



# EVALUATION OF STRATEGIES FOR IMPROVED UPTAKE OF PREVENTIVE TREATMENT FOR INTESTINAL SCHISTOSOMIASIS AMONG SCHOOL CHILDREN IN JINJA DISTRICT, UGANDA.

Simon Muhumuza<sup>1</sup>, Annette Olsen<sup>2</sup>, Anne Katahoire<sup>1</sup>, Fred Nuwaha<sup>3</sup>

<sup>1</sup> Makerere University, School of Medicine, Child Health and Development Center, Kampala, Uganda, <sup>2</sup> University of Copenhagen, Faculty of Health and Medical Sciences, Section for Parasitology and Aquatic Diseases, Copenhagen, Denmark, <sup>3</sup> Makerere University, School of Public Health, Kampala Uganda

**Dr. Muhumuza Simon  
PhD fellow**

**Child Health and Development Center (CHDC), Makerere University,  
Kampala, Uganda**

**8th European Congress on Tropical Medicine & International Health (ECTMIH 2013)10 -  
13 September 2013, Copenhagen, Denmark**

# Introduction

- Schistosomiasis is one of the most common parasitic infections in Uganda
- The infection is more important in school-age children than in adults
- Since 2003, attempts to control the infection have been made through annual mass drug administration (MDA) with praziquantel
- Target population: school-age children and adults at risk of infection: regular treatment to at least 75% of school-age children in high burden areas (WHO target)

# The Problem

- A recent study undertaken among school children in Jinja district reported very low uptake of mass treatment of 28.2% (Muhumuza *et al*, 2013)
- Prevalence and intensity of *S. mansoni* infection was high~ 35% and 116.1 eggs per gram of stool (epg) respectively
- Factors contributing to the low uptake of PZQ treatment included:
  - 1) Fear of the side effects attributable to praziquantel treatment
  - 2) Inadequate teacher preparation & motivation to distribute treatment
  - 3) Failure to appreciate rationale for annual treatment (low knowledge)
  - 4) Uptake was much lower in schools with low prevalence infections

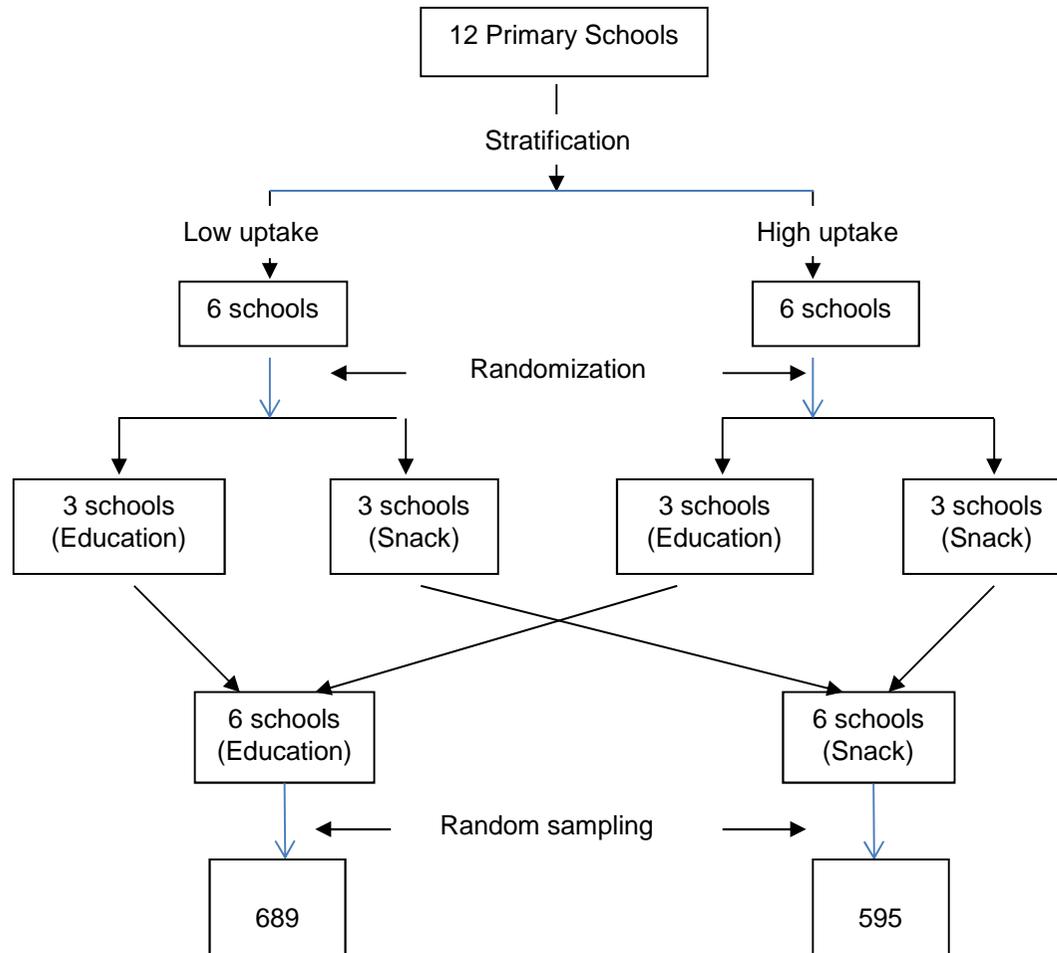
# Hypotheses

- We tested the hypotheses that provision of specific messages for schistosomiasis prevention alone or in combination with a pre-treatment snack during MDA will:
  - 1) Improve uptake of preventive treatment for intestinal schistosomiasis among primary school children
  - 2) Reduce the prevalence and intensity of *S. mansoni* infection among children
  - 3) Reduce the side effects attributable to praziquantel treatment

# Methods

## **A stratified cluster randomized trial**

Clinical Trials.gov Identifier: NCT 01869465



Flow diagram of enrollment, stratification, intervention allocation and follow up

# The interventions

## Specific messages

- All children in both arms received specific messages for 2 months prior to MDA.
- Head teachers and school teachers were trained to deliver the messages, twice a week for 8 weeks during school assemblies
- Stationary & print messages were provided.

## The snack

- Consisted of a 500 ml Safi mango juice and doughnuts
- All children in the snack arm received the snack shortly before swallowing the drug
- The snack was distributed by teachers
- Cost about 0.8 USD per child.

# The Interventions



← Training



The snack →



← No snack



# Evaluation

Design	Sample size	Sampling & data collection	Study variables
Stratified cluster randomised trial	1,284 children: (689 [54%] in education arm, 595 [46%] in the snack arm)	Children randomly selected from grades 4-6 in both arms	Self-reported uptake
4 weeks after MDA	Assumed an increase to 75% (WHO target)	No. selected in each school & class determined by PPS	Prevalence/intensity of schistosomiasis
Quantitative methods	90% power and 95% CI, STATA 10.0 (TX, USA)	Systematic sampling used	Occurrence of side-effects due to PZQ
		Structured questionnaires  Kato-Katz faecal thick smear technique used for stool test	

## Results

- Children in both arms were comparable in terms of age, sex proximity to the lake and knowledge levels of schistosomiasis transmission and prevention

Variable	Education arm (N=689)	Snack arm (N=595)	P value
Mean age of children in years (S.D)	11.7 (1.8)	11.4 (1.7)	<b>0.92</b>
Number of male children (%)	346 (50.2%)	299 (50.3%)	<b>0.99</b>
Distance from home to lake: < 5km	330 (47.9%)	284 (47.7 %)	<b>0.95</b>
Knowledge of schisto. prevention (%)	595(86.4%)	500 (84.0%)	<b>0.241</b>

## Comparison of outcomes between arms

Outcome variable	Education arm (N=689)	Snack arm (N=595)	P value
Self-reported uptake of praziquantel	<b>78.7 %</b> (95% CI 75.4%-81.7%)	<b>94.0 %</b> (95% CI 91.7%-95.7%)	<b>&lt;0.001</b>
Prevalence of S. mansoni infection	<b>14.1%</b> (95% CI 11.5%-16.9%)	<b>1.3%</b> (95% CI 0.6%-2.6%)	<b>&lt;0.001</b>
Intensity of S. mansoni infection	<b>78.4 epg</b> (95% CI 60.6-101.5)	<b>38.2 epg</b> (95% CI 21.8-67.2)	<b>&lt;0.001</b>
Occurrence of side effects due to PZQ	<b>46.4 %</b> (95% CI 42.1%-50.7%)	<b>35.6 %</b> (95% CI 31.5%-39.8%)	<b>&lt;0.001</b>

## Logistic regression modeling

- Uptake of praziquantel treatment was more likely if a child:
  - Was from a school belonging to the snack arm (OR 3.86,  $p < 0.001$ )
  - Had adequate knowledge of schistosomiasis prevention (OR 4.38,  $p < 0.001$ )
- Uptake of praziquantel treatment was less likely if a child:
  - Was from a school with low prevalence infection (OR 0.26,  $p = 0.02$ )

# Conclusion

- Provision of a pre-treatment snack during MDA for schistosomiasis is effective in:
  - Improving uptake of praziquantel among school-age children
  - Reducing prevalence and intensity of schistosomiasis infection
  - Reducing side effects attributable to praziquantel treatment
- Such interventions may be considered for integration in MDA if the objective of preventive chemotherapy is to be achieved.
- Locally available/ affordable snacks (such as porridge) can make a difference

# Acknowledgement

- The Danish Ministry of Foreign Affairs for funding the project.
- The co-authors/academic supervisors for the study project
- The Ministry of Health, Vector Control Division (VCD), Uganda
- Study team - the research assistants and laboratory technicians
- Schools management and children who participated in the study