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Original article

Communal farmers' perceptions on the use of indigenous knowledge in controlling ticks and tick-borne disease (Anaplasmosis) in cattle: a case of Katima rural constituency, Zambezi region Namibia

P. Mashebe, J. Abah*, A. Zulu

Department of Mathematics, Science and Sport Education, University of Namibia, Katima Mulilo Campus, Private Bag 1096, Katima Mulilo Namibia.

*Corresponding author; Department of Mathematics, Science and Sport Education, University of Namibia, Katima Mulilo Campus, Private Bag 1096, Katima Mulilo Namibia.

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ABSTRACT

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Communal farmers in most African countries have used both indigenous and modern knowledge to control ticks and tick-borne diseases. The aim of this paper is to report on the communal farmers' perceptions on the use of indigenous knowledge in controlling ticks and tick-borne diseases (Anaplasmosis) of cattle in the Katima Rural Constituency, Zambezi Region Namibia. The data was collected using structured questionnaires and analyzed as percentage of the participants. The results show that 85% of the participants are aware of the existence of ticks and tick-borne diseases affecting cattle in the study area and this suggests that the problems are evident in the area. It was also found that the roots, leaves and bark extracts of Muhonono (*Terminalia sericia*), Mukolotela (*Piliostigmathonningii*), Muchoko/Itanga (shrub) and Umbwiti/Ligwatanga (shrub) are often used by the farmers in the ethno-veterinary control of ticks and tick-borne diseases. This practice is evident among the older age bracket (51 – 70 years), with the 61 – 70 years old participants indicating complete reliance on the use of ethno-medicine to control their cattle's ticks and tick-borne diseases. Even though, there is an existing government policy that compels all farmers to vaccinate their animals against all sorts of

livestock diseases in order to supply healthy meat to the markets, the financial cost of utilizing the conventional methods appears to be beyond the reach of most of the communal farmers. This effect will continue to promote the use of ethno-medicine in the control of ticks and tick-borne diseases in the study area. Therefore, there is need for government veterinary department to work with the communal farmers in identifying and standardizing the plant extracts for wider applications in controlling cattle's ticks and tick-borne diseases.

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1. Introduction

Cattle industry in the Zambezi region of Namibia contributes significantly to the agricultural sector of the country's economy. Generally, many African tribes value cattle highly and attach many uses to them (Owen et al., 2005). The possession of cattle contributes significantly to the farmers' income and food source. Cattle are also used in many ceremonial purposes such as payment of bridal price (lobola) during marriages (Owen, et al., 2005). They are an important source of draught power, meat, milk, hides and can easily be converted to cash (FAO, 1998). Since the majority of cattle in Zambezi region of Namibia are owned by resource-poor farmers found in the rural areas, they face many constraints inhibiting productivity of the animals.

Notably, the incidences of ticks and tick-borne diseases have been the leading cause of cattle's high mortality rate in the region (Muchenje et al., 2008). Although, ticks are known to attack large game and other small animals such as rabbits and birds, their favourite hosts remains the cattle (Peter et al., 2005). The economic impact of ticks and tick-borne diseases has long been recognized (de Waal, 2000). In fact, ticks have been reported to account for the most common external parasites affecting the economic operations of small-holder farmers in Southern Africa (Hlatshwayo and Mbatj, 2005). They transmit diseases such as *anaplasmosis*, *babesiosis* and *ehrlichiosis*, which account for the high morbidity and mortality rates of cattle. It is reported that anaplasmosis is commonly widespread in Africa putting cattle production at risk (de Waal, 2000). Anaplasmosis is an infectious, tropical vector-borne disease of cattle which is transmitted by rickettsial parasites: *Anaplasma marginale* and *Anaplasma centrale*. The disease is commonly transmitted by ticks although it can also be transmitted through the use of contaminated needles, dehorning and castrating equipment, knives, tattoo instruments, as well as mosquito and fly bites (de Waal, 2000). Anaplasmosis causes fever, breathlessness, severe anemia, weight loss, uncoordinated movements, abortion and, ultimately, death (de Waal, 2000).

Ticks are also notorious for causing what is termed as 'tick worry', causing cattle to lose condition and become weakened, resulting in reduced immunity to other infections (Drummond, 1983). Ticks cause damage to animal hides leading to teats and blood loss, exposing the animals to secondary bacterial infection (Peter, et al., 2005).

In confronting tick-borne diseases of cattle, the uses of conventional acaricides have been considered as the main effective remediation approach. However, the high expenses associated with utilizing conventional *acaricides* make them inaccessible to the majority of resource-poor rural farmers. The United States Department of Agriculture (USDA, 1967) declared that conventional acaricides can be severely toxic as they can leave residues in human and animal tissues and may be destructive to the environment if not properly used. Owing to these challenges, many resource-poor farmers in the Katima rural constituency of Zambezi region, Namibia have resorted to the use of alternative indigenous methods that fall within ethno-veterinary remedies in tackling ticks and tick-borne diseases in the area. Ethno-veterinary remedies are indigenous and time-tested methods and systems of caring for livestock based on local people's knowledge, folk beliefs, skills and traditional practices of animal production and healthcare (Mathias-Mundy and McCorkle, 1989). Ethno-veterinary remedies are complimentary and provide valuable alternatives to modern medicines. They play a significant role in grassroots development by enhancing the use of indigenous knowledge and resources (Bizimana, 1997). Considering the impact of this practice in the study area, it becomes pertinent to study and document the communal farmers' perceptions on the use of indigenous knowledge in controlling ticks and tick-borne diseases (Anaplasmosis) of cattle in the Katima Rural Constituency, Zambezi Region Namibia.

2. Materials and methods

2.1. Study area

The study was conducted in the Katima rural constituency of Katima Mulilo district, Zambezi region Namibia. Zambezi region is located on latitude 17°41.59''S and longitude 24°08'15.7''E based on the World Geodetic System (WGS) 84 coordinates reference system (Abah, et al., 2014). There is a national conservation (Salambala conservancy) adjacent to the study area. The vegetation of the study area is characterized by tall deciduous trees, open grass land and swamps. The study area has a wet and scorching summer with a mean temperature ranging between 30-38°C and a dry and cold winter with a mean temperature of between 5°C to 18°C. As an agrarian region with predominantly livestock farming, the study area is faced with ticks and tick-borne diseases as the major constraint to livestock productivity which they have been managing to curtail via ethno-veterinary remedies.

2.2. Data collection

Questionnaires were used to collect qualitative data on the perceptions of the communal farmers in the use of ethno-veterinary remedies in controlling ticks and tick-borne diseases. A total of 15 participants, consisting of 3 village-heads and 12 other cattle farmers were purposely selected from 3 villages to fill the questionnaires. The data were collected between August and September 2015. Great care was taken to ensure that only farmers who owned cattle or are involved in taking care of cattle participate in the study. The data sought both on the participants' cattle farming experience, knowledge of ticks and tick-borne diseases as well as their perceptions of using ethno-veterinary remedies and conventional *acaricides* to control tick and tick-borne diseases. Demographic data of the participants collected include village name, age, and literacy level. Data on the plant species used based on their local names, method of preparation and administrations were recorded respectively.

2.3. Ethical consideration

Before conducting the study, personal visits to the 3 selected villages were made to seek permission to carry out the study. The objective of the study was clearly explained to the participants and verbal consent was obtained prior to the administration of questionnaires. The participants were told that the data will be used for academic purposes only and assured of their rights to withdraw from the study at any point they wish to.

2.4. Data analysis

Data collected using the questionnaires were tallied in figures and presented using graphs.

3. Results

Fig. 1. below provides information on the educational levels of the participants.

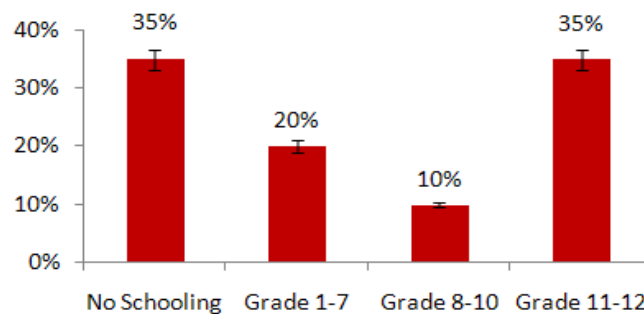


Fig. 1. Distribution of respondents by level of education.

The result shows that 35% of the participants had grade 11-12 level education, 10% had grade 8-10, 20% had grade 1-7 while 35% had no schooling experience at all.

The results in Fig. 2. provide the participants' awareness of the incidence of ticks and tick-borne diseases in the study area. The level of the farmers' awareness of the incidence of tick and tick-borne diseases affecting cattle

is highest in Sikanjabuka (90%), followed by Silumbi (88%) while in Salambala, the result showed equal levels of aware (50%) and not aware (50%) of the problem by the participants.

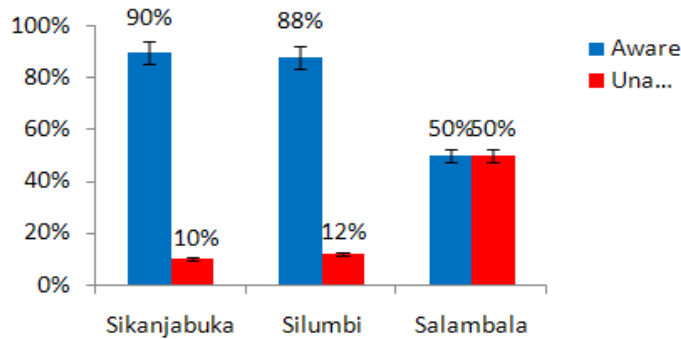


Fig. 2. Awareness of the incidence of ticks and tick-borne diseases per study area.

Fig. 3. shows the overall level of awareness of the incidence of ticks and tick-borne diseases affecting cattle across the study area. The majority (85%) of the participants are aware of ticks and tick-borne diseases and only 15 % of the participants indicated that they are not aware of the problem.

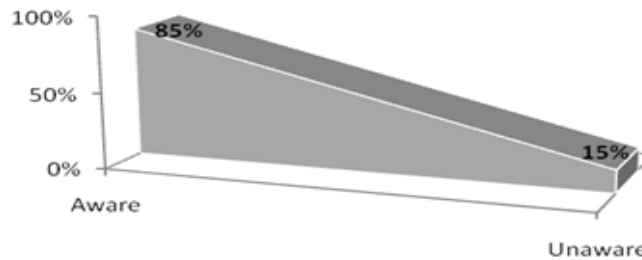


Fig. 3. Overall awareness of ticks and tick-borne diseases across the study area.

The results in Fig. 4. indicate the participants' awareness with age on the use of traditional medicines in controlling tick and tick-bone diseases of cattle in the study area. The younger generations (21 – 50 years) and the elderly (> 70 years) indicated that they are not aware of the use of traditional medicines in controlling tick and tick-bone diseases of cattle while the older generations (51- 70 years) were aware of using the traditional medicine approach.

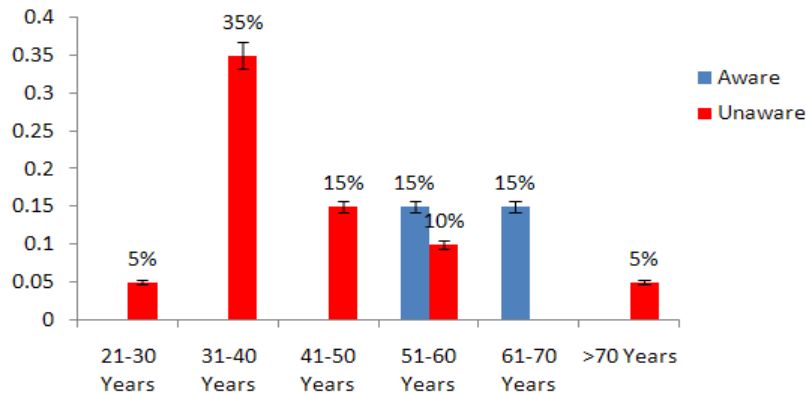


Fig. 4. Awareness grouped by age of the participants on the use of traditional medicines in controlling ticks and tick-borne disease (Anaplasmosis) in cattle.

Fig. 5. presents the overall percentage awareness of the use of traditional medicines to control ticks and tick-borne diseases of cattle in the study area. The majority (70%) of the participants indicated that they are unaware of the use of traditional medicines while 30% are aware of the use of traditional medicines in the control ticks and tick-borne diseases in cattle.

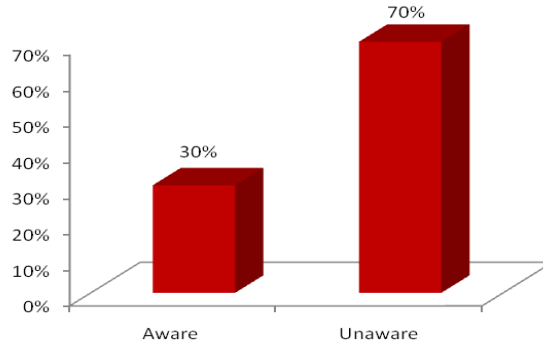


Fig. 5. Overall awareness of the use of traditional medicine in the study area.

The results in Fig. 6. show that 20% of the participants who had no schooling experience and 10% of those who had attained grade 1-7 level education indicated that they are aware of the use of traditional medicines in the control of ticks and tick-borne diseases. Thirty-five percent (35%) of the participants who had grade 11-12 and 8% (grade 8-10) levels of education indicated that they are not aware of the use of traditional medicine in the control of tick and tick-borne ailments in cattle (Fig. 6.).

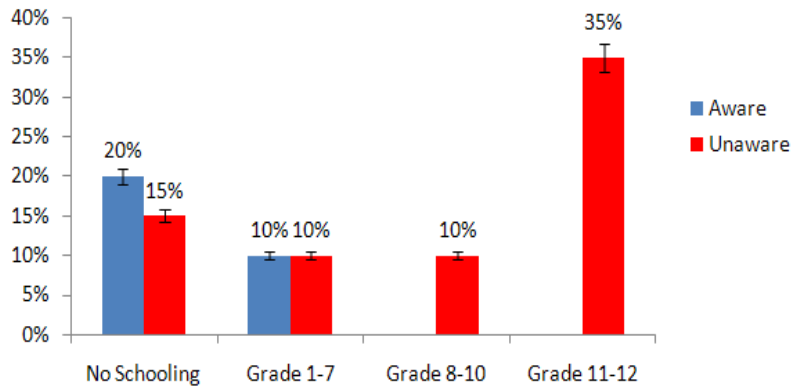


Fig. 6. Percentage awareness of use of traditional medicines to control of tick and tick-borne diseases by level of education.

The results in Table 1 below show the four popular medicinal plant species used in the treatment of ticks and tick-borne disease (Anaplasmosis) affecting cattle in the study area. The traditional methods of preparations and administrations of the medicines were as indicated in the table.

Table 1

Medicinal plant species used in the treatment of ticks and tick-borne disease (Anaplasmosis) in cattle in the Katima Rural constituency.

Family	Botanical name	Local name (Silozi)	Plant parts used	Preparation and administration
Combretaceae	Terminalia sericia	Muhonono	Leaves and roots	Chop the roots and crush the leaves and add water. Mix with Leaves, roots and ponds of Muchoko/Itanga and Terminalia sericia and add water. Allow the mixture to overnight. The following morning cattle can be given orally to drink. For the

Caesalpiniaceae	Piliostigmathonningii	Mukolotela	Leaves, resin, ash, roots and ponds	treatment of anaplasmosis. Chop the roots and crush the leaves, mix with Leaves, roots and ponds of Muchoko/Itanga and Terminalia sericia and add water. Allow the mixture to overnight. The following morning cattle can be given orally to drink. For the treatment of anaplasmosis.
Shrub family	-	Muchoko/Itanga	Tubers and leaves	Chop the tubers and leaves into smaller pieces and then crush the material in pounding pot. When completely crushed put in a container, preferably a bucket and add water. Allow it to dissolve in water for a night. Mix it with Leaves roots and ponds of Piliostigmathonningii and leaves and roots of Terminalia sericia. Allow the mixture to overnight. The following morning cattle can be given orally to drink. For the treatment of anaplasmosis.
Shrub family	-	Umbwiti/Ligwatanga	Tubers and leaves	Chop the tubers and the leaves into smaller pieces, put into a dish and then add water. Take a cloth and spear all the areas on the animals with visible tick infestation.

4. Discussions

The results obtained in this study revealed that some communal farmers in the Katima rural constituency still rely on traditional knowledge and ethno-medicines to treat their cattle infested with ticks and tick-borne diseases. However, the use of ethno-medicines by farmers in the study area was more evident among the older age bracket (51 – 70 years). In particular, the 61 – 70 years participants indicated complete reliance on ethno-medicines to control of cattle's ticks and tick-borne diseases. In a study on the ethno-botanical survey of medicinal plants used in the treatment of ticks, (Magwede et al., 2014) reported that more information was recorded among the older age group on the use of traditional plant extracts in the control of ticks. It was observed that people below the age of 50 years seem not to have knowledge of ethno- medicinal plants that are used in treating ticks and tick-borne diseases such as *anaplasmosis*. This suggests a lack of interest in the use of traditional medicines and a large dependence on modern conventional medicine by the younger (21 – 50 years) category of the participants. The less interest in the use of the traditional medicines to control ticks and tick-borne diseases of cattle by the younger people may also suggest lack of their involvement in the use of the medicines.

The majority (85%) of the participants which indicated awareness of the problems associated with ticks and tick-borne diseases in the study area suggest that the problems are evident in the area.

The study also found that the plant species often used in the ethno-veterinary control of ticks and tick-borne diseases in the study area include Muhonono (*Terminalia sericia*), Mukolotela (*Piliostigmathonningii*), Muchoko/Itanga and Umbwiti/Ligwatanga (both of shrub family). Common names are used to identify these plants

species in the study area perhaps, because majority of the people share the same cultural background. These medicinal plants are often collected by the farmers from forest or bushes except in few cases where the plants are planted around the villages for easy access and fear of extinction due to veld fires and over collection by other users. The parts of the plants often used in the ethno-medicinal preparations include the roots, barks and leaves.

The participants were asked regarding the efficacy of the traditional medicine and the result revealed that 60% indicated that ethno-medicines were so effective and very cheap, since one does not need money to collect the plant species from forest or bush. However, it was revealed that farmers with insufficient knowledge of the herbal preparations but interested in using them could pay a certain fee (very small fee) to those who have the knowledge to prepare for them. Even though, the conventional *acaricides* is more effective, the financial cost of utilizing it appears to be beyond the reach of most of the communal farmers and this effect will continue to promote the use of the ethno-medicines in the study area. However, with the government of the Republic of Namibia's policy that compel all farmers to have their animals vaccinated against all sort of livestock diseases in order to supply healthy meat to the market, the use of ethno-medicine is being discouraged.

5. Conclusion

The results of the study have shown that plant extracts are still being commonly used among communal farmers in the Katima rural constituency for controlling ticks and tick-borne diseases in cattle. The communal farmers in Katima rural constituency believed that the plant extracts are efficacious, cost effective and convenient to administer. It was noted that the use of ethno-medicines by farmers in the study area was more evident among the older age bracket (51 – 70 years). In particular, the 61 – 70 years participants indicated complete reliance on ethno-medicines in the control of cattle's ticks and tick-borne diseases. In order to supply healthy meat to the market, the government of the Republic of Namibia enacted a policy that compel all farmers to vaccinate their animals against all sort of livestock diseases. This, to some extent has discouraged some farmers, especially the younger generation (21 – 50 years age bracket) from utilizing the ethno-medicines. However, the financial cost of utilizing the conventional *acaricides* appears to be beyond the reach of most of the communal farmers and this effect will continue to promote the use of ethno-medicines to control ticks and tick-borne diseases in the study area. Therefore, there is the need for government veterinary department to work with the communal farmers in identifying and standardizing the plant extracts for wider usage in controlling cattle's ticks and tick-borne diseases.

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