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Medicinal plants used in treatment of cattle diseases in Serere district, Eastern Uganda

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Article

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Abstract

Medicinal plants form the backbone of the traditional medicine system in the whole world. However, use of medicinal plants for treatment is slowly disappearing due to modernization, urbanization and use of conventional medicine and drugs. The purpose of the study was therefore to identify and document medicinal plants used in the treatment of cattle diseases in Serere district, Eastern Uganda. A total of 80 cattle keepers were purposively selected for the study. Data was collected using a semi-structured questionnaires, observation guides, key informant interviews and field guided walk. The commonest medicinal plants' families of the 25 families identified were Fabaceae (9.76%), Euphorbiaceae (7.32%), Meliaceae (7.32%), Mimosaceae (7.32%), Poaceae (7.32%) were the most dominant families. Followed by Combretaceae (4.88%), Cucurbitaceae (4.88%), Menispermaceae (4.88%), Solanaceae (4.88%), Vitaceae (4.88%). The main medicinal plant part used was the root (70%). The oral route (68.5%) was commonly used in administration of medicinal plants, prepared mainly as cold extracts (86.4%). A total of 28 cattle diseases/conditions were reported by the farmers to be treated using medicinal plants. The challenges faced by the farmers in the use of medicinal plants were mainly difficulty in preparation of extracts (30.3%) and seasonal unavailability of plants (16.7%), climatic change and deforestation (9.1%) and lower efficacy (9.1%). The plants were sourced from wild (76.2%), cultivated sources (15%) and Agricultural gardens (8.85%). Further research should be done to test the efficacy of these plants. The use of mainly root presents a significant conservation concern because it involves destructive harvesting that can kill the entire plant, rather than allowing for regeneration hence increasing vulnerability for extinction.

1. Introduction

The livestock industry is a source of livelihood for approximately 58% of households in Uganda (FAO, 2019). The livestock industry however faces a number of challenges including a veterinary sector with inadequate veterinary personnel and high cost of conventional medicines (Nabatanzi *et al*., 2025). Studies have shown that nearly 90% of drug retailers and veterinary practitioners lack specialized training in veterinary medicine, which increases the risk of antibiotic misuse and emergence of antimicrobial resistance (Dione *et al*., 2021). Ethnoveterinary medicine is essential for addressing high costs and limited access to conventional veterinary drugs as it offers cost-effective, locally available solutions (Bakare et al., 2020).

The use of ethnoveterinary practices remains a prominent aspect of traditional medicine in Uganda. Many rural farmers have depended on it for a long time to manage their livestock (Anywar et al., 2025). Medicinal plants are a rich resources of ingredients which can be used in drug development and synthesis (Bukuluki et al., 2014). Curative properties of plants for livestock diseases have been recorded in several and different parts of the world (Romero-Daza, 2002). The development of acceptable and effective drugs from reasonably inexpensive sources for use as supplements to commercial drugs from medicinal plants is needed (Nalule et al., 2011). This would provide a cheap source of naturally available medicines at no or little cost in mostly rural areas (Sori et al., 2004; Githiori et al., 2005).

However, use of medicinal plants for treatment is slowly disappearing due to modernization, urbanization and use of conventional medicine and drugs (Yesilada and Sezik, 2003). Although many medicinal plant species have been used to treat a variety of animal diseases, most of these plant species have however not been scientifically documented. To date, specific ethno pharmacological studies have been limited in Uganda (Kamoga, 2010; Nalule et al., 2011). The purpose of the study was therefore to identify and document the medicinal plants used in the treatment of cattle diseases in Serere district, Eastern Uganda.

2. Materials and Methods

2.1. Study area

The study was conducted in Sub-counties of Kateta, Pingire, Kyere, and Bugondo in Serere district. These sub counties were purposely chosen because of their proximity to water bodies (L. Kyoga) and have large swamps which act as rest and breeding areas of disease vectors and pathogens. Agriculture is the main economic activity in the area and is mainly characterized by crop and livestock farming (Matovu and Olila, 2010). Savannah grassland is the main vegetation in the study area, which receives 1200–1500 mm of rainfall annually distributed in a bimodal manner. Two seasons wet seasons and dry season, March to May and September to November. The overall daily mean minimum temperature is 15°C and the mean maximum 27°C (Eisler et al., 2012). Such areas are prone to cattle diseases due to high interactions between cattle from different areas. In addition, these areas are remote from veterinary centers and farmers tend to use medicinal plants for treatment and prophylaxis of cattle diseases.

2.2. Study design

Eighty respondents were purposively sampled from the whole district, 20 from each of the 4 Sub counties for semi structured interviews. Fifteen key informants were selected for further interviews on use and application of medicinal plants in treatment of cattle diseases (Nalubega et al., 2012). Data was collected using a structured questionnaire that was developed for this study, group discussions, participatory general conversation with field guided walk, direct observations and collection trips (Jovel et al., 1996). Qualitative data was collected through key informant interviews that provided in-depth analytical information from knowledgeable people, and observation guides as previously described (Nalubega, 2010). Quantitative data was collected using a questionnaire administered to the 80 respondents. The full questionnaire is provided as a supplementary file. The plants specimens were viewed and collected from the field. Medicinal plants local names were identified from the key informants and in the fields after being shown by the farmers. Identification of plants' local names was also done using the photos, adopting the method of Yin et al. (2012). Botanical identification for some plants was done using the available secondary data. Other specimens were taken to Makerere University herbarium, Department of Botany for botanical identification. Specifically, plant samples were mounted on hard paper, air dried under a press with brief description of the plant i.e. local name of the plant, and uses of the plant (Matovu and Olila, 2010). All the plants were observed and identified according to their

local names (WHO, 2007); and their medicinal parts used in treatment of cattle diseases. The collection of specimens from medicinal plants and harvesting was carried out in accordance with legal and environmental requirements and with ethical codes and norms of the community in which the activity took place. The provision of the convention on biological diversity was observed (WWF, 1993).

2.3. Data analysis

The information gathered was entered in Microsoft excel (2013) computer package, the data was coded and analyzed basing on statistical descriptions like percentages, frequency and rate with the help of SPSS statistical package to analyze quantitative data in order to obtain descriptive statistics based on analysis of variance and t-test.

3. Results

3.1 General Demographic characteristics of the respondents

Gender distribution of the respondents indicated that 33.8% were females and 66.2% were males. The age characteristics of the respondents showed that a majority were aged above 51 years (53.8%), the rest were either 19-35 years (12.5%) or 36-50 years (33.8%). The results on religious affiliation indicated that Roman Catholics constituted 46.2% of the respondents, Protestants 28.8%, Muslims 12.5%, and Pentecostals 12.5%. The Education background of the respondents revealed that primary level 40.0% was the mostly attended level of education by the respondents, secondary level 22.5%, 7.5% attained tertiary level of education, 13.3% attained junior level of education and 16.2% never attended formal education.

3.2. Mode of acquisition of knowledge

Results on mode of acquisition of knowledge indicated that 63.8 % had acquired it from older family members including father, mother, grandfather/mother, 4.35% had acquired it from other elders and 20% from friends and relatives. The rest acquired by trial and error on their own animals (10%) or through training/workshop (6.2%). The responses regarding experience in use of medicinal plants indicates that 5% have been using these plants for a period of < 5 years, 21.2% for a period of <10 years, 28.8% for a period of < 20 years and 45% for a period of < 50 years.

3.3. Medicinal plants used in treatment of cattle diseases in Serere district

During the current study, 41 species of medicinal plants were identified to be used in treatment of cattle diseases in Serere district. These were grouped into 25 families: of which Fabaceae (9.76%), Euphorbiaceae (7.32%), Meliaceae (7.32%), Mimosaceae (7.32%), Poaceae (7.32%) were the most dominant families. Followed by Combretaceae (4.88%), Cucurbitaceae (4.88%), Menispermaceae

(4.88%), Solanaceae (4.88%), Vitaceae (4.88%) and the rest of the families were identified with single species (2.44%) as shown in Table 1. Different parts of these plants were documented for treatment of cattle diseases. Of these, root was identified as the most frequently used (70%), whole plant (7.5%), fruit (5%), Leaves & Stem (5%). The other plant parts used were Stem and seed (2.5%), Stem (2.5%), Leaves &Roots (2.5%), Bulb (2.5%), and Leaves (2.5%) as summarised in Table 2. The various diseases that were reported to be treated with medicinal plants and methods used in the preparation of these medicinal extracts were provided in Table 3.

3.4. Methods of preparation of medicinal plants remedies

The main methods of medicinal plant preparations/extraction were through; cold extract (86.4%), powder extract (2.3%) and decoction (11.4%) (Table 4).

3.5. Routes of administration medicinal preparations

In this study, three different routes of administrative were used for different plant preparations and these were oral route (68.5%), topical route (22.2%) and Eye drop (9.3%) (Table 5).

3.6. Common cattle diseases treated by the medicinal plants in Serere district

3.7. Challenges faced by farmers in using medicinal plants

Of the 80 respondents, all responded that utilization of traditional herbal drug has been declining from time to time due to several challenges rest. The challenges responsible for this were difficulty of preparation (30.3%) seasonal unavailability of plants (34.8%), availability and coverage of modern drugs and education (16.7%) Lower efficacy (9.1%) climatic change and deforestation (9.1%)

3.8. Sources of medical plants

The sources of the medicinal plants used in the treatment of cattle diseases are shown on the figure below. The plants were obtained from the wild (76.2%), cultivated sources (15%), and Agricultural gardens (8.85%)

4. Discussion

From this study, the gender distribution of the respondents indicates that 33.8% were females and 66.2% were males. This was in agreement to the observations by Nalule et al. (2011) in the dry lands of Uganda where males dominated use of herbal remedies in helminthes control. The male dominance in ethno veterinary practices is explained by findings of Esenu (2005) who reported that males dominate

treatment of livestock in the Teso farming systems in addition to ownership of cattle which are referred in this study. Women usually owned small ruminants, poultry and pigs and are culturally responsible for milking animals, processing the milk and generally looking after family stock (Oluka et al., 2005). The age characteristics of the respondents showed that a majority were aged above 51 Years (53.8%), the rest were either 19–35 years (12.5%) or 36–50 years (33.8%). This is an indication that very few youths were involved in the administration of medicinal plants in treatment of cattle diseases. Similar observations have been made (Adeola et al., 2012). These findings showed that use of ethno veterinary medicines is associated with old people. Tamiru et al. (2013) noted that indigenous knowledge is being held secrete by old people and at times they die without passing on to the next generation. This poses a danger of extinction of indigenous knowledge on use of medicinal plants. As the knowledge of traditional medicine is held as professional secret, the practitioners should be encouraged to transfer their knowledge to interested persons in their communities (Yirga et al., 2012).

The results on religious affiliation in this study indicate that Roman Catholics constituted 46.2% of the respondents, followed by Protestants 28.8%. The rest were either Muslim (12.5%) or Pentecostal (12.5%). This compares to the findings of Adeola et al. (2012) who observed that majority of the people practicing ethno veterinary practice in Ekiti State were Christians and less of Islamic and Pentecostals. This means some people believed on the highest God and believed that the use of medicinal plants in treating any disease was a pagan way of life or most of them used conventional medicines. The education background of the respondents revealed that Primary level 40.0% was the mostly attended level of education by the respondents, secondary level; constituted 22.5% of the respondents, only 7.5% attained tertiary level of education, 13.3% attained junior level of education and 16.2% never attended formal education. Adeola et al. (2012) reported that people practicing ethno veterinary medicine are less educated whereby 61.5% of the people from his study area had no formal education while the remaining 15.6%, 13.3% and 9.6% had primary education, secondary education and Tertiary education. As people advance with education they have a tendency of leaving behind traditional knowledge and adopt western cultures and conventional medicines (veterinary antibiotics).

Results on mode of acquisition of Ethno veterinary knowledge indicated 63.8% of them had acquired the knowledge from older family members including father, mother, and grandfather/mother; while (4.35%) had acquired it from other elders, friends and relatives (20%). The rest acquired through trial and error on animals (10%) or through training/workshop (6.2%). The present research revealed vertical transfer of ethno veterinary medicine knowledge to the most selected family member and few individuals outside the family members orally with great secrecy which corresponds to Tamiru et al. (2013) in Ethiopia. It is known that ethno veterinary practices have been developed by trial and error (Tamiru et al., 2013). This is consistent with acquisition of the knowledge and practice by trial and error presented in the current study. Traditional veterinary knowledge like all other traditional knowledge systems is handed down orally from generation to generation and it may disappear because of rapid socioeconomic, environmental and technological changes and as a result of the loss of cultural heritage under the guise of civilization (Khan et al., 2012).

During the current study, 41 species of medicinal plants were identified to be used in treatment of cattle diseases in Serere district. This is in agreement with the findings of Verma (2014) who found out that a total of 41 plant species in 39 genera and 25 families were used traditionally for the treatment of more than 36 diseases in the studied area elsewhere of Tikamgarh District of Bundelkhand, Central India. Some of the plants used by the Cattle keepers in Serere district have also been reportedly used in other districts of Uganda. It has been reported that the People of Karamoja of northern Uganda chiefly rely on ethno veterinary knowledge to control and treat common livestock health problems. The use of 209 plant species has been documented from that region (Gradé et al., 2009). Kamoga (2010) documented a total of 43 plant species from 20 families were as useful in managing various cattle diseases/ailments by the pastoral farmers in Kabira sub-county, Rakai District. These were grouped into 25 families: of which Fabaceae (4.8%), Euphorbiaceae (7.3%), Meliaceae (7.3%), Poaceae (7.3%) were the most dominant families. Followed by Combretaceae (4.8%), Cucurbitaceae (4.8%), Menispermaceae (9.8%), Solanaceae (4.8%), Vitaceae (4.8%) and the rest families were identified with single species (Table 1). Fabaceae and Solanaceae families were also reported to be commonly used at Rakai district for treatment of cattle diseases (Kamoga, 2010). The dominant use of Cucurbitaceae, Euphorbiaceae, Fabaceae and Solanaceae families have also been reported to be used for treatment of cattle diseases in Ethiopia (Tamiru et al., 2013) and other countries (Khan et al., 2012). Such widespread use of these plants by different groups of societies in different countries could be to a certain extent being attributed to their efficacy. In other words, the ethno medicinal reports of those species from wider geographical regions and different cultural groups could validate the medicinal properties of these species (Lulekal et al., 2008).

Different parts of these plants were documented for treatment of cattle diseases. Of these, root was identified as the most frequently used (70%) plant part followed by whole plant (7.5%), fruit (5%), Leaves & Stem (5%). The other plant parts used were Stem and seed (2.5%), Stem (2.5%), Leaves &Roots (2.5%), Bulb (2.5%) and Leaves (2.5%). The results of the current study disagree with findings of Kamoga (2010) whose findings revealed that leaves (62.7%) as the plant parts most used as sources of medicines for treatment of cattle diseases in Kabira Sub County, Rakai district. The popularity of the roots, stem and whole plant have a negative effect from both ecological point of view and from survival of the medicinal plant species (Nalule et al., 2011). A plant whose roots are most used is more susceptible to extinction than that whose leaves and fruits are used unless proper conservation and sustainable measures are considered (Nalule et al., 2011). Medicinal preparation that involves roots, rhizomes, bulbs, barks, stems or whole parts have effects on the survival of the mother plants (Dewit and Ahadu, 1993).

In this study, three different routes of administration were used for different plant preparations and these were oral route (68.5%), topical route (22.2%) and Eye drop (9.3%). The use of oral route for administration of drugs for treatment of livestock disease has been documented (Nalubega *et al*., 2011). Oral drenching was the major (91.9%) route of administration of medicinal plant preparation in pastoral communities of Uganda (Nalule *et al*., 2010; Nalubega *et al*., 2011). Elsewhere, Harun *et al.* working in Banladesh also reported that oral route of administration was mostly used in application of medicinal plant preparation in addition to topical application for control of external parasites. Routes of

administration of herbal preparations varied depending on perceived diagnosis. In this study, topical application was common in the treatment of skin diseases, parasite control and treatment of wounds. This is comparable to the findings of Masika and Afolayan, 2002) in South Africa.

A total of 28 diseases/conditions were found to be treated using the identified medicinal plants in the current study. These disease conditions are comparable to those reported by Kamoga (2010) whose study indicated similar diseases/condition such as Worms (Helminthosis), diarrhea, eye infections, East Coast Fever, Retained Placenta, Cough, Bloat, Wounds and Ectoparasites. Similarly Nalule et al. (2011) reported diseases/conditions like bloat, Poor milk let down, Trypanosomiasis, Lumpy Skin diseases, CBPP, FMD. Heart water, Anaplasmosis, retained placenta, snake bites, ECF were also reported by Ejobi et al. (2007) in the Lake Victoria basin. Elsewhere, Trypanosomiasis, Diarrhea, bloat, Helminthosis snake bites, and wounds were the common diseases in Ekiti state Nigeria (Adeola et al., 2012). A multitude of diseases and conditions reported in the area may be attributed to type of climate, production and system. The habitat plays a great role in the existence of some diseases like trypanosomosis due to their harboring of the disease vector- tsetse flies (Magona et al., 2008). The prevalence of these diseases constitutes a serious problem to livestock production in Serere and Uganda as a whole.

All respondents agreed that utilization of traditional herbal drug has been declining from time to time due to several challenges. The challenges responsible for this were difficulty of preparation (30.3%) seasonal unavailability of plants (34.8%), availability and coverage of modern drugs and education (16.7%) Lower efficacy (9.1%) climatic change and deforestation (9.1%). Tamiru et al. (2013) reported similar challenges in Ethiopia. Low efficacy of medicinal plants and unwillingness of some practitioners to transfer the indigenous knowledge to other people in the community have also been cited (Ejobi et al, 2007). Some drawbacks to traditional medicine have been reported as; incorrect diagnosis, imprecise dosage, low hygiene standards and secrecy of some healing methods (Bhandari et al., 2000). Nalule et al. (2011) cited deforestation (56%), overgrazing (5%), changing land use (24%), termite invasion (7%), medicine trafficking and poor harvesting (6%) and persistent drought (2%) as some of the challenge facing use of medicinal plants in pastoral communities of Uganda. Documentation of indigenous knowledge (IK) on medicinal plants use would help in solving the problem of unwillingness of practitioners to transfer knowledge from generation to generation (Tamiru et al., 2013)

The sources of the medicinal plants used in the treatment of cattle diseases are shown on the figure above. The plants were obtained from the wild (76.2%, cultivated sources (15%), Agricultural gardens (8.85%). This implied that most plants were obtained from the wild as it was earlier on reported by Nalule et al. (2011) in pastoral areas of Uganda. In Ethiopia ethno veterinary medicinal plants are mainly collected from the wild stands (Yirga et al., 2012. The results of the current study imply that no conservation measures have been put across to preserve the medicinal plants and the indigenous knowledge in the study area. Yirga (2010) advocated for awareness creation among the cattle keeping communities in Africa to preserve the indigenous medicinal plant species through establishment of botanical gardens.

5. Conclusions

Forty one plant species belonging to twenty five families were identified to be used in treatment of cattle disease in Serere district. The use of mainly roots was a significant conservation concern because it involves destructive harvesting that can kill the entire plant, rather than allowing for regeneration hence increasing vulnerability for extinction. The main routes of administration of medicinal plants preparation remedies was found to be oral drench. The challenges faced by farmers in the use of medicinal plants were: difficulty of preparation, seasonal unavailability of plants, availability and coverage of modern drugs, Lower efficacy, climatic change and deforestation. The common cattle diseases/conditions treated by medicinal plants in Serere were Poor Milk let down, Cataracts, ECF, Wounds, Anaplasmosis, Heart water, Intestinal Worms, Snake bites, Trypanosomiasis, Ticks, Cough, Retained placenta among other diseases/conditions. The plants were mainly obtained from the wild. There is therefore need to conduct agronomic research into growing medicinal plant gardens, especially on those extensively used in the study area and other parts of Uganda, this could reduce pressure on plant populations that remain in the wild. Efficacy of documented medicinal Plants against the most prevalent cattle diseases should be evaluated, in order to recommend effective preparations and treatments to this poor population group of cattle farmers.

Declarations

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Author contributions

J. E., conceived and designed the study; G.A, reviewed the concept; G.A, carried out the fieldwork; J.E, G.A, analysed data; J.E, G.A, wrote, reviewed and edited the manuscript.

Data availability

The datasets created or analyzed in our study are available from the corresponding author upon reasonable request.

Clinical trial number: not applicable

Ethical approval: The study was approved by the Research Ethics Committee of the Faculty of Agriculture and Animal Sciences, Busitema University. The study protocols complied with institutional, national and international guidelines.

Consent to participate: Informed consent was obtained from all the farmers who participated in the study. The process complied with institutional, national and international guidelines.

Consent to Publish: not applicable

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Tables

Tables 1 to 6 are available in the supplementary files section

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