

Documentation of ethnoveterinary practices used in family poultry in Botswana

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Abstract

Aim: To document the use of indigenous plants used by family poultry rearers to treat and control diseases and parasites in 15 villages of Botswana.

Materials and Methods: A total of 1000 family poultry rearers in 15 villages were interviewed using a structured questionnaire. Data were also collected through direct observation, village walks, interview of passers-by, group interviews, and meetings with key informants (i.e., traditional leaders, extension agents and chairpersons of village development committees).

Results: The ethnoveterinary practices in 15 villages of Botswana were identified and documented. Nineteen plant species representing 15 families were used by family poultry rearers to treat and control poultry diseases and parasites. Most frequently used plants were from Fabaceae, Asteraceae and Liliaceae. Both human and veterinary medications (*e.g.*, vicks, disprin and Compral tablets, blue stones, potassium permanganate, veterinary drugs and vaccines) were used in health management. Sixty-six percent of the respondents said they used traditional remedies to control and treat diseases, 19% did not use vaccines or remedies, 2% used vaccines while 13% used drugs to control and treat diseases.

Conclusions: Ethnoveterinary medicine predominates in family poultry healthcare. Scientific investigations should be carried out to ascertain the effectiveness of identified plant species used in health management of family poultry.

Keywords: diseases, documentation, ethnoveterinary medicine, family poultry, parasites

Introduction

Ethnoveterinary medicine (EVM) is a scientific term for traditional animal health care that encompasses the knowledge, skills, methods, practices, and beliefs about animal health care found among community members [1]. Ethnoveterinary practice to animal health care is as old as the domestication of various livestock species [2]. The EVM provides valuable alternatives to and complements western-style veterinary medicine [3]. This is increasingly evident in the West where herbal medicine is becoming mainstream. Ethnoveterinary medicine is of specific value in developing countries where allopathic veterinary medicines are often beyond the reach of livestock producers. Many indigenous veterinary beliefs and practices persist in a wide majority of stock raisers and farmers, particularly in the developing countries. Medicinal herbs as potential sources of therapeutics aids have attained a significant role in health system all over the world for both humans and animals not only in the diseased condition but also as potential material for maintaining proper health [4]. The widespread use of herbal remedies and healthcare preparations, as those described in ancient texts such as the Vedas and the Bible, and obtained from commonly used traditional herbs and medicinal plants, has been

traced to the occurrence of natural products with medicinal properties [5]. The indigenous traditional knowledge of medicinal plants of various ethnic communities, where it has been transmitted orally for centuries is fast disappearing from the face of the earth due to the advent of modern technology and transformation of traditional culture [6].

Resource-poor farmers in rural and peri-urban areas have limited access to veterinary care in terms of support services (from state and private veterinarian and animal health technicians), information about the prevention and treatment of livestock diseases, and preventative and therapeutic veterinary medicines [7]. This leads to farmers utilizing EVM for health management of livestock. Ethnoveterinary medicine is widely used by resource-poor family poultry farmers, especially women. Natural products, especially plant products that are locally available, are generally used [8]. The wide use of traditional remedies by family poultry rearers in Botswana is attributable to lack of knowledge in the use of vaccines, lack of cooling facilities, unavailability of vaccines, and possible effectiveness of the remedies in curing some diseases [9]. The use of EVM can be considered sustainable as it is economical, culturally acceptable and ecologically sound [10].

Table -1. Categories of research sites

| More urban | Less rural | Remote |
|------------|------------|-------------|
| Gantsi | Etsha | Motokwe |
| Kanye | Hukuntsi | New Xade |
| Masunga | Marapong | Malolwane |
| Maun | Tlokweng | Parakarungu |
| Mochudi | Tsabong | Mokgomane |

In Botswana, it was observed [11] that family poultry rearers are not vaccinated against any poultry diseases and even when sick resulting in 100% of chicken rearers using herbal concoctions instead. Additionally, 79% of family poultry rearers in Serowe-Palapye Sub-district of Botswana used traditional and human medications to treat diseases and parasites; only 2.11% used vaccines; 15.79% a combination of traditional remedies and vaccines, whereas 3% of rearers said they did not use any form of treatment and/or control [9]. Only 16.46% family poultry rearers in Kalabo and Mongu Districts of Zambia used veterinary drugs, indicating that disease control was mainly through the use of traditional remedies [12]. These findings indicate that EVM utilization predominates in the healthcare of family poultry.

Traditional medicine (EVM) has served as a found of alternative medicine, new pharmaceuticals, and healthcare products [5]. Due to its wide usage, EVM practices need to be investigated and documented. Ethnoveterinary research has as its explicit, overarching goal the enhancement of livestock productivity through improved management of animal health, as informed by an understanding of folk veterinary medicine and related husbandry techniques [1].

There has been little documentation of EVM in Botswana [13]. The objective of this study was to document the use of indigenous plants used by family poultry rearers to treat and control diseases and parasites in family poultry in 15 villages of Botswana.

Materials and Methods

Fifteen villages were randomly selected from a list of villages in all the 10 districts of Botswana. A total of 1000 rearers (450 more urban areas, 300 less rural and 250 remote rural) were interviewed across 15 villages. As shown in Table-1, the research sites were chosen on the basis of the villages being rural (5), less rural (5) and urban (5).

Data collection and analysis: A formal questionnaire was administered to 1000 family poultry rearers in 15 villages. Data were also collected through direct observation, village walks, interview of passers-by, group interviews, meetings with key informants (i.e., traditional leaders, extension agents and chairpersons of village development committees) and also by reviewing secondary sources of data.

Data were analyzed using the Statistical Package for Social Scientists (SPSS) software. Descriptive data such as mean, range and percentage were used to summarise and present results.

Table-2. Poultry species reared in 15 villages

| Poultry species | Number | Percentage |
|-----------------|--------|------------|
| Chickens | 11 524 | 94.27 |
| Pigeons | 372 | 3.04 |
| Ducks | 309 | 2.53 |
| Other | 19 | 0.16 |
| Total | 12 224 | 100 |

Results and Discussion

Poultry species and ownership: Seven species of poultry were kept in the villages including chickens, ducks, pigeons, turkeys, peafowls, geese and guinea fowl. As shown in Table 2, chickens predominated in all the villages followed by pigeons and ducks. In the present study, 82% of women said they owned and reared family chickens while only 18% was owned by men. This probably indicates that family poultry have a bearing in the lives of women than men.

Diseases of poultry: The diseases of village chickens reported in this study were Newcastle disease (NCD), fowl pox, coccidiosis and *saakhubama* (swelling of the bursa of Fabricius, suspected to be Gumboro). Compared to other diseases, NCD was found to occur frequently and caused major losses. The majority of the family poultry rearers were able to describe the symptoms of fowl pox such as scabs around the eyelids and wattles.

Eighty percent of the respondents said that they did not know when NCD occurred while the remainder (20%) said it occurred from April to January. It, however, appeared that NCD occurred mainly between September and January. Newcastle disease had different names in different locations. For example, in Etsha it was known as *dihamba*, *muchachapansi* in Parakarungu and *mokorobalo* or *korobela* in all the villages. Although NCD is currently known as *leroborobo*, it appears that the appropriate name would be *mokorobalo*, as it is the popular name by which it is known by the majority of the rearers countrywide. The name *leroborobo* is based on the fact that NCD kills a large number of birds within a short time while *mokorobalo* defines the nervous signs of NCD.

Control of diseases:

Table-3 summarizes plant species used in family poultry health management. Nineteen plant species were identified by respondents for the treatment and control of poultry diseases and parasites. Sixty-six percent of the respondents said they used traditional remedies to control and treat diseases, 19% did not use vaccines or remedies, 2% used vaccines to control diseases while 13% used drugs. Because of the low number of farmers that vaccinate their flocks, disease outbreaks often occur resulting in high mortalities and economic losses. These findings indicated that the use of traditional remedies predominated in all the villages, especially in the remote areas where drugs and vaccines were not easily accessible. In a similar study, it was reported [14] that 53.25% of the rural chicken farmers in Nigeria used EVM for the management of

Table-3. Plant species and plant parts used in family poultry health

| Family name | Scientific name | Tswana name | English name | Part used | Mode of application |
|---------------|------------------------------------|------------------|----------------------|--------------|-------------------------------|
| Asteraceae | <i>Dicoma sp.</i> | Pelobothoko | Wild karmedik | Roots/leaves | Cold water extract |
| Clusiaceae | <i>Garcinia livingstonei</i> | Motsaodi | African mangosteen | Leaves | Decoction/ cold water extract |
| Fabaceae | <i>Senna italica</i> | Sebete | * | Roots | Decoction |
| Aloaceae | <i>Aloe sp.</i> | Mokgwapha | * | Leaves | Cold water extract |
| Pedaliaceae | <i>Harphagohytum procumbens</i> | Sengaparile | Grapple plant | Tuber | Decoction |
| Capparaceae | <i>Boscia albitrunca</i> | Motlopi | Shepherd's tree | Leaves | Decoction/infusion |
| Euphorbiaceae | <i>Croton grattissimus</i> | Moologa | Lavender fever-berry | Leaves | Decoction |
| Anacardiaceae | <i>Sclerocya birrea</i> | Morula | Marula | Bark | Infusion |
| Fabaceae | <i>Colophospermum mopane</i> | Mophane | Butterfly tree | Leaves | Decoction/infusion |
| Combretaceae | <i>Terminalia serecea</i> | Mogonono | Silver cluster-leaf | Root/bark | Decoction |
| Asteraceae | <i>Artemesia afra</i> | Lengana | African worm food | Leaves | Decoction/infusion |
| Alliaceae | <i>Urginia sanguinea.</i> | Sekaname | Bloodlilly | Bulb | Cold water extract |
| Fabaceae | <i>Cassia abbreviata</i> | Monepenepe | Long tail cassia | Roots/bark | Decoction/infusion/powder |
| Compositae | <i>Senecio strictifolius</i> | Mosimama | Ragwort | Leaves | Cold water extract |
| Mimosoideae | <i>Elephantorrhiza elephantina</i> | Mositsane | Elephant foot | Bulb | Decoction/ cold water extract |
| Polygonaceae | <i>Oxygonum alatum</i> | Letswai la khudu | * | Roots | Decoction/ cold water extract |
| Solanaceae | <i>Nicotiana tabacum</i> | Lebolara | Tobacco | Leaves | Decoction |
| Liliaceae | <i>Allium sativum</i> | * | Garlic | Bulb | Decoction |
| Liliaceae | <i>Allium cepa</i> | Kwii | Onion | Bulb | Decoction |

*Name could not be found

chickens suffering from NCD, whereas 29.4% sought for modern veterinary services. Village poultry (also known as family poultry) are never vaccinated with standards Western-type vaccines [10]. Additionally, access to vaccinations in family poultry is poor although veterinary facilities are improving in most countries and that some veterinary attention is now reaching family flocks [15].

The most common forms of ethnoveterinary preparations were decoction, infusion, cold water extract, tincture, fumigation, poultice, and ointment and cream [16]. According to Table-3, the common method of preparation is decoction followed by cold water extraction.

In the present study, the common veterinary drugs used included Terramycin, oxyphen, oxytetracycline and sulphazine. Both human and veterinary medications were used in treatment of diseases. For instance, blue stones that are used by humans to treat wounds and tinea were also used to treat fowl pox scabs. Other human medications used by the rearers were vicks, disprin and Compral tablets. The use of human medications in the current study is consistent with previous study [10] that reported that very occasionally family poultry are given antibiotics originally intended for human use.

In agreement with the results of the present study, the previous study [17] in Zimbabwe reported the use of *Aloe spp.* in the control and treatment of coccidiosis and other poultry diseases including NCD. Previous study [18] showed that *C. grattissimus*, *E. elephantina* and *C. abbreviata* are used to treat high blood pressure and *U. sanguinea* for stroke in humans in Botswana. *Cassia abbreviata* is used in humans when urine is found to contain some blood.

Potassium permanganate was the common remedy used by the rearers. The rearers said they used it before and during disease outbreaks, especially NCD. However, there were divergent views on the efficacy of potassium permanganate in controlling and treating diseases. For instance, while some rearers said it was

effective some doubted its efficacy suggesting that its efficacy needed to be evaluated. Tobacco snuff (*Nicotiana tabacum*) and Eno were also used to control and treat diseases.

The low use of vaccines by the rearers in the present study could be attributable to the fact most vaccines come in 1000 doses compared to the small flocks reared by families. The average flock size in this study was 14 birds per household. Another factor that contributed to low use of vaccines is lack of housing for family chickens. The majority of birds were not confined resulting in bird catching for vaccinations extremely difficult. Only four villages (Gantsi, Etsha, Maun and Parakarungu) had a high proportion of rearers that provided housing to their flocks, implying that in the remaining villages, vaccination was likely to be difficult to achieve because of lack of confinement. Rural and peri-urban communities are not easily accessible to modern veterinary information and services, and are less economically endowed albeit coping will enormous animal health problems [19].

Parasites and control:

The common parasites of poultry reported by rearers were tampan, mites, fowl lice and ticks. These findings are in line with previous study [20] that reported that the common parasites of poultry in Botswana were mites, fleas, lice, ticks and helminths, with helminths being the most prevalent followed by mites. Smallholder farmers also use traditional methods to treat some ailments, especially those caused by pests [21]. As is the case of diseases, traditional remedies in the present study also predominated in the control and treatment of parasite. The common remedies used in parasite control included ashes (cold and hot), paraffin, used automobile oil, Jeyes fluid, Cape aloes, potassium permanganate and boiling water. Usually, boiling water and ash were poured where birds usually roosted or slept. In addition, ashes were also smeared on the birds. On the other hand, the common chemical dusts were dichlor-diphenyl-trichlor-methane (DDT) and Karbadust. The rearers

claimed that smearing or rubbing paraffin and used automobile oils on the birds resulted in parasites falling off the birds. The result on the use of used automobile oil is consistent with previous study in Zimbabwe [22]. In small ruminants, *Veronia conferia* (leaves), palm oil and engine oil are used against fleas, ticks and mange, respectively in Nigeria [21].

The rearers mentioned that administering potassium permanganate orally or bathing birds in a solution of potassium permanganate was effective in controlling parasites. The rearers said that oral administration of potassium permanganate makes the blood of birds bitter (acidic) or unpalatable to the parasites, thus helping to control parasites. The use of boiling water and hot ash in the shelter or where birds usually slept was reported to be effective in controlling parasites. Also, bathing birds in a solution of washing detergent such as OMO and SURF brands were reported to be effective against parasites.

Conclusion

Nineteen plant species representing 15 families were used by family poultry rearers to treat and control poultry diseases and parasites. Sixty-six percent of the respondents said they used traditional remedies to control and treat diseases, 19% did not use vaccines or remedies, 2% used vaccines to control diseases while 13% used drugs. Traditional remedies predominated in family poultry health care. These results suggest that scientific investigations should be conducted to ascertain the effectiveness of identified plant species in the treatment and control of diseases and parasites of poultry.

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Competing interest

The author declares that he has no competing interest.

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