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ETHNOVETERINARY PRACTICES: A REVIEW OF PHYTOTHERAPEUTICAL APPROACHES IN THE TREATMENT OF LIVESTOCK IN AFRICA: CASE OF CAMEROON

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ABSTRACT

Livestock health is a vital production factor in all production units. In the developed world, a lot of resources are invested in preventive measures unlike in the developing countries where resources are geared toward curative methods of livestock health care. Smallholder livestock production is an important sector of Cameroon's economy, therefore for a sustainable production there should be a good livestock health care system. In Cameroon, livestock production is entrusted to poor, old and illiterate's farmers with their indigenous methods of keeping livestock healthy and productive. For Cameroon to increase production, ethno veterinary medicine, which is adapted and affordable to smallholder breeders, should be developed for a sustainable smallholder production. Over 90% of the materials used in ethno veterinary medicine are from plants, hence there is an urgent need to conserve and propagate the medicinal plants already identified for fear of extinction due to random harvesting. Since ethno veterinary plants will be continuously used by smallholder livestock producers, there is a need to development ethno veterinary gardens for a sustainable use and conservation of these plants' species for future generations. More research is needed to evaluate and validate the ethno veterinary properties of these plants' preparations through collaboration between the ethno veterinary practitioners and researchers.

Keywords: Ethno Veterinary Medicine, Review, Phytotherapeutical Treatment, Livestock, Cameroon

1. INTRODUCTION

Ethno veterinary medicine is the science that studies the beliefs, knowledge, techniques, methods, and practices used in keeping animals healthy and productive Wanzala et al. (2005). Interest in evaluating, validating and documentation of ethno veterinary knowledge and practices started in the early 1980s worldwide and since then several studies have been carried out, many reports written, and numerous

conferences and workshops held Aihanuwa et al. (2017). These documents have saved ethno veterinary knowledge from extinction as most of these resided in the elderly illiterate livestock farmers and could have disappeared as they died Ngeh et al. (2007).

In Cameroon like in many developing countries, ethno veterinary medicine is carried out by small holders' livestock farmers to keep their livestock healthy and productive Ngeh et al. (1995). Traditional livestock health care or ethno veterinary medicine (EVM) is a practice which include the use of medicinal plants, surgical techniques, and management practices to prevent and treat a range of diseases and problems encountered by livestock holders Wanzala et al. (2005). Many of these practices have been developed and tested over centuries. Unlike conventional veterinary medicine, ethno-veterinary medicine has been developed by farmers in fields and not by scientists in laboratories and clinics. It is less systematic, formalized, documented, and usually transferred by word of mouth rather than in writing.

Until 1989 in Cameroon, ethno veterinary practices were mostly carried out by smallholder livestock farmers, with little coordination Dzoyem et al. (2020). About six decades into colonization in the 1940's, orthodox veterinary medicine was introduced in the Northwest Province of Cameroon. Many orthodox veterinarians did not promote indigenous practices, because they did not appreciate the role which they played. In some places, it was even illegal to treat animals using local herbs without the permission of veterinarians. As a result, many livestock owners ceased to use local practices, while those who continued to rely on them did so in secret Toyang et al. (1995). This meant that the knowledge and use of ethnoveterinary medicine declined. Before the introduction of orthodox veterinary medicine in Cameroon, pastoralists depended solely on indigenous health practices. Nomadic livestock owners treated animal health problems using various biologicals from plants and animals, while carefully avoiding disease-infested areas and regions dominated by toxic plants. Their knowledge of ethno veterinary medicine encompassed surgery, pharmacology, and toxicology (Ndi, 1990:4). Conventional veterinary medicine was believed to be superior to indigenous veterinary practices in solving health problems encountered in livestock. The re-enforcement of conventional veterinary medicine in Cameroon was in the early 1960s due outbreaks of a number of livestock epidemics especially the Rinderpest. However, dependence on conventional medicine failed to solve the majority of livestock health problems and this has been accompanied by a steady decline in the provision of livestock health care especially in the rural areas. Livestock health care then failed in Cameroon as in many African countries because of many bottlenecks which include inadequate manpower and logistical inputs, scarce and erratic supply of veterinary drugs and services, high cost of veterinary drugs and supplies, poor communication and other social facilities. Also, counter-productive government policies did not promote complementary utilization of conventional medicines?? And inadequate attention was paid to the development of these ethno veterinary medicine practices. All these made most livestock breeders to revert to the use of traditional methods for the treatment of various diseases of livestock Bullitta et al. (2018).

In Cameroon ethno veterinary medicine research has been going on since 1989 and only few publications and documentations are available. The main objective of this review is to contribute knowledge in ethno veterinary medicine in Cameroon. The main objective of this review was to summarize what has been carried out since 1989 when ethno veterinary research began in Cameroon, from the creation of

ethno veterinary council with support of HPI Cameroon, and researchers from IRZ and the University of Dschang. This review therefore provides baseline knowledge of most the ethno veterinary research that has been carried out and propose a way forward.

2. METHODOLOGY

This study was a library based systematic review. The technological tools that were available for data collection in this review included the libraries, journals, books, reports, documentaries, and archive access tools which were provided by data search engines: Searching Online Library Academic and Generic Search of Online Facilities (through Google search and/or Google Scholar). The inclusion factors were the locations: Cameroon and Africa. The search was limited to keywords like veterinary medicine, ethno veterinary medicine, ethno botany, ethno botanical, ethno medicine; ethno medicinal, medicinal plants, traditional healer, traditional medicine, traditional practitioner, and traditional medicine were used. Studies were considered for inclusion if they dealt with ethno veterinary medicine knowledge and ethno medicinal plant species. The literature search was performed for studies carried out and written in English on ethno veterinary medicine in Africa with focus on Cameroon. Systematic reviews, reports and documents that investigated the use of ethno veterinary medicines in Africa and Cameroon were used in this review. This review paper highlights available developments and understanding of ethno veterinary medicine in Cameroon from 1989 till date.

3. ETHNO VETERINARY MEDICINE IN AFRICA

Livestock farmers in Africa keep animals to meet household demands as their additional sources of incomes, but its production is hampered by rampant livestock diseases Eiki et al. (2021). The impact of animal diseases is particularly severe for smallholder farmers who relying heavily on livestock but have limited access to conventional veterinary services, hence depend on indigenous medicines for the treatment of livestock ailments. To keep livestock healthy, traditional healing practices have been applied for centuries and have been passed down orally from generation to generation Aihanuwa et al. (2017).

In most villages in Africa livestock farmers use EVM regularly as curative and preventive measures in assuring the health conditions of their animals. In Tanzania for example 58% of small holder indigenous poultry keepers use ethno veterinary medicine in the control of most poultry diseases Yongolo (1996). In Ethiopia, traditional medicine has been used by 90% of livestock farmers where complimentary remedies are required to the modern health care system as plants with pharmacological activities prescribed as best choice against livestock diseases. A community-based survey conducted to investigate ethno-veterinary knowledge and practices showed that, a total of 74 species of ethno veterinary plants from 31 families were identified for treatment of 22 different livestock ailments. Three families: Asteraceae, Cucurbitaceae and Solanaceae make up larger proportion of the medicinal plants which accounted for 10.41%, 8.33% and 6.25%, respectively. The findings showed also showed that, trees accounted for 43.24%, followed by shrubs (33.78%) and herbs (14.86%). Eighty one percent of medicinal plants were collected from wild habitats, and leaves represented 68% of the parts of the plant used. The ethno veterinary knowledge use in the treatment of livestock diseases needs further scientific evaluations by phytochemical and antimicrobial

experimentation to determine safety, efficacy, posology, drug development and dosage in pharmacological Yared et al. (2014).

A participatory study involving cattle grazers in the rural areas in Nigeria showed that, these Fulani pastoralists have high levels of ethno veterinary knowledge and good clinical diagnostic abilities. The Fulani pastoralists are mostly illiterates and live far away from veterinary and extension services. They have little knowledge of conventional veterinary knowledge with mostly incorrect veterinary drugs chosen for the treatment some cattle diseases Ayodele et al. (2018).

In the sub-Sahara Africa where livestock production is mostly carried out by small holder farmers, ethno veterinary medicine, especially the use of medicinal plants in the treatment of livestock disease needs to be scientifically explored. Because Africa has several medicinal plants research should be directed towards their potentials

From studies conducted all over Africa, Bruschi et al. (2017), Gabalebatse et al. (2013), Gakuubi and Wanzala (2012), Alhaji and Babalobi (2015)., the search for alternative methods of keeping livestock healthy and productive is now going on in search alternatives or complimentary methods to the conventional veterinary method of keeping livestock healthy and productive.

4. ETHNO VETERINARY MEDICINE IN CAMEROON

The dependence on conventional medicine failed to solve some of the livestock health problems and has been accompanied by a steady decline in the provision of health care services especially in the rural areas where most the smallholder farmers are found Ngeh (1989). Hence promoting the use of ethno veterinary medicine or the complementary application of conventional and ethno veterinary will go a long way in solving livestock health productions problems in the rural areas in Cameroon. The use of ethno veterinary medicine in the management of livestock healthcare is as old as the domestication of various livestock species Moreki (2012). This knowledge which was neglected during the colonial period in Cameroon is being revamped due to the decline of subventions to livestock breeders by the government in the early 1990s due to economic crisis. In Cameroon and most sub-Sahara countries, attention is gradually turning from conventional to ethno veterinary medicine for two reasons: firstly, as the gap widens between the developing and developed countries, where the former can no longer afford for the drugs produced by the latter and secondly the quality of some of the drugs available in the developing countries is questionable Nfi, et al. (2001).

The absence of response to some conventional veterinary treatment coupled with lack of adequate awareness, its usefulness compels smallholder livestock keepers particularly in rural areas to frequently used indigenous remedies in the prevention and treatment of their animals. In Cameroon livestock breeding is mostly practiced by smallholder farmers and traditional medicines has been used for generations to treat human and livestock ailments. Now our days the dependence on this indigenous medicine is still practiced because of its acceptability, accessibility, availability, and safety. Hence the elderly livestock breeders and healers who are mostly the Fulani's are libraries of ethno veterinary knowledge which must be taped and documented for fear of being eroded with time since they are illiterate.

5. ETHNO VETERINARY PRACTITIONERS IN CAMEROON

In Cameroon, ethno veterinary medicine and practices is mostly carried out by smaller holder livestock farmers who make up about 80% of livestock breeders. These farmers are mostly found in the remote areas far from the urban areas where less veterinary personnel and services are available. The breeders keep cattle, sheep, goats, horses, pigs, and chicken and poultry species. Ethno veterinary medicine is mostly practiced by ruminant breeders and to some extend pig and indigenous chicken farmers. These indigenous livestock care practices are carried out in areas where livestock breeding is practiced like in the three northern regions (Adamawa, North and Extreme North Regions) and in the Northwest and West Regions of Cameroon. In the other regions, crop farming and hunting are the main occupations of the people. Livestock production in these regions is carried out by big commercial farmers in urban and peri-urban areas. These farmers do not practice ethno veterinary medicine but use conventional drugs to prevent and cure livestock.

Before the arrival of the Fulani to Cameroon, the indigenous people were keeping pigs, goats, and indigenous chicken in their backyards for sustainability and depended more on hunting for meat so did not care much about the health of their livestock Toyang J.N. et al. (2007). They will either cull the animals or allow them to die. With the arrival of the Fulani nomads, the indigenous people became interested in cattle, sheep, and horse breeding and in their ways of keeping them healthy and productive. In the Northwest, Far North Adamawa, and North Regions of Cameroon, the Fulanis make up the majority of the pastoralists and have a long history of EVM and skills. Most of the indigenous knowledge regarding livestock health in Cameroon is found among the Fulani and they have the knowledge of the epidemiology and pathology of most diseases and ailments that affect their livestock especially cattle Nfi, et al. (2001). The Fulani livestock keepers depended solely on indigenous health care practices to treat themselves and their livestock, and sometimes avoided endemic areas or regions as they move from place to place in search of suitable areas for their animals Toyang, et al. (2007).

After independence and due to the damages caused to the crops of the sedentary indigenes and the spread of diseases as they wander from place to place, the government of Cameroon banned nomadism and promoted transhumance. This action forced the Fulanis to have permanent homes and could move to greener pastures in dry season and back to their homes in the rainy season. The fulanis and other pastoralist who were practicing the transhumance system of livestock breeding in the Northwest and Southwest of Cameroon under the British administration were allocated grazing land to graze their animals around their permanent residences Dongmo, et al. (2012). In so doing, the local councils were able to collect grazing taxes from the herders, while the ministry of livestock, fisheries and animal industries assured livestock health care Pamo, et al. (1991).

6. ETHNO VETERINARY RESEARCH IN CAMEROON

Ethno veterinary Medicine (EVM) is an ancient medical practice which existed in most pastoral communities before the advent of modern health sciences. It was only recently that veterinarians and researchers in Cameroon began recognizing the fact that livestock farmers have a holistic understanding and approach in dealing with diseases and problems that plague livestock production Fokunang et al. (2011). EVM is based on indigenous theories, beliefs and experience that are passed down

by words of mouth for generations. Before 1989, ethno veterinary practices were mostly carried out at individual level by smallholder livestock farmers, with little coordination. From 1989 the Cameroon ethno veterinary council was founded by Heifer Project International Cameroon (HPI Cameroon). This council had about 300 members, all practicing ethno veterinary medicine and the main objective of the project was to bring all the stakeholders of ethno veterinary medicine together and allowed members to share ideas while working together, to create ethno veterinary gardens, carrying out researches and gathering knowledge for proper documentation. Since then, much research work has been done to document and evaluate this indigenous knowledge in some regions of Cameroon. A majority of the ethno veterinary council members were Fulanis' (Aku/Bororos) who have long used traditional livestock healthcare practices and are convinced of their efficacy. In a study carried out by of HPI/Cameroon, 33 out of 55 cattle diseases and ailments (60%) prevalent in the Northwest Region of Cameroon are treatable or preventable solely by ethno veterinary medicine. Only diseases such as anthrax, black quarter, bovine tuberculosis, contagious bovine pleuropneumonia, and rinderpest which could only be treated using conventional veterinary medicine and about 30% these diseases could be dealt with using both traditional and conventional approaches Toyang, et al. (2007).

There are very few reports of experiments carried out under controlled conditions with the aim of validating scientifically EVM practices in Cameroon Agbede, et al. (1993). Tchoumboue et al. (1996), also reported that the bark of *Combretum sp*. has nematodicinal properties on indigenous chickens naturally infected at a dose 1g of the powder per kilogram body weight. In the Northwest Province, an analysis of ethno veterinary medicine practices in the province was carried out. From this research it was found out that conventional veterinary medicine was introduced in the Northwest province in the 1940s. At that time, many orthodox veterinarians did not promote indigenous livestock health practices because they did not appreciate the role it played. In some places, it was even illegal to treat livestock using local herbs without the permission of a veterinarian. Hence, many smallholder livestock farmers ceased to use ethno veterinary practices, while those who continued to rely on them did so in secret. This made the knowledge and use of ethno veterinary medicine to decline Ngeh et al. (1995).

In IRZ Bambui, HPI Cameroon organized a research to analyse the efficiency of indigenous anthelmintics for low cost and sustainable animal healthcare in Cameroon Nfi et al. (1999). This research was carried out in collaboration with the Department of Animal Production of the Faculty of Agronomy and Agricultural Sciences (FASA), University of Dschang and the then Institute of Zoo technical Research (IRZ) Bambui, Bamenda and funded by the African Development Foundation through HPI Cameroon Mopoi (1997). At the end of these trials, it was recommended that, conventional treatments were more potent than the indigenous medicines although the difference was not statistically significant. So, it was recommended that in the absence of conventional treatments, livestock farmers can use these indigenous medicines.

In 2013 a research was carried out in the Far North of Cameroon to study pastoralists' knowledge of zoonotic diseases to evaluate the claims that mobile pastoralist in the Lake Chad Basin do not recognize endemic zoonotic diseases. After the study pastoralists' ethno veterinary knowledge indicated that they were dealing with a non-system. The variation in knowledge and not knowing was not much because pastoralists do not care but do care very much about their livestock health. They were actively seeking and experimenting with traditional and conventional

medicine that could be effective in preventing and treating diseases that affected their livestock in an environment which many dangerous infectious diseases are endemic Moritz et al. (2013). Consequently, ethno veterinary knowledge of pastoralists is best described as a practical knowledge and the most appropriate way to study this kind of knowledge is through a combination of observations and interviews rather than interviews only Meutchieye, et al. (2014a).

A study of ethno veterinary practices against common parasitism in smallholders' goat farming systems in the Southern Cameroon, presented at 6th all African Conference on animal agriculture, Kenyatta international convention Centre, Nairobi. From this paper goat farmers in Cameroon use various plant resources, derived from their cultural background and their immediate environment. From this study it was observed that leaves appeared to be the most used, followed by fruits and barks. Plants parts were used as powder, decoction, and infusion, in drenching, in common salt or in a combination with other ingredients Meutchieye, et al. (2014b).

An ethno botanical and ethno pharmacological study of ethno veterinary practices in the Western Highlands of Cameroon was collectively carried out by researchers supported by Heifer International Cameroon. In this publication, 476 treatments were described with 434 recipes made from plants as raw material and 42 made from mineral and other materials. The frequencies of recipes per animal species were small ruminants 21.43%, pigs 16.81%, Fowls 5.21%, rabbits 14.71%, and cattle 41.80% Tsabang N. (2015).

7. ETHNO VETERINARY PLANTS OF CAMEROON

An ethno veterinary plant is any plant with one or more of its parts, contains substances that can be used for treatment purposes, or which are used as precursors for the synthesis of useful veterinary drugs. Some of these plants have been scientifically evaluated and while some are regarded as ethno veterinary plants but have not yet been subjected to a thorough scientific study. A number of plants have been used as ethno veterinary plants in Cameroon for many years although there are no sufficient scientific data to confirm their efficacies.

Traditional African healing practices make use of three important elements: application of natural products, appeal to spiritual forces, manipulation, and surgery. The natural products include medicinal plants and by products, edible earth (soil) and minerals, parts and products of animals and other ingredients Rhuan, et al. (2012). Plants are the most commonly used ingredients in the preparation of ethno veterinary drugs. More than 90% of the materials used in ethno veterinary medicine are from plants, which mean that there is an urgent need to conserve and propagate the medicinal plants already identified Rhuan, et al. (2012). All parts of the plants including leaves, barks, roots, fruits, flowers, seeds are used in medicinal preparations. At present 35 000 plants are known to have healing properties Susan, et al. (2018).

The methods of collecting the ethno veterinary plants, handling, preparations, storage, preservation, dosage, and administration have been documented and published by Agromisa and CTA Ngeh et al. (2007). In this book, 46 ethno veterinary plants were identified scientifically in addition to their common names the names of some of these plants were also given in Fulfulde and Swahili. Twenty-six diseases that could be treated or prevented by the ethno veterinary plants were identified, meaning that most of these medicinal plants can be used in treating more than one diseases or ailments.

In Cameroon 138 plants were identified in the management of livestock diseases and concluded that an overwhelming majority of livestock farmers in Cameroon rely on traditional healthcare practices to keep their animals healthy. This review noted that most plants could be used in more than one livestock disease. Hence considering the veterinary usage of the medicinal plants, more pharmacological studies are required to confirm the effectiveness of these herbal remedies Dzoyem et al. (2020).

8. DISCUSSION AND CONCLUSION

The major contribution of this review was to come out with what has been done on ethno veterinary research in Cameroon. This has been done since the 1989 when the ethno veterinary council was formed in the Northwest Region of Cameron. Since ethno veterinary is based on plants and will be continuously used by smallholder livestock producers, there is a need for the development of ethno veterinary gardens for a proper conservation of these plant species for fear of extinction.

There is need for more research to evaluate and validate the ethno veterinary properties of these plants. Collaboration between the ethno veterinary practitioners and researchers will help to validate many preparations as well as help in the isolation and purification of compounds and extracts that will be of higher efficacy than the crude preparations. Guideline on validation trails should be developed expeditiously to provide stands for claims of product efficacy Githiori, et al. (2005).

9. RECOMMENDATIONS

In order to incorporate EVM in the smallholder livestock health care in Cameroon, the following recommendations should be considered; create a good and viable phyto-pharmaceutical industry in Cameroon, Translate EVM research into innovation by stepping up the already existing research funding to meet up with the Abuja declaration (Annual 2% of GDP for Research and Innovation). Establish EVM Clinics and promote collaboration between the smallholder livestock farmers' organizations and MINEPIA. The collaboration with MINEPIA will have as objectives; (a) to develop knowledge of local EV plants and to provide training for stakeholders and manuals for livestock producers. This will create knowledge and data base of locally available EV plants for use in managing common livestock ailments. (b) to investigate and understand EVM knowledge and practices of small livestock producers; (c) to offer opportunities for learning and network development among EV practitioners; (d) to create EV gardens for conservation and sustainably use of EV plants species for future generations; (e) to document and produce handbooks in local languages; to create EV medicinal plant database with a view to training new practitioners.

CONFLICT OF INTERESTS

None.

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