DR-2090
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RESEARCH ARTICLE Asian Journal of Dairy and Food Research

Assessment of Rationality in the Use of Veterinary Drugs in the Valley of Kashmir

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10.18805/ajdfr.DR-2090

ABSTRACT

Background: The study of rationality in the use of commonly prescribed drugs especially antibiotics and anthelmintics in the Central Kashmir in a retrospective manner of two years from April, 2019 to April, 2021.

Methods: A retrospective study was designed to assess rationality of drug use at 4 locations *i.e.* Veterinary Clinical Complex (VCC) FVSc. and A.H Shuhama SKUAST Kashmir, Intensive Cattle Development Centre (ICDC) Saloora Ganderbal (Department of Animal Husbandry, Govt. of J and K), Intensive Cattle Development Centre (ICDC) Bakura, Ganderbal (Dept. of Animal Husbandry, Govt of J and K) and Poultry Section of District Veterinary Hospital Ganderbal (Dept. of Animal Husbandry Govt. of J and K).

Result: A total of 4116 cases were recorded and a total of 11132 medicines/drugs were prescribed. The average number of drugs per prescription came out to be 2.7. Out of all the drugs used 12.10 % were antimicrobials, 3.94% were anthelmintics and 83.96% were other drugs. The most commonly used antibiotics and anthelmintics came out to be Enrofloxacin (17.22%), Ceftriaxone (13.81%), Ivermectin (23.29%) and Fenbendazole (27.17%). The results revealed the therapy to be deviating from rational guidelines as per WHO (2012) set for humans. The irrational, injudicious and indiscriminate use of drugs in veterinary practice leads to the increase in the menace of drug resistance and more chances of drug residues in animal foods like meat, milk, chicken, eggs *etc*.

Key words: Anthelmintics, Antibiotics, Injudicious, Rationality, Resistance, Retrospective.

INTRODUCTION

Veterinary drugs are used in livestock either rationally or irrationally for treatment, prophylactic and growth promotion purposes. Rational use of drugs is based on the use of right drug, at the right dose, right cost and right time which is well defined by WHO whereas irrational use of drugs refers to " too many medicines prescribed per patient, inadequate doses or duration of drugs, antibiotics prescribed even for non-bacterial infections, prescriptions do not follow clinical guidelines". Rational approach to therapeutics involves careful evaluation of the health problem in animals and selecting suitable treatment protocols (Rehan *et al*., 2001; Matter *et al*., 2007). Selection of treatment requires cost/benefit analysis especially in food animals. Its efficacy, safety with minimal harmful effects and minimal residues in food animals also requires due attention as irrational and indiscriminate use of drugs leads to the increased probability of drug residues in food animal products like milk, meat, eggs *etc.*

Irrational use of drugs can cause ineffective treatment, useless wastage of resources and may harm the patient as well as environment and the need for restriction of their use becomes even more important when used on food producing animals. Hence it is necessary to use drugs rationally *i.e*. to use them only when they are really needed, in the right way, at the right time and right duration, right dose and observing withdrawl or withholding periods. Unnecessary and injudicious use of antimicrobials and anthelmintics in veterinary practice favours the development of antimicrobial and anthelmintic resistance.

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How to cite this article: Akhoon, Z.A., Shaheen, M., Muhee, A., Hussain, S.A., Makhdoomi, D.M., Pampori, Z.A. and Kamil, S.A. (2023). Assessment of Rationality in the use of Veterinary Drugs in the Valley of Kashmir. Asian Journal of Dairy and Food Research.doi:10.18805/ajdfr.DR-2090.

Submitted: 11-03-2023 **Accepted:** 18-05-2023 **Online:** 10-06-2023

MATERIALS AND METHODS

Study period and design

A retrospective study was designed to assess rationality of drug use at 4 locations *i.e.* Veterinary Clinical Complex (VCC) FVSc. and A.H Shuhama SKUAST Kashmir, Intensive Cattle Development Centre (ICDC) Saloora Ganderbal (Department of Animal Husbandry, Govt. of J and K), Intensive Cattle Development Centre (ICDC) Bakura, Ganderbal (Department of Animal Husbandry, Govt of J and K) and Poultry Section of District Veterinary Hospital Ganderbal (Dept. of Animal Husbandry Govt. of J and K). The sampling units were animal patient encounters to treat acute/sub-acute or chronic illness. The study period was from Ist April, 2019 to Ist April, 2021. The drugs were evaluated on WHO drug use indicators (WHO, 2012).

Study population

The retrospective study was conducted for previous two years starting from April, 2019 to April, 2021 on animal patients (cattle, sheep, goats, horses, poultry etc of all ages and sexes) that were brought or sought for treatment. A study was conducted to assess.

(i) The proportion of infectious and noninfectious diseases.
(ii) Whether treatment done by Veterinarians or not.
(iii) Total number of drugs prescribed.
(iv) Average number of drugs per prescription/disease.
(v) Percentage of antibiotics, anthelmintics and other drugs used.
(vi) Total number of cases in the reported period.

Prescription indicators

Since there was no available guideline for prescription indicators used in veterinary medicine. As a result the WHO prescription indicators were used in the study. The final indicators were:

1. The average number of drugs prescribed per encounter were calculated by dividing the total number of different drug products prescribed with the number of encounters surveyed to measure the degree of polypharmacy as per Beyene *et al*. (2016).

$$\text{Average no of drugs used} = \frac{\text{Total no. of drugs used}}{\text{Total no. of cases}}$$

2. Percentage of encounters in which antimicrobials and anthelmintics prescribed were calculated by dividing the number of patient encounters in which drugs were prescribed with the total number of encounters surveyed, multiplied by 100 to measure the overall use of commonly used forms of drug therapy. No of times a drug *i.e.* a particular antibiotic or anthelmintic used/Total number of times antibiotics/anthelmintics used × 100 as per Beyene *et al.* (2016). *Eg*. If an antibiotic Z is used n times out of the total number of (N) times the sum of all antibiotics used, then percentage of

$$Z = \frac{n}{N} \times 100$$

RESULTS AND DISCUSSION

Out of the all prescriptions surveyed, it was found that the treatment was done by the qualified veterinarians directly or it was done in direct consultation with the veterinarians. A total of 4116 cases were recorded in the study period, 1318 from VCC, FVSc. Shuhama, 1583 cases from ICDC Saloora, 573 cases from ICDC Bakura and 642 cases from poultry section of District Veterinary Hospital Ganderbal. A total of 11132 medicines/drugs were prescribed at the 4 locations, 4518 drugs at TVCC Shuhama, 4296 drugs at ICDC Saloora, 923 drugs at ICDC Bakura and 1395 drugs at poultry section of District Veterinary Hospital Ganderbal (Table 1). The average number of drugs per prescription came out to be 2.7. The overall percentage of infectious cases came out to be 20.31% and the non-infectious cases came out to be 79.69% at the 4 locations combinedly. Out of the total 11132 drugs used, 1347 (12.10%) were antimicrobials, 438 (3.94%) were anthelmintics and 9347 (83.96%) were other drugs. The most commonly used antimicrobials and anthelmintics were Enrofloxacin (17.22%), Ceftriaxone (13.81%) (Table 2) Ivermectin (23.29 %) and Fenbendazole (27.17%) (Table 3).

From the above table it is clear that antibiotics are not used so judiciously as they should be. It is also clear from the above table that an irrational approach of antibiotic use was made in 31.46 per cent of parasitic cases, 23.25 per cent in metabolic cases and 28.66 per cent in miscellaneous cases (Table 4).

In this study regarding rationality in the use of drugs in veterinary practice, the average number of medicines/drugs came out to be 2.7. However the WHO standard for humans is 1.6 to 1.8 (WHO, 1993; Isah *et al*., 2004). The findings of the similar study conducted by Beyene *et al*., (2015) and Beyene *et al*. (2016) reported it to be 1.23 and 1.25 respectively. The present study showed that antibiotics have been used even in parasitic, metabolic and miscellaneous diseases. In parasitic diseases antibiotics have been used at the rate of 31.46% while in metabolic and miscellaneous diseases antibiotics have been used at the rate of 23.25% and 28.66% respectively. The study also proved that

Table 1: Location wise number of drugs and number of cases.

Location	No. of cases	No. of drugs used	No. of non-infectious cases	No. of infectious cases
VCC Shuhama	1318	4518	1039	279
ICDC Saloora	1583	4296	1289	294
ICDC Bakura	573	923	502	71
Poultry Section of Dist. Hospital Ganderbal	642	1395	450	192
Total	4116	11132	3280	836

Table 2: Total Percentage of antimicrobial/antibiotic used at the 4 locations.

Antimicrobial (Total=1347)	Frequency	Percentage	Antimicrobial (Total=1347)	Frequency	Percentage
Gentamicin	44	3.27%	Cefixime	138	10.25%
Oxytetracycline	54	4.01%	Ampicillin/Cloxacillin	22	1.63%
Enrofloxacin	232	17.22%	Amoxycillin/Sulbactum	104	7.72%
Ceftriaxone	186	13.81%	Tetracycline	10	0.75%
Streptopencillin	58	4.31%	Ceftiofur	56	4.16%
Amoxycillin/Cloxacillin	4	0.30%	Sulphadimidine	27	2.01%
Ciprofloxacin/Tindazole	67	4.97%	Procaine Pencillin	63	4.68%
Sulphamethoxazole	40	2.97%	Norfloxacin/Tindazole	70	5.20%
Doxycycline	43	3.19%	Levofloxacin	22	1.63%
Neomycin	90	6.68%	Colistin	5	0.37%
Cephalexin	12	0.90%			

Table 3: Total percentage of Anthemintics used at the 4 locations.

Anthelmintic (Total = 438)	Frequency	Percentage
Ivermectin	102	23.29%
Albendazole	72	16.44%
Fenbendazole	119	27.17%
Oxyclozanide	72	16.44%
Fenbendazole/praziquantal combination	73	16.67%

Table 4: Disease category wise percentage along with the percentage of antibiotics and anthelmintics used.

Drug	Disease category (%)					
administered	Bacterial	Viral	Parasitic	Metabolic	Surgical	Miscellaneous
Antibiotics	94.26%	78.45%	31.46%	23.25%	63.68%	28.66%
Anthelmintics	9.36%	11.21%	83.92%	23.25%	1.41%	11.82%

anthelmintics have been used in other diseases apart from parasitic ones though the values of their use are not of so much significance. All the above results reveal that the usage of drugs in veterinary practice is deviating from the rational guidelines. Overuse or injudicious use of drugs particularly antibiotics is serious as it leads to emergence of multidrug resistant pathogens (Till *et al*., 1991). Moreover the injudicious and excessive use of drugs in veterinary practice leads to the chances of more drug residues in animal foods like milk, meat and chicken which was our main focus of study. The study of rationality of drug use in humans in 12 developing countries has shown that the average no of drugs per encounter to be high in Nigeria (3.8), low in Sudan (1.4) and Zimbawe at the rate of 1.3 (Bimo, 1992). The low values of average number of drugs per encounter in the above countries might imply that there may have been a constraint in the availability of the drugs or prescribers may have been to be more trained in therapeutics.

In our study 12.10% of antimicrobials and 3.94% anthelmintics were used while the percentage of other drugs used was found to be 83.96%. The ideal standard percentage of encounters in which antibiotics are prescribed for humans is 20.0 to 26.8% (WHO, 1993; Isah *et al*., 2004) which is higher than our findings. Present study also revealed that Enrofloxacin (17.22%) and Ceftriaxone (13.81%) were the most commonly used antibiotics while the findings by Beyene *et al*., (2015) and Beyene *et al*. (2016) showed that Oxytetracycline was the most commonly used antibiotic at the rate of 45.5% and 73.90% respectively. In this study we found that Fenbendazole (27.17%) and Ivermectin (23.29%) were the most commonly used anthelmintics which is in consonance with the finding of Beyene *et al*., 2016 who found that Ivermectin was the most commonly used anthelmintics in his study at the rate of 94.80%.

CONCLUSION

The Government, private animal health care institutions and animal owners all have a role to exercise rational use of drugs in veterinary practice to ensure the efficacy of drugs and the safety of foods of animal origin. The veterinarians have a leading and prominent role to play in the advocating of rational use of veterinary drugs by disseminating suitable information and exercising their careful and judicious role about veterinary drugs and their adverse effect both on animals and environment. The rational and judicious use of drugs especially antibiotics and anthelmintics is the need of the hour as it will not only curb the emergence of multi drug resistant microbes and superbugs but also promote

the efficacy as well as the cost of treatment. It will also curb the growing menace of adulteration of animal foods like milk, meat, chicken, eggs etc. with the residues of veterinary drugs which will not only promote and safeguard human health but also the overall environmental safety and animal health too in a One Health Context.

Conflict of interest: None.

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