

Survey on attitude, practice, and antibiotic usage pattern of livestock farmers: Implications of antibiotic resistance

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Received: 17-01-2026, Accepted: 25-02-2026, Published online: 02-03-2026



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HOW TO CITE THIS

Ezejiegu et al. Survey on attitude, practice, and antibiotic usage pattern of livestock farmers: Implications on antibiotic resistance. *Mediterr J Pharm Pharm Sci.* 2026; 6(1): 62-67. [Article number: 242]. <https://doi.org/10.5281/zenodo.18838838>

Keywords: Antibiotic usage pattern, antimicrobial resistance, knowledge, veterinary public health

Abstract: Antimicrobial resistance is compromising the potential of livestock systems. The misuse and abuse of antimicrobial drugs are significant drivers of resistance. This study aims to document knowledge, attitudes, and practices related to antimicrobial use in livestock systems and identify associated livelihood factors. The survey used physical and online validated self-designed questionnaires to collect information on antibiotic usage patterns and awareness among farmers in Nigeria. The study included 130 livestock farmers, comprising 84.6% poultry farmers, 9.2% beef farmers, and 6.2% dairy farmers. Of the participants, 71.5% were males and 28.5% were females. 50.0% of the farmers disagreed that antibiotics can treat all animal diseases, but 98.5% believed that antibiotics can treat infections. Additionally, 96.9% were aware of the side effects associated with antibiotic usage, and 96.2% knew that Antibiotic resistance is the loss of antibiotic function. During the survey, 65.4% of farmers intended to use leftover antibiotics, and 70.0% still unconsciously used antibiotics despite being aware of their public health effects. Furthermore, 58.5% of farmers did not follow evidence-based antibacterial therapy. Out of all the participants, 89.2% took advice from other farmers while choosing antibiotics. The study found that despite a high level of awareness about antibiotic use and resistance, there are significant gaps in behavior and decision-making among farmers that may lead to antibiotic resistance. Farmers still intend to use leftover antibiotics despite awareness of their impact on public health.

Introduction

Livestock production is crucial for food security, economic growth, and public health, especially in developing nations, where it supports income and employment [1, 2]. However, the sector faces challenges, including the need for sustainable intensification to meet demand while minimizing environmental impact [3]. A major concern is the widespread use of antibiotics in livestock farming, initially for disease prevention and growth promotion in cattle, pigs, and poultry. Over time, this has contributed to rising antibiotic resistance [4]. Responsible antibiotic use involves multiple stakeholders, including farmers and veterinarians, with varying perspectives on best practices [5]. In regions like sub-Saharan Africa, small-scale farmers heavily rely on antibiotics due to socioeconomic factors [6, 7]. Their usage is influenced by knowledge, attitudes, disease prevalence, and economic pressures [8-10]. Education, veterinary access, and risk perception shape antibiotic

practices, but awareness does not always lead to responsible use [11-14]. Some farmers see antibiotic resistance as a distant problem, affecting other countries more than their own [11]. Non-veterinary advisors, such as feed dealers and drug sellers, also influence antibiotic use [15]. Contradictions in attitudes and practice persist-some farmers continue traditional antibiotic use despite reduction recommendations [16], while others, especially in low- and middle-income countries, lack adequate knowledge [17]. Conventional dairy farmers may be skeptical about reducing antibiotic use, seeing regulatory pressure as driven by consumer misconceptions fueled by organic product marketing [18]. Research shows that education, experience, and government oversight improve compliance with veterinary guidelines [19]. However, significant knowledge gaps remain, especially in understanding antibiotic resistance and decision-making. Targeted surveys can clarify current practices and inform strategies to promote responsible antibiotic use, mitigating resistance in agriculture.

Materials and methods

Study design: Using a structured, validated, self-designed questionnaire to gather quantitative data on their knowledge, perceptions, and practices, this cross-sectional survey assessed farmers' attitudes toward antibiotic use and antimicrobial resistance (AMR) in poultry, dairy, and beef sectors.

Data collection: Data was collected during visits to farming facilities between January 2024 and March 2024. This was conducted among livestock farmers in Agulu, Anaocha local government area, Anambra state, Nigeria. A total of 300 questionnaires were distributed, with a response rate of 43.3%. To encourage a greater response rate, participants were given the choice of filling out the questionnaire online or as a hard copy document. General information about the participants, including gender, type of farm, education level, and number and type of animals reared, was collected. A questionnaire was developed and administered to farmers through face-to-face interviews and electronic surveys. The questionnaire included closed-ended and Likert-scale questions to capture respondents' attitudes and perceptions regarding antibiotic use, purchasing decisions, awareness of AMR, and support for antibiotic regulations.

Ethical approval/informed consent: Ethical approval was obtained from Chukwuemeka Odimegwu Ojukwu University Teaching Hospital, Amaku, Awka, Anambra, Nigeria (COOUTH, 2025). Participation in the study was voluntary. At an individual level, informed consent was received from each of the participants before sample and data collection.

Data analysis: Data collection in the course of the study was entered into an Excel spreadsheet using Microsoft Office. Simple descriptive statistics were employed to generate frequencies and percentages.

Results

Table 1 summarizes the demographic characteristics of farmers enrolled in the study. The majority of the participants are males (71.5%) and with high and university education (36.2% and 35.4%, respectively).

Awareness: About 50.0% of livestock farmers had a strong disbelieve on the use of antibiotics for the treatment of all animal diseases (**Table 2**). On the use of antibiotics for the treatment of infections, 98.5% believe antibiotics are useful, and 96.9% are aware of the side effects associated with antibiotic usage as well as possible adverse effects. Over 95.0% of respondents are knowledgeable on the meaning of ABR as the loss of clinical function; in addition, they were aware of the increased risk of resistance development with continued misuse and abuse of these medications.

Attitude: 9.1% of participants agreed that there is a relationship between antibiotic use and resistance. Thus, 50.0% of dairy and 32.7% of poultry farmers supported the nation of antibiotic restrictions (**Table 3**). Most of the participants agree for restriction of antibiotic usage are more beneficial, and agreed for that the improper

use of antibiotics and the use of antibacterials without prescription can lead to AMR. Still, the attitude of use of antibiotics in animals has led to resistance, revealed 29.1% negative response from farmers for poultry.

Table 1: Demographic data of the participants

Variables	Frequency (%)
Gender	
Male	93 (71.5%)
Female	37 (28.5%)
Type of farm	
Poultry	110 (84.6%)
Beef	12 (09.2%)
Dairy	08 (06.2%)
Level of Education	
Primary	12 (09.2%)
Secondary	47 (36.2%)
Diploma	25 (19.2%)
University	46 (35.4%)
Number of animals	
1 - 100	80 (61.5%)
101 - 200	34 (26.2%)
201 - 300	09 (06.9%)
301 - 400	03 (02.3%)

Table 2: Assessment of awareness of farmers on antibiotics, their uses, and side effects

Aspects	Variables	True	False
Antibiotics are effective for the treatment of infections- true	Poultry	108 (98.2%)	02 (01.8%)
	Diary	08 (100%)	0 (00.0%)
	Beef	12 (100%)	0 (00.0%)
Antibiotics can treat all diseases in farm animals-false	Poultry	52 (47.3%)	58 (52.7%)
	Diary	03 (37.5%)	05 (62.5%)
	Beef	10 (83.3%)	02 (16.7%)
Antibiotics have side effects-true	Poultry	108 (98.2%)	02 (01.8%)
	Diary	06 (75.0%)	02 (25.0%)
	Beef	12 (100%)	0.0 (0.0%)
ABR is the loss of activity/function of antibiotics-true	Poultry	105(95.5%)	05 (04.5%)
	Diary	08 (100%)	0 (00.0%)
	Beef	12 (100%)	0 (00.0%)
Improper use of antibiotics on the farm can lead to ABR-true	Poultry	105 (95.5%)	05 (04.5%)
	Diary	07 (87.5%)	01 (12.5%)
	Beef	12 (100%)	0 (00.0%)
Using antibiotics without a prescription can lead to ABR-true	Poultry	76 (69.1%)	34 (30.9%)
	Diary	05 (62.5%)	03 (37.5%)
	Beef	08 (66.7%)	04 (33.3%)
Bacteria in animals can become resistant to antibiotics-true	Poultry	78 (70.9%)	32 (29.1%)
	Diary	06 (75.0%)	02 (25.0%)
	Beef	06 (50.0%)	06 (50.0%)

Practice: 65.4% of the farmers make use of leftover antibiotics in the treatment of their livestock. Although 70.0% of the farmers still unconsciously use antibiotics despite being aware of their public health effects, 58.5% of the farmers do not practice evidence-based antibacterial therapy. 1.0% of the farmers increase the dose of antibiotics when faced with resistance instead of consulting a veterinarian. Though 89.2% take advice from other farmers while choosing antibiotics. The sources of antibiotic prescription, indications of antibiotic therapy, and reasons for incomplete therapy were also shown in **Table 4**.

Table 3: Assessment of the attitude of farmers to antibiotics and antibiotic resistance

Parameter	Variables	Agree	Disagree
ABR is not important in public health	Poultry	31 (28.2%)	60 (54.5%)
	Dairy	04 (50.0%)	03 (33.3%)
	Beef	07 (58.3%)	04 (37.5%)
There is a relationship between antibiotic use in animals and the development of resistance	Poultry	98 (89.1%)	11 (10.0%)
	Dairy	06 (75.0%)	0.0 (00.0%)
	Beef	10 (83.3%)	0.0 (00.0%)
Restriction of antibiotic usage in animals will be more beneficial than harmful	Poultry	36 (32.7%)	55 (50.0%)
	Dairy	04 (50.0%)	04 (50.0%)
	Beef	05 (41.7%)	06 (50.0%)
Usage of the same antibiotic for a long time can lead to the development of ABR	Poultry	73 (66.4%)	17 (15.5%)
	Dairy	05 (62.5%)	03 (37.5%)
	Beef	08 (66.7%)	02 (16.7%)
Usage of antibiotics for non-therapeutic reasons can lead to the development of ABR	Poultry	70 (63.6%)	20 (18.2%)
	Dairy	07 (87.5%)	01 (12.5%)
	Beef	8 (66.7%)	01 (8.3%)
Purchasing power affects your choice of antibiotic.	Poultry	104(94.5%)	04 (03.6%)
	Dairy	08 (100%)	0.0 (00.0%)
	Beef	11 (91.7%)	01 (8.3%)
The effectiveness of antibiotics affects your choice of antibiotic.	Poultry	107 (97.3%)	01 (0.9%)
	Dairy	07 (87.3%)	0 (00.0%)
	Beef	09 (75.0%)	02 (16.7%)
Do you think we should get antibiotics with a prescription	Poultry	98 (89.1%)	10 (09.1%)
	Dairy	06 (75.0%)	02 (25.0%)
	Beef	11 (91.7%)	0.0 (00.0%)
Do you think the development of resistance is increasing?	Poultry	59 (53.6%)	26 (23.6%)
	Dairy	04 (50.0%)	01 (12.5%)
	Beef	08 (66.7%)	0 (00.0%)
The usage of antibiotics on the farm should strictly be monitored.	Poultry	87 (79.1%)	09 (08.2%)
	Dairy	07 (87.5%)	0 (00.0%)
	Beef	09 (75.0%)	01 (08.3%)
Using antibiotics to protect animals on the farm against diseases is the most important	Poultry	86 (78.2%)	13 (11.8%)
	Dairy	07 (87.3%)	01 (12.5%)
	Beef	10 (83.3%)	01 (08.3%)

Table 4: Assessment of antibiotic practice by livestock farmers in Nigeria

Variables	Poultry	Beef	Dairy
Sources of antibiotics prescription:			
Physician's prescription	83 (83.0%)	09 (09.0%)	08 (08.0%)
Suggestions from friends or relatives	16 (84.2%)	0 (00.0%)	03 (15.8%)
From previous prescriptions	57 (83.8%)	07 (10.3%)	04 (05.9%)
Pharmacist's suggestion	11 (91.7%)	01 (08.3%)	0.0 (00.0%)
Self-medication	36 (76.6%)	05 (10.6%)	06 (12.8%)
When to administer antibiotics:			
Skin lesions/infections	94 (85.5%)	09 (08.2%)	07 (06.4%)
Wound/fracture	12 (80.0%)	01 (06.7%)	02 (13.3%)
Surgery	0.0 (00.0%)	0 (00.0%)	0 (00.0%)
Cough/cold	10 (83.3%)	01 (08.3%)	01 (08.3%)
Ear infection	05 (62.5%)	01 (12.5%)	02 (25.0%)
Urinary infection	06 (54.5%)	04 (36.4%)	01 (09.1%)
Gastroenteritis	09 (81.8%)	02 (18.2%)	0.0 (00.0%)
Reasons for incomplete medication:			
Animal feels better	33 (91.7%)	01 (02.8%)	02 (5.6%)
Allergic reactions/side effects	09 (60.0%)	03 (20.0%)	03 (20.0%)
Forgetfulness	30 (88.2%)	03 (08.8%)	01 (02.9%)
Usually not adherent	17 (85.0%)	01 (05.0%)	02 (10.0%)

Discussion

This current study assessed farmers' attitudes toward antibiotic use and AMR across poultry, dairy, and beef sectors. A substantial portion of respondents across all categories recognize the link between antibiotic use in animals and the development of resistance, with poultry, dairy, and beef agreeing. A study in India found that while 58.3% of farmers had some awareness of antibiotics, 49.5% understood AMR [20]. Similarly, Ethiopian livestock producers exhibited poor knowledge about AMU and AMR, and while they demonstrated good AMU behavior, it was largely due to practical concerns rather than awareness [21]. Opinions differ on the necessity of restricting antibiotic use, with 32.7% of poultry farmers, 50.0% of dairy farmers, and 41.7% of beef farmers supporting restrictions. This could lead to resistance to policy changes limiting antibiotic availability. However, prescription-based antibiotic access and farm antibiotic use monitoring were widely supported, paralleling findings from a South Korean study, where 86.3% of consumers were willing to pay more for livestock products following prudent antimicrobial use guidelines [22]. This suggests that while most farmers support some level of regulation, they are concerned about its extent, which explains the strong preference for prescription-based access. Awareness of ABR development due to prolonged use and non-therapeutic applications is relatively high, with poultry (66.4% and 63.6%, respectively), dairy (62.5% and 87.5%), and beef (66.7% for both) acknowledging these risks. Interestingly, economic factors play a crucial role in antibiotic selection, as purchasing power strongly influences choices (poultry: 94.5%, dairy: 100%, and beef: 91.7%), emphasizing the economic constraints shaping decisions. Effectiveness is also a primary determinant, particularly among poultry farmers (97.3%). While this study found a relatively higher awareness level, particularly regarding the risks of long-term antibiotic use and non-therapeutic applications, a UK study highlighted that consumer knowledge of antibiotic use in agriculture was low, with 50.0% unsure about AMR risks [23]. Still, awareness of rising resistance is mixed, with 53.6% of poultry farmers recognizing its increase, compared to 66.7% in beef and 50.0% in dairy. A majority of farmers consider using antibiotics for disease prevention essential (poultry: 78.2%, dairy: 87.3%, and beef: 83.3%). This necessitates intensive training of farmers on alternatives to antibiotic prophylaxis, such as improved biosecurity and vaccination.

Conclusion: The current study sample represents specific livestock sectors and may not reflect the attitudes of farmers in different geographic, economic, or regulatory environments. Despite these limitations, the results contribute to a broader understanding of antibiotic use in livestock farming in Nigeria and can inform interventions aimed at reducing antimicrobial resistance.

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Acknowledgements: The authors sincerely appreciate all farmers who responded to the questionnaire, and all who contributed to the success of this survey.

Author's contribution: CKE conceptualized the study and assisted in the interpretation of the survey result as well as manuscript drafting. AIO & BOA coordinated data collection and result interpretation. CO & IBC drafted the manuscript. All authors read and approved the final manuscript.

Conflict of interest: The authors declare the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

Ethical issues: The authors completely observed ethical issues, including plagiarism, informed consent, data fabrication or falsification, and double publication or submission.

Data availability statement: The raw data that support the findings of this article are available from the corresponding author upon reasonable request.

Author declarations: The authors confirm that they have followed all relevant ethical guidelines and obtained any necessary IRB and/or ethics committee approvals.

Generative AI disclosure: No Generative AI was used in the preparation of this manuscript.