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Indigenous Control Methods for Parasites among Pastoralists Communities in Adamawa State, Nigeria

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Abstract

The study analyzed the indigenous control methods of livestock parasites by pastoralists' communities in Adamawa state, Nigeria. Primary data were collected by the use of questionnaire administered to randomly selected 363 respondents. Data collected were analyzed using percentages, frequency distribution and regression analysis. The most common parasites in the study area were helminthosis, biting flies and ticks. Eleven indigenous control methods were identified to be practiced by the respondents. The regression result showed that coefficient of age, number of cattle owned and number of cattle affected by parasites were positive and significant at 5% level. Tree felling and bush burning were constraints to utilization of the control methods. The study concluded that indigenous control methods were well established and utilized by the respondents. It is recommended that laws banning bush burning and indiscriminate tree felling be re-enforced in order to preserve indigenous herbs to avert possible extinction. Indigenous knowledge system should be incorporated in the modern teaching of veterinary medicine since the knowledge is well accepted by pastoralists.

Keywords: Livestock, parasites, Control

Introduction

Indigenous control methods also known as ethno-medicine, refers to the traditional medical practice which is concerned with the cultural interpretation of health,

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diseases and illness and also addresses the healthcare seeking process and healing practices (Krippner, 2003). The practice of ethno-medicine is a complex multidisciplinary system constituting the use of plants, spirituality and the natural environment and has been the source of healing for livestock since the time immemorial (Lowe, 2000).Indigenous control methods of parasites are therefore, the system and practices developed by a community through observation and real life experiences over a period of time, communicated orally from one generation to the other with the ultimate aim of moulding its thought for the sole purpose of ensuring survival and progress.

Livestock are found throughout Nigeria. More than half of the livestock are in the hands of the nomadic pastoralists who hold over 90% of the Nigeria's 15.9 million cattle (Inuwa, 2013). Among the livestock species domesticated in Nigeria, cattle is the single most prominent and the most important in terms of animal protein supply (David, 2010). Its production provides meat, dairy, hides and fibre production (FAO, 2010). They provide income and sustain millions of people in rural areas and generate organic manure for improving soil fertility (Usman, 2010).

Indigenous control methods of cattle parasites are the oldest form of remedies used by cattle herdsmen in Nigeria (Usman, Mani and Mohammed, 2015). These practices remain relevant and vital in the country as a result continued increase in the prices of veterinary drugs, compounded by their prolonged absences from offices of veterinary research institutes in the states and inadequate provision particularly in rural areas (Ojowole, 2004). Nigeria is endowed with vast and readily available indigenous control methods that are within the reach of the herdsmen which they can choose from instead of depending only on modern technologies for feasible solutions that are available within their environment. Therefore, ignoring these local knowledge practices by the development workers will constraint the cattle industry and result into waste of huge amount of time and resources.

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Objective of the study

The broad objective of the study was to analyze the indigenous control methods of livestock parasites by pastoralists' communities in AdamawaState, Nigeria. The specific objectives were to:

1. describe the socio-economic characteristics of the respondents;
2. identify the indigenous control methods of livestock parasites used by the respondents;
3. ascertain the relationship between socio-economic characteristics of the respondents and use of indigenous control methods; and
4. identify the constraints to the use of indigenous control methods.

Methodology

The Study Area

The study was conducted in Adamawa State, Nigeria. The state lies between latitudes 7^0 N and 11^0 N of the equator and longitudes 11^0 E and 14^0 E of the Greenwich meridian (Adebayo and Tukur, 1999). It has a tropical climate marked by distinct dry and wet seasons and mean annual temperature is about 34.6^0c. The annual rainfall of the area ranges between 760mm in the northern part of the state to 1000mm in the southern part and has a landmass of 7,282.2 km^2 (Adebayo and Tukur, 1999). The study area has a population of 3,168,101 persons in 2006,based on 2.9% growth rate as at 2016 the state has 4,117,676 people (United Nations Fund for Population Activities–Nigeria, 2010).

The vegetation of the state, availability and abundance of water and also the culture of the inhabitants influence the distribution of livestock in the State. The state is one of the principal livestock producing states in Nigeria. Livestock Census Figure of 1991 shows that the state has over 2.5 million cattle (Ministry of Agriculture, 1991). The estimated cattle population as at 2016 stands at 3,153,030heads of Cattle, based on the one percent yearly increment.

Seven out of the 21 Local Government Areas of Adamawa state were purposively selected based on the concentration of registered members of Mi-yetti Allah cattle breeders' association in the areas. The list of registered members was obtained from

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the officials of the association within the Local Government Areas selected which was used as sampling frame. Based on the list obtained, respondents were randomly selected proportionate to the number of registered members from each of the Local Government Area selected. In all, 400 respondents were randomly selected. However, out of the 400 questionnaires administered, 363 (91.0%) questionnaires were retrieved and used for the study

Percentages were used to analyze the socio-economic characteristics of the respondents and indigenous parasites control methods and the constraints to the use of control methods. Regression analysis was employed to ascertain the relationship between socio-economic characteristics of the respondents and the utilization of the control methods.

Results and Discussion

Socio-economic Characteristics of Respondents

Table 1 shows the socio-economic characteristics of the respondents. The result indicates that none of the respondents was below 30 years of age. About 12.1% of the respondents were between the ages of 30-39 years, while 25.3% were above 59 years.

The result also shows that the majority (59.5%) of the respondents were above 49 years of age. This could be because most of those who were involved in Mi-yettiAllah cattle breeders' associationwere elders of the nomads. Younger ones believed that rubbing shoulders with their fathers is sign of disrespect to the elders. In a study conducted by Saleh, Atala, Omokore, Ahmed, Aliand Kajang (2016) they reported that 63% of their respondents were above 35years of age in a study they conducted in Northern Nigeria

Household size of the respondents reveals that 46.5% of the respondents have family size of between 6-10 persons, 38.3% have family size of between 1- 5 persons and 15.2% have between 11- 15 persons as members of their family. The result show that there was an average house hold size of 8, which is below African rural average house hold size of 10 (Timothy, 2012). This may be because most of the household members marry very early and become independent. The finding corroborates Aaron (2011) and Nalule, Mbaria, Olila and Kimenju, (2011) who

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reported an average of 7 and 8 people, respectivily as the average family size among herdsmen in the studies they conducted in Ekiti state, Nigeria and Uganda respectively.

Table 1: Socio-economic characteristics of the respondents

Socio-economic variable	Percentage (%)	Mean
Age (years)		
30-39	12.1	
40 – 49	28.4	45
50 – 59	34.2	
>59	25.3	
Household size		
1-5	38.3	
6-10	46.5	8
11-15	15.2	
Educational qualification		
No formal	20.00	
Primary	22.22	
Secondary	10.29	
Tertiary level	16.94	
Herding experience (years)		
< 25	19.8	
25-34	29.4	
35-44	30.8	37
45-54	14.0	
>54	6.0	
Management Practices		
Intensive	1.7	
Semi-intensive	10.7	
Extensive	87.6	
Extension Contact		
Once a month	3.8	
Once in 2 months	1.4	
Once in 6 months	18.7	
Once a year	28.4	
Not at all	47.7	

Source: Field Survey, 2015

The result in Table 1 also revealed that only 16.5% of the respondents had formal education (out of which 8.5% had primary, 6.6% secondary and 1.4% attained tertiary education). From the result it can be seen that there is high level of informal

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education among the herdsmen. This may not affect the utilization of the indigenous control methods. Shicai (2010) and Usman (2010) opined that western education brings enlightenment and exposure to different sources of information on modern veterinary medicine and also tend to transform herders' management practices to modern one.

Herding Experienceof the respondents shows thatabout 20% of the respondents have less than 25 years experience in cattle herding whileonly 6.0% had herding experience of more than 54years. This result shows that respondents are highly experienced in cattle herding with a mean herding experience of 37 years.This may also indicate that herders have experience in the use of traditional control methods of cattle parasites. A majority (87.6%) practiced extensive system of management while 10.7% practiced semi-intensive and only 1.7% practiced intensive system of livestock management. This impliedthat 87.6% of the respondentswere nomadic by nature moving over long distances in search of pasture and water and sometimes moving away from suspected disease infested locations.

Result of the extension visits to the respondents was also presented in Table 1. The result reveals that about 48% of the respondents did not have any extension visit, while 18.7% had two visits in a year and only 3.9% had up to 12 visits in a year. The 3.9% that indicated a visit in every month are herdsmen that are close to local government headquarters and they had to personally call the extension workers to their herds. The result indicated that there were inadequate extension services to the cattle herders, because the frequency of contact between herdsmen and extension agents shows that extension service as related to cattle herding was very low.

Ownership of Cattle, Number Affected and Type of Parasites

Number of cattle owned by the respondents is presented in Table 2. About 48% of the respondents owned between 41-80 heads of cattle, while 28.4% owned less than 40 heads of cattle only 1.1% owned more 160 heads of cattle. The result shows that the majority (71.6%) owned more than 40 heads of cattle. According to Ikhatua (2000), cattle serve as index of social prestige **a**mong the nomadic Fulani pastoralists apart from the economic gain. This could be the reason why they accumulated the cattle.

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Result in Table 2 also revealed that 44.9% of the respondents had between 31 – 60 heads of their cattle affected by parasites and only 0.5% had more than 120 heads of their cattle affected by parasites. The result shows that all the respondents complained of occurrence parasites among their cattle. This may be the reason why all the respondents practiced indigenous control methods of cattle parasites.

The common parasites encountered as indicated by the respondents were ticks, helminthosis and biting flies. All of the respondents (100%) had encountered these parasites among their herd. This shows that these three parasites are very serious problems to cattle production in the study area. The herdsmen also recognized the economic importance of helminthosis especially in calves of less than one year that is why routine herbal treatment is started within one week of birth (Bamaiyi, 2009).

Table 2: Distribution of respondents based on number of cattle owned, affected and type of parasites

Number Cattle Owned	Percentage	Mean
≤ 40	28.4	
41-80	47.7	
81-120	20.1	96
121-160	2.8	
>160	1.1	
No. Cattle Affected By Parasites		
≤ 30	28.4	
31-60	44.9	
61-90	11.375	
91-120	2.8	
>120	0.5	
Parasites Affecting Cattle		
Liver flukes	9.9	
Ticks	100	
Helminthosis	100	
Biting flies (Tabanus)	100	
Lice	24	
Tsetse flies	4.1	

Source: Field Survey, 2015

Indigenous Control Methods of Cattle Parasites

Many herders manage and treat their animals without anyinputs that cost money, especially if the parasite is common and can be diagnosed easily. This is common with tick infestation, helminthosis, biting flies (Tabanus) among others.

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Table 3: Indigenous Control Methods Used by the Respondents

Control Methods	Percentage
Hygiene	98.9
Movement away from infected	96.1
area	44.1
Bush burning	76.6
Use of Holy books	32.5
Incantations (Spiritual)	21.2
Herd sharing	96.7
Isolating affected animals	11.8
Manual ticks removal	87.3
Use of smoke	100
Dietary supplementation to sick animals	96.7
Use of Herbs	98.3

Source: Field Survey, 2015

The methods are; Manual ticks' removal: Data in Table 3 revealed that all the respondents (100%) practiced this method in controlling the menace of ticks. Before leaving the enclosure in the morning, herders (both adults and children) remove ticks from the cattle and throw it into fire that is burning near them. In corroborating this finding of Farrah (2009) asserted that pastoralists in India practiced manual ticks removal in controlling ticks on their herds.

Use of smoke**:** different herbs are burnt by the nomads to generate smoke so as to drive away flies in the evening. All (100%) of the respondents practiced this method. The commonest herbs used are *Ocimum basilicum* and *ipomea isorifolia*.

Use of herbs:The table shows that98.3% of the respondents use various herbs to control parasites. It involved cutting of leaves, stem or bark, roots, seeds of herbs and boiling them for the animals to drink. It was sometime dried, grounded and added to fed or dried grounded soaked in drinking water or mixed with oil to rub on skin. For example, ticks are controlled by oil from seed *of Vitellaria paradoxa*which is mixed with table salt and potash, the mixture is applied topically on the body of the animal, also latex from the *Calotropis procera* plant apply topically to control ticks. In controlling helminthosis , *Striga hermontheca* is used, when dry and grind to powder, mix with feeds to feed the animals. Also, fresh leaves of *Balanites aegyptiaca* is boiled and given to cattle orally to control helminthosis.

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Relationship Between Socio-Economic Characteristics of Respondents and Use of Indigenous Control Methods

Double log was selected as the lead equation based on the coefficient of determination (R^2), and the statistical significance of the estimated regression coefficients. The R^2 was 0.96 (Table 4), which means that 96 percent of the variation in the dependent variable was explained by the various independent variables in the model.

Analysis of the result in Table 4 shows that coefficient of age (X_1), number of cattle owned by the respondents (X_5) and number of cattle affected by diseases and parasites (X_6) were positive and statistically significant at 1% level and it is in conformity with *apriori* expectation. This implies that, as the herder's age increases, the more the tendency of the respondent beingadhered to the use of indigenous control methods.

Table 4: Relationship between of indigenous method used and socio-economic characteristics

Variable	Coefficient	Standard error	T-value
Age (X_1)	1.194	0.121	9.863*
Education (X_2)	0.064	0.070	0.913
Household Size (X_3)	0.270	0.115	2.346*
Experience (X_4)	0.663	0.325	2.040*
No. of Cattle owned (X_5)	0.239	0.051	4.709*
No. of Cattle Affected(X_6)	18.219	3.569	5.105*
Extension Visits (X_7)	0.081	0.145	0.560
Constant	0.836		
R^2	0.96		
Adjusted R^2	0.94		
F-ratio	4.19*		

Source: Computed from Field Survey, 2015 *P≤0.05..

The number of cattle owned by the respondents (X_5) and use of indigenous control methods shows that, the higher the number of cattle owned by herder, the more the likelihood of the herders using indigenous methods of diseases and parasites control. This could be because there is tendency of having parasites occurrence among their cattle especially with extensive management system practiced by the respondents.

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Coefficients of household size (X_3) and experience (X_4) were positively and significantly related to the use of indigenous control methods of cattle parasites control at 5% level. The interpretation of this result is that, the higher the number of members of household of a respondent, the more the tendency of them using indigenous control methods of cattle diseases and parasites. This may be because members of the household may have the opportunities of getting new ideas from different sources as a result of interacting with different people. The positive and significance relationship of years of experience implies that, as the herders experience increases, so also their knowledge on cattle diseases and parasites control methods and the ability to make use of the knowledge. Experience implies more familiarity, specialization and perfection with the practice of indigenous methods, which could encourage their adherence to these methods.

Constraints to effective utilization of indigenous control methods of cattle

The constraint that ranked highest (93.9%) was indiscriminate feeling of trees for farming, building houses, industries and fire wood (Table 5). This problem had led to depletion of most trees and herbs that are sources of local medicine and sometime extinction of the herbs. Moonga and Chitambo (2010) revealed that natural habitats of many valuable plants were being lost to other land uses or being degraded as a result of population pressure. The second ranked problem with 88.2% was bush burning. According to the respondents, most of the shrubs used are being destroyed by bush burning. Indigenous people have to trek long distance that involved risking their lives in search of herbs and other raw materials for parasites control.

Table 5: Constraints to utilization of indigenous control methods

Constraints	Percentage (%)
Cutting of Trees	93.9
Bush burning	88.2
Concealing of knowledge	79.1
Wrong diagnosis	63.6
Flood and drought	54.5
Lack of government recognition	50.7
Time consuming	50.4
Stressful	49.3
Improper knowledge of dosage	48.2

Source: Field Survey, 2015 *Multiple responses exist

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The least ranked constraint (48.2%) was improper dosage knowledge of the herbs to be given to sick animal. The variation in prescription such as quantity to administer at a time and for how long is common among the custodians of the knowledge. As a result of this, there are cases of overdosing the herbal medicine. This is mostly manifested in severe diarrhea or vomiting, shivering and weakened joints. Sometimes the herbs may not be effective against an ailment not because it is not good, but because it was under dosed. There is also problem of multiple administrations of herbs that may lead to over dosage. It also sometimes makes it difficult to identify the herbs or single out the role and contribution of each medicinal plant species.

Conclusion and Recommendations

A majority of the respondents were more than 50 years of age, very few attended western education, while the majority were well experienced in cattle herding and used of indigenous control methods of livestock parasites. This traditional knowledge faces the risk of disappearing due to increasing livelihood changes and environment degradation. This knowledge system can be used as a foundation for the development of cattle production and also serve as a source of pride to the herdsmen and stimulates their willingness to participate in development projects.

There is the need for the re- enforcement of laws banning bush burning and indiscriminate tree cutting in order to preserve indigenous herbs by the three tiers of government. The traditional knowledge faces the risk of disappearing due to secrecy and increasing livelihood changes.There is the need for sensitization and mobilization of relevant stakeholders by *Miyetti* Allah Cattle Breeders Association to establish Farmer - field schools that bring herders from different locations to understudy a specific problem using their knowledge so as to avoid extinction. Indigenous knowledge system should be incorporated in the modern teaching of veterinary medicine since the knowledge is well accepted by herders. Investigations need to be undertaken by research institutes to ascertain the precise dosage of herbs used in the treatment and control of cattle pests and diseases.

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