OPERATIONAL GRANULAR ASSESSMENT OF SCHISTOSOMIASIS AND SOIL-TRANSMITTED HELMINTHIASIS AMONG SCHOOL-AGE CHILDREN IN EKITI STATE, SOUTHWEST NIGERIA

REPORT

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Abstract

Background: Operational assessment of schistosomiasis and soil-transmitted helminthiasis (STH) treatment programs is a critical step in understanding the real-time progress in the mass administration of medicine in target areas. It also provides scientific insight into where at-risk populations live in order to effectively plan and target available resources and to achieve maximum impact on disease burden.

Methodology: This schistosomiasis and STHs granular operational assessment was conducted in 16 Local Government Areas (LGA) Ekiti State between October & November 2023. Samples were collected in 166 wards/communities covering 166 schools.
Urine and stool samples were collected from 7670 pupils between 5 and 18 years, comprising 3823 (49.8%) males and 3847 (50.1%) females. The highest number of participants (658 children) was recorded in Ado Ekiti State LGA. Emure recorded the lowest number of participants with 320 children across 9 out of 10 wards in the LGA.
The result of this operational assessment was compared to the baseline prevalence and the rounds of total/effective Mass Drug Administration (MDAs) administered in the state.

Results: 58 (0.76%) out of 7670 pupils were infected with *Schistosomia haematobium*. No *Schistosoma mansoni* infection was detected in any of the 7670 analyzed samples.
296 (3.86%) of the examined samples were infected with STHs.
In the 16 LGA accessed, Ekiti west had the highest *S. haematobium* prevalence of 4.26%. Ise/Orun and Oye ranked 2nd and 3rd with a prevalence of 3.48% & 2.40% respectively. Lowest prevalence levels of *S. haematobium* were recorded in Efon, Ekiti-East, Ekiti South-west, Ido/Osi & Mobi with a 0% prevalence level.
The prevalence of STHs was highest in Ekiti-West with a prevalence of 10.45%. Gbonyin & Isle/Orun had the prevalence of 9.62% & 8.9% respectively, making them 2nd and 3rd in ranking accordingly. Emure, Ikole and Irepodun Local Governments had the lowest prevalence of 0.31%, 0.38% & 1.01% respectively.

Conclusion: There is a sharp decline in the prevalence of *S. haematobium & STHs* in the state across the 16 LGAs as compared to the baseline prevalence obtained from the Federal Ministry of Health NTD program.
Our assessment demonstrates that 6 of the 16 LGAs can be classified as non-endemic for *S. haematobium*. Seven LGA's with computed prevalence of <1 were categorized as requiring surveillance. The remaining 3 LGA's would require at least one round of MDA every 2/3 years based on the WHO decision algorithm.
The prevalence of STHs has significantly reduced across the 16 LGAs. Comparative analysis of the computed and baseline prevalence shows that 6 LGA are not endemic according to WHO Decision Program. Two of the assessed LGA require one round of MDA yearly and 8 LGA need one round of MDA every two to three years.

Introduction

Schistosomiasis is a snail-borne acute and chronic parasitic disease that is caused by trematode blood flukes of the genus Schistosoma (1,2). Globally, it is one of the World Health Organization's (WHO) Neglected Tropical Diseases (NTDs) that has increasingly drawn attention of public health experts over the past decade and a half. Transmission has been reported from 78 countries, the majority of which are classified as low- or middle-income countries, according to WHO (3). An estimated 207 million people in 74 countries are infected with the bulk of the global prevalence (90%) occurring in sub- Saharan Africa (2,3,4,5). Nigeria is home to the largest number of people in the world in need of treatment for schistosomiasis (> 25 million),(5) and the fourth-largest number of children in need of treatment of STHs (> 48 million).(6)

There are 2 major forms of schistosomiasis—intestinal (due to *Schistosoma mansoni* and *S. japonicum*) and urogenital (predominantly due to *S. haematobium*). Common signs and symptoms of urogenital S. *haematobium* include a swollen belly, blood in the urine, stunted growth, cognitive impairment in children and infertility among adults of childbearing age. Advanced disease may sometimes present with fibrosis of the bladder and ureter, kidney damage and bladder cancer. Diagnosis is normally done through the detection of parasite eggs in urine or stool specimens using microscopy [13]
Both the intestinal form (caused by S. *mansoni*) and urogenital form (caused by *S. haematobium*) are known to occur in Nigeria. People are often infected during routine agricultural, domestic, occupational (e.g., car washing, sand harvesting, fishing), and recreational activities, which expose them to the contaminated infective waters.

The cornerstone of current schistosomiasis control is preventive chemotherapy (PC) with praziquantel, targeted towards school-age children. The frequency of treatment is determined by the disease endemicity within a subset of surveyed schools, which are classified using parasitological prevalence and intensity of infections (6,7,8).

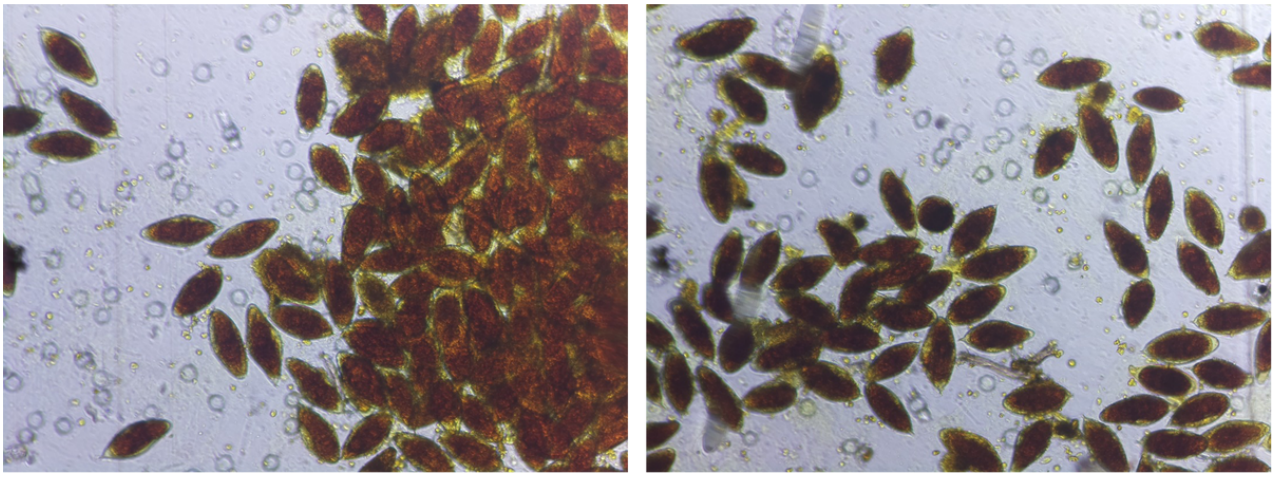

Image 1: Schistosomiasis eggs

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Problem Statement

MAM

Ongoing Mass administration of Medicine (MAM) is a strong and valid contribution to the control and elimination of schistosomiasis and STH.

Lack of diagnostic real-time disease mapping data for the operational assessment of the impact of MDA is a limitation to the program as this may lead to uncertainties in distribution of medicines. Decision on the right time to discontinue MDA in a community requires accurate assessment results determined in real-time. This challenge often leads to waste of both human and material resources. In many cases, accurate prevalence in communities and their eligibility for preventive chemotherapy (PC) could be undermined or over-exaggerated without first gaining scientific insight into the disease prevalence. These inaccuracies prevent successful PC coverage of all populations that need treatment and, not only hamper the achievement of elimination and interruption of transmission of schistosomiasis but also impede universal health coverage (UHC).

Because of the highly focal distribution of schistosomiasis, there is a need for more accurate assessment/mapping at a more refined level to deepen the understanding of the distribution of schistosomiasis in order to guide program decision-making for MDA. The selection of only a few schools to decide for the entire ward's endemicity leads to uncertainties and errors if the site selection and sampling are not properly considered. In this context, a misclassification of wards and the subsequent decision to inappropriately implement or not implement MDA. Inappropriate frequency of MDA may result in overtreatment in some areas and, most importantly, undertreatment or absence of treatment in areas with significant transmission. A major impediment to more granular surveys is the lack of skilled technicians to read urine and stool smears. Granular assessment and mapping of schistosomiasis with the AiDx NTDx Assist therefore provides an avenue to address this challenge by providing more refined data to guide understanding on where at-risk populations live in order to effectively target available resources and to achieve maximum impact on disease burden. Accurate delineation of prevalence of schistosomiasis at a much lower level is therefore a critical prerequisite to move from disease morbidity control towards elimination and eventual interruption of transmission as envisioned WHO's 2021-2030 NTD Roadmap.

We hereby report the results of the operational assessment and mapping for S. *mansoni*, *S. haematobium* and the burden of soil- transmitted helminths (ascariasis, trichuriasis and hookworm) in Ekiti states in Southwest, Nigeria. The aims and objectives that defined this field research activities are hereby defined below:

Specific Objectives

I. To determine the prevalence and intensity of, *S. haematobium*, *S. mansoni* and STH at the Ward administrative level in Ekiti states in Southwest, Nigeria.

II. To assess the role of operational assessment and granular mapping towards targeted implementation of MDA programs and intervention.

III. To compare the measured diagnostic prevalence to the WHO predicted baseline.

IV. To provide updated data and potentially update the National prevalence map for schistosomiasis and STH from analyzed data.

V. To identify specific risk groups in order to enable more targeted messaging, treatment and prevention activities.

Research Questions

01. What is the prevalence and intensity of S. mansoni, S. haematobium and STH based on surveys conducted at finer geographical levels in Ekiti state in Southwest, Nigeria?

02. Can granular operational assessment eliminate the errors, in terms of overtreatment and undertreatment during MAM, caused by missing the focal variation in schistosomiasis prevalence?

03. Can mass treatment activities be refined to improve impact based on evidence of risk groups and epidemiological influences?

Operational Assessment Methodology

Study Site and Population

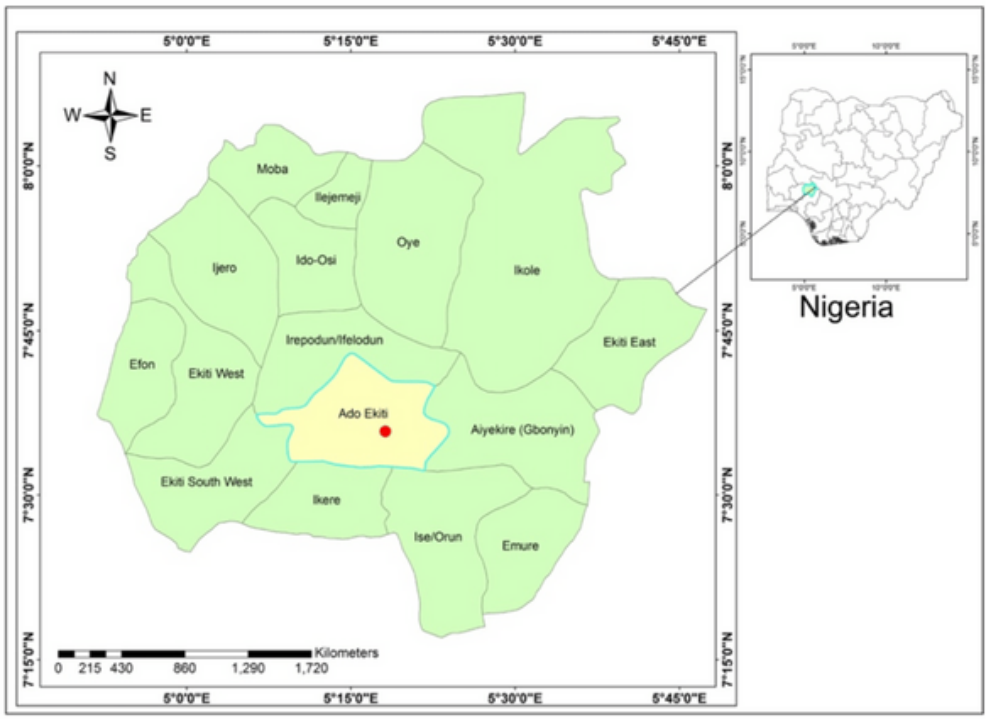

Diagram 1: Map of Ekiti

Ekiti State is in the south-western region of the country. It has a population of 3,480,006 (Male-1,774,803 and Female-1,705,203)and covers a land area of 5,434 square kilometers. It has 16 Local Government Areas, 177 wards and lies between latitude 70 151 and 80 51 N and longitude 40 451 E. Ekiti has a population growth rate of 3.1% per annum.

Table 1

State	Number of local government	Number of Wards
Ekiti	16	177

<u>Study design:</u> Site Selection and Sample Size for sampling in SAC

By increasing the map granularity and spatial resolution, precision mapping provides the best, high-resolution evidence-based data to guide intensified interventions in targeted transmission zones and allows for a better and rational utilization of the donated praziquantel and available resources [7,9,1011].

The population for this study was drawn from school-age children attending selected primary schools in each of the 177 wards in the 16 LGAs of Ekiti State.

A primary school was selected from each of the 177 Wards in Ekiti State. Selection was based on purposeful sampling. According to the WHO NTD mapping guide, our sampling method was guided by previous knowledge of the areas where transmission is known, suspected or more likely near water bodies; lakes, streams, dams and irrigation areas [21]. Identification of water bodies were aided by suitability maps and expert local knowledge provided by the State Neglected Tropical Disease team.
In each of the selected schools, 50[1] participants, age ranging from 5 to 16 years, were randomly selected. Selection was stratified based on age. A two-stage cluster survey design was undertaken such that one school and 50 school-age children, aged 5-16 years were selected for sample collection and analysis in each ward. Expected total sample size for analyzed was estimated as (177 * 50 = 8,850). To compensate for inadequacies and errors in sample collection, we added a variance of 2% and therefore scale up the total expected sample to 9,027 for analysis. The samples were collected between the hours of 10:00 am - 14:00 hours. The sample collection process included participants whose parents/guardian provided written informed consent and who were willing to provide assent. Children with severe disease requiring urgent medical intervention, or residing in the area for less than 6 months, were also excluded.

[1] Though the Guidelines provide for 50 participants, an extra 5 children are included to mitigate against any problems with samples collected e.g. quality (watery stool, dark stools etc) and quantity (inadequate sample).

Study procedures

Community & School Sensitization and mobilization
An extensive awareness campaign, mobilization and community sensitization was undertaken to gain support for this project. A more detailed report on the stakeholder engagement, awareness campaign and community mobilization is presented in a supporting document. State, local government health officers, school principals, teachers, community leaders were invited for sensitization and training workshops, based on the study protocol, before the project kicked off.Obtaining informed consent and assent

Biodata information

Biodata information including age and gender were recorded on the prepared study data sheet. To ensure privacy and proper handling of the data, the documents were strictly managed only by authorized participating government personnel.

Image 2: Strategic partnership and meeting with the Chief Medical Director of Ekiti State Teaching Hospital & his team. From left to right: The HOD - Microbiology, representative of the CMAC, the CMD and AiDx team.

Image 3: Strategic partnership and meeting with the Ekiti State Ministry of Health. Right at the center is the Executive Secretary of the State Primary Health Care Board and director of family health and planning. Also in the picture is the State NTD coordinator and his team member.

Image 4: Strategic advocacy and awareness visit to the Nigerian Ambassador to the Netherlands. A former commissioner for education in Ekiti State.

Image 5 : Sample collection from pupils during sample collection process.

Image 6: Sample collection

Image 7: Sample collection

Image 8: Sample collection

Image 9: Training by FMoH staff

Image 10: Training by State coordinator -NTD

Image 11: Conclusion of the granular operational assesment program

Image 12: Sample processing at the project lab

Image 13: Sample preparation at the project Lab

Image 14: Sample preparation & recording

Image 15: Advocacy and community mobilization

Image 16: Sample Collection

Image 17: Lab planning and discussion

Image 18: Sample analysis with AiDx Assist device

Image 19: Sample analysis with AiDx Assist device

Training of Personnel

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The training of personnel was subdivided into the following categories:

- Data collection
- Geographic Information System
- Kato-Katz Sample Preparation technique
- Urine Filtration Sample Preparation Technique

The training was conducted at the state and local government levels. A total of 320 personnel participated in the training and impact assessment exercise.

The Executive Secretary of the State Primary Health Care Development Agency, Dr. Ayodele Seluwa and the director of community and family health - Dr. Ogunsakin Akintude were personally present to kick-off the training program.
During the training, the Executive Secretary provided insight into the delicate nature of the project. He shared lessons learnt in the 2014 mapping exercise that was abruptly terminated due to community misconceptions and misgivings. He clearly outlined steps to be taken to prevent a recurrence of violent resistance of the project. He particularly stressed the need for community mobilization, sensitization, and the need for a signed agreement.

The breakdown of the categories of the personnel trained for the assessment is listed in table 1 below.
The training at the state level was delivered by expert Schistosomiasis Program Officers from the Federal Ministry of Health. The practical training session involved the standard urine and stool sample preparation using the urine filtration and Kato-Katz Sample preparation techniques.

Image 20: Training Personnel

Image 21: Training Personnel

Image 22: Training

Image 23: Training

Image 24: Training

Image 25: Training

Image 26: Training

Image 27: Training

Image 28: Training

Training at the state level was mostly focused on the use of smartphones for smart data collection and monitoring. The system uses an integrated google geo-tagging application software which provides the coordinate of the sample collection locations. The state coordinator and the AiDx technical manager provided training in this perspective. Sample collectors and community mobilisers were trained to install the application software on their smartphones. They were further trained on how to apply the software with the image recognition functionalities of their phone with subsequent protocol on how to upload registered images with the coordinates to a central real-time online software platform. During the training and planning sessions, the systems were practically tested for use. This sample collection, location recognition and storage platform provided the participants of the training with an overview of necessary tools for effective epidemiological assessment tools which could assist in the implementation and evaluation of planned NTD control activities in the state.

Training of Field Officers

Training was provided for the field teams as well. The field team consisted of staff of the State Ministries of Health and Education (Including SUBEB). Training included community mobilization across communities, religious and traditional institutions, schools, and market squares. The field staff were also trained on sample collection to avoid contamination, artifact, or duplication of samples. Laboratory officers were trained on sample examination and digital analysis of registered images. Recorders were trained on use of electronic data capturing. The practical sessions and the post training sections were conducted in the laboratory at the Ekiti State University Teaching Hospital. Micro planning meetings were held at the state level to discuss proper selection of schools, strategies for effective community mobilization and detailed implementation plans.

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Stool and urine sample collection at School

On the morning of sample collection, after obtaining consent and assent, each participant was assigned a unique study identification number, used to track all collected samples.
The procedure for safe stool and urine collection was explained by trained laboratory technicians.
Participants were provided with a labeled wide mouthed stool container, a piece of plain paper, a piece of applicator stick and a piece of toilet paper. The participants were instructed to defecate on a piece of paper provided, to avoid contamination from the toilet environment, and then transfer a portion of the stool to the clean plastic container using the applicator stick. A member of the study team verified and validated the sample code against the participants' name.
At the time of sample collection, each participant was also issued an empty urine container and other sanitary necessities such as tissue paper. Urine sample were collected between 10.00 am and 2.00 pm.

Collected fresh stool and urine samples were then transported within 2 hours of collection in cool boxes containing ice packs to the Ekiti State Teaching Hospital Laboratory, where they were processed by urine filtration and Kato-Katz method and tested for presence or absence of target parasites in urine and stool using the AiDx NTDx device.

01

Stool processing for diagnosis of helminth infections (Kato-Katz Method)

Prepared stool sample slides were examined within one hour for hookworm eggs (they are cleared by glycerine after one hour), S. mansoni and any other parasites (A. lumbricoides and T. trichiura). Data were recorded on laboratory reporting results forms. Quality control was performed by systematic random examination, by a more qualified laboratory technologist for 10% of the daily examined Kato-Katz slides.

02

Urine processing for diagnosis of Schistosoma haematobium infection (Urine filtration)

10 ml of all the urine samples collected were syringe-filtered through a filter mesh, and the mesh was then examined under the AiDx auatomated microscope to enumerate S. haematobium. A diagnosis of S. haematobium was defined as positive egg count of S. haematobium in urine (> 1 egg/10 mL of urine), and intensity of infection was defined as light (< 50 eggs/10 mL of urine) and heavy (⩾ 50 eggs/10 mL of urine) according to WHO classification (8). Data was recorded on laboratory reporting results forms.

Category of Personnel Trained

Table 2

S/N	Category of Personnel	Number Trained
1.	Laboratory Scientists	8
2.	Laboratory Technicians	21
3.	Technical Officers	8
4.	Recorders (Laboratory)	4
5.	State NTD officers	6
6.	Local NTD coordinators	16
7.	Health Educators	16
8.	Education Secretaries	16
9.	SUBEB officers	80
10.	Frontline Health Workers (FHLWs)	178
11.	School Heads	178
12.	Town announcer	178
13.	Mathematical Modelers	5
14.	FMOH personnel	1
TOTAL		**715**

Note: 178 Frontline Health Workers, school heads and town announcers were trained instead of 177 because of the need for sample collection in an additional primary school in Ogebse community.

Ogbese community is located in the Erinwa II ward, in Ise/Orun Local Government. The community was inititally avoided due to the sensitivty of the community members to sample collection.

We later re-strategized and planned a visit to Ogbese community where 100 urine and stool samples were successfully collected. A total of 154 samples were collected from the Erinwa II ward as shown in page 34. 54 of the samples were collected from Obada community and the remaining 100 samples from Ogbese. 17 of the 100 samples were *S.haemtobium* positive and this accounted for the schisto prevalence in the ward.

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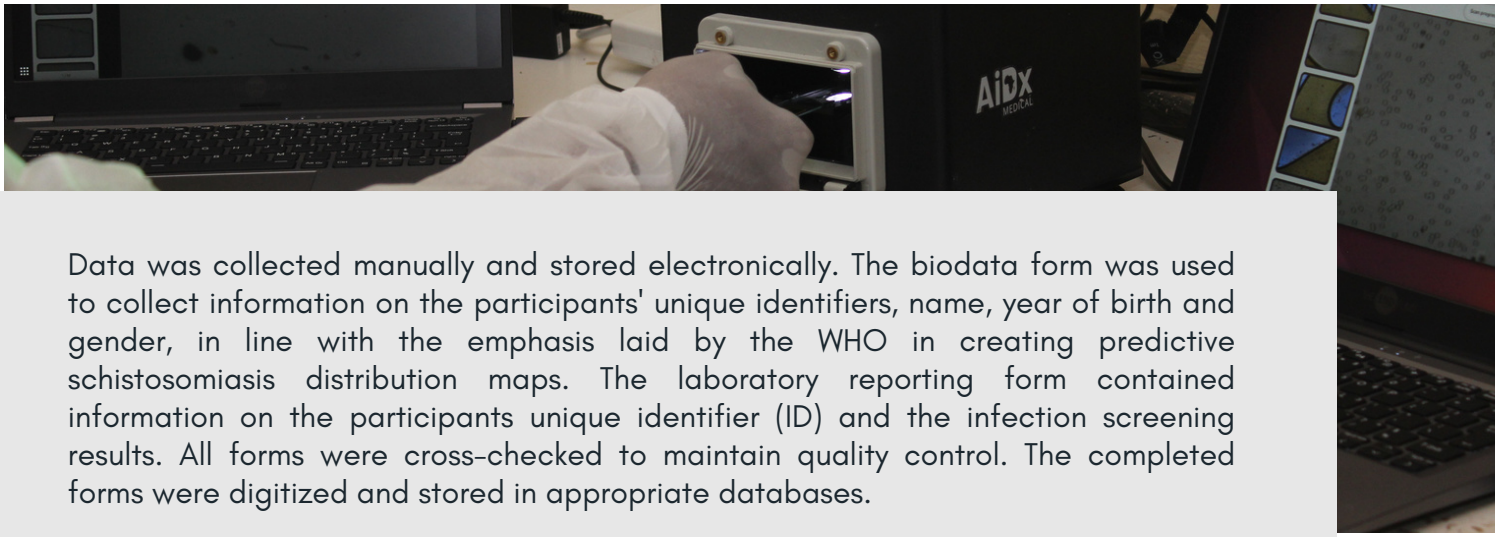
Data Collection



Data was collected manually and stored electronically. The biodata form was used to collect information on the participants' unique identifiers, name, year of birth and gender, in line with the emphasis laid by the WHO in creating predictive schistosomiasis distribution maps. The laboratory reporting form contained information on the participants unique identifier (ID) and the infection screening results. All forms were cross-checked to maintain quality control. The completed forms were digitized and stored in appropriate databases.

Data processing and analysis

To determine the prevalence/intensity at 95% confidence intervals (CIs), descriptive statistics such as percentages, frequencies etc were computed to estimate the prevalences.
Parasitological data were entered using Microsoft Excel and subsequently analyzed with statistical functions in MATLAB®. IBM SPSS Statistics software version and Data tab accordingly.

The prevalence of infection is estimated as the number of those who test positive out of the total number of participants surveyed. The intensity of STH, S. mansoni and S. haematobium infection were enumerated and expressed as eggs per gram (epg) and ep/10ml of urine and categorized according to WHO-proposed thresholds for the classification of individuals with helminth infections as shown in Table 2

Organism	Light-intensity infections†	Moderate-intensity infections†	Heavy-intensity infections†
A. lumbricoides	1-4,999 epg	5,000-49,999 epg	≥50,000 epg
Hookworm	1-1,999 epg	2,000-3,999 epg	≥4,000 epg
T. trichiura	1-999 epg	1,000-9,999 epg	≥10,000 epg
S. mansoni	1-99 epg	100-399 epg	≥400 epg
S. haematobium	1-50 eggs/10 ml of urine	-	>50 eggs/10 ml of urine

Ethical Clearance

The Ethical Approval was received from the Research Ethics Committee (Ekiti State Ministry of Health and Human Services, HREC) under approval number: MOH/EKHREC/EA/P/59 and all research was performed in accordance with the relevant guidelines and regulations.

Collaboration and Sustainability plan

The Impact Assessment project included the extensive collaboration of the Ekiti State University Teaching Hospital and the College of Medicine. The university provided us with a laboratory for use, and technical staff were seconded to the project. The pictures with the Chief Medical Director of the Hospital, the Provost, and other university dons are shown below.

Medical students were also trained on the use of the AiDx automated microscope for the quick detection and screening of parasitological targets in urine and stool samples.
Accreditation of the College of Medicine: Interestingly, delegates from the National University Commission visited the AiDx project laboratory during their mission to accredit the college of medicine. Thankfully, the meaningful collaboration and the practical demonstration of the impact assessment project in the hospital lab, with innovative technology added value and points to the accreditation process. The provost of the college of medicine, Prof. Ajayi gladly recounted his experience at the end of our project.

Image 29: Training

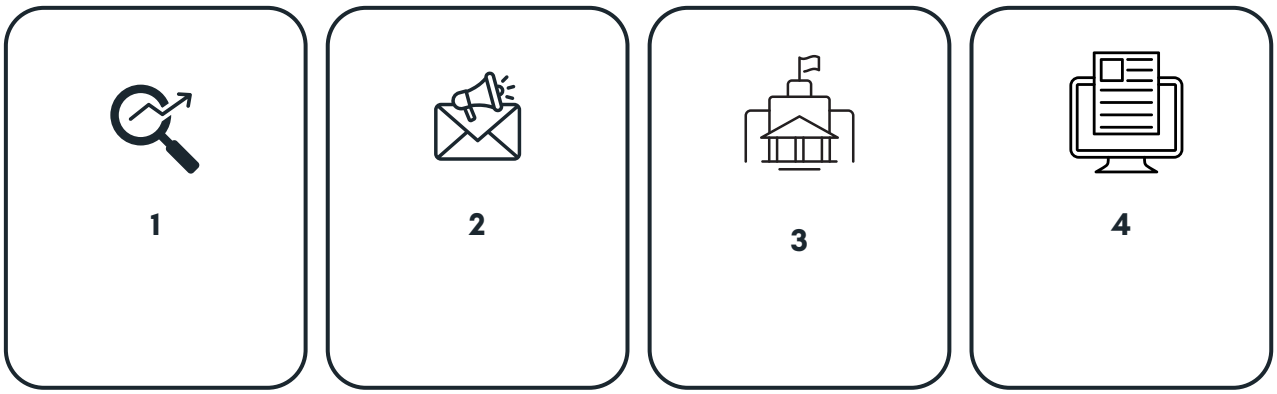
Plan for Dissemination of study findings

The findings will be shared with all relevant stakeholders to support and inform implementation of intervention activities and any possible incorporation in policy formulation. Meetings will be held to share the data with stakeholders at National and state level. Manuscripts will be written from analyzed results and published in international peer-reviewed journals.

Image 30: Sample Collection

Study limitations

One limitation of the study was the single stool sample taken from each child (as opposed to two or more consecutive samples). This may have reduced detection rates by stool microscopy due to the known daily variation in eggs released. However, we believe that homogenization of stool prior to slide preparation and use of duplicate slides will have mitigated this.



Results

Demography data

The schistosomiasis and STHs operational assessment was conducted in 16 Local Government Areas Ekiti State between October & November 2023. Samples were collected in 166 wards/communities covering 166 schools. Samples were not collected from 9 of the wards in a total of 6 Local Governments due to community resistance. Two communities demanded the return of collected samples as shown in Table (3).

The samples were collected from 7712 pupils within the age group of 5-16 years. Only 7670 samples were analyzed (as 42 samples were returned), including 3823 (49.8%) males and 3847 (50.1%) females

Ado LGA has the highest number of participants with 658 SAC across the 13 wards while Emure recorded the lowest number of participants with 320 SAC across 9 out of 10 wards in the LGA.

Table 3

S/N	LGA	No of wards where samples were collected	No of wards where samples were NOT collected/returned	No of Participants per LGA	No of participant whose samples were returned
1.	ADO	13	0	658	0
2.	EFON	9	1	416	0
3.	EKITI EAST	12	0	618	0
4.	EKITI SOUTH WEST	11	0	556	0
5.	EKITI WEST	9	2	469	0
6.	EMURE	9	0/1	320	9
7.	GBONYIN	9	1	447	0
8.	IDO/OSI	11	0	509	0
9.	IJERO	10	2	303	0
10.	IKERE	11	0	550	0
11.	IKOLE	12	0	527	0
12.	ILEJEMEJE	10	0	546	0
13.	IREPODUN/IFELODUN	10	1	396	0
14.	ISE/ORUN	8	1/1	517	33
15.	MOBA	11	0	420	0
16.	OYE	11	1	418	0
TOTAL		**166**	**9/2**	**7670**	**42**

58(0.76%) out of 7670 pupils were infected with S. *haematobium* as shown in appendix-table 2. No *S. mansoni* infection was detected in any of the 7670 analyzed samples. In the 16 LGA accessed, Ekiti west had the highest S. *haematobium* prevalence of 4.26%. Ise/Orun and Oye ranked 2nd and 3rd with a prevalence of 3.48% & 2.40% respectively.

Lowest prevalence levels were recorded in Efon, Ekiti-East, Ekiti South-west, Ido/Osi & Mobi with a 0% prevalence level.

Soil- Transmitted Helminths (STHs)

296 (3.86%) of the examined 7670 pupils had STHs as shown in Tables 6 & 7. The prevalence was highest in Ekiti-West with a prevalence of 10.45%. Gbonyin & Isle/Orun had the prevalence of 9.62 & 8.9% respectively, making them 2nd and 3rd in ranking accordingly. Emure, Ikole and Irepodun Local Governments had the lowest prevalence of 0.31%, 0.38% & 1.01% respectively.

All the STHs species: Ascaris Lumbricoides, Tichuris Trichuria and Hookworm were observed in 75 of the 166 wards assessed. *A. lumbricoides* was detected in 255 samples. The highest prevalence of *A. lumbricoides* (9.59%) was observed in Ekiti West. TT & Hookworm were observed in 17 & 33 examined stool samples respectively.
The highest prevalence of TT (2.46%) was reported in Gbonyin and HK had the highest prevalence of 2.13% in Ise/Orun LG.

Table 4

Distribution & Prevalence of Parasites across the LGA					
LGA	S. Hae	S. Man	Ascaris	TT	Hk
ADO	4 (0.61)	0 (0.00)	8 (1.22)	0 (0.00)	1 (0.15)
EFON	0 (0.00)	0 (0.00)	22 (5.29)	0 (0.00)	0 (0.00)
EKITI EAST	0 (0.00)	0 (0.00)	9 (1.46)	1 (0.16)	0 (0.00)
EKITI SOUTH WEST	0 (0.00)	0 (0.00)	15 (2.70)	0 (0.00)	0 (0.00)
EKITI WEST	20 (4.24)	0 (0.00)	45 (9.59)	1 (0.21)	4 (0.85)
EMURE	0 (0.00)	0 (0.00)	1 (0.31)	0 (0.00)	0 (0.00)
GBONYIN	1 (0.22)	0 (0.00)	29 (6.49)	11 (2.46)	6 (1.34)
IDO/OSI	0 (0.00)	0 (0.00)	12 (2.36)	0 (0.00)	4 (0.79)
IJERO	1 (0.33)	0 (0.00)	6 (1.98)	0 (0.00)	1 (0.33)
IKERE	8 (1.45)	0 (0.00)	24 (4.36)	0 (0.00)	2 (0.36)
IKOLE	2 (0.38)	0 (0.00)	1 (0.19)	1 (0.19)	0 (0.00)
ILEJEMEJE	2 (0.37)	0 (0.00)	23 (4.21)	2 (0.37)	1 (0.18)
IREPODUN/IFELODUN	1 (0.25)	0 (0.00)	4 (1.01)	0 (0.00)	0 (0.00)
ISE/ORUN	18 (3.48)	0 (0.00)	37 (7.16)	0 (0.00)	11 (2.13)
MOBA	0 (0.00)	0 (0.00)	8 (1.90)	0 (0.00)	0 (0.00)
OYE	1 (0.24)	0 (0.00)	11 (2.63)	1 (0.24)	3 (0.72)
Grand Total	**58 (0.76)**	**0 (0.00)**	**255 (3.32)**	**17 (0.22)**	**33 (0.43)**

The prevalence of STHs was highest in Ekiti-West with a prevalence of 10.45%. Gbonyin & Isle/Orun had the prevealence of 9.62 & 8.9% respectively, making them 2nd and 3rd in ranking accordingly. Emure, Ikole and Irepodun Local Governments had the lowest prevalence of 0.31%, 0.38% & 1.01% respectively.

Infection Load Estimation

The computed infection load demonstrates light infection in the state as shown below:

Table 5

Parasite intensity in eggs per gram (epg) of Faeces or per 10 ml of urine				
Parasite species	Level of intensity	Number (%) of intensity of infection		
		Male	Female	Total
S. haematobium	Light infection (<50 eggs/10ml)	24 (0.63)	28 (0.73)	52 (0.68)
	Heavy infection (>50 eggs/10ml)	5 (0.13)	1 (0.03)	6 (0.08)
S. mansoni	Light infection (1 - 99 epg)			
	Moderate infection (100 - 399 epg)			
	Heavy infection (>400 epg)			
A. lumbricoides	Light infection (1 - 4,999 epg)	125 (3.27)	130 (3.38)	255 (3.32)
	Moderate infection (5000 - 49,999 epg)			
	Heavy infection (>50, 000 epg)			
T. trichiura	Light infection (1 - 1,999 epg)	10 (0.26)	7 (0.18)	17 (0.22)
	Moderate infection (1,000 - 9,999 epg)			
	Heavy infection (>10,000 epg)			
Hookworm	Light infection (1 - 1,999 epg)	24 (0.68)	9 (0.23)	33 (0.43)
	Moderate infection (2,000 - 3,999 epg)			
	Heavy infection (>4,000 epg)			

Measured prevalence compared with Baseline prevalence

The plots in the Figure 1 below show the comparative analysis between the baseline prevalence data as retrieved from the FMoH database. Ado Ekiti demonstrates a clear decline from 32% prevalence level to 0.6% in the *S. haemtobium*. Sharp decline to zero was recorded in about 6 LGAs.

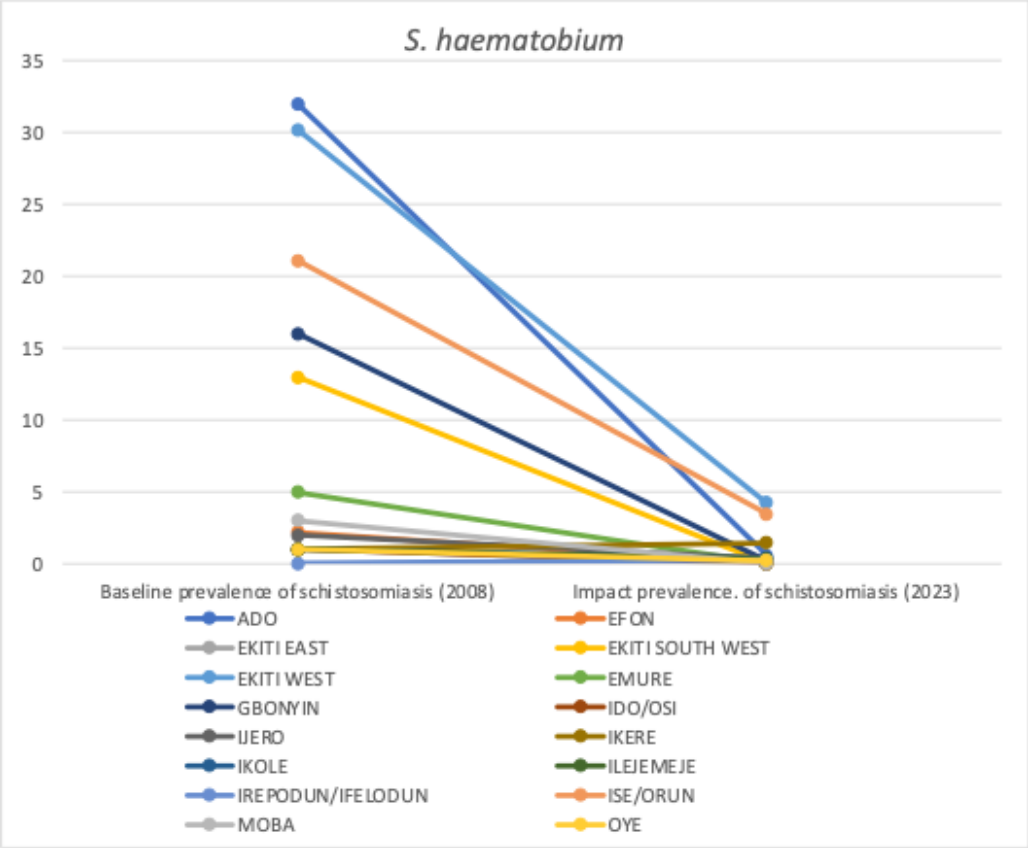


Fig. 1: The plot demonstrates the decline in s.haematobium prevalence in all the 16 LGA's with respect to base

The plots in the Figure (2) below show the comparative analysis between the baseline prevalence data as retrieved from the FMoH database. Ekiti East demonstrates a clear decline from 48.9% pevalence level to 1.5% in the *S.mansoni*

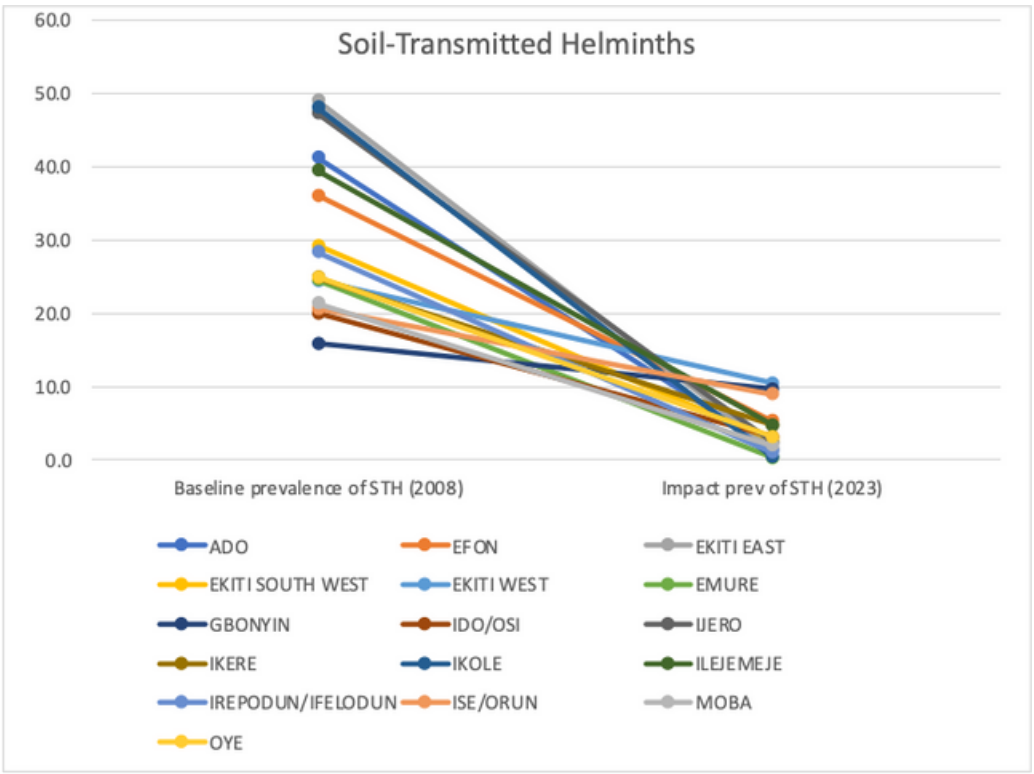


Fig. 2: The plot demonstrates the decline in STH's prevalence in all the 16 LGA's. with respect to baseline.

Discussions

From the analysis and computational statistics of the collected data, the overall prevalence of schistosomiasis in Ekiti State (0.8%) was within the low-risk range based on the World Health Organization's recommendations and guidelines.

There is a sharp decline in the prevalence of S. *haematobium* in the state across the 16 LGAs as compared to the baseline obtained from the Federal Ministry of Health, NTD program. Table 3 shows the distribution of the prevalence across all the 16 LGA's. The table also shows the baseline prevalence as measured in 2008, and the number of rounds of total/effective MDA conducted between the years 2010 and 2022.

Table 3 demonstrates that 6 of the 16 LGAs can be classified as non-endemic because of the recorded 0% prevalence in the LGA. Seven LGA's with computed prevalence of <1 are categorized as requiring surveillance. The remaining 3 LGA's would require at least one round of MDA every 2/3 years based on the WHO decision programme.

The estimated low prevalence indicates effectiveness of the deworming program in the states. IAdo-Ekiti (State Capital) had a baseline prevalence of 32% 15 years ago, now reduced to 0.6%. Although 6 rounds of MDA have been conducted, only 3 are classified as effective based on implementation metrics. An effective MDA round will imply treatment of all target populations in the selected location.

We also observe an interesting rise in prevalence of schistosomiasis from 0 to 0.3% in Irepodun/Ifelodun LGA. This rise may be attributed to the fact that only one round of MDA has been conducted since 2015, or may reflect a different sampling population.
All the communities in Irepodun demonstrate 0% prevalence except Igbemo with a prevalence of 2.9% leading to a cumulative prevalence of 0.3%. Similar increase in prevalence was observed in Ikere LGA where a 0.5% increase in prevalence was recorded. Again, one community (Ugele) with a prevalence of 13.1% was responsible for the jump in prevalence. The remaining communities were all 0%.

The surge in the two identified communities in both selected LGA's may be due to (1) lack of effective rounds of treatment in the communities, (2) resistance of the treatment program in the location and (3) migration of people or animals from one local community to another.
It will be interesting to further discuss with the local active NGDO (implementation partner) to provide some insight or comment on this situation.

The results obtained are consistent with the results reported in 2008 [14]. From this result, it is evidently clear that S. *haematobium* was more prevalent that S. *mansoni* in Ekiti state.

The prevalence of STHs has significantly reduced across the 16 LGAs. Ascaris is more prevalent than Trichuris and hookworms. Comparative analysis of the computed and baseline prevalence shows that 6 LGA are not endemic according to WHO Decision Program.
Results from this survey demonstrates that of the 177 wards accessed, 149 require no MDA for schistosomiasis. 14 would require 1 round of MDA every 2/3 years and only 3 require 1 round of MDA annually. For Soil-transmitted helminths (STH), surveillance is required in 101 wards. 1 round of MDA is required in 43 wards every 2 years. 18 wards would need 1 round of MDA annually.

Diagnostic tools for disease mapping and surveillance – The AiDx Assist

The multi-diagnostic AiDx Assist Microscope device shown in Fig. 1, is a low-cost and compact automated single-slide scanner and microscope. The AiDx Assist multi-diagnostic microscope can detect *microfilaria*, *s. haematobium and s. mansoni* eggs in blood, urine, and stool samples respectively [15].

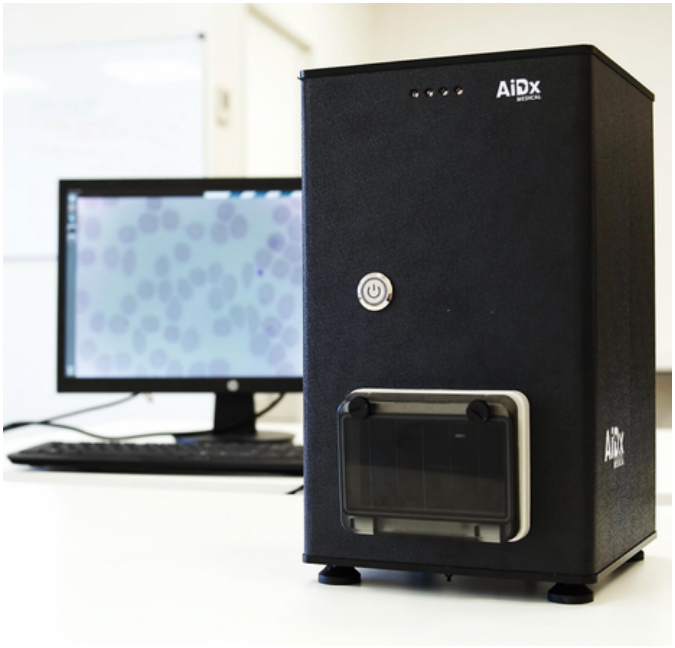


Image 31: AiDx Device

With the use of the multi-diagnostic AiDx Assist, collected samples were analyzed in the EKSUTH laboratory. Eight AiDx Assist devices installed in the laboratory were powered by solar panel grids connected to the laboratory facility. This enabled the consistent supply of power to the devices throughout the project implementation. The devices performed a complete urine sample (13 mm urine filter) scan and analysis in 5 minutes. The prepared stool sample using the standard Kato-Katz template was analyzed in 11 minutes. Averagely, 50 samples of urine and 50 stool samples were processed by each AiDx Assist multi-diagnostic microscope in a day. The devices were set in continuous operational mode and therefore were operated for 15 hours/day.

Device operators worked in shifts of 8 hours according to the local standard work ethics and regulations. This continuous operation demonstrates the robustness of the AiDx Assist.

Contrary to human microscopist, there was consistency in the result of the AiDx Assist. As repeated test/analysis of samples at intervals of 24 hours and more produced the same results. The repeatability of the devices and its lack of susceptibility to error due to fatigue and lack of concentration as experienced by human microscopist is a gain to disease detection accuracy.
The usability of the devices [16] was validated in this study. Training of hired staff with no significant medical qualification was realized in less than 20 minutes. The low-level medical health care worker could in turn train and demonstrate the use of the device to new intakes. The training outcome validates the ease-of-use of the AiDx Assist which positions the equipment as a good tool not only for diagnostics but for surveillance and monitoring in remote areas and regions. Locals can be easily trained on the use of the device. This would support the control and elimination target goals.

Despite the brilliant performance of the AiDx Assist devices, some device optimization would be necessary to converge to a completely robust system for field use.

- Optimization of the system hardware against shocks and vibration: While 8 systems were deployed, 7 of those worked optimally leaving out one device that had performance issues. We later confirmed that the unstable performance was largely due to system failure because of insufficient quality control specifically focused on the response of the system connections to vibrations.
- Optimization of the software: We observe increased internal heat in the AiDx Assist Microscope after prolonged sample processing. This was largely due to the environmental temperature as this defect was not observed when the air-conditioner units were fully functional. There is therefore the need to optimize the cooling effects in the devices.

Recommendations

- Significant progress has been achieved in Ekiti State MDA program over the years. However a few more effort is required to reduce prevalence in some communities.
- Both human and material resources can be better deployed for disease surveillance, monitoring and elimination programs.
- Slight surges in some of the communities should be strictly monitored and eliminated as soon as possible.

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- Ekiti State Ministry of Health
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- INSPiRED - Delft University of Technology/Leiden University Medical Centrum
- MITOSATH
- AiDx Medical BV
- THE END FUND

Table 6: Comparison of computed *s. haemtobium* prevalence with baseline (FMoH)

S/N	LGA	Baseline Prevalence in 2008	No of MDA (Effective)	Prevalence of Schisto in 2023	Prevalence Difference	Remark based on WHO Programme Decision using 2023 Prevalence
1.	ADO	32	6 (3)	0.6	-31.4	Surveillance
2.	EFON	2.2	5 (3)	0.0	-2.2	Non-endemic
3.	EKITI EAST	1	6 (3)	0.0	-1	Non-endemic
4.	EKITI SOUTH WEST	13	6 (2)	0.0	-13	Non-endemic
5.	EKITI WEST	30.2	7 (3)	4.3	-25.9	1 round of MDA every 2/3 years
6.	EMURE	5	4 (1)	0.0	-5	Non-endemic
7.	GBONYIN	16	6 (5)	0.2	-15.8	Surveillance
8.	IDO/OSI	1	4 (3)	0.0	-1	Non-endemic
9.	IJERO	2	4 (3)	0.3	-1.7	Surveillance
10.	IKERE	1	5 (2)	1.5	+0.5	1 round of MDA every 2/3 years
11.	IKOLE	1	5 (3)	0.4	-0.6	Surveillance
12.	ILEJEMEJE	1	5 (5)	0.4	-0.6	Surveillance
13.	IREPODUN/IFELODUN	0.0	1 (1)	0.3	+0.3	Surveillance
14.	ISE/ORUN	21.1	6 (2)	3.5	-17.6	1 round of MDA every 2/3 years
15.	MOBA	3	5 (4)	0.0	-3	Non-endemic
16.	OYE	1	4 (3)	0.2	-0.8	Surveillance
TOTAL		**8.2**	**79 (46)**	**0.8**	**-7.4**	

Table 7: Comparison of computed STH's prevalence with baseline (FMoH)

S/N	LGA	Baseline Prevalence in 2008	No of MDA (Effective)	Prevalence of STH in 2023	Prevalence Difference	Remark based on WHO Programme Decision using 2023 Prevalence
1.	ADO	41.2	8 (3)	1.4	-39.8	Surveillance
2.	EFON	36.0	7 (5)	5.3	-30.7	1 round of MDA every 2 years
3.	EKITI EAST	48.9	7 (6)	1.5	-47.4	Surveillance
4.	EKITI SOUTH WEST	29.2	7 (6)	2.7	-26.5	1 round of MDA every 2 years
5.	EKITI WEST	24.5	7 (5)	10.4	-14.1	1 round of MDA annually
6.	EMURE	24.5	6 (4)	0.3	-24.2	Surveillance
7.	GBONYIN	15.8	3 (1)	9.6	-6.2	1 round of MDA annually
8.	IDO/OSI	20.0	7 (5)	3.1	-16.9	1 round of MDA every 2 years
9.	IJERO	47.2	7 (5)	2.3	-44.9	1 round of MDA every 2 years
10.	IKERE	24.8	7 (4)	4.7	-20.1	1 round of MDA every 2 years
11.	IKOLE	48.0	7 (6)	0.4	-47.6	Surveillance
12.	ILEJEMEJE	39.4	8 (7)	4.8	-34.6	1 round of MDA every 2 years
13.	IREPODUN/IFELODUN	28.3	8 (6)	1.0	-27.3	Surveillance
14.	ISE/ORUN	20.6	7 (6)	8.9	-11.7	1 round of MDA every 2 years
15.	MOBA	21.3	7 (6)	1.9	-19.4	Surveillance
16.	OYE	24.9	7 (5)	3.1	-21.8	1 round of MDA every 2 years
TOTAL		**30.9**	**110 (80)**	**3.9**	**-27**	

Appendix

Demography- Prevalence/Community

S/N	LGA/Wards	Total sampled	Total Positive for schistosomiasis	Prevalence of Schistosomiasis	Total Positive for STH	Prevalence of STH
1.	**ADO**	**658**	**4**	**0.6**	**9.0**	**1.4**
i	Agoaduloju	55		0.0	7.0	12.7
ii	Basiri	42	1	2.4		0.0
iii	Ekute	50		0.0		0.0
iv	Igirigiri	50		0.0		0.0
v	Ijigbo	47	2	4.3		0.0
vi	Irona	55		0.0		0.0
vii	Odo	50		0.0		0.0
viii	Odo Ado	49		0.0		0.0
ix	Oke Ila	50	1	2.0		0.0
x	Okesa	50		0.0		0.0
xi	Okeyinmi	55		0.0	1.0	1.8
xii	Opopogboro	53		0.0	1.0	1.9
xiii	Ureje	52		0.0		0.0
2.	**EFON**	**416**		**0.0**	**22.0**	**5.3**
i	Alajo	33		0.0		0.0
ii	Alanaka	55		0.0	2.0	3.6
iii	Araromi	55		0.0	5.0	9.1
iv	Erekesan	61		0.0		0.0
v	Igboolofin	54		0.0		0.0
vi	Iloro	55		0.0	2.0	3.6
vii	Ilugbeku	39		0.0	5.0	12.8
viii	Iwaji	27		0.0	8.0	29.6
ix	Obake	37		0.0		0.0
3	**EKITI EAST**	**618**		**0.0**	**9.0**	**1.5**
i	Araromi Ugbesi	55		0.0		0.0
ii	Ijero	50		0.0		0.0
iii	Ilasa/Eda	49		0.0	3.0	6.1
iv	Ilasa/Ikun/Araromi	41		0.0		0.0
v	Ilisa	55		0.0		0.0
vi	Iludofin	55		0.0	1.0	1.8
vii	Isinbode	55		0.0	3.0	5.5
viii	Iworo	53		0.0		0.0
ix	Kota I	50		0.0		0.0
x	Kota II	55		0.0	2.0	3.6
xi	Omuoke I	50		0.0		0.0
xii	Omuoke II	50		0.0		0.0
4	**EKITI SOUTH WEST**	**556**		**0.0**	**15.0**	**2.7**
i	Aaye	51		0.0	4.0	7.8
ii	Adin	34		0.0	1.0	2.9
iii	Ifakin	54		0.0		0.0
iv	Iro/Okeloye	53		0.0		0.0

v	Irorin	60		0.0		0.0
vi	Odogba	53		0.0		0.0
vii	Oke Emo	54		0.0		0.0
viii	Oke Ode	53		0.0	1.0	1.9
ix	Okebode I	50		0.0	6.0	12.0
x	Okebode II	42		0.0		0.0
xi	Okemi	52		0.0	3.0	5.8
5	**EKITI WEST**	**469**	**20**	**4.3**	**49.0**	**10.4**
i	Aramoko I	54		0.0	2.0	3.7
ii	Aramoko II	55	4	7.3	9.0	16.4
iii	Erijiyan I	44	11	25.0		0.0
iv	Erijiyan II	56		0.0	6.0	10.7
v	Erio	54		0.0	1.0	1.9
vi	Ido Ile	50		0.0	16.0	32.0
vii	Ikogusi	55		0.0	4.0	7.3
viii	Ipole	55	3	5.5	6.0	10.9
ix	Oke Imesi II	46	2	4.3	5.0	10.9
6	**EMURE**	**320**		**0.0**	**1.0**	**0.3**
i	Ariyasi	48		0.0		0.0
ii	Ibeji Shitu	29		0.0		0.0
iii	Idamudu	48		0.0		0.0
iv	Odo Emure I	29		0.0	1.0	3.4
v	Odo Emure II	30		0.0		0.0
vi	Ogbontioro	50		0.0		0.0
vii	Oke Emure	54		0.0		0.0
viii	Owode	32		0.0		0.0
7	**GBONYIN**	**447**	**1**	**0.2**	**43.0**	**9.6**
i	Agbado	50		0.0	2.0	4.0
ii	Aisegba I	50		0.0	3.0	6.0
iii	Aisegba II	50		0.0	8.0	16.0
iv	Ijan	49	1	2.0		0.0
v	Ilumoba	50		0.0		0.0
vi	Imesi	50		0.0		0.0
vii	Ode I	48		0.0	8.0	16.7
viii	Ode II	50		0.0	8.0	16.0
ix	Ode III	50		0.0	14.0	28.0
8	**IDO/OSI**	**509**		**0.0**	**16.0**	**3.1**
i	Aaye/Ifisin	52		0.0		0.0
ii	Ayetoro I	49		0.0		0.0
iii	Ayetoro II	46		0.0	3.0	6.5
iv	Ido I	50		0.0	1.0	2.0
v	Ido II	42		0.0	1.0	2.4
vi	Ifaki I	50		0.0	3.0	6.0
vii	Ifaki II	50		0.0	3.0	6.0
viii	Ilogbo	25		0.0	3.0	12.0
ix	Orin/Ora	50		0.0		0.0
x	Osi	53		0.0	2.0	3.8
xi	Usi	42		0.0		0.0
9	**IJERO**	**303**	**1**	**0.3**	**7.0**	**2.3**
i	Ekamarun	6		0.0		0.0
ii	Ekameta	9		0.0		0.0
iii	Ijero I	46		0.0		0.0
iv	Ijero III	16		0.0		0.0

v	Ikoro	37		0.0		0.0
vi	Iloro I	30		0.0	2.0	6.7
vii	Iloro/Ijurin	26		0.0		0.0
viii	Ipoti I	54		0.0	5.0	9.3
ix	Ipoti II	54		0.0		0.0
x	Odo Owa	25	1	4.0		0.0
10	**IKERE**	**550**	**8**	**1.5**	**26.0**	**4.7**
i	Afao/Kajola	55		0.0	4.0	7.3
ii	Agbado Oyo	53		0.0	6.0	11.3
iii	Are/Araromi/Ayetoro	53		0.0	1.0	1.9
iv	Atiba/Aafin	44		0.0		0.0
v	Idemo	22		0.0	1.0	4.5
vi	Ijao/Ilapetu	27		0.0	1.0	3.7
vii	Odose	51	0	0.0	2.0	3.9
viii	Ogbonjana	46		0.0	5.0	10.9
ix	Oke Osun	102		0.0	3.0	2.9
x	Okeruku	36		0.0		0.0
xi	Ugele	61	8	13.1	3.0	4.9
11	**IKOLE**	**527**	**2**	**0.4**	**2.0**	**0.4**
i	Asin	54		0.0		0.0
ii	Ijesa Isu	37		0.0		0.0
iii	Ikole II	51		0.0		0.0
iv	Ikole/Ara	55		0.0		0.0
v	Irele	15		0.0		0.0
vi	Iyemero/Itapaji	16		0.0		0.0
vii	Odo Oro	40		0.0		0.0
viii	Odo/Ayebode	46		0.0		0.0
ix	Odo/Ayedun	55	2	3.6		0.0
x	Oke Ayedun/Esun	50		0.0		0.0
xi	Orin Odo	53		0.0	1.0	1.9
xii	Usin/Isaba	55		0.0	1.0	1.8
12	**ILEJEMEJE**	**546**	**2**	**0.4**	**26.0**	**4.8**
i	Eda Oniyo I	55	1	1.8	3.0	5.5
ii	Eda Oniyo II	55		0.0	1.0	1.8
iii	Ewu	55		0.0	3.0	5.5
iv	Ijesmodu	55		0.0		0.0
v	Ilefon/Iye	55		0.0		0.0
vi	Iludun I	55		0.0	6.0	10.9
vii	Iludun II	51		0.0	5.0	9.8
viii	Ipere	55	1	1.8	3.0	5.5
ix	Isapa	55		0.0	1.0	1.8
x	Oke Iye	55		0.0	4.0	7.3
13	**IREPODUN/IFELODUN**	**396**	**1**	**0.3**	**4.0**	**1.0**
i	Afao	55		0.0		0.0
ii	Are	37		0.0		0.0
iii	Igbemo	35	1	2.9		0.0
iv	Igede I	12		0.0		0.0
v	Igede II	55		0.0		0.0
vi	Igede III	35		0.0		0.0
vii	Iropora/Eyio/Esure	48		0.0	2.0	4.2
viii	Iworoko	53		0.0	2.0	3.8
ix	Iyin I	35		0.0		0.0

x	Iyin II	31		0.0		0.0
14	**ISE/ORUN**	**517**	**18**	**3.5**	**46.0**	**8.9**
i	Erinwa I	51		0.0		0.0
ii	Erinwa II	154	17	11.0	34.0	22.1
iii	Odose I	55	1	1.8	1.0	1.8
iv	Odose II	52		0.0	5.0	9.6
v	Odose III	54		0.0		0.0
vi	Oraye I	55		0.0	4.0	7.3
15	**MOBA**	**420**		**0.0**	**8.0**	**1.9**
i	Erinmope I	55		0.0	8.0	14.5
ii	Erinmope II	27		0.0		0.0
iii	Igogo I	27		0.0		0.0
iv	Igogo II	42		0.0		0.0
v	Ikun I	37		0.0		0.0
vi	Ikun II	33		0.0		0.0
vii	Osan	29		0.0		0.0
viii	Osun	21		0.0		0.0
ix	Otun I	54		0.0		0.0
x	Otun II	40		0.0		0.0
xi	Otun III	55		0.0		0.0
16	**OYE**	**418**	**1**	**0.2**	**13.0**	**3.1**
i	Ayede	19		0.0	3.0	15.8
ii	Ayegbaju	47		0.0	2.0	4.3
iii	Ilupeju I	11		0.0		0.0
iv	Ire I	51	1	2.0	2.0	3.9
v	Ire II	51		0.0		0.0
vi	Isan/Ilafon	50		0.0	2.0	4.0
vii	Itaji	32		0.0	1.0	3.1
viii	Itapa/Osin	37		0.0		0.0
ix	Omu/Ijelu	27		0.0	2.0	7.4
x	Oye I	45		0.0	1.0	2.2
xi	Oye II	48		0.0		0.0
	GRAND TOTAL	**7670**	**58**	**0.8**	**296.0**	**3.9**

Appendix I

Demography and Prevalence by sex

Of all the 7670 participants, 3828 (49.84%) are male and 3847 (50.16%) are female. Similar prevalence level of schistosomiasis was recorded among both male and female participants. Only a slight difference of 0.01 was observed. The prevalences of STH among the male and female participants are almost the same as well. A slight difference of 0.18 was computed.

Table 1: Prevalence of Schistosomiasis by Sex

S/N	LGA	No. of Participants (Positive)	No. of Male (Positive)	No. of Female (Positive)	Prevalence of Schisto among Male	Prevalence of Schisto Among Female	Prevalence of Schisto among the participants
1.	ADO	658 (4)	324 (2)	334 (2)	0.62	0.60	0.61
2.	EFON	416 (0)	199 (0)	217 (0)	0.00	0.00	0.00
3.	EKITI EAST	618 (0)	313 (0)	305 (0)	0.00	0.00	0.00
4.	EKITI SOUTH WEST	556 (0)	250 (0)	306 (0)	0.00	0.00	0.00
5.	EKITI WEST	469 (20)	220 (6)	249 (14)	2.73	5.62	4.26
6.	EMURE	320 (0)	161 (0)	159 (0)	0.00	0.00	0.00
7.	GBONYIN	447 (1)	222 (0)	225 (1)	0.00	0.44	0.22
8.	IDO/OSI	509 (0)	260 (0)	249 (0)	0.00	0.00	0.00
9.	IJERO	303 (1)	169 (1)	134 (0)	0.59	0.00	0.33
10.	IKERE	550 (8)	265 (4)	285 (4)	1.51	1.40	1.45
11.	IKOLE	527 (2)	261 (1)	266 (1)	0.38	0.38	0.38
12.	ILEJEMEJE	546 (2)	258 (0)	288 (2)	0.00	0.70	0.37
13.	IREPODUN/IFELODUN	396 (1)	207 (1)	189 (0)	0.48	0.00	0.25
14	ISE/ORUN	517 (18)	291 (13)	226 (5)	4.47	2.21	3.48
15.	MOBA	420 (0)	213 (0)	207 (0)	0.00	0.00	0.00
16.	OYE	418 (1)	210 (1)	208 (0)	0.48	0.00	2.40
TOTAL		**7670 (58)**	**3823 (29)**	**3847 (29)**	**0.76**	**0.75**	**0.76**

Table 2: Prevalence of STH by Sex

S/N	LGA	No. of Participants (Positive)	No. of Male (Positive)	No. of Female (Positive)	Prevalence of STH among Male	Prevalence of STH Among Female	Prevalence of STH among the participants
1.	ADO	658 (9)	324 (2)	334 (7)	0.62	2.10	1.37
2.	EFON	416 (22)	199 (11)	217 (11)	5.53	5.07	5.29
3.	EKITI EAST	618 (9)	313 (6)	305 (3)	1.92	0.98	1.46
4.	EKITI SOUTH WEST	556 (15)	250 (4)	306 (11)	1.60	3.59	2.70
5.	EKITI WEST	469 (49)	220 (21)	249 (28)	9.55	11.24	10.45
6.	EMURE	320 (1)	161 (0)	159 (1)	0.00	0.63	0.31
7.	GBONYIN	447 (43)	222 (24)	225 (19)	10.81	8.44	9.62
8.	IDO/OSI	509 (16)	260 (8)	249 (8)	3.08	3.21	3.14
9.	IJERO	303 (7)	169 (4)	134 (3)	2.37	2.24	2.31
10.	IKERE	550 (26)	265 (13)	285 (13)	4.91	4.56	4.73
11.	IKOLE	527 (2)	261 (2)	266 (0)	0.77	0.00	0.38
12.	ILEJEMEJE	546 (26)	258 (13)	288 (13)	5.04	4.51	4.76
13.	IREPODUN/IFELODUN	396 (4)	207 (1)	189 (3])	0.48	1.59	1.01
14	ISE/ORUN	517 (46)	291 (26)	226 (20)	8.93	8.85	8.90
15.	MOBA	420 (8)	213 (5)	207 (3)	2.35	1.45	1.90
16.	OYE	418 (13)	210 (11)	208 (2)	5.24	0.96	3.11
TOTAL		**7670 (296)**	**3823 (151)**	**3847 (145)**	**3.95**	**3.77**	**3.86**

References

1. Steinmann P, Keiser J, Bos R, Tanner M, Utzinger J, 2006. Schistosomiasis and water resources development: systematic review, meta-analysis, and estimates of people at risk. Lancet Infect Dis 6: 411–425.
2. Hotez PJ, Yamey G, 2009. The evolving scope of PLoS Neglected Tropical Diseases. PLoS Negl Trop Dis 3: e379.
3. WHO, 2002. Prevention and control of schistosomiasis and soil-transmitted helminthiasis: Report of a WHO expert committee. WHO Technical Report Series No. 912. Geneva: World Health Organization, 1–57.
4. Anderson RM, May RM. Infectious diseases of humans. 1991. Oxford: Oxford University Press.
5. Kabatereine NB, Vennervald BJ, Ouma JH, Kemijumbi J, Butterworth AE, Dunne DW, et al. 1999. Adult resistance to schistosomiasis mansoni: age-dependence to reinfection remains constant in communities with diverse exposure patterns. Parasitology; 118:101–5.
6. WHO, 2006. World Health Organization. Preventive chemotherapy in human helminthiasis: coordinated use of anthelminthic drugs in control interventions: a manual for health professionals and programme managers. Geneva: World Health Organization Press.
7. Tchuem TchuenteÂ L-A, Stothard JR, Rollinson D, Reinhard-Rupp J. 2018. Precision mapping: An innovative tool and way forward to shrink the map, better target interventions, and accelerate toward the elimination of schistosomiasis. PLoS Negl Trop Dis 12(8): e0006563.
8. WHO-AFRO, 2014. Guide for Mapping Neglected Tropical Diseases Targeted by Preventive Chemotherapy in the African Region. World Health Organization-Regional Office for Africa.
9. Tchuem Tchuenté LA, Rollinson D, Stothard JR, Molyneux D. 2017. Moving from control to elimination of schistosomiasis in sub-Saharan Africa: time to change and adapt strategies. Infect Dis Poverty. 6(1):42.
10. World Health Organization. Preventive chemotherapy in human helminthiasis: coordinated use of anthelminthic drugs in control interventions: a manual for health professionals and programme managers. Geneva: World Health Organization Press; 2006.
11. Tchuem Tchuente LA, Rollinson D, Stothard JR, Molyneux D. Moving from control to elimination of schistosomiasis in sub-Saharan Africa: time to change and adapt strategies. Infect Dis Poverty. 2017;6(1):42. pmid:28219412; PubMed Central PMCID: PMCPMC5319063.
12. National Protocol for Integrated Epidemilogogical Mapping and Baseline Survey of Schistosomiasis and Soil Transmitted Helminths. Federal Ministry of Health, Nigeria (2013).
13. Makau-Barasa, L., Assefa, L., Aderogba, M. et al. Performance evaluation of the AiDx multi-diagnostic automated microscope for the detection of schistosomiasis in Abuja, Nigeria. Sci Rep 13, 14833 (2023). https://doi.org/10.1038/s41598-023-42049-6
14. Report on Epidemiologibal Mapping of Schistosomiasis and Soil Transmitted Helminthiasis in 19 states and the FCT, Nigeria. May 2015.

15. Makau-Barasa, L., Assefa, L., Aderogba, M., Bell, D., Solomon, J., Urude, R. O., ... & Agbana, T. (2023). Performance evaluation of the AiDx multi-diagnostic automated microscope for the detection of schistosomiasis in Abuja, Nigeria. Scientific Reports, 13(1), 14833.
16. Onasanya A, Bengtson M, Agbana T, Oladunni O, van Engelen J, Oladepo O, Diehl JC. Towards Inclusive Diagnostics for Neglected Tropical Diseases: User Experience of a New Digital Diagnostic Device in Low-Income Settings. Tropical Medicine and Infectious Disease. 2023; 8(3):176. https://doi.org/10.3390/tropicalmed8030176

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Details

AiDx Medical Bv has unique experience in the development of affordable automated AI-assisted optical detection methodology and its integration into microscopic systems with off-the shelf optical components. We have assembled a team with over 25 years of experience in optical system design, artificial intelligence, software & product design both from industry and the Delft University of Technology.

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