PREVALENCE AND RISK FACTORS OF *BOVINE TUBERCULOSIS* IN CATTLE OF BUTALEJA DISTRICT

BY

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DECLARATION

The content in this research dissertation is my own work and has never been used for submission to any institution for award or assistance of academic credit or qualification.

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APPROVAL

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DEDICATION

I dedicate this research dissertation to my lovely wife Shamimu Namukose for the physical and moral support given to me during my academic career. I also humbly dedicate this research to my employer Butaleja District Local Government for the study motivation they rendered to me.

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ABBREVIATIONS

ANOVA	Analysis of variations
CV	Co-efficiency of variations
bTB	Bovine Tuberculosis
AMR	Anti- Microbial Resistance
BUAC	Busitema University Arapai Campus
GDP	Gross Domestic Product
USD	United States Dollar
WAHIS	World Animal Health Information System
IGRAs	The Interferon-Gamma Release Assays
PCR	Polymerase Chain Reaction
ELISA	Enzyme-Linked Immuno-sorbent Assays
LFA	Lateral Flow Assays
PPD	Purified Protein Derivatives
BCG	Bacillus Calmette-Guérin
CT	Computed Tomography Scans
NADDEC	National Animal Disease Diagnostics and Epidemiology Centre

ABSTRACT

Bovine tuberculosis (bTB) is a highly contagious disease that affects cattle populations worldwide and can also infect other wildlife species. However, the prevalence and factors contributing to its spread are not well understood in Butaleja district. This study aimed to explore the prevalence and risk factors of bTB in cattle in Butaleja district, Uganda.

A cross-sectional research design was used, incorporating both qualitative and quantitative methods. The study was conducted between August and September 2024 across 12 lower local governments in Butaleja district. A total of 180 samples (lung and superficial lymph node tissues) were collected from cattle suspected of having bTB. The samples underwent histopathological examination, and 20 samples showing TB-like lesions were tested using the Ziehl-Neelsen (ZN) stain test. Additionally, a questionnaire was administered to 96 farmers and traders to gather data on socio-demographics, risk factors, and awareness of bTB. Descriptive statistics were used to estimate the prevalence of bTB at slaughter slabs and identify associated risk factors.

The results indicated that 6 out of 180 cattle (3.33%) tested positive for mycobacterium infection. Prevalence varied by age group, with the highest rate (66.67%) observed in cattle aged 2-3 years, and lower rates (16.67%) in those aged 1-2 years and over 5 years. All positive cases were found in male cattle (100%), and only in local breeds (100%), with no disease detected in crossbreeds. Univariate analysis identified several significant risk factors: the wet season (44.44%), direct contact with infected animals (66.66%), intensive farming systems (55.56%), inadequate isolation of infected animals (44.44%), and exposure to respiratory secretions (44.44%).

In conclusion, the study found a 3.33% mycobacterium infection positivity rate in the sample population, with variations in prevalence by age, sex, and breed. Key risk factors included direct contact with infected animals, respiratory secretions, seasonal conditions, and inadequate quarantine measures. The study recommends establishing a national bTB control program, including a surveillance plan with standardized methods and evidence-based interventions tailored for Butaleja and other districts.

CHAPTER ONE: INTRODUCTION

1.1 Background

Bovine tuberculosis (bTB) is a long-lasting infectious disease caused by the bacterium *Mycobacterium bovis*, which impacts a variety of animal species, including cattle (Kapur *et al.,* 2020). The disease presents major economic and public health challenges worldwide, especially in areas where livestock farming is a vital part of people's livelihoods (Kwaghe *et al.,* 2023a). Bovine tuberculosis (bTB) significantly impacts the global livestock industry, affecting trade, public health, and food security (Health, 2019). The disease reduces productivity by lowering milk and meat production, and it also threatens human health as it can be transmitted through zoonotic diseases. These diseases are contracted by close contact with infected animals or by consuming contaminated animal products (Ayele *et al.,* 2004; Oloya *et al*., 2008*;Kapur et al.,* 2020). Due to its potential impact on both human and animal health, as well as the local economy, the prevalence of bovine tuberculosis is a critical subject for research *(Tschopp et al.,* 2022). Bovine tuberculosis is found globally, though no cases have been detected in Antarctica (Pal, 2017) Many developed countries have successfully reduced or eradicated bovine TB from their cattle populations, limiting the disease to specific areas or zones (Crop, 2016). Nevertheless, substantial cases of infection persist in wildlife in countries such as Canada, the United Kingdom, the United States, and New Zealand (Mugambi, 2016).

It is estimated that more than 50 million cattle worldwide are at risk of contracting bovine tuberculosis (*Srinivasan et al.,* 2021). India has been identified as having the highest number of infected herds globally, with an estimated bovine tuberculosis prevalence of 7.3% among farm and dairy cattle (Ramanujam and Palaniyandi, 2023). Although bovine tuberculosis was once widespread, management efforts have significantly reduced or eliminated the disease in livestock populations in many countries (Khairullah, 2024). As per the latest statistics, the following countries are free from bovine tuberculosis: Australia, Sweden, the Czech Republic, Norway, Austria, Switzerland, Luxembourg, Jamaica, Latvia, Slovakia, Iceland, Estonia, Canada, Lithuania, Finland, Barbados, Denmark, and Singapore(Khairullah, 2024). Moreover, initiatives are currently in progress to eradicate bovine tuberculosis in the United States, New Zealand, Japan, and several European countries (*Borham et al.,* 2022). There are considerable regional

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