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Antibiotic stewardship and antimicrobial resistance profiles in livestock farming in South Kivu (DRC)

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Abstract

Antimicrobial resistance in livestock farming is a major challenge for global health. The excessive and inappropriate use of antibiotics in animal production contributes to the development of resistant bacterial strains in animals, which can be transmitted to humans through the food chain or environmental contamination. Based on the One Health approach, this study aims to evaluate antibiotic use practices in cattle farming and their impact on the emergence of antibiotic-resistant organisms.

A descriptive, cross-sectional study was conducted from April 2024 to January 2025 in three territories of South Kivu province, including the Kalehe, Walungu and Kabare territories. The study consisted of 140 farms, for which samples were taken from cattle (128 rectal swabs and 28 milk samples), soil (78 samples) and farmers (134 throat swabs). In all samples, bacterial species were isolated and sensitivity tests were carried out using the diffusion method on antibiotic discs. A survey was conducted interviewing cattle farmers to evaluate their antibiotic use practices.

Results of laboratory testings revealed that 137 bacterial strains were isolated from rectal swab samples, with *Escherichia coli* as the most prevalent species. 21 bacterial strains were isolated from milk samples, including 9 species of *Klebsiella pneumoniae*, followed by 4 species of *E. coli*. A high oropharyngeal carriage rate of *K. pneumoniae* was shown in throat swab of farmers followed by *E. coli*. The *E. coli* strains were also the most isolated from soil samples, followed by *Staphylococcus aureus*. It was observed that certain germs isolated from throat swab and soil samples were multidrug-resistant. A proportion of 2.69% bacterial strains were found to be multidrug-resistant, including one of *Staphylococcus aureus*, *Klebsiella pneumoniae*, *Enterobacter* spp, *Salmonella* spp, and two strains of *Escherichia coli* and *Proteus mirabilis*. Significant levels of resistance were observed to Piperacillin, Cefuroxime, and Amoxicillin-Clavulanic acid. Regarding antibiotic use, 59.3% of farmers used antimicrobials and disinfectants for prophylactically.

To limit the emergence of antibiotic-resistant bacteria and the misuse of antibiotics, mass awareness campaigns and rigorous monitoring of antibiotic use must be implemented in livestock farming. Besides, it important to improve rational use of antibiotic

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