Accuracy of height gauge for praziquantel administration in a schistosomiasis endemic village in Burkina Faso

R.F. Compaoér1*, M. Sou/Dakouré1, B. Savadogo2, H. Yacouba3 and J. Simporé4

1 International Institute for Water and Environmental Engineering, Laboratory of Water, Decontamination, Ecosystem and Health (LEDES), 01 PO Box 594, 01, Ouagadougou, Burkina Faso
2 Research Institute for Health Sciences (IRSS), 03 BP 7192, Ouagadougou 03, Burkina Faso
3 International Institute for Water and Environmental Engineering, Laboratory of Water Resource and Hydrology (LEAH), 01 PO Box 594, 01, Ouagadougou, Burkina Faso
4 University Ouaga I Professor Joseph Ki-Zerbo, Laboratory of Molecular Biology and Genetics (LABIOGENE) – Biomolecular Research Center Pietro Annigoni (CERBA), 01 BP 364 Ouagadougou.

* Corresponding author: R.F. Compaoér; e-mail: frederic.compaore2016@gmail.com

ABSTRACT
The purpose of this study is to evaluate the accuracy of the height gauge used for praziquantel doses estimation. 258 individuals were recruited. The weight and height of each individual were measured and the number of tablets to be administered was calculated based on each parameter. It appeared from the analysis of height doses, 50 cases of overdoses (19.38%), 117 (45.35%) cases under the normal dose and 91 (35.27%) cases of normal dose. Friedman’s ANOVA by Ranks showed a significant difference between the two treatment methods (p-value <0.0001). Besides, according to World Health Organization criteria 50.78% of acceptable doses (30-40 mg/Kg), 97.29% of appropriate doses (30-60 mg/Kg), 46.51% of optimal doses (40-60 mg/Kg) and 2.71% of inaccurate doses (< 30mg/Kg) were noted.

Keywords: Burkina Faso; Height; Praziquantel.

1. INTRODUCTION
Schistosomiasis is a parasitosis caused by worms of the genus Schistosoma. It is endemic in low incomes countries with tropical climates including Burkina Faso and pertains to the category of Neglected Tropical Diseases (NTDs). Among the remedial measures, chemotherapy using praziquantel is performed all around the world for communities mass treatment in endemic areas [1]. In Burkina Faso, the significant socio-economic consequences of the disease have led to the establishment in 2004 of a national program against schistosomiasis under the umbrella of Schistosomiasis Control Initiative (SCI). The strategy of the program is Mass Drug Administration (MDA) in 22 sentinel sites identified as the most at risk with significant prevalences. Despite control efforts initiated since then, a persistence is observed on several sites[2].

On Panamasso site where the present study has been performed, the treatment was administered according to the height of individuals, not the bodyweight.

Because of funds scarcity to provide all the endemic settlements with a balance, a dose pole has been developed for mass drug administration with praziquantel; this method has been tested in several settlements and this one appeared to be a good alternative. However, although the method of treatment according to the body height has been validated in several studies, it should be noted that this method present shortcomings and further investigations are required [3], [4]. Thus, many authors have recommended performing additional study of that...
method particularly at a local level in order to provide more data that will contribute to improve the method. This study aims at contributing to show the factors that may explain the persistence of the disease. Specifically it is evaluating the accuracy of praziquantel dose pole in mass treatment strategy and its implications in terms of achieving the elimination goals in an endemic village of schistosomiasis.

In Burkina Faso, this type of study has not been performed yet according to our knowledge. It is very important considering the socio-economic drawbacks of the disease to demonstrate the efficiency of the method in Burkina Faso endemic settlements. This study contributes to enrich existing databases regarding the use of praziquantel dose pole with a final purpose of achieving a better tool of dose determination for mass drug campaigns.

2. MATERIALS AND METHODS

2.1 Study site
The study site is Panamasso, a settlement of around 3000 inhabitants. This village has been selected on the basis of high risk criteria such as the presence of a perennial river with high densities of schistosomiasis snails vectors, the poor access to sanitation characterized by open defecation (0% according to Burkina Faso National Program for Safe water supply and sanitation), the co-existence of intestinal and urogenital forms of the disease on the site. The figure 1 shows the site localization.

2.2 Study design and ethics consideration
A sample of 258 individuals of the two genders and of all age was randomly selected. Based on the weight and the height of each subject, optimal doses of praziquantel were calculated and compared. Data have been analyzed using Excel 2010 and tanagra1.4. The statistical method used is the Friedman ANOVA with a significance level of 1%.

This study protocol has officially received an approval (authorization No. 2015-01-043) from the ethics committee for health research of Burkina Faso.

3. RESULTS AND DISCUSSION
Data analysis revealed that of the 258 doses, the height based doses are equivalent to weight based in 35.27% (91) cases. 19.38% (50) doses are above and 45.35% (117) are below the optimal dose of 40 mg/Kg. The statistical test clearly demonstrated that there is a significant difference between the two methods of treatment (p-value <0.0001). However regarding WHO criteria, the dose pole allows to get 50.78% of acceptable doses (between 30 and 40 mg/Kg), 97.29% of appropriate doses (between 30 and 60 mg/Kg), 46.51% of optimal doses (40 and 60 mg/Kg) and 2.71% of inaccurate doses (< 30mg/Kg). No dose greater than 60 mg/Kg was found. As demonstrated by many other
studies, the dose pole gives an appropriate dose at a rate of nearly 98%.

These results have clear implications on disease elimination goals. Indeed, assuming the 258 subjects in the sample are ill, a significant proportion of the sample will be treated with praziquantel doses lower than the optimal dose (by weight). This would result in a partial removal of schistosomes and the subject could still help spread the disease.

Moreover, overdoses noted lead to an increase in adverse events[5–8] of the disease very badly perceived by the subjects on the one hand and on the other hand, contributes to drug shortage. A comparative study of doses 40 and 60 mg / kg showed a non-significant difference in cure rates and recommended taking into account the adverse effects of the disease to proceed with treatments of 40mg / kg body weight [7].

The treatment according to the height of the subjects, even if it leads to the drawbacks mentioned above, has advantages. Indeed, this treatment requires fewer resources [4] compared to the one according to weight [3]. A balance costs about 200 euros, (133,000 CFA francs), while a height gauge available locally is less than 30 euros (20,000 FCFA). Also, the simplicity of that method does not require a very qualified workforce. Thus, this technique allows you to assign much of the available resources to the acquisition of praziquantel, which allows reaching more individuals during treatment campaigns; in fact less than 20% of resources for the fight against the disease in Africa are currently available[10]. Besides the aspects mentioned above, the technique is faster and thus takes shorter time in its implementation. This is a very significant alternative to the shortage of balance.

4. CONCLUSION
The dose pole for praziquantel administration is a very good alternative currently used on many schistosomiasis endemic sites because of weak availability of means. However, substantial resources have to be injected in the fight against schistosomiasis to help overcoming the shortcomings of dose pole. Moreover, additional studies are needed to improve the drug not only to reduce or permanently eliminate the side effects, but also to develop its efficiency against schistosomules.

Funding
The study was supported by Swiss Direction for Development and Cooperation.

5. REFERENCES

© 2016; AIZEON Publishers; All Rights Reserved
This is an Open Access article distributed under the terms of the Creative Commons Attribution License which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited.

http://crmb.aizeonpublishers.net/content/2016/6/crmb950-952.pdf