V, VIII, X, XI, and CARAGA, by the number of working days in 2013.[13-15] T-tests were utilized to determine the significance of the difference of costs between government and private hospitals, and the difference of costs between PhilHealth members and non-PhilHealth members. Level of significance was set at $p<0.05$. Regression analysis was conducted to identify drivers of cost of hospitalization of schistosomiasis. All statistical analyses were calculated using Stata 11.

RESULTS

Patient characteristics

Medical records of 1,415 hospitalized cases were collected from nine selected hospitals (Figure 1). Majority (94% or 1,337 cases) were hospitalized in government hospitals while only a few (6% or 78 cases) were confined in private facilities. Average age of hospitalized patients was 43 years old with a 25th to 75th percentile ranging from 27 to 58 years old (Table 2). There were more males hospitalized (62% or 877 cases) than females. Majority of cases were admitted in hospital G, a government hospital specializing in schistosomiasis cases in the province of Leyte.

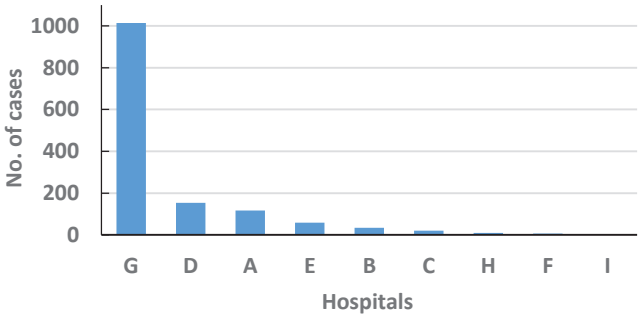

Figure 1. Number of schistosomiasis cases in selected hospitals, January-December 2013, Total Cases = 1,415.

More than half of the cases (59% or 835 cases) were classified under uncomplicated schistosomiasis. There were almost equal proportion of hepatic (22% or 311 cases) and neuroschistosomiasis (20% or 283 cases). There were 8 cases where patients had both hepatic and neurologic complications due to schistosomiasis. There were four cases of other schistosomiasis with the following ectopic complications: hypertensive nephrosclerosis, ovarian new growth, and cecal adenocarcinoma. Pathology reports were not available to confirm this diagnosis. There were no cases of pulmonary schistosomiasis detected. There were 11 deaths, of which five (5) had hepatic schistosomiasis, another five (5) had neuroschistosomiasis, and one had uncomplicated schistosomiasis.

Table 2. Age, sex, length of stay, hospitalization costs per type of case among selected hospitals, January-December 2013, Total Cases = 1,415

Type of case	Mean age	Gender			Length of stay, in days		Hospitalization cost, in PhP 1,000 (USD)			
		Male	Female	Unknown	Mean	Total	Mean		Total	
Uncomplicated schistosomiasis	42.5	432	342	54	2.7	2,255	2.81	(66.13)	2,324.17	(54,755.64)
Hepatic schistosomiasis	50.5	210	93	4	5.5	1,713	15.74	(370.92)	4,833.45	(11,3872.44)
Neuroschistosomiasis	44.7	190	71	15	3.6	1,019	4.68	(110.37)	1,293.00	(30,462.12)
Others	49.0	2	2	0	6.0	18	12.97	(305.50)	38.90	(916.50)
Overall	**43.0**	**834**	**508**	**73**	**4.2**	**5,005**	**6.02**	**(141.75)**	**8,489.52**	**(200,006.70)**

Forty-four percent (623 cases) of patients had non-schistosomiasis complaints. Twenty eight percent (28% or 396 cases) had non-schistosomiasis conditions affecting one organ system, 11% (156 cases) had two comorbidities, and 6% (85 cases) had three or more comorbidities. The most common comorbidities present among patients were hypertensive disease, urinary tract infection, and acute gastroenteritis.

Length of stay

The average duration of hospital stay of patients diagnosed with any form of schistosomiasis was four days, with private facilities reporting shorter stays (3.3 days) when compared with government hospitals (4.2 days). Those with hepatic complications had the longest duration of stay (average of 5.8 days) and uncomplicated cases the shortest (2.7 days) (Table 2). Duration of hospital stay for hepatic complications vary largely among the data observed. It was assumed that each stay was the only hospital stay experienced by the patient for the disease episode.

Cost of hospitalization

Rooming and other expenses contributed the highest (34%) to the total hospitalization expenses for the entire population, with the rest of the expenses split almost evenly among diagnosic tests (20%), medicines (22%), and doctor's fees (24%). The average cost of hospitalization for any schistosomiasis was PhP 6,016.75 (USD 141.75). Highest average hospitalization expenses were for cases with hepatic schistosomiasis at PhP 15,744.14 (USD 370.92), while the lowest expenses were for patients with uncomplicated schistosomiasis at PhP 2,806.97 (USD 66.13). For neuroschistosomiasis cases, expenses in government facilities averaged at PhP 3,995.99 (USD 93.20) while expenses in private facilities were PhP 16,946.22 (USD 399.24) (Table 2). Overall, average hospitalization expenses were significantly higher in private facilities in comparison with government hospital ($p<0.05$).

Costs incurred by patients in government hospitals were generally lower than those incurred in private facilities (Table 3). Average rooming and other expenses were almost double in private hospitals at PhP 2,806.54 to 5,179.29 (USD 66.12 to 122.02) as compared with government facilities at PhP 235.15 to 4,436.48 (USD 5.54 to 104.52). Doctors in private facilities charged two times more at PhP 3,003.92 to 5,034.12 (USD 70.77 to 118.60) when compared with physicians in government hospitals at PhP 900.28 to 2,840.08 (USD 21.21 to 66.91). There was also a wide margin of costs of medicines and diagnostic tests from private facilities when compared with government hospitals at PhP 212.23 to 2,546.77 (USD 5.00 to 60.00).

Hospitalization cost between PhilHealth and non-PhilHealth members were compared. A total of 288 cases had PhilHealth reimbursement records. The average total cost of hospitalization of PhilHealth members were three times more at PhP 16,053.58 (USD 378.21) in comparison with non-PhilHealth members at PhP 4,481.47 (USD 105.58) ($p<0.05$) (Table 4). The largest difference in average costs were seen in cases of uncomplicated schistosomiasis (PhP 14,155.81 or USD 333.50) and the smallest difference was in neuroschistosomiasis (PhP 7,428.93 or USD 175.02). None of the cases of other schistosomiasis were PhilHealth members.

Total cost was log transformed and length of stay recoded to categorical variables to improve normality

Table 3. Average costs of diagnostic tests, medicines, doctor's fees, and room and others per type of case and type of hospital, January-December 2013

Type of case / Type of hospital	Average cost, PhP (USD)							
	Diagnostic tests		Medicines		Doctor's fees		Room and others	
Uncomplicated schistosomiasis								
Public	293.30	(6.91)	235.15	(5.54)	900.28	(21.21)	235.15	(5.54)
Private	3,076.08	(72.47)	2,915.63	(68.69)	3,003.92	(70.77)	2,915.63	(68.69)
Hepatic schistosomiasis								
Public	3,696.64	(87.09)	4,412.28	(103.95)	2,797.63	(65.91)	4,436.48	(104.52)
Private	3,937.73	(92.77)	5,179.29	(122.02)	5,034.12	(118.60)	5,179.29	(122.02)
Neuroschistosomiasis								
Public	733.74	(17.28)	615.05	(14.49)	1,099.36	(25.90)	615.05	(14.49)
Private	2,764.95	(65.14)	2,806.54	(66.12)	3,580.34	(84.35)	2,806.54	(66.12)
Other schistosomiasis								
Public	1,813.73	(42.73)	3,917.36	(92.29)	912.17	(21.49)	3,515.82	(82.83)
Private	N/A		N/A		N/A		N/A	

Table 4. Costs of hospitalization between PhilHealth member and non-member among selected hospitals, January-December 2013

Type of case	Average cost of hospitalization, PhP (USD)					
	PhilHealth member		Non-PhilHealth member		Difference	
Uncomplicated schistosomiasis	15,730.99	(370.61)	1,575.18	(37.11)	14,155.81	(333.50)
Hepatic schistosomiasis	21,173.01	(498.82)	8,041.86	(189.46)	13,131.16	(309.36)
Neuroschistosomiasis	11,256.73	(265.20)	3,827.80	(90.18)	7,428.93	(175.02)
Overall	**16,053.58**	**(378.21)**	**4,481.47**	**(105.58)**	**11,572.11**	**(272.63)**

Table 5. Regression analysis of total hospital cost of schistosomiasis cases

Factors	Coefficient	Standard error	t-test	*p*>t	95% confidence interval	
Private hospital (vs government)	0.353130	0.032801	10.77	0.000	0.288781	0.417479
With comorbidity	0.128628	0.017873	7.20	0.000	0.093565	0.163691
With hepatic schistosomiasis	0.211404	0.024502	8.63	0.000	0.163337	0.259472
With neuro schistosomiasis	0.079278	0.019271	4.11	0.000	0.041472	0.117084
PhilHealth member	0.417233	0.025540	16.34	0.000	0.367128	0.467338
Length of stay (vs <3 days)						
3-6 days	0.342150	0.019264	17.76	0.000	0.304358	0.379942
7-9 days	0.550501	0.037562	14.66	0.000	0.476812	0.624190
≥10 days	0.744310	0.032660	22.79	0.000	0.680238	0.808381
Constant	3.056059	0.021530	141.95	0.000	3.013823	3.098295
Age	0.000472	0.000418	1.13	0.260	-0.000350	0.001292
Female sex	-0.020220	0.016183	-1.25	0.212	-0.051960	0.011531
Having pneumonia	-0.020120	0.066065	-0.30	0.761	-0.149720	0.109491

n = 1,314; F(11, 1,302) = 338.75; r2 = 0.7196

of residuals and minimize heteroskedasticity. A robust stepwise linear regression was ran using Stata 11. Regression analysis showed that the following were factors significantly associated with increased costs of hospitalization: admission in private hospital, presence of comorbidities, having hepatic or neurologic complications of schistosomiasis, having PhilHealth membership, and length of stay. Age, sex, and having pneumonia were not found to be correlated with total cost of hospitalization. Refer to Table 5.

Economic and financial losses

According to 18 key informants interviewed, the average transportation cost for a one-way trip to the health facility was estimated to be PhP 769.97 (USD 18.14). Thus, a roundtrip transportation cost was estimated to be equal to PhP 1,539.95 (USD 36.28). This estimate considers that some of the 18 patients came from far-flung areas. So, for 1,415 cases, the total roundtrip transportation cost was equal to PhP 2,179,026.61 (USD 51,336.20). And assuming that each patient was accompanied by one caregiver, the total transportation costs would amount to PhP 4,358,053.22 (USD 102,672.40).

The cost of three meals a day for the caregiver was estimated to be at PhP 199.92 (USD 4.71). Patient's meals were assumed to be included in the hospital bills. Given the total cases of 1,415 with an average length of stay at 4.2 days, the meal expenses would be PhP 839.59 (USD 19.78) per admission or a total of PhP 1,188,134.08 (USD 27,991.53).

Based on the 2013 National Wage and Productivity Commission (NWPC), Region V, VIII, X, XI, and CARAGA workers had an average annual wage of PhP 167,640.84 (USD 3,949.49). Dividing it by 219 working days in 2013 (inclusive of national holidays), daily labor productivity was equivalent to PhP 765.30 (USD 18.03). Assuming that the 1,415 patients are accompanied by a single relative/watcher, a total of 5,005 days of productivity was lost to the Philippine economy in 2013 which is equivalent to PhP 7,660,691.45 (USD 180,480.30). Combined non-medical costs and productivity losses at PhP 13,019,363.75 (USD 306,726.25) was 35% more than total hospitalization costs.

DISCUSSION

This is the first study to document costs of hospitalization due to schistosomiasis in the Philippines. In 2013, the clinical cost burden of schistosomiasis was computed at PhP 8,489,524.39 (USD 200,006.70) in selected study sites. More than half of the clinical cost burden were from hepatic cases despite having a smaller prevalence proportion among all types of cases (22%). A quarter of the cost burden came from uncomplicated cases, which comprised the majority among all types of cases.

It was observed that hospitalization costs are dependent on the specific clinical presentation and course of schistosomiasis. Although all cases with active schistosomiasis would be treated by praziquantel, the management of complications added to the cost. Hepatic cases had the highest average hospitalization costs among all types of cases. The average hospitalization cost of uncomplicated and neuroschistosomiasis cases were only 18% and 30%, respectively, of the average hospitalization costs of hepatic cases. This is explained by the higher costs on diagnostic tests and medicines in comparison with all other cases. Doctors tend to charge more fees for hepatic cases due to their complexity and longer length of treatment. Room and other hospital bills were higher due to longer length of stay as well. Uncomplicated cases had lower costs among all types of cases mainly due to shorter length of stay and non-complexity of the cases. Neuroschistosomiasis cases had lower costs than hepatic cases since majority were seizure cases in which the main objective of treatment was controlling the episodes of seizures.

It is not directly observed why uncomplicated cases of schistosomiasis would require hospitalization since the only intervention required by clinical practice guidelines is the administration of praziquantel. Majority of uncomplicated cases came from hospital G, a specialized schistosomiasis hospital. An interview with its medical director yielded an observation that patients would like to verify if they have schistosomiasis through laboratory tests firsts before agreeing to take praziquantel. This behavior could be attributed to the fear of adverse effects and lack of knowledge of praziquantel.

The cost of hospitalization of PhilHealth-reimbursed patients were higher than non-PhilHealth cases. This study was not able to ascertain if this was an artificial rise in cost or if this represented the true cost of an appropriately managed case of schistosomiasis. Oftentimes, certain diagnostic tests and treatment would be foregone by patients due to financial constraints. PhilHealth members would be less likely to be affected by this constraint and might then receive the complete work-up and treatment regimen. Another perspective is that the non-member costs represented the most efficient way of managing cases. Due to the limitation of funds, health professionals would conduct the minimum work-up to diagnose and the patient would only be given the most essential drugs which have more marginal benefits. On another note, the FFS payment system of PhilHealth for health professionals was still in place in 2013, although ACR payment scheme was introduced in 2011 in selected 11 medical cases not including schistosomiasis.[16] FFS payment system has historically led to prolonged length of stay and overutilization of diagnostic tests and medicines, which may explain higher hospital bills of PhilHealth members for schistosomiasis cases in 2013.[17]

Average age of hospitalized patients was 43 years old and majority of cases with complications were adults. As patients get older, hospitalization costs and length of stay increase. These cases are likely caused by prolonged occupational exposure to schistosomiasis and perhaps due to the low praziquantel treatment intake rates in the community. Overall estimated economic and financial burden on non-medical costs were higher by PhP 4,529,839.36 (USD 106,719.55) than overall medical cost burden of schistosomiasis cases in 2013.

The average cost for schistosomiasis, given that a worker in the selected sites earns an average minimum wage of PhP 282.27 (USD 6.65) per day, one hospitalization episode would entail around 22 days' wages.[18] Combining medical, transportation, meals, and compensation loss on an average hospitalization length of stay due to schistosomiasis, an average total of PhP 12,307.28 (USD 289.95) was lost from a patient and her/his family, which would total to 44 days' wage. Even uncomplicated cases would incur a total of PhP 7,951.02 (USD 187.32), which would require 29 days' wage. Others may be able to afford the hospitalization at PhP 2,806.97 (USD 66.13) but the cost of transportation, meals, and missed work would amount to PhP 5,144.05 (USD 121.19). A family coming from the poorest quintile (estimated annual family income from this quintile: PhP 62,650.59 or USD 1,476) may even experience catastrophic health spending when admitted for hepatic schistosomiasis. Catastrophic spending is defined by WHO as greater than or equal to 40% of capacity to pay; capacity to pay is estimated to be 50% of annual income.[19,20]

The combined annual amount of clinical and economic burden brought about by schistosomiasis may be controlled and mitigated through effective control and prevention measures of the national program as hospitalization costs, especially on cases with complications, may not be incurred as long as MDA coverage increases significantly.[1] One main barrier in achieving high treatment coverage is the fear of adverse effects of anthelminthics.[6,21-23] In order to help address the fear of adverse effects of praziquantel, health education and promotion may highlight the safety of anthelminthics and in case of adverse effects, a system for assessment and monitoring of all adverse events, can be put in place.[24] Furthermore, social mobilization activities such as local events and distribution of information, education, and communication (IEC) materials may be conducted more often to help increase the number of MDA accepters. However, these proposed activities that aim to strengthen MDAs may be difficult to implement in hard-to-reach far-flung areas considering the limited resources of the DOH. A health coverage for schistosomiasis that approximates average actual costs of care would thus protect current patients from catastrophic spending.

Currently, PhilHealth ACR for schistosomiasis is at PhP 4,000.13 (USD 94.24) per case.[25] This ACR is only limited for cases without complications as it does not allow additional second case rate payment. Uncomplicated cases may be covered by this case rate but complicated cases may not be fully covered as per this study's cost estimate. PhilHealth should thus reconsider increasing the ACR but should take into account its resource constraints. To this end, future actuarial studies and budget impact analyses should be undertaken.

There are several limitations in this study. The use of records in data collection limits our ability to classify patients or to confirm their diagnoses. The main causes of admission are also not ascertainable by the records review. It could be that schistosomiasis may be just one of the problems being treated, or that the main cause of admission is not related to it. Hospital bills may not reflect the entire cost to the patient rather it reflects the charge on the hospital and the national health insurance system. Most of our patients also came from one government hospital which may skew the data. It was also not possible to control for variance in treatment practices per hospital that may affect the cost. Thus, to minimize the effect of the limitations to the results, consultation with experts were conducted prior to data collection, and validation meetings with key stakeholders were conducted before the study ended.

The data from this study can serve as a basis to examine the complete health and economic impact of schistosomiasis in the Philippines. Survival and quality of life of patients with schistosomiasis in the Philippines is not well studied. This information would allow estimation of disability-adjusted life years as well as better quantify productivity loss due to the disease.

CONCLUSION

The estimated clinical cost burden and economic losses due to schistosomiasis in selected sites in the Philippines

was PhP 21,508,888.14 (USD 506,732.95) for 1,415 patients. Significant drivers of cost were the presence of schistosomiasis sequelae or complications, co-morbidities, and increasing length of stay. Estimated productivity losses and non-medical expenses of patients due to hospitalization were found to be more than the actual hospital bills. While control and prevention efforts of schistosomiasis should be strengthened to prevent new infections and complications, the government must provide health coverage to protect existing schistosomiasis sufferers from catastrophic spending.

Statement of Authorship

All authors approved the final version submitted.

Author Disclosure

All authors declared no conflict of interest.

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