Water Borne Diseases: Schistosomiasis in West Africa

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Underdeveloped countries of Western Africa continue to fight the uphill battle of controlling and treating water borne diseases. These diseases can cause a host of symptoms, and in many cases, make victims vulnerable to other diseases or health issues, and/or possibly lead to death. Many of these illnesses could be eradicated or greatly reduced with proper sanitation, better health care systems, extensive education on how to prevent oneself from contracting these illnesses, and how to stop the vicious cycle of spreading them. Organizations like the World Health Organization and the United Nations work very hard to reduce the prevalence of these diseases, but only time will tell if their efforts truly will make a difference. What will it take for the people of Western Africa to be freed from the plague of water borne illness, and their devastating complications?

Schistosomiasis

Of the many water borne illnesses endemic to the countries of Western Africa, Schistosomiasis remains as one of them. This disease is one of the many Neglected Tropical Diseases (NTD's), and is a problem in many of the poorer countries of the continent. Schistosomiasis is caused by parasitic worms, which develop inside of certain types of freshwater snails. Once developed, they leave the snails and live in the freshwater for about 48 hours. During this time, they can penetrate the skin of anyone that comes into contact with the infected water (CDC, 2012). According to the CDC, "Children who are repeatedly infected with Schistosomiasis can develop anemia, malnutrition, and learning difficulties, and after years of infection, the parasite can damage the liver, intestines, lungs and bladder." This disease is not something to be taken lightly, and should be treated immediately. Estimates show that approximately 200 million people are infected with this disease, and of this number 85% live in

Sub-Saharan Africa (Garba, Dembele, Oliva, and Fenwick, 2006). That's the majority of all cases! Figure 1, shows the global distribution of Schistosomiasis, and whether or not it is under control. As many can see, this disease is still a very serious concern in Africa and remains neglected. Let's take a closer look at two specific West African countries where Schistosomiasis is endemic, Mali and Niger.

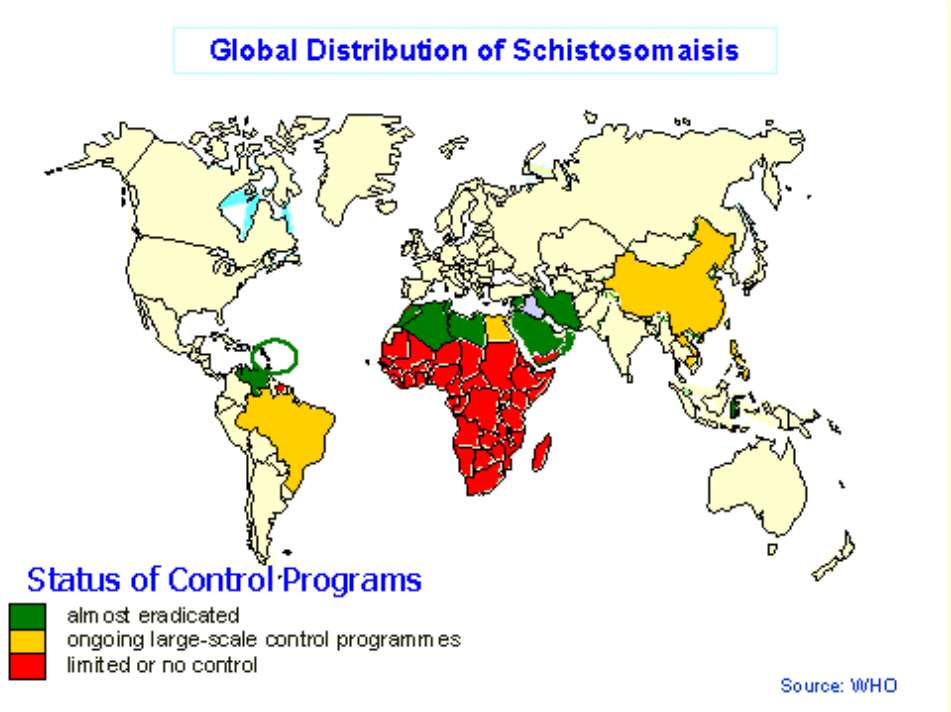

Figure 1 Global Distribution of Schistosomiasis – Original Source: World Health Organization

Schistosomiasis in Pre-School Aged Children of Mali

In 2000, the United Nations launched a program called the Millennium Development Goals (MDGs), which were a set of goals that would need to be addressed by 2015 in order to make the world a better place. One goal in particular, is to reduce child mortality. Since then, programs such as Schistosomiasis Control Initiative (SCI) have been created in order to contribute towards this that MDG, and promote better health amongst children in Mali and other countries of West Africa. A study was conducted in Mali, to see if pre-school aged children can

contribute to the transmission of Schistosomiasis, and exactly how many pre-school aged children were infected with a specific type of Schistosomiasis called *Schistosoma haematobium* across the Diema health district. Researchers screened 661 preschool children for the study but only 338 of them provided urine samples. Of the children that did give samples, results were recorded as positive or negative, and the intensity of the infection based on how many eggs were present per 10 ml of urine (Dabo, Badawi, Bary, and Doumbo, 2011). Figure 2 shows the results of urine samples collected in three different villages.

Table 1 Prevalence and intensity of *Schistosoma haematobium* infection of preschool children by village in Diema

			Intensity of infection (% of subjects #)		
Villages	No. Examined	No. infected (%)	Negative (%)	Light (%)	Heavy (%)
Fangoune B	83	70 (84.4)	13 (15.7)	49(40.8)	21 (25.3)
Dampa	108	60 (55.6)	48 (44.4)	39 (36.1)	21 (19.4)
Debo Kagoro	167	44 (26.3)	104 (62.2)	32 (26.7)	11 (6.5)
Total	338	173 (52.1)	165 (48.8)	120 (35.5)	53 (15.7)
P value		0.000			0.000

#: Negative, light and heavy infections correspond to: 0, 1-49, and ≥ 50 eggs/10 ml urine, respectively.

Figure 2 Prevalence and Intensity of Schistosoma haematobium – Source: (Dabo et al.., 2011)

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The highest number of children infected lived in the Fangoune Bamanan village. The study also showed that of the 661 children examined, the four year old age group had the highest number of infections. A mother in the Debo Kagoro village admitted that they use the lake to bathe the children, especially ones under age three because they have nowhere else (Dabo et al., 2011). These unchanging habits can have a harmful effect on the children of Mali, and put them at great risk for lifetime illness.

Schistosomiasis in Urban Areas of Niger

Another study was conducted in Niamey, Niger in order to test the correlation between urban growth and a rise in Schistosomiasis. Schools were randomly selected and students were examined for Schistosomiasis. In addition, researchers closely monitored the watering sources that were commonly used amongst participants (Ernould, Kaman, Labbo, Couret, and Chippaux, 2000). Test results showed several very interesting factors. The first showed that prevalence was higher in public in schools and lower in private schools. The infection rates were also higher amongst children that used the canal or river water versus children who used the swimming

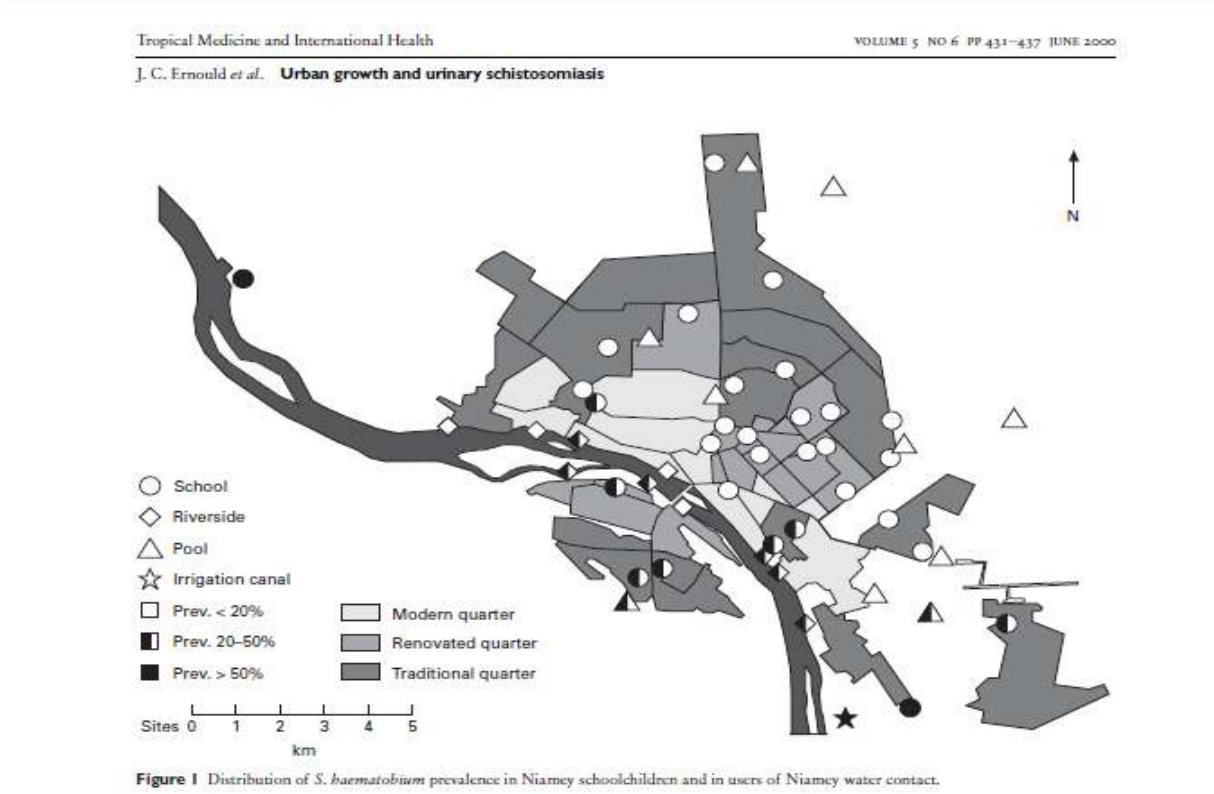

Figure.3 Distribution of S. haematobium in Niamey – Source: (Ernould et al., 2000)

pools (Ernould et al.,). Figure 3 shows the distribution of prevalence in relation to location. After observing the picture it can be concluded that location seemed to have a very large impact on the

prevalence of Schistosomiasis. As it is showed on the map that the highest prevalence appears to be towards the outskirts of Niamey, in more traditional quarters.

Data Analysis

The data above shows that there are two main issues as it comes to Schistosomiasis in West Africa. The first issue, while looking at data from the case study done in Mali is that inhabitants of this country are not being educated properly about the dangers and transmission of this disease. People see the river as the only water source, however even if that is true, there are still measures that can be taken to make the water "safe." In the village of Fangoune B. over 90% of the people tested were positive for Schistosomiasis, even if it were only a light infection. In Niger, the main issue is the location of the people living in Niamey. No, the location of these individuals cannot be changed but they can go into the rural areas of Niamey and teach about the dangers of bathing and wading in freshwater. According to studies, the number of deaths related to *Schistosoma haematobium* was estimated at 150,000 (Garba et al., 2006). If this situation is not rectified in Western Africa that number could easily double.

Methods of Control

Following World Health Assembly 54:19 countries including Niger, and Mali have implemented national programs to control Schistosomiasis, and were selected to receive financial assistance to do so by the Schistosomiasis Control Initiative (SCI) (Garba et al., 2006). The purposed of these programs are to implement mass education campaigns and treatments for areas that have higher prevalence ratios of Schistosomiasis. The goal of the program is to reduce Schistosomiasis down to level where it will no longer be considered a public health concern (Garba et al., 2006). There are two main ways in which drugs will distributed to ensure that the maximum number of people receive treatment. The first of which is where teachers at schools or

trained health care workers will distribute medicine to children in the schools, the second of which is where a trained health care worker or member of the community will distribute medicine to members in the community (Garba et al., 2006). Since these implementations began nearly 13.5 million doses of praziquantel has been distributed to Schistosomiasis endemic countries (Garba et al., 2006). If these numbers continue, this disease may be able to be eradicated sooner than thought.

Conclusion

With constant monitoring and drug administration of Praziquantel, Schistosomiasis can become a thing of the past. The number one reason observed as to why this disease is even still around is due to lack of education. If mothers could be trained in how to bathe children in safe water, and children educated in school about playing in or bathing in safe water this could all come to a halt. Just because Schistosomiasis is not as deadly as some of the other diseases such as Cholera or Malaria, does not mean that it should be taken lightly or go unnoticed. Because there is a smaller population of people with this illness or at risk for this illness, that means that it should be easier to combat, so that more effort can be put into eradication some of the bigger ones. With hard work and dedication this world can become a Schistosomiasis free world.

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