Prevalence, Geospatial Distribution and Factors Associated with Urinary Schistosomiasis in Otamokun, Ogo-Oluwa Local Government Area, Oyo State, Nigeria

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Being a PhD Thesis Submitted to the Department of Public Health, Faculty of Basic Medical & Health Sciences, Lead City University, Ibadan, Oyo State, Nigeria

In Partial Fulfilment of the Requirements for the Award of Doctor of Philosophy Degree (PhD) in Public Health

2024

Certification

This is to certify that **Taiwo Mofadeke JAIYEOLA** with Matriculation Number LCU/PG/002000 carried out this research work titled '**Prevalence, Geospatial Distribution and Factors Associated with Urinary Schistosomiasis in Otamokun, Ogo-Oluwa Local Government Area, Oyo State, Nigeria**' in the Department of Public Health, Faculty of Basic Medical and Health Sciences, Lead City University, Ibadan, Oyo State, for the award of **Doctor of Philosophy Degree (PhD) in Public Health (Epidemiology)** and that this has not been previously submitted.

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Dedication

This research is dedicated to God, my late dad and my son that God gave another chance to live.

Acknowledgment

First, my gratitude goes to the Oyo State NTD Coordinator, Mr. Tunji Oladoyinbo, and his team for the baseline information and support provided throughout this work together with all the health officials at the Otamokun Primary Health Centre, Ogo-Oluwa LGA, Oyo State, Nigeria.

I would also like to thank my supervisor, Dr. Adesola Z. Musa for her guidance and support throughout the planning, execution, and writing of this research work. And to my co-supervisor, Dr. Folahanmi.T Akinsolu, for his support, guidance, and direction throughout the PhD journey. I thank the Head of the Department, Dr. Tubosun A. Olowolafe, for taking the time to review and provide valuable feedback on my thesis. To other departmental lecturers: Mr. Olukunmi Akanni, Mrs. Olukemi Akinpelu and Dr. Posi. Aduroja, I thank them for their countless support throughout the journey. I am grateful to Drs. Oluwafemi Popoola and Oluwatosin Adebayo, for providing timely interventions and a critical judgement on the research methods. To Prof. Raphael Oyinloye, I appreciate his numerous critical reviews and valueless guidance throughout the implementation of this research work.

Special thanks to Mrs. Victoria Iwu for assisting with the molecular analysis and Dr. Ademola Adeyemi and Mr. Akintunde Akinfolayan who assisted with the geospatial mapping part of the work. I appreciate Adekunle Adeluwoye's assistance with the lab scientists. My special gratitude goes to Dr. Adewale Sokan-Adeaga for his support throughout the writing of the project. Lastly, thank you to my family for going on this journey with me; to my mother, and sisters, I appreciate their prayers, care and all time support. To my dear husband, for being my biggest cheerleader, and supporting me to the

finish line. Finally, to my older son, I thank him for allowing me and encouraging me with his kind words.

Abstract

Schistosomiasis is the second most devastating parasitic infection causing significant morbidity and mortality worldwide. Nigeria is the world's most endemic country for Urinary Schistosomiasis (USCH) with up to 20 million people requiring treatment yearly partly due to inadequate social amenities including Water, Sanitation, and Hygiene (WASH) facilities. Although Schistosomiasis is targeted for elimination in Nigeria by the World Health Organization in 2030, the current level of USCH endemicity in Otamokun, Ogo-Oluwa Local Government Area (OOLGA), one of the endemic communities in Oyo State is unknown. This study therefore sought to determine the prevalence of USCH and the phylogeny of the *S. haematobium* species in the community as well as the spatial distribution of USCH and factors associated with USCH in Otamokun, OOLGA, Nigeria. A cross-sectional study using systematic sampling with a total population of 321 children-adult-paired individuals was carried out. A semi-structured interviewer-administered questionnaire was designed to collect data including Socio-demographic Characteristics, Water, Sanitation and Hygiene practices and water contact activities of the school-age children (SAC). All questions were scripted on the Kobo Collect app and used for the data collection. Urine samples of SAC aged 5-17 years were collected and assayed for *S. haematobium*. The phylogeny of the positive SH samples was determined using the Neighbor-Joining method. The geospatial coordinates of the households were captured on kobo collect and an open-source GIS software (QGIS 3) was used to generate a map to show the distribution of USCH in the study area. A Checklist was used to assess the household characteristics and hand-washing practices of the respondents. Bivariate and multivariate logistic regression analysis were carried out using SPSS at 5% level of significance. The mean age of SAC and adults respondents were 9.98 ±2.99 and 32.20 ±14.97 years respectively. Less than half (46.4%) of the children and the majority of the adults (69.8%) were females. About 62.8% of respondents obtained water from improved sources and 76.3% used unimproved sanitation. The prevalence of USCH among the SAC was 4.03% (12 out of 298) with more males (2.3%) affected. *S. haematobium* DNA was found in 6 of the 12 urine samples positive for *S. haematobium* after urine microscopy. Three out of the 6 *S. haematobium* isolates were related to hybrid species of *S. haematobium* and *S. bovis* in the gene bank. The distance of respondents' houses to the river was not significantly associated with USCH. Predictors of USCH were: age within 13-16 years (OR: 7.42, 95CI: 1.54-35.80, P = 0.011), male gender (aOR: 7.42, 95CI:1.54-35.8, P= 0.013), bathing/swimming (aOR: 9.86, 95CI: 1.12-86.5, P=0.039), and unavailability of soap for hand washing in the household (aOR: 3.25, 95CI: 1.88-12.05, P = 0.042). Schistosomiasis is prevalent among SAC in Otamokun, OOLGA and factors associated with USCH were age, swimming/bathing, playing in rivers, and unavailability of soap for hand washing in the household. There is therefore an urgent need for strong advocacy and commitment to the

integrated control approach especially the provision of improved sanitation facilities for the community.

Keywords: Urinary Schistosomiasis, *S. haematobium*, Swimming, School-age children
Word Count: 493

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List of Acronyms

Abbreviation	Meaning
BLAST	Basic Local Alignment Search Tool
CAA	Circulating Anodic Antigen Assay
CCA	Circulating Cathodic Antigen Assay
cfDNA	Cell Free Parasite DNA
COVID-19	Coronavirus disease 2019
COX1	Cytochrome Oxidase 1
ddPCR	Droplet digital PCR
DNA	Deoxyribonucleic Acid
ESPEN	Expanded Special Project for Elimination of NTD
FCT	Federal Capital Territory
FGS	Female Genital Schistosomiasis
GPS	Geographic Point System
HIV	Human Immunodeficiency Virus
IDP	Internally Displaced Persons
KK	Kito Katz
LAMP	Loop Mediated Isothermal Amplification
LGA	Local Government Area
MDA	Mass Drug Administration
MGS	Male Genital Schistosomiasis
NCBI	National Centre for Biotechnology Information
NTD	Neglected Tropical Diseases

ODF	Open Defecation Free
POC	Point of Care
PCR	Polymerase Chain Reaction
PZQ	Praziquantel
PC	Preventive Chemotherapy
QGIS	Quantum Geographic Information System
qPCR	Quantitative Polymerase Chain Reaction
RBCs	Red Blood Cells
RPA	Recombinase Polymerase Amplification
RNA	Ribooxynucleic Acid
SAC	School-Age Children
SCC	Squamous Cell Carcinoma
SCH	Schistosomiasis
STH	Soil Transmitted Helminthes
STI	Sexually Transmitted Infections
USCH	Urinary Schistosomiasis
WASH	Water Sanitation and Hygiene
WHA	World Health Assembly
WHO	World Health Organization
ZEST	Zanzibar Elimination of Schistosomiasis Transmission