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RESEARCH ARTICLE

# How Implementation Research Could Increasing the Impact of Integrated Techniques of Controlling Schistosomiasis Among the Poor, Vulnerable and Marginalized Population in the Lower and Upper Fulladou Districts of the Gambia?

Bakary Sanneh<sup>1\*</sup>, Amadou Woury Jallow<sup>2</sup>, Dalanda Cham<sup>2</sup>, Balla Jatta<sup>2</sup>, Lamin F Manjang<sup>4</sup>, Bubacarr Touray<sup>3</sup>, Lamin Sawo<sup>3</sup>, Modou Colley<sup>1</sup>, Sana Sambou<sup>2</sup> and Sharmila Lareef Jah<sup>5</sup>

<sup>1</sup>National Public Health Laboratories, Bertil Herding High way, Kotu Layout, Ministry of Health, Gambia

<sup>2</sup>Epidemiology and Disease Control Unit, Bertil Herding High way, Kotu Layout Ministry of Health, Gambia

<sup>3</sup>Regional Health Team, Central River Region, Ministry of Health, Gambia

<sup>4</sup>Directorate of Health Research, Ministry of Health, Gambia

<sup>5</sup>World Health Organization, Country office, Gambia

## ABSTRACT

Schistosomiasis is endemic in both the central and upper river region of The Gambia. Two mass drug administrations of praziquantel did not stop the transmission of these infections. Most of the World Health Organization recommended approach to controlling schistosomiasis through Mass Drug Administration has not significantly reduced transmission. The best approach could be multifaceted which will be designed to explore in the context of implementation research approach in addressing this infection at one of the hot spots in the Gambia to enhance the attainment of the schistosomiasis elimination road map of 2030. The target population will be farmers engaged in rice growing in river sites and swampy areas, as well as fishermen. Most of whom are women who do their laundry around farmland water bodies or freshwater river sites. The data collected will be analyzed and interpreted to provide better understanding in the context of knowledge, attitudes and practices of these nomadic communities regarding the risk factors involved with schistosomiasis transmission, control and prevention. Developed materials and awareness messages on the prevention and control of schistosomiasis will therefore be use for community engagement activities to increase awareness on the disease, improve health seeking behaviors and increase treatment uptake. Thus, this community-led intervention could help to reduce the prevalence of schistosomiasis in Upper and Lower Falladou Districts.

## INTRODUCTION

In June 2015, a nationwide mapping survey of schistosomiasis and Soil-Transmitted Helminthiasis using a school-based approach was conducted [1]. The survey findings indicated that the national prevalence of schistosomiasis was 4.3%; however both the Central River Region (14%) and Upper River Regions (9%) had the highest prevalence of 14.3% and 9.9% respectively [1]. This high prevalence of

### \*Corresponding author

**Bakary Sanneh**, National Public Health Laboratories, Bertil Herding High way, Kotu Layout, Ministry of Health, Gambia

Tel: +220-983-1272/2074237

ORCID: 0000-0002-6188-9283

E-mail: sheikbakary@yahoo.com

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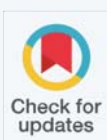
### Keywords

- Schistosomiasis
- Implementation research
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urinary schistosomiasis in these endemic regions has been reported in other studies [2]. Out of the districts mapped in the country, it was revealed that 45% of the districts were endemic for schistosomiasis (19/42); thus, these districts were eligible for treatment with praziquantel [1]. As a result, MDA using praziquantel against schistosomiasis was conducted in 2017 and 2018 with national treatment coverage of 67.85% and 88% respectively. The country has been ranked 31st out of 49 countries in Africa for performance for the MDA (NTD mass treatment coverage index: 8/100) and has not yet meet the targeted population to be dewormed [3]. The Gambia reported the first confirmation case of COVID 19 on the 16th March 2020, and the subsequent spread of the outbreak and lockdown in the Country has affected the scheduled MDA activities for schistosomiasis and access to health facility treatment services. There is no specific vector control programme for snails and these community members are posed to reinfection as established in earlier studies. The national epidemiological report of week 34 of 2021 on schistosomiasis have shown a shift in the distribution pattern in the country in which Upper Fulladou West and Lower Fulladou West Districts accounted for 92% (237/259) confirmation cases of schistosomiasis nationally. Therefore it is evident that the mainstay of reducing schistosomiasis through repeated praziquantel mass administration is not sufficiently enough to drastically reduce the disease burden. Thus, this protocol intends to explain and demonstrate the application of integrated implementation approaches to substantially reduce the schistosomiasis in Lower and Upper Falladou of Central River Region which could facilitate the attainment of the schistosomiasis elimination goal in the country as envisage in the national NTD masterplan [3-10]. This expiring NTD masterplan was not implemented in holistic approach as documented because of limited funding and interruption by COVID outbreak. This review and viewpoints will provide information for better interventions

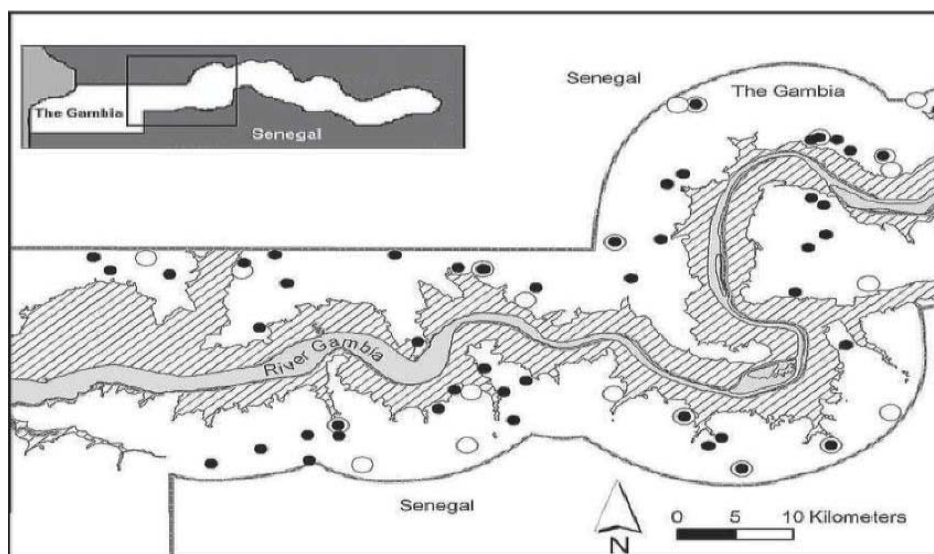
which will locally informed the national action plan towards schistosomiasis elimination which is align with the WHO/NTD road map towards 2030 elimination goal [7]. Thus providing suggestive answer to the following question: What are the implementation challenges or gaps associated with high persistent endemicity of schistosomiasis in Fulladou districts despite series of proven interventions?; What are the possible efficacious interventions or strategies that could be tested to address the implementation gaps? And Does the new strategy or intervention yield positive outcome?

### Intervention approach

The map below geographically shows the study area (Figure 1).

### Targeted population and area

Normally the communities around these two districts are mostly involved in farming and domestic business [8]. Some of them are nomadic farmers and due to the rainfall pattern and climate condition of these areas. Some of them will migrate to other areas with their animal to get better grazing lands. These movements mostly affect herds men but also with families involve in domestic business to get close to the local markets call 'LUMOs'. The study area (CRR) covers about 2894 km<sup>2</sup> and is home of 262,851 inhabitants (GBOS, 2021). The main activities in the region are livestock husbandry and rice production. With a majority of Fula cattle owners living in CRR, it is estimated that over half of Gambia's cattle are raised in this region [8]. The inhabitants in the area are mostly Muslims and Fula's peoples are the majority. Other groups in CRR include Mandinka, Jola, Wolof, and Sarahule [8]. The CRR plays an important role for national agriculture and hosts the first ever established agricultural training centers of the country in Fula Bantang and Sapu. The area has a lot of swamps and the most wet



**Figure 1** Map of Central River Region where the study area in located. Source: [www.mdpi.com/2073/4433/10-7-423](http://www.mdpi.com/2073/4433/10-7-423).

land of the country as a result it services as a reservoir for snails that are the intermediate host for *Schistosoma* [9]. The study area has a lot of swamps and water logs for rice cultivation and for animal husbandry. The area in the Gambian context is an ever green land for animal grazing as a result a lot of herdsmen settles there for animal husbandry [10]. The freshwater areas and swamps in the study area where occupational factors increase the risk of getting the *Schistosoma* infection include; Janjanbureh rice field, Sankulleh Kunda rice field, fitu Fulla swamp, in the Fulladu Districts (Upper and Lower) are Bansang rice field, Bantanto rice field, Sololo rice field, Misera rice field, Mabaly kuta and Mabaly koto rice fields and swamps, Kerewan pond, Jahaly, Patcharr, Concrete and Wellingara rice fields and for LS and US jahaur/ kaur rice swamp, bantanto rice field, Panchang sare Ali swamp, Nioro Tamba swamp [10]. The majority of the farming is done in the swampy area and these areas are also highly infested with freshwater snails which had been confirmed of carriage of schistosome cercariae [11]. Some of the inhabitants are engaged in horticultural activities while others are fishermen. Most of the women do their laundry around water bodies in the farmlands or freshwater river sites. Some boys go for regular swimming as recreational activities at lagoons, rivers, and swampy areas [12]. During the dry season, some of the youths also get involved in the construction of mud blocks for sale and other purposes around those water bodies. The herdsmen

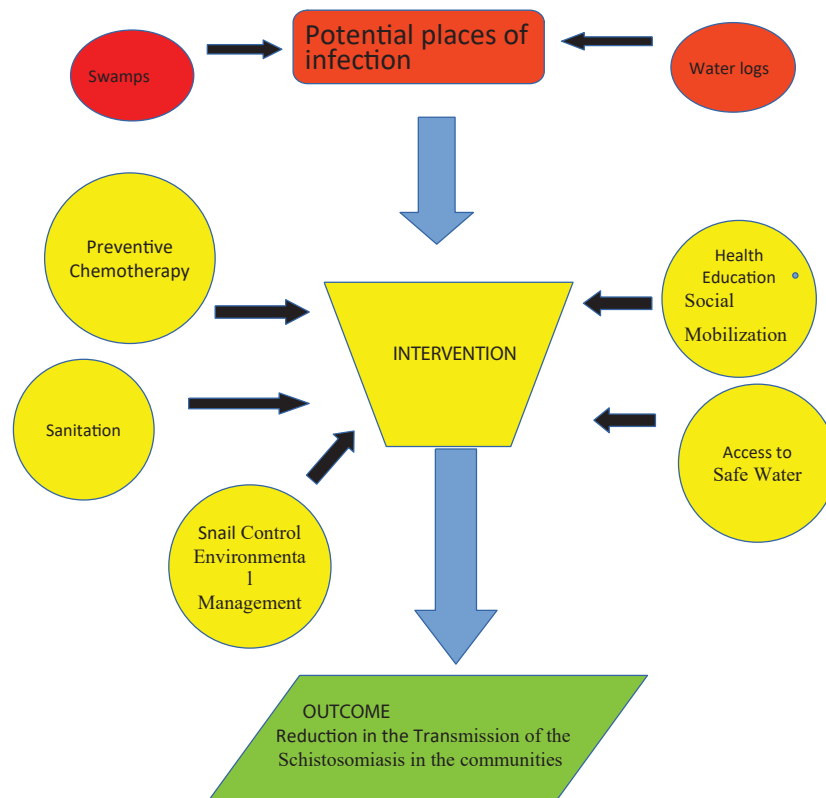
among this population also accompany their cattle for drinking and grassing at these freshwater bodies and swampy areas. Earlier studies found that the prevalence of schistosomiasis in this region was 100% [10] and the recent neglected tropical disease mappings have shown that the prevalence of schistosomiasis has been 14% in the Central River Region [1]. Thus, the hotspots for the transmission of schistosomiasis in this part of the country are Upper and Lower Falludu Districts [4].

### Conceptual framework for the control of schistosomiasis in Upper and Lower Fulladou Districts of The Gambia

The following diagram explains that the Transmission of the Schistosomiasis in the communities (Figure 2).

#### Community member's knowledge, attitude and practices about schistosomiasis and community engagement

A study conducted among 383 household heads in Kuntaur and Janjanbureh Local Government Areas (LGAs) in Central River Region found 54.3% had poor knowledge and fair (57.7%) practices toward prevention and control of schistosomiasis [13]. Whereas very positive (96.9%) attitude were revealed toward schistosomiasis control. About 97% had positive attitude. It was also found that



**Figure 2** Conceptual framework for implementation research to control schistosomiasis in Lower Falladou Region of the Gambia.

older community members were found to be more likely to have good knowledge on schistosomiasis prevention and control in these communities. Male residents were more likely to have good practice towards schistosomiasis prevention and control in the rural Gambia [13]. Besides, another study among school aged children in rural Gambia which included communities in CRR had revealed that being a male, you are more likely at-risk of *S. haematobium* infection compared to females, though bathing, playing and swimming in water bodies were found to pose less risk for *S. haematobium* infection [12]. This might have indicated a possible underreporting of the true water contact behavior of the study participants as argued by the authors [12]. These community members have demonstrated willingness attitude to uptake schistosomiasis control strategies and hence we wish to recommend the implementation of Community Dialogue Approach which has proven efficient for mainstreaming schistosomiasis control to the health system by enhancing the long-lasting synergies between the communities and the health system as done in Nampula province in Mozambique [14]. The researchers recommended for feasibility of behavioural change, community engagement strategies need to be supported by improved access to treatment services, safer water and sanitation [14]. This will be coupled with school health programmes could be suitable for awareness recreation for the students and pupils to promote uptake of schistosomiasis control programmes. The data collected will be analyzed and interpreted to understand the knowledge, attitudes and practices of these communities about schistosomiasis risk factors for transmission, treatment and preventive practices. This finding will form the baseline to develop material and messages for sensitization on how to prevent and control *Schistosoma* infection and if persons infected know where to seek treatment as shown in figure 2.

### **Mapping and engagement of Water, sanitation, hygiene and snail control stakeholders and partners for schistosomiasis prevention**

A meta-analysis review in Sub-Saharan Africa have revealed that there is limited engagement of communities and proposed that future research addresses this gap in participatory approaches such as environmental sanitation, Water, Sanitation and Hygiene (WASH), health education and economic empowerment [15]. For instance in KwaZulu-Natal showed that the key players in the promotion of water, sanitation, and hygiene were not clearly defined. Although effective implementation, promotion, and adoption of WASH can be fully achieved with the involvement of various stakeholders, we found that there was a limited collaboration among WASH stakeholders [16]. Apparently, there is disconnection between the NTD programme and stakeholders from Water, Sanitation and Hygiene, Agriculture and vector control units. Therefore, a rapid assessment and engagement of such participants and stakeholders will be done by adopting the strategies

in KwaZulu-Natal. These will help the National NTD focal point to leverage the improvement of sanitation in the schistosomiasis endemic regions through the UNICEF programmes on WASH by eliminating open defecation and provision of safe drinking water through the department of water resources. The vector control unit and National Malaria Control Programme (vector control division) and Agricultural engineering department will be engaged for the implementation of vector control.

### **Improve access to treatment and regular MDA through community-led**

The Gambia was ranked 31st in 2016 and 36<sup>th</sup> in 2019 for performance among NTD African countries needing MDA. The population eligible for neglected tropical diseases (STH and SCH) Mass Drug Administration for praziquantel/albendazole index was also 8 per 100 population in 2019 for the performance of MDA for NTDS. Subsequently, treatment coverage for schistosomiasis decreased from 67.9 in 2017, 80% in 2018 to 0% in 2019 and 0% 2020 [5]. The Covid-19 outbreak has exacerbated strive to treat people infected with schistosomiasis. The Falladou districts having highest incidence of schistosomiasis infection had 67% treatment coverage of the target 12,836 eligible people comprising of preschool age children, school age children and adult at risk. The mass drug treatment also excluded the pregnant and children who did not meet the treatment criteria and still at high risk of contracting such infections. Therefore, to improve coverage, community members and other structures should be involved in the planning and implementation. For instance, community volunteers, community nurses, community public health officers, could provide support by conducting both sensitization and the house-to-house treatment campaign. The ministry of health could also compliment the WHO funding for regular treatment programmes; an example is the successful seasonal malaria chemotherapy. It will be ideal to conduct joint seasonal malaria chemotherapy with praziquantel treatment in co-endemic regions as done in Senegal. Furthermore, to increase access to schistosomiasis treatment, the community clinics, health facilities and hospitals should be well equipped with praziquantel medicines at affordable cost for the community members. There is substantial evidence of safety of use of praziquantel among pregnant women, and that it will be wise to mainstream this treatment into the malaria prevention programme designed for pregnant women. Besides, treatment of children under has to be advocated to be administered as per approved pediatric treatment dosage.

### **Improve surveillance and testing using both community and health facility-based systems**

The national mainstay of testing and confirmation of the schistosomiasis by slide microscopy are found to be highly specific and less sensitive compared to advanced diagnostic test such as PCR [17]. The weakest performance of the slide microscopy is found in the country with high prevalence of



light infections. To that effect point of care test evaluation in the Gambia found that urine test for hematuria and macroscopic appearance of blood stain urine are highly sensitive and specific for the diagnosis of schistosomiasis [2]. However, the same study found that POCCA point care test for schistosomiasis is not adequate for the accurate testing of *Schistosoma haematobium* which form 99% of such infection in the Gambia [18]. Therefore, to increase access and affordability of testing for schistosomiasis, a testing strategy and algorithm are urged to be developed such that the urine test strip for hematuria which is user friendly and cheap is used as primary screening tool and the slide microscopy as confirmatory in all health facilities in Upper and Lower Falladou Districts. All the health facilities in this area are also participating in the World Bank's resource-based financing project wherein these facilities develop their tailored funded business plan; it will be prudent for the NTD focal point to advocate for inclusion of provision of schistosomiasis diagnostic and treatment. This will complement the provision from the Ministry of Health and WHO and could avert frequent stock out.

### Expected results and perspectives

This viewpoint will provide potential assumption which if implemented will help in the attainments of the following:

- Increase awareness among community members and how to correctly identify risk factors for schistosomiasis
- Increase in the number of community members who will correctly use the recommended drug for the treatment of schistosomiasis and access to such treatment or drugs.
- Increase in the number of individuals and families treated for schistosomiasis;
- Increase in the number of families who received praziquantel during the MDA.
- Introduction of community led initiative to control schistosomiasis.
- Reduction of the prevalence of schistosomiasis after treatment periods and other interventions.
- Treatment of the ponds which are potentially inhabited by snails which serves as intermediate host for the *Schistosoma cercariae*.

### CONCLUSION

The implementation of an integrated approach of schistosomiasis control in the context of implementation research could reduce the burden of schistosomiasis in the Fulladou Districts of the Gambia. It is therefore important that a combination of sanitation, treatment and health education be put in place for effective control of schistosomiasis in these areas. This perspective will

lead to exploring community led and own holistic ways of controlling schistosomiasis in Upper and Lower Fulladou Districts

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