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# Availability and Rational Use of Veterinary Drugs Among Sheep (*Ovis Aries*) Producers in Lesotho

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## ABSTRACT

The rationality in the use of veterinary drugs among sheep farmers has been a concern, particularly in remote areas of Lesotho. In this light, a descriptive survey was conducted where a cross-sectional design was employed to collect the data on the availability and rational use of veterinary drugs from a total of 102 sheep farmers. SPSS (Version 20.00) was used for data analysis, where the crosstabs within descriptive statistics were used to determine percentages while the significance was tested using both the Chi-square test and Fisher's exact test. Sheep farming in the study area is mostly dominated by adult men who are mostly married and have attained primary school leaving certificates, as reflected by 51.9% and 48.7% in rural and peri-urban villages, respectively. The use of commercial drugs for the control of diseases surpasses the use of medicinal plants, as demonstrated by 95.8% and 86.8% of responses in the rural and peri-urban villages, respectively. Moreover, the greater proportion of sheep farmers (83.3% and 89.1% in the rural and peri-urban, respectively) have not been trained on the use of veterinary drugs; however, it was observed that most of them diagnose and treat their animals on their own. The availability of veterinary services among sheep farming communities is very poor and mostly, farmers rely on farm feeds and hawkers as sources of drugs. The common method for dosage measurement is by guessing the animal's body weight. Most farmers are not aware of the withdrawal period following animal treatment as reflected by 78.2% and 63.8% of farmers in rural and peri-urban villages, respectively. Veterinary drugs are mostly stored at room temperature. In conclusion, the availability of veterinary drugs among farming communities is very poor and drugs are mostly irrationally used.

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## INTRODUCTION

Sheep farming in Lesotho is one of the farming endeavors that has gained momentum in recent years and contributed vastly to rural development in various ways, including income generation through the sale of wool. Despite the unfolding significance of the sheep industry in the country, its production and reproduction efficiency have been hampered by various constraints, including disease outbreaks. These diseases, in severe cases, often lead to increased mortality of sheep, particularly lambs and this is validated by **Mahlehla *et al.*, (2021).** As the result of emerging diseases, veterinary drugs have been used intensively for the control and treatment of such diseases. In the light of the given situation, the main concern has been the rational use as well as the availability of drugs of standard quality among farming communities.

**The World Health Organization (WHO) (2011)** confirmed the irrational use and scarcity of drugs of standard quality in developing countries. According to **Alebign and Hundesa, (2022)**, drug accessibility consists mainly of availability, affordability and rational use. **Isse *et al.*, (2017)** in Somalia reiterated that veterinary drugs can be used either rationally or irrationally as therapeutic, prophylactic, and growth promotion. Given the context of Lesotho, the study of **Mahlehla *et al.*, (2021)** confirmed that farming is mostly dominated by illiterate people and this provides convincing evidence that veterinary drugs are likely to be irrationally used by farmers. According to **WHO (2011)** irrational use of drugs is defined as "the prescription of too many medicines per patient, injections where oral formulations would be more appropriate, the prescription of antimicrobials in inadequate doses or duration, the prescription of antibiotics for non-bacterial infections, prescriptions that do not follow clinical guidelines, and self-medication inappropriately or lack of compliance".

**Beyene *et al.*, (2015)** noted that the irrational use of drugs becomes even more detrimental to human health when used on food-producing animals because there are likely possibilities that some quantities of drugs and their residues may remain in edible tissues or in animal products (meat, milk, eggs, honey) (Santer, 2007). In order to mitigate this risk, Beyene *et al*., (2015) indicated that it is crucial that drugs are used rationally by strictly using them only when they are really indicated, in the right way, at the right time, in the right dose, and respecting withdrawal period.

An extensive use of veterinary drugs by sheep producers in Lesotho is evident; however, studies to assess and evaluate the rationality of veterinary drug use are lacking in the country. The current study was undertaken to assess the availability of drugs of standard quality and to evaluate the rational veterinary drug use among sheep producers.

## MATERIALS AND METHODS

### Description of the study side

The study was conducted in Roma valley which is found in the foothills of Maseru District. The foothills are distinguished as the area between the lowlands and highlands that occupies about 4,600 $km^2$ representing 15% of the total area **(Makoloi, 2021).** According to **Maro, (2011)** this region lies between 1,800m and 2,000m above sea level.

### Study design and sampling

A descriptive survey was conducted where a cross-sectional design was employed to collect the data on the availability and rational use of veterinary drugs among sheep producers. The snowball sampling technique was used to collect the data and a total of 102 sheep farmers were successfully interviewed. Villages were accordingly categorized into either rural or peri-urban. According to **Andreasen *et al*., (2017)** the peri-urban is mainly distinguished as a hybrid transitional zone, combining urban and rural conditions. Rural areas on the other hand are characterized by typical living conditions, life styles, and cultural patterns **(Anton, 2007).**

### Data collection

The data was collected from January to March 2023 using structured questionnaire with close-ended questions. Sections of the questionnaire included: (i) demographic characteristics of farmers, (ii) use of drugs in farms (traditional or commercial, drug source and drug administration personnel), (iv) availability of drugs and handling of drugs (care for withdrawal, dosage measurement, means used to distinguish between drugs and drug storage and availability of veterinary services within farming communities).

### Data analysis

Statistical Package for Social Sciences (SPSS, 16.00) was used for data analysis. The cross tabs within the descriptive statistics were used to determine percentages. The association between regions and different parameters was tested using both the chi-square ($x^2$) test of independence and Fisher's exact test. In all analysis significance was tested at 0.05%.

## RESULTS

### Socio-demographic characteristics of farmers

The results in **Table 1** show that sheep farming in the study area is predominately undertaken by adult people (>50 years), as reflected by 56.4% and 48.9% of respondents in rural and peri-urban areas, respectively. The results further revealed a non-significant association between region and the age of the farmer (df = 2, X2 = 1.0, and *P* =.*60)*. In terms of gender, it was discovered that few females are involved in sheep farming, as the majority of the respondents (78.2% and 89.4% in rural and peri-urban areas, respectively) were males. The results further disclosed a non-significant association between region and gender of the farmer (df = 1, $X^2$= 2.28, *P* =.13). It was found that the majority of the respondents were married men and women, as reflected by 70.9% and 70.2% in rural and peri-urban, respectively. There was an insignificant association at the 5% significance level between region and marital status (df = 2, $X^2$= 0.54, *P* =.76).

Illiteracy exists among sheep farmers in the study area, as some of the respondents in the rural (25.9%) and peri-urban (21.7%) areas did not get formal education; however, in general, most of the respondents had primary as their highest level of education across the two regions. The results, however, confirmed an insignificant association between region and highest level of education (df = 3, $X^2$= 5.1, *P* =.16). Moreover, it was discovered that trainings are very rare in the study area, as most of the respondents, 85.5% and 83.0% in rural and peri-urban areas, respectively, reported that they had not attended any trainings before. Furthermore, results from **Table 1** also show that the majority of the respondents—65.5% and 53.3%—in the rural and peri-urban areas, respectively, keep sheep for commercial purposes.

Table 1: Socio-demographic characteristics of farmers

| Parameter | category | Rural (%) | Peri-urban (%) | $X^2$ | P-value |
|---|---|---|---|---|---|
| Age | <30 | 9.1 | 14.2 | 1.00 | 0.60 |
| | 31-50 | 34.5 | 36.2 | | |
| | >50 | 56.4 | 48.9 | | |
| Gender | Male | 78.2 | 89.4 | 2.28 | 0.13 |
| | Female | 21.8 | 10.6 | | |
| Marital status | Single | 29.1 | 29.8 | 0.54 | 0.76 |
| | Married | 70.9 | 70.2 | | |
| Level of education | None | 25.9 | 21.7 | 5.10 | 0.16 |
| | Primary | 51.9 | 48.7 | | |
| | Secondary | 22.2 | 23.9 | | |
| | Tertiary | 0.0 | 8.7 | | |
| Trainings | Yes | 14.5 | 17.0 | 0.12 | 0.73 |
| | No | 85.5 | 83.0 | | |
| Type of farming | Communal | 34.5 | 46.8 | 1.58 | 0.20 |
| | Commercial | 65.5 | 53.2 | | |

$X^2$= chi-square

## Methods of disease control

The results shown in **Fig.1** confirm that the use of medicinal plants as a method of disease control is very rare across the regions, as it was found that the majority of the respondents, 95.8% and 86.8% in the rural and peri-urban, respectively, used commercial drugs. There was a significant association at the 5% significance level between region and methods of disease control (df = 2, $X^2$= 2, *P* =.02).

## Training on the use of veterinary drugs

**Fig. 2** shows that trainings on the use of veterinary drugs among sheep farmers is rare as the majority of the respondents 83.3% and 89.1% in the rural and peri-urban areas respectively did not attended any training. A non-significant association was observed between region and trainings (df= 1, $X^2$= 0.69, *P*=0.40).

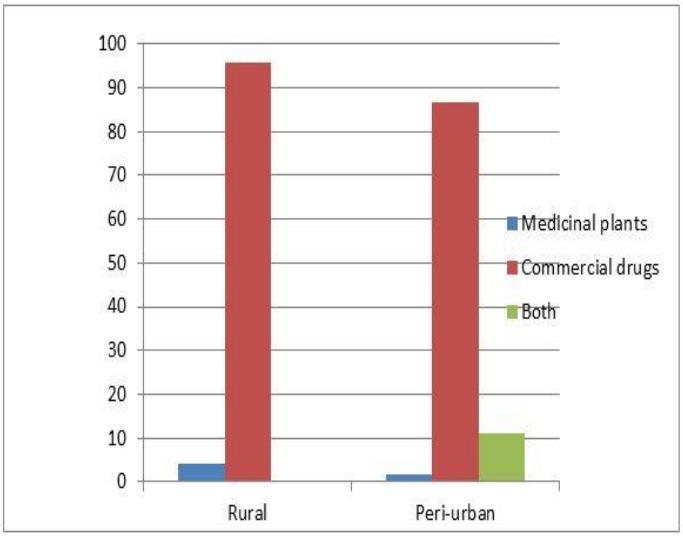


**Fig. 1:** Methods of disease control by sheep farmers in rural and peri-urban areas of Lesotho

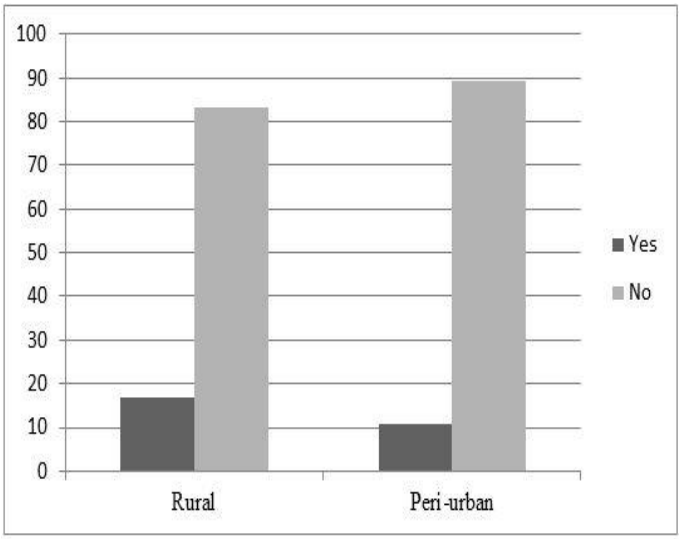


**Fig. 2:** Level of training of sheep farmers in rural and peri-urban areas of Lesotho

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## Disease diagnosis and treatment

The results presented in **Fig. 3** shows the scarcity of technical support among farmers as the greater proportion of respondents 72.2% and 87.2% in the rural and peri-urban areas respectively reported that disease diagnoses and treatment is mostly done by farmers. The results revealed a significant association at 5% significance level between region and who helps with disease diagnosis (df= 3, $X^2$= 11.6, *P*= 0.00).

## Availability of Veterinary services in communities

The results in **Fig. 4** confirm the scarcity of veterinary services among sheep farmers as the majority of the respondents 89.1% and 97.8 in the rural and peri-urban respectively rated the availability of veterinary services as poor. A non-significant association was observed between region and availability of veterinary services (df= 1, $X^2$= 2.8, P= 0.12).

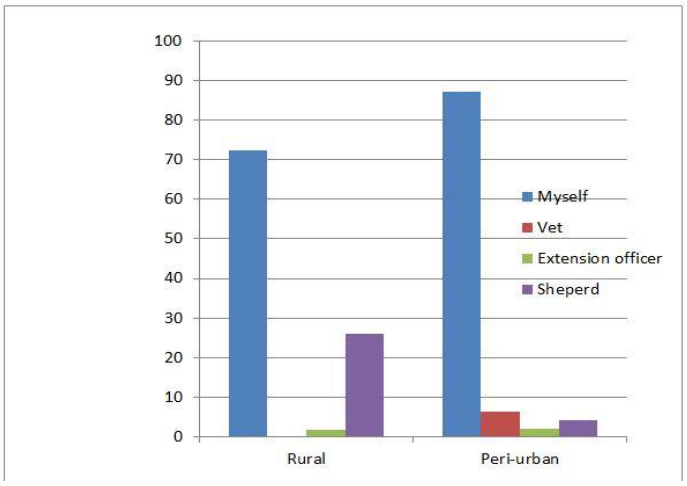


**Fig. 3:** Disease diagnosis and treatment by sheep farmers in rural and peri-urban areas in Lesotho

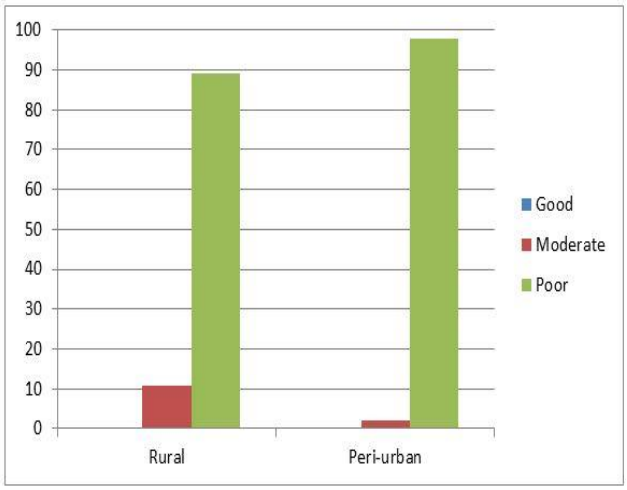


**Fig. 4:** Availability of veterinary services to sheep farmers in rural and peri-urban areas Lesotho

## Main supplier of drugs

The current findings have disclosed that the common source of drug supply among sheep farmers is farms feeds as reflected by 44.4% and 65.8% in rural and peri-urban areas respectively **(Fig.5).** The results confirmed a significant association between region and source of drug supply (df= 3, $X^2$= 10.6, *P*= 0.01).

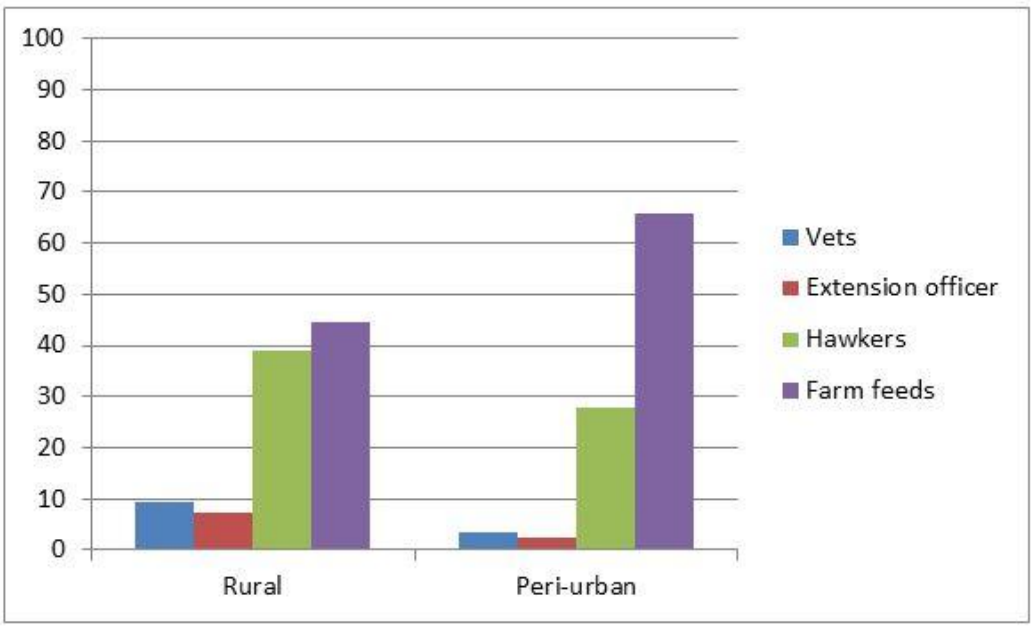


**Fig.5:** Main drug suppliers for sheep farmers in Lesotho

## Drug handling practices

**Table 2** summarizes the drug handling practices of sheep farmers in Lesotho. It was observed that the majority of sheep farmers, 76.4% and 68.1% in rural and peri-urban areas, respectively, differentiated drugs by identifying animal pictures on the sticker of the bottle, and this significantly varied between different regions (df = 2, $X^2$= 14.36, $P$ = 0.00). In terms of measuring dosage rate, it was discovered that the majority of the farmers, 64.7% and 49.9% in rural and peri-urban areas, respectively, guess the body weight of the animal to measure the quantity of drug to be administered. The means of measuring dosage rate varied significantly between different regions (df = 3, $X^2$= 16.69, $P$ = 0.00). The majority of respondents in this study store their drugs under room temperature, as reflected by 78.8% and 70.3% in the rural and peri-urban areas, respectively. Moreover, it was observed that most respondents were not aware of the withdrawal period after the use of drugs on their animals, as reflected by 78.2% and 63.8% of farmers in rural and peri-urban areas, respectively. A non-significant association was observed between region and withdrawal period (df= 2, $X^2$= 2.56, $P$ = 0.10).

Table 2: Drug handling practices

| Parameter | Category | Rural (%) | Peri-urban (%) | $X^2$ | *P*-value |
|---|---|---|---|---|---|
| How to differentiate between drugs | Ask Vet | 0.0 | 21.3 | 14.36 | 0.00 |
| | Identify animal picture | 76.4 | 68.1 | | |
| | Read names | 23.6 | 10.66 | | |
| How is dosage measured | Guessing the body weight | 64.7 | 49.9 | 16.69 | 0.00 |
| | Based on age | 14.7 | 12.5 | | |
| | Body size | 2.9 | 18.8 | | |
| | Sickness condition | 17.6 | 12.5 | | |
| Storage of drugs | Room temperature | 78.8 | 70.3 | 0.85 | 0.60 |
| | Refrigerated | 17.3 | 24.3 | | |
| | As prescribed | 3.8 | 5.4 | | |
| Care for withdrawal | Yes | 21.8 | 36.2 | 2.56 | 0.10 |
| | No | 78.2 | 63.8 | | |

$X^2$= chi-square

## DISCUSSION

The results of the current study, which showed that sheep farming is predominately done by adult people, are in accordance with those of **Molotsi *et al.*, (2019)** in Western Cape, South Africa, who revealed that 51% of the farmers were found within the ages of 41–60 years. One possible reason for the obtained results is that younger people have migrated to South Africa looking for better job opportunities. The dominance of men in sheep farming has also been reported by **Chanamuto and Hall (2015)** who articulated that the role of women in livestock management has been neglected, and consequently, this has made them to be partly excluded from livestock projects.

Sheep farming in the study area is mainly dominated by married people, and these results are in line with **Taruvinga *et al.*, (2022)** from OR Tambo District SA, who reiterated that married households' heads are more likely to own pigs and goats than single-headed households. This can possibly be due to progressively escalating rates of unemployment in the country, which compel most of the married me to opt for livestock production for their livelihood given their huge responsibilities to take care of their families.

In terms of education, there were a small proportion of farmers who never had formal education at all. According to **Mthi and Nyangiwe (2018)** education is an advantage to expose farmers to new and more advanced management and production programs. The study conducted in Lesotho by **Makhetha and Motlomelo (2004)** indicated that some boys are not able to go to school for several reasons, including taking care of animals at home, being orphans, having unemployed parents and poverty.

The obtained results confirm that livestock trainings among sheep farmers are very rare. One possible reason for the lack of training of farmers may be the fact that pursuing formal training in sheep may

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be costly; hence, many become reluctant to regularly attend or financially invest in training programs or workshops.

Majority of respondents in this study store their drugs under room temperature, as reflected by 78.8% and 70.3% in the rural and peri-urban areas, respectively. Moreover, it was observed that most respondents were not aware of the withdrawal period after the use of drugs on their animals, as reflected by 78.2% and 63.8% of farmers in rural and peri-urban areas, respectively. A non-significant association was observed between region and withdrawal period (df = 2, $X^2$= 2.56, $P$ = 0.10).

The use of commercial drugs is very common for the control of diseases in the study area. **Isse *et al*., (2017)** in Mudug Region, Somalia, also observed that the majority (56%) of farmers preferred the use of modern veterinary drugs over traditional herbs. This can possibly be attributable to the unreliability of traditional remedies and the extinction of ethnoexperts in communities.

The present results have revealed that training on the use of veterinary drugs for farmers is very rare, and these findings are in agreement with **Hart (2016)** who further revealed that many livestock owners do not get correct advice on the general use of drugs. Lack of training on the use of veterinary drugs results in poor administration routes, which might lead to drugs being ineffective for their required purposes, the development of drug residues in animal body, scar tissue and abscesses causing pain and extended suffering for the animal **(Beyene *et al*., 2015).**

The present results uncovered that disease diagnosis and treatment are mostly done by farmers on their own, and these concur with **Chauhan *et al*., (2018)** from India, who found that the majority of farmers administer veterinary drugs to their livestock. In the previous section of the results, it was discovered that most farmers have not been trained on the use of veterinary drugs. This information provides convincing evidence that farmers are not able to efficiently undertake accurate disease diagnoses. Inaccurate disease diagnoses increase the chances of animals being given irrelevant medication. According to **Beyene *et al*., (2015)** drug prescription using tentative diagnoses can result in irrational drug use, whereby the wrong drug can be administered while the diagnosis can be a different disease.

The unavailability of veterinary services in most farming communities has been confirmed by **Haakuria *et al*., (2020)** who reported that the unavailability of veterinarians or veterinary services in remote areas is usually due to the rural geographical expanse, which consequently results in an on-going risk of disease prevalence. The unavailability of veterinary services among farming communities might possibly be the major reason for farmers undertaking use of drugs, diagnosis, as well as the administration of drugs by themselves despite their low literacy level, as reiterated by **Jaime *et al*., (2022).**

According to **Chauhan *et al*., (2018),** many small-scale farmers prefer buying drugs in the form of an informal supply chain from non-professional prescribers since it is without incurring consultancy costs and the drugs are obtained easily over-the-counter. The farm feeds are the main sources of drugs for animals for most parts of the country. These findings are supported by the results of **Redding *et al*., (2013)** in Peru, who reported that many farmers preferred prescription as well as purchase of drugs from other channels, such as direct purchase from pharmacies and feed-store vendors. The farm feed attendants are not trained on the use of veterinary drugs, and they are not competent on disease diagnosis. This provides enough evidence that they are highly likely to issue to celebrities the irrelevant drugs, which will result in the drug being irrationally used.

It was observed that the majority of farmers distinguish between different drugs or even make a choice of a particular drug based on the picture of the animal on the drugs. These results are similar to those of **Isse *et al*., (2017)** in Mudug Region, Somalia, who also reported that the availability of an intentional animal's picture on the drug was the principal method that pastorals used to choose drugs for their livestock. This could also be associated with poor literacy of farmers. In terms of dosage measurement, most farmers usually guess the body weight of their animals and these results are in accordance with **Isse *et al.*, (2017)** who noted that estimation of the dose given to the animals is the commonest technique that pastoral communities use. This could be due to an inability to read the intended dose for each species written on the leaflet or drug. Given the low literacy level as well as the fact that most farmers have not been trained on routes of drug administration, it becomes apparent that in most cases animals are over or underdosed due to inaccuracies in body weight estimation. According to **Pfitzner *et al*.. (2016),** inaccuracies in body weight estimations may lead to inaccurate drug dosing.

In terms of drug storage, it was observed that the majority of farmers store drugs at room temperature regardless of the prescriptions from the manufacturer. Storing of medicines at a temperature inappropriate to the recommended one results in reducing their potential effectiveness because all the medicinal products are said

to be stored as per the given manufacturer's directions **(Shafaat *et al*., 2013).**

The vast majority of the farmers are not aware of the withdrawal period after using drugs, and these results concur with those of **Isse *et al*.. (2017)** in Mudug Region, Somalia who indicated that 66% of the respondents were not aware of the withdrawal period. This can be due to several reasons, including illiteracy and inability of drug suppliers, particularly private suppliers, to explain such important information to farmers. If farmers are not aware of the withdrawal period, that means there are higher chances that they usually eat products from animals that have been given some drugs that need some withdrawal, and in this way, farmers are consuming drug residues.

## CONCLUSION

The availability of veterinary services among sheep farming communities in Lesotho is very poor and drugs are mainly supplied by unprofessional people. Veterinary drugs are irrationally used since they are mostly handled by farmers who unfortunately have not been trained to use drugs.

## Declaration of competing interest

The authors declare no conflict of interest

## Acknowledgements

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