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A Review of Farmer Attitudes and the Persistent Challenge of Newcastle Disease in Smallholder Poultry Systems

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ABSTRACT

Newcastle Disease (ND) remains a primary constraint to smallholder poultry production in sub-Saharan Africa, resulting in cycles of poverty and food insecurity. While effective vaccines exist, their adoption remains inconsistent. Understanding the socio-behavioural factors, particularly farmer attitudes, is critical for bridging the gap between technical knowledge and effective control. This review synthesizes findings from a community-based study in Kashari Sub-County, Uganda, to analyze local poultry farmers' attitudes towards Newcastle disease and its control, situating these findings within the broader literature on disease management in smallholder systems.

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A descriptive, mixed-methods survey was conducted with 24 respondents (21 farmers and 3 local council leaders) using questionnaires and interview guides. Data was analysed using descriptive statistics and thematic analysis. The study reveals a high level of awareness (91.7% combined "very much aware" and "aware") and significant concern (87.5%) about Newcastle disease among farmers. Experienced farmers could identify key clinical signs, with watery stools (25%), lack of appetite (17%), and dragging legs (17%) being most recognized. Despite this awareness, farmers reported recurrent outbreaks, high mortality, and reduced income, indicating a critical disconnect between knowledge and practice. Barriers such as limited access to veterinary services, vaccine cost and distribution challenges, and insufficient extension support were identified as key impediments. Technical knowledge of Newcastle disease among smallholder farmers is necessary but insufficient for sustainable disease control. The findings underscore the imperative for integrated, community-sensitive interventions that move beyond awareness campaigns to address the structural and socio-economic barriers to vaccination uptake. Strengthening extension systems, promoting affordable and thermostable vaccines, and embedding control practices within local livelihood strategies are essential for reducing the burden of Newcastle disease.

Keywords: *Newcastle Disease, Smallholder Poultry, Farmer Attitudes, Vaccination, Disease Control, Uganda, Knowledge-Action Gap.*

INTRODUCTION

Poultry production is a vital component of global food security, providing a scalable source of affordable animal protein and a critical income stream for millions of rural households [1]. In sub-Saharan Africa, over 80% of poultry populations are managed by smallholder farmers who rely on indigenous, free-range chickens for income, food, and socio-cultural functions [2, 3]. Despite its importance, this sector is chronically hampered by infectious diseases, with Newcastle Disease

(ND) standing out as the most devastating viral pathogen [4].Newcastle disease, caused by virulent strains of Avian Avulavirus, can cause mortality rates approaching 100% in unvaccinated flocks, leading to severe economic losses and undermining household resilience [5, 6]. The technical solution to ND control—vaccination—is well-established. Thermo-tolerant vaccines, such as the I-2 strain, have been developed specifically to overcome the cold-chain limitations prevalent in rural areas [7]. However, decades of vaccination efforts have yielded suboptimal results, with ND remaining endemic in many regions, including Uganda [8].

A growing body of evidence suggests that the failure of disease control programs is often not due to a lack of technology, but to a poor understanding of the socio-economic and behavioural contexts in which farmers operate [9, 10]. While epidemiological and economic studies on ND in Uganda are available [11, 12], research focusing on the human dimension—specifically, the attitudes, perceptions, and decision-making processes of local farmers—is scarce. As Rushton [9] argues, the economics of animal health cannot be divorced from the perceptions of those who manage the animals.

This paper reviews the findings of a study conducted in Kashari Sub-County, Mbarara District, Uganda, which sought to investigate this gap. By analysing local farmers' awareness, perceptions, and attitudes towards ND, this review aims to contribute to a more nuanced understanding of why effective control remains elusive. The central thesis is that a profound "knowledge-action gap" exists, where high awareness does not translate into consistent preventive practices, and that closing this gap requires interventions that are as much social and economic as they are technical.

METHODOLOGY

Study design and setting

A descriptive cross-sectional survey, employing a mixed-methods approach, was conducted in Kashari Sub-County, Mbarara District, Uganda. This design was selected to capture both quantitative trends in

farmer awareness and qualitative insights into their perceptions and challenges at a single point in time [13].

Sampling and data collection

A total of 24 respondents were selected, comprising 21 local poultry farmers and 3 local council (LC) leaders. A combination of purposive (for LC leaders) and simple random sampling (for farmers) was used to ensure representation of key perspectives. Data were collected using pre-tested, structured questionnaires for farmers and semi-structured interview guides for key informants. The tools gathered data on demographic characteristics, farming practices, awareness of ND, identification of clinical signs, and perceptions of the disease's impact.

Data analysis

Quantitative data were analysed using descriptive statistics (frequencies and percentages) with results presented in tables. Qualitative data from interviews were analysed thematically to identify recurring patterns and contextual explanations for the quantitative findings.

Ethical considerations

Ethical approval was granted by the Bishop Stuart University Research Ethics Committee. Informed consent was obtained from all participants, and confidentiality was maintained throughout the research process.

Table 1. Respondent profile and sampling technique.

Respondents	Sample Size	Sampling Technique
Farmers	21	Simple Random Sampling
Local Council Leaders	3	Purposive Sampling

Total	**24**

RESULTS AND DISCUSSION

High awareness but variable knowledge

The study found an overwhelmingly high level of awareness of Newcastle disease among respondents. As shown in Table 2, 91.7% of farmers reported being aware or very much aware of the disease. This high level of consciousness is a positive foundation for any disease control program and aligns with findings from other regions where ND is endemic [14].

Table 2. Level of awareness of Newcastle disease among farmers n=24

Awareness Level	Frequency	Percentage
Very Much Aware	12	50.0
Aware	10	41.7
Not Aware	2	8.3
Total	**24**	**100**

However, awareness alone is only a crude metric. A deeper look at the identification of clinical signs (Table 3) reveals a more nuanced picture. While farmers demonstrated practical knowledge, with watery stools (25%), lack of appetite (17%), and dragging legs (17%) being the most frequently identified signs, knowledge of other specific neurological (e.g. twisting neck, 4%) and respiratory (e.g. coughing, 4%) signs was less common. This suggests that while farmers can recognize a sick bird, their ability to specifically diagnose ND, especially in its early or atypical forms, may be limited. This partial knowledge can delay targeted responses and contribute to the rapid spread of the virus.

Table 3. Clinical signs of Newcastle disease identified by farmers (n=24)

Identification Signs	Frequency	Percentage
Watery Stools	6	25
Lack of Appetite	4	17
Dragging Legs	4	17
Reduced Eggs laid	3	13
Gasping	2	8
Dullness	2	8
Coughing	1	4
Raising of Feathers	1	4
Twisting the Neck	1	4
Total	**24**	**100**

Significant Concern and Perceived Severity

Farmer attitudes reflected a deep-seated concern about the impact of ND. A significant majority (87.5%) expressed concern about the disease's effect on their flocks (Table 4), and 45.8% perceived it as "very serious" (Table 5). These attitudes are rational responses to the tangible economic losses experienced. Farmers reported effects including bird death, reduced income, and decreased egg production (Table 6), which are consistent with the documented pathogenesis of virulent ND strains [5, 15].

Table 4. Farmer concern about the impact of Newcastle disease.

Response	Frequency	Percentage
Yes	21	87.5
No	3	12.5
Total	**24**	**100**

Table 5. Perceived seriousness of Newcastle disease.

Perceived Seriousness	Frequency	Percentage
Very Serious	11	45.8
Moderately Serious	8	33.3
Slightly Serious	4	16.7
Not Serious	1	4.2
Total	**24**	**100**

Table 6. Reported effects of Newcastle disease on productivity.

Effects	Frequency	Percentage
Reduced Income	6	25
Death	5	21
Development of Culls	5	21
Reduced Egg Production	4	17
Increased Health Costs	3	13
Abnormal Egg Colour/Albumin	1	4
Total	**24**	**100**

The Knowledge-Action Gap: A Central Challenge

The most critical finding of this review is the stark disconnect between high awareness/concern and effective disease control. Farmers in Kashari Sub-County, despite their experience and knowledge, reported recurring ND outbreaks. This "knowledge-action gap" is a well-documented phenomenon in public and animal health [9, 16]. The barriers are not primarily informational but structural and economic:

- **Access and Cost:** Consistent access to affordable, quality vaccines (like I-2) and reliable vaccination services remains a key challenge [7, 8].
- **Extension Support:** Inconsistent veterinary and extension support leaves farmers without the ongoing guidance needed to implement and maintain control practices.
- **Socio-economic Priorities:** For farmers with small flocks, the perceived cost of vaccination (both financial and in terms of labour) may outweigh the perceived risk, especially if outbreaks are seen as sporadic or inevitable.

The dominance of semi-intensive and free-range systems (71% combined) in the study area further complicates biosecurity and coordinated vaccination, as birds are more difficult to gather and manage routinely.

CONCLUSION AND RECOMMENDATIONS

This review confirms that local poultry farmers in Kashari Sub-County are acutely aware of and concerned about Newcastle disease. They possess a foundational knowledge that is necessary for engagement in control programs. However, this awareness has not been sufficient to catalyse widespread and consistent preventive action, particularly vaccination. The persistence of ND is therefore not a failure of farmer knowledge, but a failure of the system to convert that knowledge into practical, accessible, and economically viable solutions. Technical interventions must be embedded within a broader support framework that addresses the real-world constraints of smallholder farmers.

Based on this synthesis, the following recommendations are proposed:

1. **Go Beyond Awareness Campaigns:** Extension services should shift focus from creating awareness to facilitating action. This includes hands-on training in vaccine handling and administration, and the establishment of community-based vaccinator programs.

2. **Strengthen Vaccine Supply Chains:** Government and development partners should invest in decentralized distribution systems for thermo-tolerant I-2 vaccines to ensure they are consistently available and affordable at the village level.
3. **Integrate ND Control with Livelihood Programs:** Link poultry health to income generation. Support farmer access to high-value markets for eggs and meat, so that investing in flock health has a clear and tangible economic return.
4. **Promote Low-Cost Innovations:** Train farmers in low-cost, improved housing designs that facilitate bird management and provide a first line of defence against disease transmission.

In conclusion, closing the knowledge-action gap for Newcastle disease control requires a paradigm shift from a purely technical approach to a socio-technical one. By aligning control strategies with farmer attitudes, economic realities, and local practices, sustainable reductions in ND prevalence can be achieved, thereby securing the critical role of poultry in rural livelihoods.

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