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Research Article

Antibiotics use and Resistance Knowledge, Attitude, and Practice Towards Dairy Camel Farmers in Banadir Region, Somalia

Shafii Abdullahi Mohmed, Abdirahman Barre*, Abdinasir Hassan Mohamud, Mohamed Mohamud Gaciye and Faduma Isse Hirsi

Faculty of Agriculture and Veterinary, Department of Veterinary Medicine, Jazeera University, Mogadishu, Somalia.

Corresponding Author: Abdirahman Barre, Faculty of Agriculture and Veterinary, Department of Veterinary Medicine, Jazeera University, Mogadishu, Somalia.

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Abstract

The misuse of antibiotics among camel dairy farmers in the Banadir Region of Somalia poses a significant and escalating public health concern due to the rise of antibiotic resistance. This cross-sectional study assessed the knowledge, attitudes, and practices of 100 respondents from 83 intensive and semi-intensive camel dairy farms in five districts. Despite the indiscriminate use of antibiotics among surveyed farmers, only 30% demonstrated knowledge of antibiotic resistance. The predominantly male composition of camel dairy farm owners and workers limited female participation. Commonly used antibiotics include oxytetracycline, tetracycline, and streptomycin, and (80%) of participants use antibiotics without prescriptions. The study findings highlight commonly used antibiotics against various pathogens (41%) of widely used treated antibiotics against bacterial diseases, (34%) against fungi, and (24%) against parasites. Farmers administer antibiotics for treatment (58%), prevention (23%), and vaccination (19%), often without veterinary assistance (88%), and some consume milk during antibiotic administration (79%) without observing withdrawal periods (81%). The study reveals a critical need for increased knowledge, attitude transformation, and improved antibiotic practices among camel dairy farmers. Further investigations are recommended to comprehensively assess antibiotic use and resistance in dairy camel farming across various regions in Somalia.

Keywords: Antibiotic use, Resistance, Knowledge, Camel Farmers and Somalia.

1. Introduction

The widespread problem of antibiotic resistance has raised alarm bells globally, as it is estimated to cause around 0.7 million fatalities annually. By 2050, the number of antibiotic-resistant bacterial strains is projected to rise to 10 million annually [1]. These strains pose a growing threat to both animal and human health. Antibiotic residues are deposited in milk due to the usage of these drugs in animals raised for food [2]. The extensive and untargeted use of antimicrobials in food animals is a significant factor contributing to the problem of antimicrobial resistance and residue, which has become a pressing issue for both human and animal health in developing countries like Somalia, as well as a matter of growing concern for the general public [3].

Antibiotic resistance is thought to be primarily caused by the use of antibiotics in livestock production worldwide [4]. Antimicrobial usage in food animals, unrestricted and widespread, contributes to the emergence of antimicrobial resistance and residue, which pose pressing public and animal health issues in developing nations [3]. Due to the lack of a withdrawal time when milking treated camels is deemed unsuitable for consumption, the recent increase of camel farming in Somalia is noteworthy in terms of widespread antibiotic usage and resistance [5]. Other reasons include needing more essential knowledge on antimicrobial resistance among livestock keepers, unregulated waste disposal, and self-medication using antimicrobials. AMR is being observed at a time when there has been a diminishing number of novel antimicrobials, risking the rise of untreatable infections and the inevitable loss of life, especially in resource-limited countries with limited treatment options [6].

The deficiency in public health capability is also a concern, particularly considering the evolving resistance mechanisms and the rise of multidrug-resistant bacteria, which necessitate identification through systematic screening in microbiology laboratories that adhere to quality standards [7]. Assessing camel dairy farmers' knowledge, attitudes, and practices (KAP) about the use of antibiotics and resistance is crucial for designing effective control and prevention strategies. These assessments aid in detecting any malpractices and identifying gaps in the farmers' understanding [8]. While antimicrobial resistance (AMR) is widely recognized

as a global issue, its extent must be more adequately comprehended in numerous regions worldwide [9].

2. Methodology

The study focused on camel dairy farms in Banadir, Somalia, specifically in five districts on the outskirts of Mogadishu: Hodan, Dayniile, Yaqshiid, Karan, and Dharkenley. These districts were deliberately chosen due to their significant camel population. Conducted from March to December 2023, the cross-sectional study aimed to assess the knowledge, attitudes, and practices regarding antibiotics and resistance among camel dairy farmers in the Banadir Region. The study utilized a structured and pretested questionnaire, initially prepared in English and later translated into the local language (Somali). The questionnaire was subsequently back-translated to English to ensure accuracy and consistency. The study population comprised 134 participants, 25 owner-farmers, and 109 camel workers. The selection of these districts was driven by the need for more information on Mogadishu's camel dairy farms and the relevance of their animal population to the study's objectives.

2.1. Sampling Procedure

The study utilized a purposive non-probability sampling technique to gather information on the number of camel farms, focusing on the five districts chosen for their significant camel population. Random samples were collected from individuals associated with these farms. The study involved 100 respondents from the target population. The selection of districts and the sampling approach aimed to enhance the validity and reliability of the data, following the methodology advocated by Amin (2012) for a comprehensive understanding of the research problem and minimizing biases.

The study used the Slovene formula to determine the sample size of the actual respondents.

Sloven's $n = N/ (1+N (\propto)^{2})$ where formula states: n = sample size, N= target population; and α=0.05 level of significance

$n = 134/ (1+134 (0.05)^{2})$

n= 134/ (1+134 (0.0025))

n = 134/ (1+0.275)

n = 100

Table 1: Showing Categories of Respondents and Sample Size

District	Target population	owners	Total	Sample size Camel keepers	Owners	Owners
Dharkenley	40	9	49	31	8	39
Hodan	19	5	24	13	4	17
Dayniile	16	4	20	10	4	14
Kaaraan	17	4	21	9	3	12
Yaqshiid	14	6	20	12	6	18
Total	106	28	134	75	25	100

3. Results and Discussion

Table 2: Analysis for Demographic Data

Variable	Responses	Frequency	Per cent	Cumulative Percent
Gender	Male	94	94.0	94.0
	Female	6	6.0	6.0
	Total	100	100.0	
Age	15-20 years	2	2.0	2.0
	21-30 years	17	17.0	17.0
	31-40 years	57	57.0	57.0
	More than 45	24	24.0	24.0
	Total	100	100	
Educational Level	Primary	9	9.0	9.0
	Secondary	9	9.0	9.0
	University	12	12.0	12.0
	Literacy	70	70.1	70.1
	Total	100	100	

Camel farming experience	6 Months	22	22.0	22.0
	1Year	9	9.0	9.0
	2Year	22	22.0	22.0
	3Year	47	47.0	47.0
	Total	100	100.0	
District of origin of respondent	Dharkeenlay	39	39.0	39.0
	Hodan	17	17.0	17.0
	Deynile	14	14.0	14.0
	Karan	12	12.0	12.0
	Yaqshiid	18	18.0	18.0
	Total	100	100	

Table 3: Analysis of Knowledge Data

Table 3A. Do you use antibiotics on your farm?

	Frequency	Percent
Yes	100	100.0

According to the table showed that 100(100%) responds yes

Table 3B. Do you ever hear antibiotic resistance?

	Frequency	Percent
Yes	30	30.0
No	70	70.0
Total	100	100.0

This showed that 30(30.0%) respondents heard, while 70(70.0%) did not hear antibiotic resistance.

Table 4

Antibiotic resistance	Frequency	Percent
Social media	2	7.0
Veterinary doctor	19	63.0
TV and Radio	9	30.0
Total	30	100.0

This Table explains that most of the respondents, 19 (63.0%), said veterinary doctor, 9(30.0%) said TV and radio, and 2(7.0%) said social media; however, this Table shows that most respondents said it is a veterinary doctor.

Table 5

Microbes Treatment Uses for Antibiotics	Frequency	Percent
Parasites	24	24.0
Bacteria	41	41.0
Virus	1	1.0
Fungi	34	34.0
Total	100	100.0

According to the table 4.2.4 showed that 24(24.0%) responds parasites, 41(41.0%) responds Bacteria, 1(1.0%) responds virus, 34(34.0%) responds fungi.

Table 6

Regularly use For antibiotic	Frequency	Percent
Penicillin	15	15.0
Streptomycin	17	17.0
Tetracycline	22	22.0
Ox tetracycline	33	33.0
Enrofloxacin	13	13.0
Total	100	100.0

According to the table 4.2.5 showed that 15(15.0%) responds penicillin, 17(17.0%) responds streptomycin, 22(22.0%) responds tetracycline, 33(33.0%) responds oxtetracycline, 13(13.0%) responds enrpfloxacine.

Table 7

Reasons use antibiotics	Frequency	Percent
Prophylactics	23	23.0
Vaccinations	19	19.0
Therapeutics	58	58.0
Total	100	100.0

According to the table showed that 23(23.0%) responds Prophylactics,19(19.0%) responds Vaccinations,58(58.0%) responds Therapeutics

Table 8: Analysis of Attitude Data

Misuse for antibiotic	Frequency	Percent
Yes	18	18.0
No	82	82.0
Total	100	100.0

According to the result shows that 18(18.0%) responds Yes 82(82.0%) responds No.

Table 9

overdose affects antibiotic	Frequency	Percent
Yes	13	13.0
No	87	87.0
Total	100	100.0

According to the Table 4.3.2 shows 13(13%) responds Yes, 87(87.0%) responds No.

Table 10

withdrawal periods for antibiotics	Frequency	Percent
Yes	18	18.0
No	82	82.0
Total	100	100.0

According to shows 18(18.0%) responds Yes, 82(82.0%) responds No

Table 11

Antibiotics reduce resistance	Frequency	Percent
Yes	20	20.0
No	80	80.0
Total	100	100.0

According to the result shows 20(20.0%) responds Yes, 80(80.0%) responds No.

Table 12: Practice Data

administer antibiotics Uses	Frequency	Percent
Yes	79	79.0
No	21	21.0
Total	100	100.0

According to the result shows 79(79.0%) responds Yes, 21(21.0%) responds no.

4. Discussion

One hundred respondents were interviewed using a semi-structured questionnaire in the current study. All camel dairy farmers from 83 intensive and semi-intensive camel dairy farms in five districts of the Benadir Region used antibiotics. Understanding holds a crucial significance in the context of antibiotic use and resistance. Our survey demonstrated that 70% of farmers lack literacy, contrasting with the findings in a study conducted in Turkey [10]. Farmers who completed their primary schooling exhibited limited Knowledge, Attitude, and Practice (KAP) responses regarding the use of antibiotics and resistance [11]. Numerous researchers propose fostering understanding and awareness regarding antibiotics and antibiotic resistance, which is crucial for judicious use [12]. In less-educated populations like Somali camel farmers, knowledge is anticipated to be primarily gained through hands-on experience in camel dairy farms, as indicated by a study conducted by [13].

Our study indicates that a limited proportion of our participants, amounting to 30%, have been informed about antibiotic resistance through various channels. This result aligns with the 30% reported in Khartoum State by [14]. Camel dairy farmers commonly use antibiotics such as ox tetracycline, tetracycline, and streptomycin. This pattern closely resembles the discoveries of in South Western Nigeria, where gentamicin and tetracycline were prevalent in antibiotic usage [15]. During our investigation, camel dairy farmers commonly employ ox tetracycline, tetracycline, and streptomycin as frequently utilized antibiotics. Consequently, the residues of these antibiotics in dairy products are transmitted to consumers through ingestion. Similar to the studym [16]. Consuming milk contaminated with antimicrobials poses potential risks, including teratogenic effects, diminished reproductive performance, allergies, acute toxicity, carcinogenicity, and the emergence of antimicrobial-resistant (AMR) bacteria, thereby increasing the risk of AMR development [17].

Antibiotics may be utilized in animal farming for both therapeutic and non-therapeutic objectives [18, 19]. In this survey, farmers employed various antibiotics for disease treatment (58%), prevention (23%), and vaccination (19%). These findings match a prior study investigating the use of antimicrobial drugs for treatment and prevention in farms within Ghanaian communities [18]. Furthermore, the research indicated that 82% of farmers lack awareness regarding antibiotic misuse and resistance, echoing similar findings reported in previous studies [20]. Our study also demonstrates that (80%) of participants administer antibiotics without a prescription, which surpasses the findings of a previous study where slightly more than half of the farmers (54.2%) believed that antibiotics should only be prescribed by veterinarians [21]. This result contradicts the outcomes of our current study.

Additionally, the study indicates that only (13%) of farmers store their drugs in refrigerators, a figure lower than reported in some studies on poultry farmers in Bangladesh but higher than in Nigeria [22, 23]. Furthermore, our investigation reveals that most farmers prefer self-administration over seeking veterinary assistance; notably, (88%) of camel dairy farmers make decisions independently when administering antibiotics. These findings are similar to the conclusions from other studies [24].

5. Conclusion

The study found that only 30% of camel dairy farmers know antibiotic resistance. Commonly used antibiotics, including oxytetracycline, tetracycline, and streptomycin, pose a risk of residues in dairy products, with potential health consequences for consumers.

The predominantly male composition of camel dairy farm owners and workers is noted, reflecting a gender disparity in the profession. Alarmingly, 82% of farmers lack awareness of antibiotic misuse and resistance, while 79% consume milk on camels during antibiotic administration. These findings underscore the need for targeted education and interventions to address knowledge gaps and mitigate potential health risks associated with antibiotic use in camel dairy farming.

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