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**Titolo tesi:** Schistosomiasis management from a Global Health perspective A model of integrated approach

## **ABSTRACT**

### Introduction

Schistosomiasis or bilharzia, is a Neglect Tropical Disease (NTDs) It could be an acute or chronic disease caused by parasitic blood flukes of the genus *Schistosoma*. Schistosomiasis affects around 240 million people in 78 countries and more than 90% of infected people live in in Sub-Saharan Africa countries. Schistosomiasis is endemic in northern Senegal and predominantly affects poor, rural communities, especially populations who work in the agriculture or fishing industries. The factors possibly associated with transmission include socio- economic status, level of education, use of untreated water, and hygienic conditions. Urogenital Schistosomiasis produces symptoms such as haematuria and dysuria. In most cases, haematuria disappears after adolescence, but previous lesions may evolve into hydronephrosis or bladder calcifications. Other sequelae, such as bladder cancer and an increased risk of HIV infection, are determined by epithelium inflammation of the urogenital organs, especially in women. In endemic countries such as those in the Sub-Saharan region, controlling and eradicating Schistosomiasis can't be limited to the delivery of drugs; a healthcare system capable of integrating a sustainable control strategy and eradicating NTDs' main causes is fundamental. The research project aim is to evaluate the effectiveness of an integrated approach to the control and surveillance of schistosomiasis, about health of the child population of a rural village in Senegal related to infection reduction and modification of risk behavior. The intermediate objective of this work is to investigate the prevalence of the disease in the specific context of the study and the factors related to it to identify coherent and sustainable interventions that take into account of environmental, cultural and religious assement

### Methods

A cross-sectional survey was carried out on 465 children resident in the village of Kassak North, in Senegal, in an area which is highly endemic for *Schistosoma haematobium*. Data on health, nutritional status and urinary schistosomiasis were collected. Schistosomiasis was diagnosed through urine microbiological analysis. A second cross-sectional study was carried out on 575 school children in Kassak North and Kassak South villages. Data about children's knowledge of schistosomiasis, behaviour and preventive measures were collected through a questionnaire survey. Socio-economic data and data about the presence of haematuria and dysuria in the previous month were collected, as reported by children With the results of the two studies has been identified a model of integreted approach to disease.

Many different educational interventions, from 2012 to today, were carried out to raise awareness of the disease and its consequences, change risky behaviours, and understand infrastructural changes in the village. To make the project more sustainable a group of teachers was established to start the "Educaeteur of the Santé" project. The aim of this specific project was to support teachers' transmissions of health messages to students. A structural project was started to create an alternative place where children could play with water. This led to the "Ile des Infantes" project, an area within the village where children can play with safe water and women can wash clothes and dishes. Pharmacologic intervention was conducted in 2016



## Results

In the first cross-sectional study (CHAPTER 2), the overall prevalence of urinary schistosomiasis in school children in Kassak North was 47.4%. As for malnutrition, 29.7% of children were malnourished (BMI-for-age Z-score [BAZ] <-2) and 14.5% had a significant linear growth retardation (height-for-age Z-score [haz] <-2). Children with urinary schistosomiasis showed lower mean baz and haz than uninfected children (haz positives  $-0.7 \pm 1.4$  vs. haz negatives  $-0.4 \pm 1.4$ ,  $P=0.004$ ; baz positives  $-1.5 \pm 1$  vs. Baz negatives  $-1.3 \pm 1.1$ ,  $P=0.03$ ). It was also found that infected children were at greater risk of malnutrition (baz<-2; Or 1.5; 95% ci 1.01-2.26).

In the second cross-sectional study (CHAPTER 3), correct answers about risky behaviour for schistosomiasis were associated with early symptoms ( $p=0.010$ ). Wearing shoes and washing hands with soap were associated with not having haematuria and dysuria ( $p=0.007$  and  $0.049$  respectively). Playing in rivers was associated with the above-mentioned symptoms ( $p<0.001$ ). Children who had good knowledge of schistosomiasis reportedly did not have symptoms ( $p=0.002$ ). A logistic regression model showed that being a female (OR=0.35;  $p=0.01$ ) or attending a primary school (OR=0.13;  $p<0.001$ ) were significant predictors of a lower risk of the early symptoms of urinary schistosomiasis.

The 2016 preliminary data, after a first development of interventions, suggest a modification of certain behaviours and a reduction of the disease incidence although the structural intervention has not yet completed.

## Conclusion

In the end of 2016, the children of Kassak North village will finally have an area where they could play with safe water, and women will have safe water to wash clothes and dishes.