

**BUSITEMA
UNIVERSITY**
Pursuing Excellence

FACULTY OF HEALTH SCIENCES

DEPARTMENT OF COMMUNITY & PUBLIC HEALTH

RESEARCH DISSERTATION

**RISK FACTORS FOR DRUG RESISTANT TUBERCULOSIS IN
ANKOLE REGION, A CATTLE CORRIDOR IN SOUTH-WESTERN
UGANDA - A MIXED METHODS STUDY**

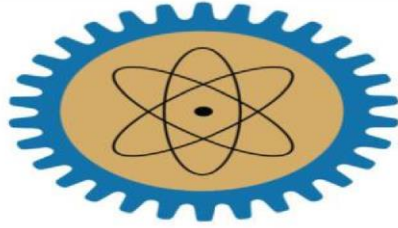
By

MATHIAS NGOBI BOGERE

REG. No.: BU/GS22/IDE/5

**A Final Dissertation Submitted to The Directorate of Graduate Studies,
Research and Innovation in Partial Fulfilment of The Requirement for
The Award of The Degree of Master of Science in Infectious Disease
Field Epidemiology of Busitema University.**

2025



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MATHIAS NGOBI BOGERE

REG. No.: (BU/GS22/IDE/5)

SUPERVISORS

Assoc. Prof. Joseph KB MATOVU

Assoc. Prof. Maxwell OTIM ONAPA

2025

DECLARATION

Candidate's Declaration

I, Mathias Ngobi Bogere, declare that this epidemiological study, titled "Risk Factors for Drug Resistant Tuberculosis in Ankole Region, a cattle corridor in South-Western Uganda- A mixed methods study," is my original work. All aspects of the study, including its design, methodology, data analysis, and conclusions, are authentic and were conducted in accordance with ethical standards and research integrity. I affirm that no part of this study has been plagiarized, and all sources, including literature and data, have been duly acknowledged.

Supervisors' Declaration

We, Assoc. Prof. Joseph KB Matovu and Assoc. Prof. Maxwell Otim Onapa hereby declare that we have thoroughly reviewed and assessed the research dissertation titled "Risk Factors for Drug Resistant Tuberculosis in Ankole Region, a cattle corridor in South-Western Uganda- A mixed methods study " submitted by Mathias Ngobi Bogere in partial fulfillment of the requirements for the award of the Degree of Master of Science in Infectious Disease Field Epidemiology of Busitema University.

Having carefully examined the contents of the dissertation, we attest to the following:

1. **Originality and Significance:** The research demonstrated originality in its approach and addressed a significant research gap within the field. The topic was relevant and held potential for contributing valuable insights into the existing body of knowledge.
2. **Feasibility and Methodology:** The methodology was appropriate for the research objectives outlined. The methods chosen were feasible within the constraints of available resources and time frame. The research design reflected a sound understanding of the subject matter and employed appropriate techniques for data collection and analysis.
3. **Academic Rigor:** The research adhered to academic standards and demonstrated a clear and logical structure. The objectives were clearly articulated, and the literature review provided a comprehensive overview of relevant theories and previous studies, establishing a solid foundation for the research.

4. Ethical Considerations: The research acknowledged and addressed ethical considerations associated with the research, including participant consent, confidentiality, and potential risks. The researcher demonstrated awareness of ethical guidelines and outlined appropriate measures to ensure the welfare of participants and the integrity of the research process.

5. Supervision and Support: As supervisors, we confirm that we provided guidance and support throughout the research process. We were confident in the researcher's ability to conduct the study effectively and to engage in critical analysis and interpretation of findings under our supervision.

Signed: 

Assoc. Prof. Joseph K B Matovu, BSWASA, MHS, PhD (Social & Behavioral Epidemiology)

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Date: 3rd November, 2025

Signed: 

Assoc. Prof. Maxwell Otim Onapa, BVM, MSc, MBA, PhD, Dip Leadership Dev ICT and Knowledge Society, Fellow of UNAS|FUNAS.

Supervisor

Busitema University

Date: 7th November, 2025

APPROVAL

I, Mathias Ngobi Bogere, the principal investigator of this epidemiological study, confirm that prior to carrying out this study, a research proposal was developed, reviewed and submitted to the Research and Ethics Committee (REC) at Mbale Regional Referral Hospital and was approved with a reference number, MRRH-2025-617.

The study adhered to all ethical guidelines and regulations governing human research, and informed consent was obtained from all participants. Any modifications to the study were duly reviewed and approved by the REC. This research was conducted with the utmost commitment to participant confidentiality, privacy, and the ethical principles outlined in the Declaration of Helsinki.

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This dissertation has been submitted for examination with our approval as supervisors.



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Busitema University

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LIST OF ABBREVIATION.

AFRICA	Africa Center for Disease Control and Prevention
CDC	
CDC	United States Centers for Disease Control and Prevention
DR-TB	Drug Resistant Tuberculosis
DS-TB	Drug Sensitive Tuberculosis
EDCTP	European and Developing Countries Clinical Trials
HIV	Human Immunodeficiency Virus
INH	Isoniazid
MDR-TB	Multi-Drug-Resistant Tuberculosis
MSc	Master of Science
MTB	<i>Mycobacterium Tuberculosis</i>
NSP	National Strategic Plan
REC	Research and Ethics Committee
RR	Rifampicin Resistance
TB	Tuberculosis
UAC	Uganda AIDS Commission
UBOS	Uganda Bureau of Statistics
WHO	World Health Organization

OPERATIONAL DEFINITIONS

Operational definitions are crucial for ensuring consistency and clarity in an epidemiological study. Here are operational definitions for key terms used in this study.

Bovine TB	A chronic bacterial disease of animals and humans caused by <i>mycobacterium bovis</i> .
MDR-TB	TB resistant to at least two anti TB drugs
DR-TB	TB resistant to any of the first line TB medicines used to treat drug sensitive TB
Nomadic Pastoralists	Cattle keepers who move from place to place In search of water and pasture for their cattle.
Pastoralists	Cattle keepers who stay in one place
Latent TB Infection	TB infection that does not cause disease at that moment.
Gene-xpert	A WHO recommended a multi-disease real-time PCR platform designed to decentralize and expand access to accurate diagnostics with gold-standard molecular tests at the point of care for rifampicin susceptibility testing.
Truenat	A WHO recommended a multi-disease real-time PCR platform designed to decentralize and expand access to accurate diagnostics with gold-standard molecular tests at the point of care for rifampicin susceptibility testing.
Diagnostic and Treatment Unit	A health unit that diagnoses and treats people with TB.

Cattle Corridor

An area of pastoral rangelands where cattle keeping is carried out on a large scale.

ABSTRACT

Background: Tuberculosis (TB) is one of the world's leading causes of death from a single infectious agent and a major cause of deaths related to drug resistance (DR). Uganda, one of the 30 countries with a high burden of HIV/TB in the world with an estimated 96000 people falling ill with TB annually, has 2 out every 100 people with TB having DR-TB. Ankole region in Southwestern Uganda has consistently been among regions with a high DR-TB burden yet no study has been carried out to understand the risk factors of DR-TB in the region. The study aimed to determine risk factors for DR-TB in Ankole and specifically to identify the individual risks, assess the social and community risks, examine the health system risks and explore the experiences and opinions of people diagnosed with TB.

It was a mixed methods study involving a case-control and a qualitative study targeting people aged 18 years and above, diagnosed with DR-TB and DS-TB, and health workers. Quantitative data was collected using a structured questionnaire and qualitative data was collected through Key informant and In-depth interviews.

Results: Significant independent predictors of DR-TB included previous TB treatment, (aPOR = 2.0, 95% CI: 1.3–3.0, $p = 0.001$), other chronic medical conditions (aPOR = 1.8, 95% CI: 1.2–2.6, $p = 0.001$), Daily alcohol consumption (aPOR = 2.3, 95% CI: 1.7–3.0, $p < 0.001$), low income (aPOR = 1.5, 95% CI: 1.1–2.0, $p = 0.004$). Smoking tobacco was negatively associated with DR-TB (aPOR = 0.2, 95% CI: 0.1–0.8, $p = 0.019$). Qualitative study revealed stigma, lack of transport, inadequate funding of health TB services, inadequate patient monitoring and follow-up, inadequate knowledge about TB treatment by transferred staff and patients and reliance on one staff to offer TB services as being risks.

Conclusions. A combined influence of previous TB treatment, chronic illnesses, daily alcohol consumption, stigma, lack of transport, and health system-level deficiencies contributed to DR-TB. Provision of appointment registers to health facilities, integrated chronic disease management, provision of social protection incentives to all people with TB, increasing the budget for TB and increased staffing are recommended

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