Sudan Journal of Science and Technology
Journal homepage:
http://jst.sustech.edu/

Comprehensive data information on the use of veterinary drugs and pesticides (chemicals) in food animals and their products in the Sudan

Nahla.Imam.Mohamed[1], Yousif .A.H.Elmansoury[2] and Mohamed.Abdelsalam.Abdalla[3]

*Ministry of Animal Resources P.O.Box 293-Fax475996 Khartoum, Sudan
*Central Veterinary research laboratory,Soba west,Khartoum,P.O.Box8067alamarat, Sudan
*Department of preventive Medicine and Public Health, College of veterinary medicine Sudan University of Science and Technology

ARTICLE INFO

ARTICLE HISTORY
Received: 31/7/2020
Accepted: 20/10/2020
Available online: December 2020

KEYWORDS:
Residues, Withdrawal period, Maximum Residue Limits (MRLs), public health

ABSTRACT

This paper represents a review of information collected from farmers, Veterinarians and other related job in relation to veterinary drug and pesticide residues in livestock and livestock products in Sudan. It was collected by using face to face interview structured questionnaire comprise of knowledge of drugs and pesticides. Residues in food have received much attention in recent years because of growing food safety, public health concerns. The levels of pesticide residues are now over alarming situation in certain countries, so consumers are becoming more worried about this, their presence in food of animal origin constitutes socioeconomic challenges of an international trade in animal and animal products. The questionnaire revealed that there is a general lack of awareness among food animal producer on the correct way of using veterinary drugs (40%) their withdrawal period, or clearance period (98%) while (19%) obtain drugs without prescription and (6%) are using growth promoter however, the data showed that (90%)of veterinarian do not calculate the dosing on body weight basis which might lead to over-dosing or sub-dosing, also there was lack of follow up of cases after leaving the clinic (60%). The wide spread of the misuse ,improper drug dispensing and handling practices can affect the drug potency and can also contribute to the veterinary drugs residues in the Sudanese food animals and their products.

Introduction:

Nowadays Veterinary drugs are widely used for disease prevention or treatment and/or production enhancement (Tollefson and Miller., 2000).but the benefit of improve producing from the use of animal drugs in food-producing species is not obtained without risk, the risk associated with drug residues that remain in the tissues of treated animals if animal drugs were not absorbed or were metabolized to harmless products, there would be no concern.it is therefore necessary to collect data on residues and withdrawal period for food animal drugs(Crawford.,1985). The presence of the residues may be due to failure to observe the withdrawal period of the drug, over dosage or the use of an unlicensed drug (Paige.,1994). However, these residues may cause numerous public concern in human, these problems may include the transfer of veterinary drugs resistant to humans, mutagenicityو allergy and carcinogenicity (Nisha.,2008).

In the Sudan, a great deal of concern has been demonstrated over the last decades about the presence of chemical residues, mainly veterinary drugs and pesticides, in the food of animal origin, Also accidental exposure to chemicals in the environment can also result in tissue residues (Hisham.,2013) .

However scarce data information are lacked therefore this study questionnaire was designed to provide a realistic data of the uses of veterinary drugs and pesticides and their consequence to public health and trade. So veterinarians and farmers should be aware, to control the withdrawal period and misuse of veterinary drugs, and finally using the law and legalization to avoid the side effect on livestock and human.

Materials and Method:

Study Design: Questionnaire and data collection:

During four months from January to April, 2018, two questionnaires targeting (Veterinarian and farmers) Fifty and fifty two forms veterinarians and other related jobs where selected randomly that means not all the veterinarians have the same chance for being selected and this was called Non-probability sampling methods as described by (Thrusfield .,2007). The majority of respondents was designed to collect information about drugs used knowledge about withdrawal period and the risk of using animal's products during this period, veterinarian guidance about the importance of not using animal products during withdrawal period, and disposal of waste vials. The questionnaire included three parts: the first part (n = 5 questions) open questions regarding information about the uses of drug.

The second part (n = 20 questions) Yes, No general question, and the third part about how drug used by animal producer. Fifty two farm the second questionnaire for farm include 42% of respondents were work in dairy type of production, while 37% were work in meat type, and 21 were work in both type of production (dairy and meat), were randomly chosen. The questionnaire included three parts: the first part (n = 2 questions) questions regarding general information about the farmers. The second part (n = 7 questions) was about farms and current management and husbandry practices, and the third part (n = 16 questions) herd health problems. The farms were selected according to the responder's ability to participate and the52questionnaires were filled by direct interviewing of the responding farm's owners from Khartoum (21), Omdurman (17) and Bahri (14). Observations were carried out to determine farm conditions and to identify

potential problems encountered. Herds were stratified into three groups (according to the herd size). The herd size was estimated in numbers of heads in each herd follows: < 50 head small herd, n = 15, from 51 to 100 medium herd, n = 26 and > 101 large herd, n =

Data collection tools and methods:

It was collected by using face to face interview structured questionnaire comprise of knowledge and practice of drugs and pesticides used among veterinarians and animal owners at Khartoum state, Sudan.

Data analysis:

The Descriptive statistical analysis (frequency,descriptive,and cross tabulation tests) for the respondents (veterinarians and other related jobs and Breeder) was done by using Statistical Package for Social Sciences (SPSS version 20)programme, and graphs was done by using Microsoft Office Excel (Office 10) programme.

Result:

Table (1) Herd &Management

Statement	Response, n %					
Herd Size	Small	15(29)	Medium	26(50)	Large	11(21)
Farm System	Traditional	30(59)	Semi pastoral	7(13)	Sedentary	15(29)
Production Type	Dairy	22(42)	Meat	19(37)	Dairy &Meat	11(21)
Dispensing of the veterinary drugs	Clinic & pharmacy	22 (44)	Company &pharmacy	11 (22)	Illegal dispensing	17 (34)
source of chemical residues in animal product (milk – meat)	Drugs	21 (42)	pesticides	17 (34)	Withdrawal period	12 (24)
Veterinary Services in the Area	Governmental	2 (4)	Private	18 (38)	The both	27 (58)

The result show 50% of respondents had medium herd size, while 29% had small herd size, and 21% had large herd size, with traditional farm system 59% while others used sedentary and semi pastoral system (.29%, 13% respectively). Most of them work in dairy type production (42%), while 37% were work in meat type, and 21 were work in both type of production (dairy and meat).

The veterinary services in the study area the result show 58% have (government and private) of veterinary services while 38% of them had private type, and only 4% had

government type of veterinary services. 10% of respondents did not have veterinary services in their areas.
Also the result show the dispensing of the veterinary drugs 44% by Clinic & pharmacy, 22% by Company &pharmacy and 34% illegal dispensing.
The source of chemical residues in animal product from drugs 42% pesticides 34% and withdrawal period 24%.

Table (2) Awareness of veterinary drugs residues

Statement	Response, n %	
	YES	NO
Keeping Records	15 (29)	37 (71)
Using of Growth Promoter for your Animals	4 (8)	48 (92)
Animal Identification System	15 (29)	37(71)
Additives Used in your Animal Feed	17 (33)	35 (67)
knowledge of dangerous of veterinary drug residues	21 (40)	31 (60)
Following up the cases after treatment	37 (74)	13 (26)
Farmers Storing medicine of their animals in suitable storage condition	8(16)	42(84)
Advising of the owner for the importance of the withdrawal period	30 (60)	20 (40)
Veterinarians calculate the doses of the drugs depending on body weight basis	5 (10)	45 (90)
Using of the drugs to provide a higher return of investment	44 (88)	6 (12)
Improper dosage of veterinary drug can cause public health problems	48 (96)	2 (4)
producers are treating their animals by themselves	37 (75)	13(25)

The majority of respondents 71% did not keep records containing the name of medicine, doses and the date you gave it, and 29% they did. Also the majority of respondents 71%did not have animal identification system, while 29 % had.
The majority of respondents (92%) did not use growth promoter for their animals, and 8% did. And (82%) from the total of respondents that answered yes for additives used in animal feed said that they were use vitamins as additive in their animals feed, and 18 % of them were use vitamins and minerals.
Most of respondents 60% did not know the dangerous of veterinary drug residues beside 74% were follow up their cases after treatment, while 26% of them were not
Veterinarians were advising the animal owner for the importance of the withdrawal period of the drug 92%.and 96% said that the improper dosage of veterinary drug can cause public health problems, and only 10% of veterinarians calculate the doses of the drugs depending on body weight basis. 74% of respondents said that there is following up of the cases after prescribing the treatment, and 88% were used the drugs to provide a higher return of investment.

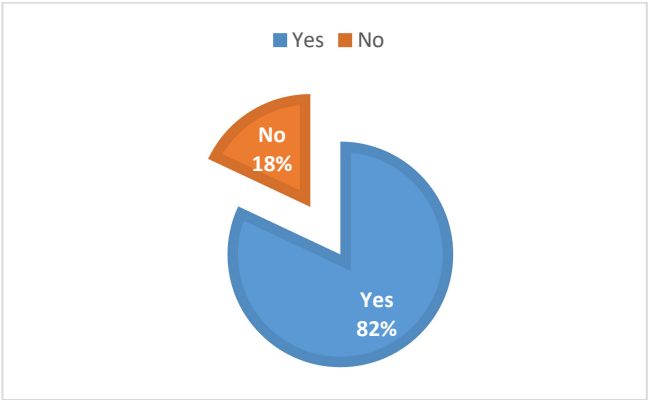


Figure (1): The drugs and pesticides are the major food hazard

The majority of respondents 82% said that the drugs and pesticides are the major food hazard in their area, while 18% of them said it not a major hazard in their area.

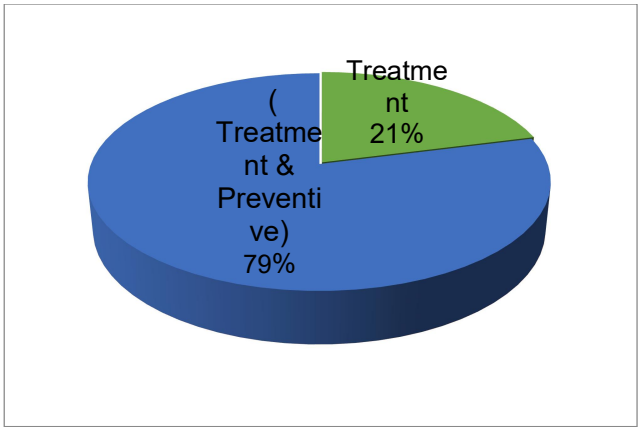


Figure (2) Uses of veterinary Drugs

The majority of respondents 79% were used veterinary drugs for both treatment and preventive, while 21% were used it only for treatment

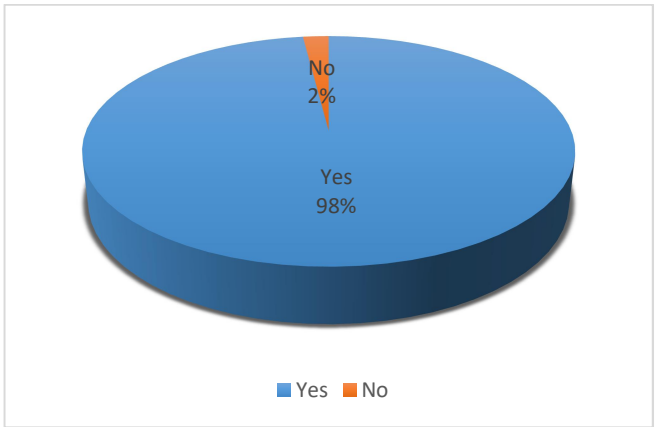


Figure (3): Chemical residues affect the public health and international trade

The majority of respondents 98% said that the chemical residues in food of animal origin will affect the public health and may also harm an international trade, while only 2% said no.

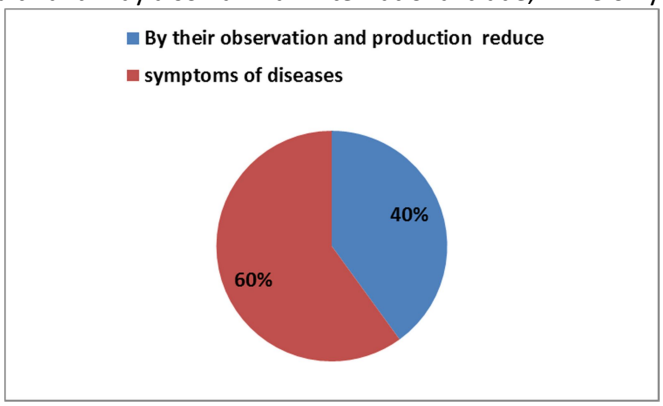


Figure (4) the breeder their basis of Treatment animals

The breeder treated their animals by their observation and production reduce 40% and by symptoms of diseases 60% .

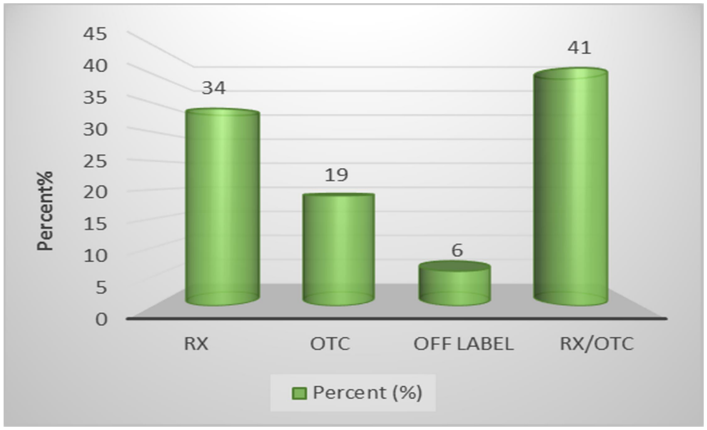
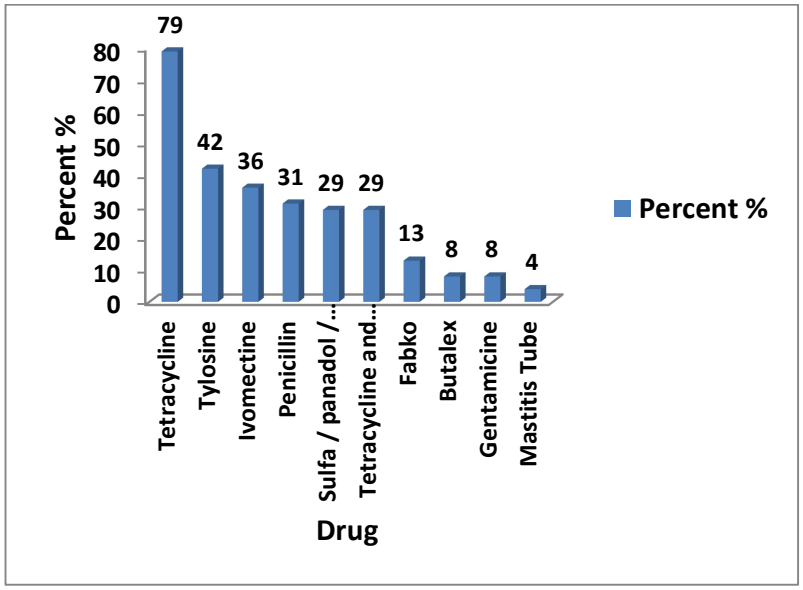


Figure (5): How drug use by animal producer

41% of using of drug done by prescription or over the counter, 34% done by prescription only, 19% done over the counter, while 6% off label.



Figure(6) the most commonly used drugs in respondent's farm

The majority of respondents (79%) were use Tetracycline as most commonly used drug in their farm, 42% of them use Tyrosine, 36% were use Ivomectine, 31% were use Penicillin, 29% were use Sulfa / panadol / teterazone, 29% were use Tetracycline and Tylosine, 13% were use Fabko, 8% were use Butalex, 8% were use Gentamicine, and 4% were use Mastitis Tube.

Discussion:

Analysis of questionnaire data (veterinarian and farmers) farmer work with veterinarians to support the health care of their animals. The result show most of farmers had traditional farm 50% and medium herd59%, they work in dairy type of production 42%, while 37% were work in meat type, and 21% in both type of production dairy and meat (table 1).The majority haven't animal identification system 29% and did not keep records containing the name of medicine, doses and the date they gave drug 71% (table2). the absence of following up the cases after treatment 26% (table2), also result show the major food hazard in their area were drugs and pesticides 82% (Figure1), most of the farmers used veterinary Drugs for treatment 44% and for both (treatment and prevention) 56% (figure2) and they treated their animals by themselves75% (table2) depending on their observation, production dropped 40%, and the symptoms of disease 60%(figure 4). this result agreement with (Katakweba et al., 2012) that about 70% of owners give the drugs to their animal by their selves, so most of the animal owners did not understand the information given by drug dispensers or were not able to read and understand the information written on the drug labels/leaflets in English. For this reason, some breeders use the colour of drugs to identify drugs. Also presence of veterinary services in their areas 58% (government and private), while 38% of them had private, and only 4% had government type of veterinary services (table1). Farmer using Growth Promoter for their Animals 8% and additives Used in Animal Feed 33% (table2) so this related to their knowledge of dangerous of veterinary drug residues affect the human health 60% not aware (table 1) Residues may be present in animal product after treatment with a drug

42%, pesticides 34% and withdrawal period 24% if they milked or sent to slaughter before the drug has been metabolized and adequately cleared from its system to help ensure the safety of the human food supply and from pesticides (table 1). Also result show 60% of Veterinarian advising the owner for the importance of the withdrawal period (table2). These results are the same as the results of (Mohamed. I.M. Fr.et al, 2019) 60% of veterinarians give tips to the owners about the withdrawal period. The dispensing of the veterinary drugs by Clinic 22%, pharmacy 44%, or illegal dispensing 34% (table1).The using of drugs by farmers administrated (Figure5) by prescription, over the counter, off label and besides using growth promoter (98%, 34%, 19%, 6%, 38% respectively). Also 90% of veterinarians not calculate the doses of the drugs depending on body weight basis which may lead to over-dosing or sub-dosing, and Antimicrobial resistances or toxicity for consumers and animals, and (74%) of them not following up cases after leaving the clinic or pharmacy (table 2). This result In agreement with (Mohamed. *et al*.,2011) .Survey in Khartoum revealed that veterinarian did not restrict to the weight of animal when describing doses 76% and there was no following up of cases after leaving the clinic or pharmacy 86%. In spite of farmers (40%), not awarded about withdrawal period and hazard of veterinary drug residues and they did not care they only look at profit and 84% and 88% they used drugs to provide a higher return of investment (table 2) they did not keep the drugs according to veterinarian advising in suitable condition .The most using drugs are Tetracycline 79% which indicated absence of diagnostic methods in clinics and veterinary pharmacies and they only depended on tentative diagnosis (figure 6).The missing veterinarian's role in public health reflected in the high percentages of farmers 60% who do not have Knowledge about dangerous of veterinary drug residues , so the main source of chemical residues in animal product 42% from drugs, 34% from pesticides and withdrawal period 24% (table1).Also the result show 98% of the chemical residues in food of animal origin will affect the public health and may also harm an international trade (Figure 3).These result explained the high percentage of drugs residues in animal's products during questionnaire data collection which may lead to public health hazard in Sudan.

Conclusion:

Our survey revealed that there is a general lack of awareness and misusing of veterinary drugs. The widespread misuse and improper drug dispensing and handling practices was observed can affect the drug quality and can also contribute to the drug residues in Sudan. Veterinarians must be well aware of the importance of drug/chemical residues in the food animals and their possible risk to the general public. They must have updated information about the proper withdrawal times of all the drugs/chemicals used in their areas of practice, and extend this information to the livestock production of residue free edible animal products like milk and meat for residue analysis, trained manpower are needed. In this regard, the availability of sensitive equipment and modern analytical techniques and they must have government policies to controlling veterinary drug residues. The responsibility for residue control and prevention must be shared by the government, producers, veterinarians, teachers and academicians, marketing associations, and other interested parties, who must strive for both healthy and efficiently grown animals as well as a safe food supply .

Acknowledgement:
The authors express his gratitude to staff members of department of the radioisotopes and immunology, and the cvrl administration for facilitating conduction of this study my thanks are also due to the veterinarians in veterinary pharmacies and clinics, the animal's owners and the Ministry of Animal Resources

References:

1.Abdul Katakweba,M M A M tambo, J E Olsen and Amandus Muhairwa., (2012.) Awareness of human health risks associated with the use of antibiotics among livestock keepers and factors that contribute to selection of antibiotic resistance bacteria within livestock in Tanzania Livestock Research for Rural Development 24 (10) 2012.

2.Hisham Ismail Seri, (2013). Introduction to Veterinary drug residues: Hazards and Risks Veterinary Drug Residues in Food Derived From animals 26-27th May.

3.Katakweba. A .A. S, Mtambo M. M. A, Olsen. J. E and Muhairwa. A. P(2012). Awareness of human health risks associated with the use of antibiotics among livestock keepers and factors that contribute to selection of antibiotic resistance bacteria within livestock Research for Rural Development 24 (10)

4.L.M.Crawford, (1985).The impact of residues on animal food products and human health, Rev.sci.tech.off.int.Epiz, 1985, 4(4), 669-685.

***5.*Mohamed Ismail Mohamed Fangama, Mohammed Abdel Salam Abdalla and Ismail Mohamed Fangama (2019)** .Assessment of Uses Antibiotic Residues Consumed in Khartoum State, Sudan .*International Journal of Current Microbiology and Applied Sciences ISSN: 2319-7706 Volume 8*

6.Mohamed Bashir Wahab Alla1, Twfig Eltigani Mohamed and Atif Elamin Abdelgadir.(2011). Detection of antibiotics residues in beef in Ghanawa Slaughterhouse, Khartoum State, Sudan African Journal of Food Science Vol. 5(10), pp. 574-580, 30, Available online ISSN 1996-0794 ©2011 *Academic Journals*

7.Nisha, A.R., (2008). Antibiotic residues – A global health hazard', Veterinary World 1(12):375– 377

8.Paige, J, (1994), Analysis of tissue residues.FDA.Vet, 9:4-6

9.Tollefson, Land M.Miller, (2000). Antibiotic use in food animals: controlling the human health impact .*J.Amin.Sci. 14:402-413*