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Responsible and Prudent Veterinary Use of Antimicrobial Agents

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Abstract: This study provides a call for the responsible and prudent veterinary use of antimicrobial agents with the aim of protecting both animal and human health in the country. It addresses the respective parties involved in the authorization, control, distribution and use of veterinary medicinal products to take action committed to achieving, the specific obligation to protect consumer health by ensuring the safety of food of animal origin with respect to residues of antimicrobials and the ability to transfer resistant micro-organisms to humans and to contribute to maintaining and prolonging the efficacy and usefulness of antimicrobial agents used in animal and human medicine. Review of residue control in local animal produce shows that the better half of samples tested positive for antimicrobial drug residues that >80% of the producers are conceptually unaware regarding the withholding periods and that only in 20% of the cases occasional veterinary prescription or supervision is asked for. Recommendations include legislative measures; quality control surveillance procedures and veterinary extension and public education.

Key words: Antimicrobial agents, quality, animals, food, Sudan

INTRODUCTION

Historically, the veterinary services were set up to control livestock diseases at the farm level. There was an emphasis on prevention and control of the major epizootic diseases of livestock and of diseases that could affect man (zoonotic diseases). As countries begin to bring the serious diseases under control, the scope of official animal health services normally increases to address production diseases of livestock where control leads to more efficient production and/or better quality animal products.

The role of the veterinary services has traditionally extended from the farm to the slaughterhouse where veterinarians have a dual responsibility; epidemiological surveillance of animal diseases and ensuring the safety and suitability of meat. The education and training of veterinarians which includes both animal health (including zoonoses) and food hygiene components, makes them uniquely equipped to play a central role in ensuring food safety, especially the safety of foods of animal origin. In many countries, the role of the veterinary services has been extended to include subsequent stages of the food chain in the farm to fork continuum (Benet *et al*., 2006; Benet and Bellemain, 2005).

The veterinary services contribute to the achievement of these objectives through the direct performance of some veterinary tasks and through the auditing of animal and public health activities conducted by other government agencies, private sector veterinarians and other stakeholders. In addition to veterinarians, several other professional groups are involved in ensuring food safety throughout the food chain, including analysts, epidemiologists, food technologists, human and environmental health professionals, microbiologists and toxicologists. Irrespective of the roles assigned to the different professional groups and stakeholders by the administrative system in the country, close cooperation and effective communication between all involved is imperative to achieve the best results from the combined resources. Where veterinary or other professional tasks are delegated to individuals or enterprises outside the veterinary authority, clear information on regulatory requirements and a system of checks should be established to monitor and verify performance of the delegated activities. The veterinary authority retains the final responsibility for satisfactory performance of delegated activities (OIE, 2007).

Residues of antibiotics will occur in veterinary products from the treated animals, so the procedures for using antibiotics should be strictly observed to prevent contaminated products reaching the consumer. Antibiotics residues pose a hazard to consumers, possibly causing allergic reactions and the development of bacterial resistance. They also have inhibitory effects on starter cultures of bacteria used to make fermented milk products which causes financial losses in the dairy industry (Voirin *et al*., 2000).

MATERIALS AND METHODS

In as-far-as, the hearsay of the contamination of local veterinary products with antibiotics due to ignoring the withholding periods or the deliberate addition of them as preservatives, the following review was conducted with the following objectives:

- To about the current status of this problem
- To suggest possible interventions to avoid veterinary residues in food
- To increase the public awareness

RESULTS

Control of veterinary residues in food

A review of the current status in the Sudan

Hygiene, prevalence of disease and antibiotic use: It has been shown that most of the dairy farms in Khartoum are in bad hygienic status that mastitis is the most common disease in combination with other diseases, as 68.8% of the farms show the presence of disease and that all farms use one or more type of antibiotic including Penicillin, Tetracycline and others (Adil *et al*., 2013), Oxytetracycline, sulfonamides, Penicillin, Tylosine, Gentamycine and Streptomycine and that diagnostic procedures, such as antibiogram are not conducted.

Here, 72.6% of poultry farms in Khartoum are in bad hygienic status, diseases were reported in all visited farms, the most prevalent were diarrhea in combination with respiratory disease (36.4%) followed by diarrhea alone (33.3%), 36.4% used tetracycline while 27.3% used penicillin, 42.4% of the farms were visited by veterinarians (on call) and in 75.8% of the farms the owners were responsible for drug administration, 59% do not withhold their product during or post medication (Adil *et al*., 2013a, b).

Veterinary residues in food: It has been shown that 43.4% of milk samples obtained from farms contained antibiotics, 23.2% milk samples obtained from markets showed positive results wherein 54% of samples collected in Omdurman area tested positive (Adil *et al*., 2013a). Where 55.4 and 43.2% of egg samples at farms and sales points, respectively tested positive for antibiotic residues (Adil *et al*., 2013b).

Awareness: It has been shown that most farms are run by producers with low educational qualifications that most producers have no information about the withdrawal period or the release of antibiotics in their produce (85.1 and 94% of milk and poultry producers, respectively (Adil *et al*., 2013a, b).

It has been reported that 66% of the consumers are unaware of the issue of antibiotic contamination of animal products.

A review of the current international standards

WHO reports: According to the results of the technical report prepared for milk hygiene by World Health Organization and Joint Expert Committee on Food Additives (JECFA), the rate of contamination of milk and dairy products with antibacterial additives in developed countries such as USA, Australia, UK and Scotland was 7-10% until 1969, after that year, the rate of contamination of the same products decreased to 0.5% in USA, 2.1% in Australia, 1.5% in UK and 3.4% in Scotland due to the precautions taken after the given date.

Various determinations of veterinary antibiotic residues were described in the developing countries, most are better than the national reports; 15.2% in Trinidad (Adesiyun *et al*., 2005), 34.2% in Nigeria (Ezenduka *et al*., 2011) and 21.4% in Tanzania (Nonga *et al*., 2010).

The British residues regulations: These regulations give authorized officers powers to inspect and examine animals and take samples for analysis, inspect records on farms and to carry out follow-up investigations on farms when residues above statutory or other limits are detected (UK Government, 2013).

The residues regulations ensure that the process of authorizing veterinary medicines is working correctly and veterinary medicines do not result in residues above the relevant maximum residue level. Under these regulations, it is an offence to use any veterinary medicine on animals unless those medicines have a marketing authorization and whose active ingredients have been evaluated for residue safety and the veterinarian must keep records of their use (UK Government, 2013).

Residue monitoring and inspection: The UK operates a statutory surveillance programme that fulfils the obligations to the EU directives requiring member states to analyze food samples for residues of veterinary medicines, unauthorized substances and environmental contaminants. The programme covers red meat, poultry, salmon, trout, eggs, wild and farmed game, honey and milk.

Over 35,000 samples are collected for analysis each year. They are collected from farms, egg-packing stations, abattoirs and meat-cutting plants (UK Government, 2013).

Actions taken where unacceptable residues are detected: Where a residue of an authorized veterinary medicine is detected at a concentration above the MRL, a thorough on-farm investigation is undertaken and the

farmer and their veterinary surgeon can then be given advice to help avoid a recurrence. Where very high concentrations of authorized substances or unauthorized substances are detected, a prosecution is done and animals on the farm that are shown to contain residues of unauthorized substances could be destroyed (UK Government, 2013).

DISCUSSION

The old statement in the pharmacology classes that more concern and much attention have been directed towards the freedom of animal products from antibiotics rather than from micro-organisms still counts. The reasons behind this concern and this attention are obvious and have no room for discussion in this context. Veterinarians should righteously retain the right to antibiotic use for the wellbeing and welfare of the animals they supervise or attend to. It is nevertheless, the responsibility of the veterinary authorities to check that these populations are raised under comfortable husbandry conditions that possible bio-security farming is conducted and that the antibiotic content in the produce and carcasses of these animals is within the Maximum Residual Level (MRL) when presented to consumers. This has been the historical role of the veterinary services and it still is in ensuring food safety as has been shown in this study.

The investigations reviewed in this research focused on methods to screen for residual antibiotic activity in the local animal products rather than the quantitative assay of these residues regarding their MRLs. This can be attributed to the field of interest of these investigators or to the absence of a national reference MRLs. However, international MRLs should be applied in any such investigations considering the fact that they do not vary. Qualitative assays are of no benefit as under normal practical conditions, trace residual drug contents do exist in animal products. These residues can prove harmless to the consumers given that they are below the standard MRLs.

CONCLUSION

The very low determinations of MRLs in the developed countries could be attributed to the strict surveillance policies adopted in these countries to the high competition in their markets for better products but by far to the good farming practice which is also more cost effective. Protection is not only better than treatment but is also cheaper. Not forgetting the excellent continuous training and the introduction of technology in the farming industry. The high awareness of the consumers and legislations that set penalties also contribute to these standards.

RECOMMENDATIONS

The relevant authorities should ensure that all the antimicrobial agents used in animals are supplied only through licensed/authorized distribution systems are prescribed and administered to animals by a veterinarian or under the supervision of a veterinarian. Effective procedures for the safe collection and destruction of unused products containing antimicrobial agent (s) should be developed.

The relevant authorities should encourage training of antimicrobial users, public and industry-funded research, implement a pharmacovigilance programme and on request, specific surveillance for bacterial susceptibility and resistance data.

Distributors of retailers distributing antimicrobial agent(s) should only do, so on the prescription of a veterinarian or other suitably trained person authorized in accordance with the national legislation and all products should be appropriately labeled.

Retail distributors who should keep detailed records of date of supply; name of prescriber, name of user, name of product, batch number, expiration date and the quantity supplied.

Distributors should also be involved in training programmes on the responsible and prudent use of antimicrobials.

Veterinarians are to carry out a proper clinical examination of the animal (s) and only prescribe antimicrobials when necessary and make an appropriate choice of the agent based on treatment experience and diagnostic laboratory information (pathogen isolation, identification and antibiogram) where possible.

Veterinary professional organizations should participate in the training programmes and develop for their members species-specific clinical practice recommendations on the responsible and prudent use of antimicrobials (e.g., guidelines for the judicious use of antimicrobials in various animal species developed by the American Veterinary Medical Associations).

Food-animal producers with the assistance and guidance of a veterinarian are responsible for implementing animal health and welfare programmes on their farms (good farming practice) in order to promote animal health and food safety; draw up a health plan with the attending veterinarian that outlines preventative measures (e.g., feedlot health plans, mastitis control plans, endo and ectoparasite control and vaccination programmes, etc.); use antimicrobial agents only on

veterinary prescription and according to the provisions of the prescription and in accordance with product label instructions, including maintenance of the storage conditions as appropriate.

Food-animal producers should isolate sick animals, when appropriate to avoid the transfer of pathogens; dispose of dead or dying animals promptly under conditions approved by the relevant authorities; address on-farm bio-security measures hygienic conditions and take basic hygiene precautions as appropriate regarding contacts between people (veterinarians, breeders, owners, children) and the animals treated; comply with and record the recommended withdrawal periods to ensure that residue levels in animal-derived food do not present a risk for the consumer; dispose of un-used and expired surplus antimicrobials under safe conditions for the environment; maintain all the laboratory records of bacteriological and susceptibility tests; these data should be made available to the veterinarian responsible for treating the animals.

Food-animal producers should keep adequate records of all medicines used, including the name of the product/active substance and batch number and expiry date; name of prescriber and/or the supplier; date of administration; identification of the animal or group of animals to which the antimicrobial agent was administered; clinical conditions treated; dosage; withdrawal periods (including date of the end of the withdrawal periods); result of laboratory tests; effectiveness of therapy; inform the responsible veterinarian of recurrent disease problems.

Food-animal producers should participate in the training programmes. It is recommended that food-animal producer organizations work in cooperation with the veterinary professional organizations to implement existing guidelines for the responsible and prudent use of medicines.

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