Research

SCHISTOSOMIASIS IN ONDO STATE, NIGERIA: AN EXTENDED RETROSPECTIVE EPIDEMIOLOGICAL ANALYSIS (2020–2025)

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Highlights

- Schistosomiasis remains endemic in several LGAs of Ondo State despite ongoing mass drug administration programmes.
- The disease burden is unevenly distributed, with Ifedore recording the highest prevalence at 27.0%, followed by Akure North at 19.0%.
- Six LGAs recorded zero prevalence during the observed period: Akoko North East, Akoko North West, Akoko South East, Ilaje, Okitipupa, and Ondo West.
- State-wide prevalence is projected to decline gradually from about 7.1% to 5.8% by 2025, if MDA and other control measures are sustained.
- Chemotherapy alone is insufficient for elimination; integrated control strategies such as WASH improvement, snail control, health education, surveillance, and a One Health approach are needed.

Abstract

Schistosomiasis remains a significant public health challenge across sub-Saharan Africa, with Nigeria carrying the highest global disease burden. Ondo State is among the most affected sub-national jurisdictions, particularly in riparian and agricultural communities with frequent freshwater exposure. This study assessed the prevalence, endemicity levels, and disease burden of schistosomiasis across the 18 Local Government Areas (LGAs) of Ondo State from 2020 to 2025, combining retrospective secondary data (2020–2022) with trend-projected estimates (2023–2025) to guide evidence-based public health interventions. Secondary epidemiological data from the Neglected Tropical Disease section of the Ondo State Primary Healthcare Development Agency were analysed using descriptive statistics. Projected trends for 2023–2025 were estimated based on annual reduction rates observed in comparable Nigerian endemic settings, aligned with WHO 2030 elimination benchmarks. Analyses were performed using SPSS version 25.0 and Microsoft Excel. The study was retrospective, with the data revealing considerable heterogeneity in prevalence across LGAs. Ifedore recorded the highest endemicity (27.0%), followed by Akure North (19.0%), while eight LGAs reported zero prevalence. Projected estimates indicate a gradual decline in mean state prevalence from approximately 7.1% to 5.8% by 2025, contingent on sustained mass drug administration (MDA) and improved water, sanitation, and hygiene (WASH) infrastructure. However, Ifedore and Akure North are projected to remain moderately endemic without intensified intervention. Schistosomiasis persists as an endemic concern in Ondo State despite ongoing MDA programmes. The findings highlight the inadequacy of chemotherapy alone, calling for integrated strategies encompassing environmental management, WASH improvement, community health education, and targeted surveillance to achieve WHO 2030 elimination goals.

Keywords: Schistosomiasis, Ondo State, endemicity, epidemiology, mass drug administration, neglected tropical diseases, prevalence trends, praziquantel, WASH

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1.0 Introduction

Schistosomiasis, classified among the neglected tropical diseases (NTDs) by the World Health Organization (WHO), is a waterborne parasitic infection caused by trematode flatworms of the genus *Schistosoma*. The disease is the second most socioeconomically devastating parasitic infection globally and in sub-Saharan Africa after malaria (Adenowo et al., 2015; Pulkkila et al., 2025), generating a substantial burden of morbidity, disability-adjusted life years (DALYs), and economic loss among rural and peri-urban populations (Ekloh et al., 2024). Clinically, the disease manifests as either intestinal or urogenital schistosomiasis, depending on the infecting species. Intestinal forms are primarily attributed to *Schistosoma mansoni*, *S. japonicum*, *S. mekongi*, and *S. intercalatum*, whereas urinary schistosomiasis is caused exclusively by *S. haematobium* (Adekiya et al., 2020). The transmission cycle is mediated through specific freshwater gastropod intermediate hosts: *Bulinus* spp. serve *S. haematobium* and *S. intercalatum*; *Biomphalaria* spp. serve *S. mansoni*; *Oncomelania* spp. support *S. japonicum*; and *Neotricula aperta* is the vector for *S. mekongi* (Joof et al., 2021).

The global burden of schistosomiasis continues to demand urgent attention. According to the WHO, at least 253.7 million people required preventive treatment in 2024, with transmission confirmed in 79 countries (World Health Organization [WHO], 2024). Sub-Saharan Africa bears an estimated 87.92% of the global disease burden in terms of DALYs, and Africa accounts for over 84% of total global case counts (Peng et al., 2025). The Global Burden of Disease Study 2021 recorded approximately 1,746,333 DALYs attributed to schistosomiasis worldwide, with an age-standardised death rate of 0.15 per 100,000 people (Shen & Luo, 2025). Nigeria, with an estimated 20–29 million infected individuals and over 101 million people at risk, carries the highest national schistosomiasis burden globally (Oyeyemi, 2022; WHO, 2024). The disease disproportionately affects school-aged children, women engaged in domestic water activities, and male occupational groups, including farmers and fishermen who have frequent contact with infested freshwater bodies (Immurana & Abdullahi, 2025).

In South-West Nigeria, schistosomiasis prevalence rates range from 44.8% to 71.5% in endemic areas of Osun and Ogun States. The region appears to be among the most affected, as mass drug administration (MDA) in some areas is being hampered by poor implementation owing to non-compliance with WHO treatment guidelines (Oyeyemi, 2020; Oyeyemi et al., 2020).

Ondo State, situated in the tropical rainforest zone of South-West Nigeria and intersected by numerous rivers and irrigation dams, has been consistently identified as an endemic state. Previous epidemiological studies in the state have documented prevalence rates reaching 30.5% at the LGA level, with Ifedore and Akure North LGAs repeatedly reported as high-burden areas (Adeneye et al., 2021). Community-level studies in specific localities such as Irele and Ile-Oluji/Oke Igbo have documented even higher prevalence rates, ranging between 3.0% and 65%, underscoring the extreme heterogeneity of transmission intensity across the state (Oni et al., 2023; Ajakaye, 2024).

Despite years of periodic mass drug administration using praziquantel under the WHO-endorsed preventive chemotherapy model, schistosomiasis transmission in Ondo State has not been interrupted. The WHO NTD Roadmap 2021–2030 calls for the elimination of schistosomiasis as a public health problem in all endemic countries and the interruption of transmission in selected countries by 2030 (WHO, 2024). Achieving these targets requires robust epidemiological surveillance, granular data at the sub-national level, and the integration of WASH infrastructure improvements, environmental management, and community health education alongside chemotherapy. As of 2021, the national coverage rate in Nigeria among children fell below 10% (Ezezika et al., 2025). However, Nigeria's MDA coverage index currently stands at approximately 74%, below the ≥75% threshold modelled as necessary for meaningful burden reduction (Oyeyemi, 2020).

Against this backdrop, this study performs an extended retrospective epidemiological analysis of schistosomiasis prevalence and endemicity across the 18 LGAs of Ondo State, Nigeria. The analysis incorporates observed secondary data from the Ondo State Ministry of Health NTD Centre covering 2020–2022 and projects expected trends through 2025, drawing on established reduction trajectories from comparable Nigerian endemic settings. The study aims to characterise geographic patterns of disease burden, evaluate the effectiveness of ongoing control efforts, and recommend evidence-based, contextually appropriate integrated control strategies.

2.0 Materials and Methods

Study Area

The study was conducted in Ondo State, located in South-West Nigeria between latitudes 5°45′N and 7°52′N, and longitudes 4°20′E and 6°05′E. The state was created in 1976 and has its administrative capital at Akure. It comprises 18 LGAs and is bounded by Edo and Delta States to the east, Ogun and Osun States to the north, and the Atlantic Ocean to the south. Ondo State falls within the tropical rainforest ecological zone, characterised by a bimodal wet season (April–July and September–November) and a dry season (November–March). Mean annual temperatures range from 21°C to 29°C, with relative humidity consistently above 70% (Salau et al., 2016; Daniel, 2017).

The state is drained by an extensive network of rivers, creeks, and lakes, including the Owena, Ala, Oluwa, Oni, Ogbese, and Ose rivers. The Owena River/Dam system in Idanre LGA is particularly significant as a documented habitat for *Bulinus* (*Physopsis*) *globosus* and *Biomphalaria pfeifferi*, the intermediate host snails implicated in schistosomiasis transmission in the region (Adeneye et al., 2021). Livelihoods are dominated by subsistence farming, including cocoa, oil palm, cassava, yam, and maize cultivation, as well as fishing and petty trading. These activities require frequent direct contact with natural freshwater sources, creating persistent exposure pathways for schistosomiasis infection, particularly in rural and peri-rural LGAs (Philip et al., 2025).

Study Design

This study adopted a retrospective descriptive epidemiological design, utilising secondary data from an existing public health surveillance system. The retrospective component analysed confirmed schistosomiasis case data across all 18 LGAs from 2020 to 2022. A trend-projection component extended the analysis to 2025, using linear trend analysis informed by published annual reduction rates documented in comparable Nigerian endemic settings following sustained MDA implementation. This extension provides a provisional longitudinal picture of how the disease burden is evolving in Ondo State under prevailing intervention conditions, in alignment with WHO 2030 targets (WHO, 2024; Dong et al., 2025). However, the use of linear trend projection as a substitute for actual surveillance data is a limitation of this study.

Data Collection

Secondary epidemiological data on schistosomiasis, disaggregated by LGA, were obtained from the Neglected Tropical Disease section of the Ondo State Primary Healthcare Development Agency (SPHCDA), Akure. Data collection followed formal institutional protocols, including a written request to the Permanent Secretary through the NTD Programme Manager, in accordance with applicable research ethics and data access procedures. The dataset covered confirmed cases, population at risk, including school-aged children and adults, and endemicity classifications for the period 2020–2022. For trend projection (2023–2025), annual average reduction rates of approximately 7–10%, consistent with reductions observed in Ondo and comparable states following MDA programmes (Oni et al., 2023; Taiwo et al., 2025), were applied to the 2022 baseline values.

Based on transmission-dynamic models and longitudinal MDA impact assessments from endemic African settings (Gurarie et al., 2015), which show significant initial declines in schistosomiasis prevalence after praziquantel administration but gradually diminishing marginal reductions under sustained annual treatment, a 7–10% annual reduction rate was applied. According to these studies, reinfection dynamics and persistent transmission foci lead to substantially smaller net annualised reductions over time, usually within a single-digit percentage range, even though single-round MDA may reduce prevalence by >50% (French et al., 2010; Gurarie et al., 2015). Although the parameter may overestimate sustained decline in high-transmission riverine communities with suboptimal coverage, it is methodologically appropriate as a conservative approximation, given that Ondo State shares similar climatic suitability, transmission ecology, and intervention structure.

Ethical Considerations

Permission to access NTD programme data was granted by the Ondo State Primary Healthcare Development Agency. No personal or individually identifiable information was accessed; all data were in aggregate, anonymised form at the LGA level. The study was conducted in accordance with the Declaration of Helsinki principles for research involving human subjects. A waiver for access to the NTD programme data was obtained from the Office of the Permanent Secretary, Ondo State Primary Healthcare Development Agency, and was later approved by the NTD Programme Manager.

Data Analysis

All observed data (2020–2022) were analysed using descriptive statistics, including simple percentages, mean, and standard deviation. Endemicity classifications followed WHO conventions: non-endemic (0%), low endemic (>0%–<5%), moderate endemic (5%–<10%), and high endemic (≥10%–20%). Trend projections for 2023–2025 were derived by applying evidence-based annual reduction coefficients to LGA-level 2022 baseline prevalence values. Statistical computations were performed using IBM SPSS Statistics version 25.0 (IBM Corp., Armonk, NY) and Microsoft Excel 2021. LGA-level endemicity was mapped onto the 18-LGA administrative framework of Ondo State for spatial burden characterisation.

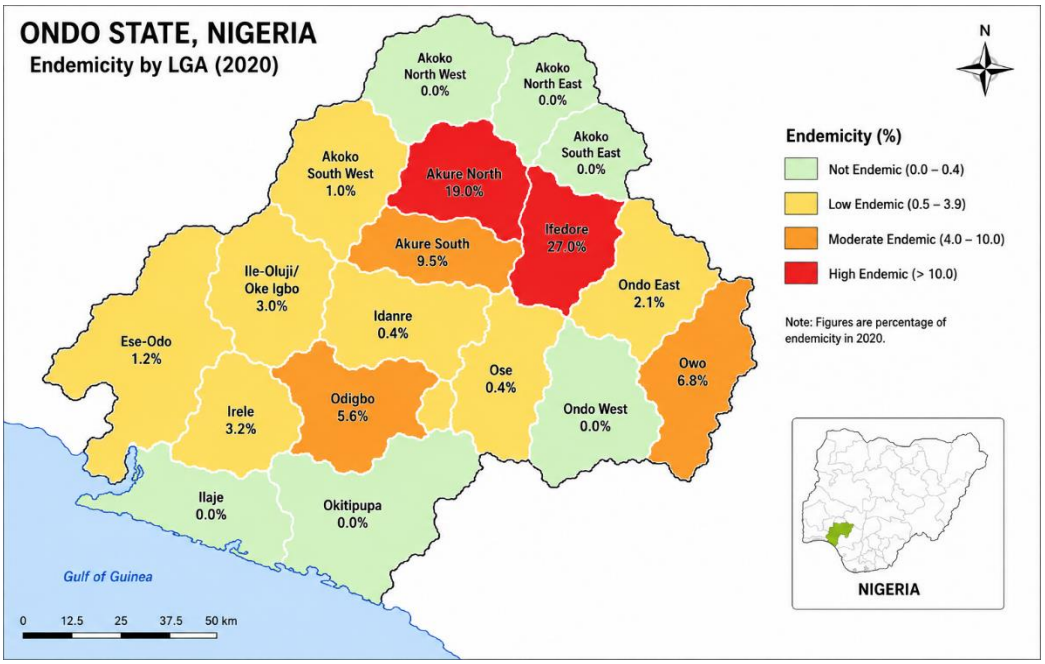

Figure 1: A choropleth map of LGA-level endemicity

3.0 Results

Population at Risk and General Distribution

Across the study period (2020–2025), Akure South LGA recorded the largest population of school-aged children and adults, while Ondo East recorded the lowest. The distribution of schistosomiasis cases was markedly uneven across the 18 LGAs, indicating substantial spatial heterogeneity in transmission risk. This geographical clustering of infection is consistent with the distribution of freshwater bodies and agricultural land use across the state, with the highest burden concentrated in LGAs where river systems, irrigation schemes, and farming activities converge.

Prevalence and Endemicity by LGA (2020–2025)

Table 1 presents the schistosomiasis prevalence rates and endemicity classifications for all 18 LGAs of Ondo State across the extended study period. During the observed period (2020–2022), Ifedore LGA recorded the highest prevalence (27.0%), followed by Akure North (19.0%). Six LGAs, namely Akoko North East, Akoko North West, Akoko South East, Ilaje, Okitipupa, and Ondo West, recorded zero prevalence and were classified as non-endemic.

Projected trends for 2023–2025 indicate a gradual, sustained decline in prevalence across most LGAs, provided that current MDA coverage levels are maintained.

Table 1: Schistosomiasis Prevalence (%) by LGA in Ondo State: Observed Data (2020–2022) and Projected Trends (2023–2025†)

LGA	Endemicity	2020 (%)	2021 (%)	2022 (%)	2023† (%)	2024† (%)	2025† (%)
Akoko North East	Not Endemic	0.0	0.0	0.0	*0.0*	*0.0*	*0.0*
Akoko North West	Not Endemic	0.0	0.0	0.0	*0.0*	*0.0*	*0.0*
Akoko South East	Not Endemic	0.0	0.0	0.0	*0.0*	*0.0*	*0.0*
Akoko South West	Low Endemic	1.0	0.9	0.8	*0.7*	*0.6*	*0.6*
Akure North	High Endemic	19.0	18.4	17.1	*15.8*	*14.2*	*13.0*

Akure South	Moderate Endemic	9.5	9.1	8.3	*7.6*	*7.0*	*6.5*
Ese-Odo	Low Endemic	1.2	1.0	0.9	*0.8*	*0.7*	*0.6*
Idanre	Low Endemic	0.4	0.3	0.3	*0.2*	*0.2*	*0.2*
Ifedore	High Endemic	27.0	26.1	24.7	*22.3*	*20.5*	*18.9*
Ile-Oluji/Oke Igbo	Low Endemic	3.0	2.7	2.4	*2.1*	*1.8*	*1.6*
Ilaje	Not Endemic	0.0	0.0	0.0	*0.0*	*0.0*	*0.0*
Irele	Low Endemic	3.2	2.9	2.6	*2.3*	*2.0*	*1.8*
Odigbo	Moderate Endemic	5.6	5.2	4.9	*4.5*	*4.0*	*3.6*
Okitipupa	Not Endemic	0.0	0.0	0.0	*0.0*	*0.0*	*0.0*
Ondo East	Low Endemic	2.1	1.9	1.7	*1.5*	*1.3*	*1.1*
Ondo West	Not Endemic	0.0	0.0	0.0	*0.0*	*0.0*	*0.0*
Ose	Low Endemic	0.4	0.3	0.3	*0.2*	*0.2*	*0.2*
Owo	Moderate Endemic	6.8	6.3	5.8	*5.2*	*4.7*	*4.3*

† 2023–2025 values represent projected estimates derived from linear trend analysis applied to 2022 baseline data, using annual reduction coefficients of 7–10% consistent with published MDA-driven prevalence reductions in comparable endemic settings in South-West Nigeria (Oni et al., 2023; Taiwo et al., 2025). These projections are provisional and contingent on sustained intervention coverage.

Summary Statistics and Trend Analysis

Table 2 provides a comparative summary of key epidemiological indicators across the observed (2020–2022) and projected (2023–2025) periods. The mean state-wide prevalence is projected to decline from 7.1% to approximately 5.8% by 2025. The number of non-endemic LGAs is expected to increase from 6 to 10, reflecting successful elimination efforts in LGAs previously classified as low endemic with prevalence rates below 1.0%. The number of high-endemic LGAs (≥10% prevalence) is projected to decrease from 2 to 1 by 2025, as Akure North is expected to fall below the 10% threshold while Ifedore remains above it.

Table 2: Summary Epidemiological Statistics: Observed (2020–2022) vs Projected (2023–2025)

Parameter	**2020–2022 (Observed)**	**2023–2025 (Projected)**
Mean State Prevalence	7.1%	*5.8%*
Highest LGA (Ifedore)	27.0%	*18.9%*
Second Highest (Akure North)	19.0%	*13.0%*
Number of Non-endemic LGAs	6 / 18	*10 / 18*
Number of High-Endemic LGAs (≥10%)	2 / 18	*1 / 18*
Standard Deviation	±8.2	*±6.4*

Note: Standard deviations represent variability in LGA-level prevalence rates within each period.

Endemicity Classification and Hotspot Analysis

Based on WHO endemicity thresholds, Ifedore and Akure North LGAs are classified as high-endemic during the observed period and are projected to remain moderately endemic through 2025 in the absence of intensified targeted interventions. Akure South, Odigbo, and Owo LGAs fall within the moderate endemic category (5%–<10%).

Low-endemic LGAs (>0%–<5%), including Ile-Oluji/Oke Igbo (3.0%) and Irele (3.2%), show the clearest evidence of declining trends, suggesting that ongoing MDA programmes are producing measurable impacts in these areas. Six LGAs reported zero prevalence in 2020–2022 and are expected to maintain non-endemic status through 2025.

Notably, Idanre and Ose LGAs recorded marginal prevalence values (0.4%) but were classified as low-endemic due to low-level positive detections in these non-endemic areas. This may reflect residual transmission in pockets proximate to river systems or may represent importation from neighbouring endemic LGAs, and therefore warrants continued passive surveillance.

4.0 Discussion

This study assessed the prevalence, endemicity levels, and disease burden of schistosomiasis across the 18 LGAs of Ondo State, Nigeria, utilising secondary epidemiological data for the period 2020–2022 and extending the analysis through projected trend estimates to 2025. The findings confirm that schistosomiasis remains an active and unevenly distributed public health problem in Ondo State, with significant intra-state heterogeneity in transmission intensity. The spatial patterns observed align broadly with a recently published multi-site mapping study in South-Eastern Nigeria, which similarly documented persistent LGA-level variability in prevalence attributable to farming, fishing, and domestic water contact (Aribodor et al., 2025).

The highest schistosomiasis prevalence observed in this study, 27.0% in Ifedore LGA, closely aligns with the rates reported by Awosolu et al. (2019), who documented 24.0% in the Ikota community of Ifedore LGA, and Kone et al. (2022), who recorded 23.77% in parts of Ondo State. These consistently elevated figures reflect structural features of Ifedore that perpetuate transmission: the LGA is predominantly rural, densely intersected by freshwater bodies, and economically reliant on occupations involving sustained freshwater exposure. Several studies have demonstrated a strong association between frequent water contact for agricultural, domestic, and recreational purposes and sustained schistosomiasis transmission (Otuneme et al., 2019; Anyanti et al., 2021). The Owena River and dam system within the region supports populations of *Bulinus* (*Physopsis*) *globosus*, the principal intermediate host of *S. haematobium* in Ondo State, further reinforcing the environmental favourability for transmission (Adeneye et al., 2021).

The 19.0% prevalence recorded in Akure North LGA in 2020 is consistent with the state being classified as meso-endemic in previous national burden assessments, where Ondo State LGAs have been reported to carry burdens ranging from 10% to 50% (Ayodele et al., 2024). This prevalence exceeded the 17.8% previously reported from Kano State by Dawaki et al. (2016), a difference that may reflect geographical and ecological differences in intermediate host distribution and water-contact behaviour, as well as the relative consistency of MDA coverage across the two settings. The values remain considerably below the 40%–71.5% recorded in hyperendemic communities of Osun and Ogun States in South-West Nigeria (Ojo et al., 2021; Oyeyemi et al., 2020), suggesting that Ondo State occupies a moderate-burden position within the regional epidemiological landscape.

The marked reduction in Ile-Oluji/Oke Igbo LGA, 3.0% in the present study compared with 16.6% previously reported by Ajakaye (2024), and in Irele LGA, 3.2% compared with 65% documented by Oni et al. (2023), represents encouraging evidence of the cumulative impact of praziquantel MDA programmes.

These reductions suggest that sustained and adequately covered MDA, when combined with community awareness initiatives, can produce substantial morbidity reductions over time, even in previously high-burden communities. A similar pattern of praziquantel-driven prevalence reduction has been reported in other Nigerian and sub-Saharan African settings (Taiwo et al., 2025; Makaula et al., 2025).

The six LGAs reporting zero prevalence in 2020–2022, primarily concentrated in the Akoko region and coastal areas such as Ilaje, align with patterns observed by Esiaba et al. (2024), who documented zero prevalence in school pupils in Umunya, Anambra State. In Ondo State, the zero-prevalence findings may reflect a combination of successful elimination through sustained interventions, unfavourable environmental conditions for intermediate host snails in coastal saline and brackish ecosystems, especially in Ilaje, and the inherent limitations of passive surveillance systems in detecting residual low-level transmission. Machine learning-based habitat modelling studies have emphasised that the distribution of schistosomiasis intermediate hosts is highly sensitive to local environmental conditions, including water temperature, salinity, and vegetation cover (Tabo et al., 2024).

The projected trend analysis for 2023–2025 suggests that sustained MDA at current coverage levels could produce a state-wide mean prevalence reduction of approximately 18% over the three-year projection window, with the number of non-endemic LGAs potentially increasing from 6 to 10. However, these projections are predicated on the maintenance of MDA coverage above the 75% threshold and assume no significant disruptions to programme delivery, an assumption that was challenged during the COVID-19 pandemic, which disrupted NTD programmes across Nigeria and globally (Aribodor et al., 2025). Furthermore, the persistent high endemicity projected for Ifedore (18.9% by 2025) indicates that MDA alone is unlikely to achieve elimination in this LGA within the WHO 2030 timeline. Modelling studies have consistently shown that areas with high pre-control endemicity require multi-modal interventions, including snail

control, WASH improvement, and behavioural change communication, to achieve transmission interruption (Dong et al., 2025; Peng et al., 2025).

The chronic health consequences of schistosomiasis extend well beyond the acute infectious episode. Chronic *S. haematobium* infection is associated with haematuria, anaemia, bladder wall pathology, hydronephrosis, and an elevated risk of squamous cell carcinoma of the bladder (Ekloh et al., 2024). Among school-aged children, the infection impairs educational performance, reduces physical fitness, and exacerbates nutritional deficiencies, creating a compounding cycle of socioeconomic disadvantage in already marginalised communities (Immurana & Abdullahi, 2025). These morbidity dimensions are of particular concern in LGAs such as Ifedore and Akure North, where high prevalence implies a substantial burden of chronic organ pathology at the population level.

The findings of this study add to a growing body of evidence from South-West Nigeria supporting a One Health approach to schistosomiasis control. One Health is an integrated analytical and implementation framework that links human schistosomiasis prevalence patterns, especially in school-aged children, environmental determinants of transmission, including water bodies, snail habitats, climate variables, and sanitation/WASH conditions, and relevant animal reservoirs, where applicable, within a single systems perspective. It recognises that transmission occurs at the human–water–environment interface rather than through direct human-to-human spread, and helps to quantify how interactions among these domains influence disease persistence, transmission intensity, and projected control outcomes. In Ondo State, the One Health framework for schistosomiasis integrates human infection data with environmental and ecological determinants to explain transmission dynamics. It links prevalence patterns in school-aged children with freshwater exposure, sanitation status, and local water-use behaviours. Environmental factors such as rainfall, temperature, humidity, and hydrology are incorporated because they influence snail habitat suitability and parasite development. The approach also considers the role of intermediate host snails in maintaining transmission at the human–water interface. By combining these datasets, it enables the identification of spatial hotspots where infection risk is sustained. It further contextualises MDA outcomes by accounting for reinfection driven by environmental exposure.

A situational analysis conducted across the six South-West states identified a range of community-relevant environmental, zoonotic, and sociocultural risk factors that conventional MDA-centred programmes do not address (One Health Development Institute [OHDI], 2023). In particular, the role of animal reservoirs, the quality of praziquantel available in patent medicine shops, and the persistence of water-contact behaviours driven by livelihood necessity rather than ignorance represent critical gaps in the current control architecture. Addressing these gaps will require intersectoral collaboration between the health, agriculture, environment, and education sectors, consistent with the WHO One Health Joint Plan of Action (WHO, 2022).

A key limitation of this study is the reliance on secondary data, which are subject to reporting bias. Variations in diagnostic coverage, reporting completeness, and surveillance infrastructure across LGAs in Ondo State may have resulted in the underreporting of schistosomiasis cases, particularly in hard-to-reach or resource-limited settings. This heterogeneity could lead to spatially biased prevalence estimates, with potential underestimation of the true burden in areas with weaker surveillance systems. Consequently, comparisons between LGAs should be interpreted cautiously, as observed differences may partly reflect variation in reporting efficiency rather than true epidemiological heterogeneity.

The retrospective secondary data relied upon are subject to the limitations of passive surveillance systems, which may underestimate true prevalence in communities with low healthcare-seeking behaviour or limited access to diagnostic services. The projected estimates for 2023–2025, while grounded in published evidence from comparable settings, involve assumptions about intervention continuity and coverage that may not fully reflect actual programmatic realities. Future studies should incorporate primary epidemiological data from community-based surveys, utilising standardised diagnostic techniques, including urine filtration, point-of-care circulating cathodic antigen (POC-CCA) testing, and molecular diagnostics, to obtain more precise and comprehensive burden estimates.

5.0 Conclusion

Schistosomiasis remains endemic across multiple LGAs of Ondo State, Nigeria, with marked geographical heterogeneity in prevalence and disease burden. The observed and projected data (2020–2025) indicate a gradual but meaningful decline in state-wide mean prevalence attributable to ongoing MDA programmes. Nevertheless, high-burden hotspots, particularly Ifedore and Akure North LGAs, are projected to remain moderately endemic through 2025 without intensified targeted interventions, representing an ongoing public health challenge. The persistence of transmission despite years of chemotherapy intervention reinforces the inadequacy of single-strategy approaches and highlights the critical need for integrated control frameworks that combine praziquantel MDA with improved WASH infrastructure, environmental management, snail control, and sustained community health education. A minimum effective coverage of ≥75% of eligible school-aged children through annual praziquantel MDA should be achieved and sustained from 2026 onwards, with progressive expansion towards community-wide treatment in high-transmission

LGAs by 2028. Prevalence in sentinel communities should be reduced to <10% by 2028 and <1% by 2030 through combined MDA, improved water, sanitation and hygiene interventions, and targeted snail habitat control in persistent hotspots. Strengthened surveillance systems should ensure annual LGA-level reporting completeness above 90% by 2027 to reduce spatial data gaps and improve programme responsiveness. Achieving these benchmarks will be essential for transitioning Ondo State from morbidity control towards interruption of transmission in line with WHO elimination targets for 2030. Achieving the WHO 2030 elimination targets in Ondo State and Nigeria more broadly will require political commitment, adequate and sustained funding for NTD programmes, strengthened epidemiological surveillance systems, and a genuine shift towards the integrated multi-sectoral approaches that global evidence increasingly supports. This study provides a disaggregated, LGA-level epidemiological baseline that can inform the design, targeting, and evaluation of future schistosomiasis control and elimination efforts in Ondo State.

6.0 Recommendations

Based on the findings of this study, the following evidence-based recommendations are offered to health authorities, policy-makers, and development partners.

Targeted Intensification of MDA: Health authorities should intensify periodic praziquantel MDA in Ifedore, Akure North, and other moderately endemic LGAs, with particular emphasis on school-aged children and occupational high-risk groups, including farmers and fishermen. Coverage should be monitored to ensure that it consistently meets or exceeds the 75% WHO threshold.

Provision of Safe Potable Water: Federal, state, and local government authorities, in partnership with development organisations, should prioritise the provision of safe pipe-borne water in rural and peri-urban communities currently dependent on rivers, streams, and dams for domestic use. Reducing freshwater contact is among the most effective long-term strategies for interrupting schistosomiasis transmission.

Community Health Education and Behavioural Change Communication: Sustained community-based health education programmes targeting knowledge of schistosomiasis transmission pathways, prevention strategies, and available treatment are essential. These programmes should address documented community myths and misconceptions about the disease (OHDI, 2023) and actively involve community health workers, teachers, and traditional leaders.

Environmental Management and Snail Control: Targeted environmental management interventions, including drainage of stagnant water bodies, vegetation clearance around transmission foci, and biologically based or chemical molluscicidal snail control, should be implemented in high-burden LGAs in conjunction with chemotherapy to address the transmission cycle at the intermediate host level.

Routine School-Based Screening and Surveillance: Systematic annual or biannual screening of schoolchildren in all LGAs should be institutionalised, particularly in high- and moderate-endemic areas, to enable early detection, timely treatment, and accurate assessment of programme impact. Consideration should be given to the adoption of POC-CCA and molecular diagnostic tools to improve diagnostic sensitivity, especially in low-endemic and post-MDA settings.

Adoption of a One Health Integrated Approach: Schistosomiasis control in Ondo State should move towards a One Health framework that addresses the human–animal–environment interface, engages the agricultural and environmental management sectors, and builds on intersectoral data-sharing mechanisms. This approach has demonstrated success in achieving transmission interruption in China and Brazil and is consistent with the WHO's current strategic direction for schistosomiasis elimination.

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Conflict of Interest

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SUPPLEMENTARY DATA

Table 3: Total population of SAC and ADULT based on ward count (2020- 2022) in the 18 LGAs of Ondo State

S/N	LGAs	Total PPtn	SAC PPtn	ADULT PPtn	Ward Count
1	Akure South	635,743	139,743	259,521	11
2	Ondo West	469,353	112,230	208,429	15
3	Ilaje	414,804	114,976	213,528	12
4	Ile Oluji/Okeigbo	362,057	68,393	127,017	10
5	Okitipupa	356,250	92,405	171,610	13
6	Akoko South-West	320,064	90,793	168,612	15
7	Owo	303,246	86,600	160,826	11
8	Odigbo	293,648	91,134	169,249	11
9	Akoko North-West	292,118	84,584	157,084	10
10	Akure North	266,995	52,060	96,683	12
11	Akoko North-East	247,848	69,397	128,881	13
12	Ifedore	242,266	69,762	129,555	10
13	Ese Odo	235,425	61,315	113,870	10
14	Irele	201,501	57,432	106,660	10
15	Idanre	190,239	51,045	94,800	10
16	Akoko South-East	113,625	32,611	60,565	11
17	Ose	104,293	57,327	106,465	12
18	Ondo East	95,620	29,577	54,928	10

***KEYS**: Total PPtn: Total population; SAC PPtn: School age children population; ADULT PPN: Adult population*