

Indigenous Knowledge: The Basis of The Maasai Ethnoveterinary Diagnostic Skills

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ABSTRACT The Maasai indigenous knowledge of animal diseases is comparable to the conventional knowledge of the modern veterinarian. Their diagnostic skills of livestock diseases is based on indigenous symptoms of diseases, vectors of diseases, season effects and species affected. The pastoralist diagnostic skills appear to be superior to those of agropastoralists. With the advent of modern veterinary medicine, the Maasai ethnoveterinary practice appears to be on the decline. This paper focuses on indigenous knowledge basis for diagnosis, treatment and control of selected examples of livestock diseases. In addition, the impact of modern veterinary medicine on pastoral (Maasai) ethnoveterinary practice will be briefly discussed.

INTRODUCTION

The definition of indigenous knowledge may easily lead to a semantic confusion. However, at this stage, it might suffice to give a working definition, which implies that indigenous knowledge is the body of knowledge that evolves within a community over time and is orally communicated from one generation to the next with the ultimate aim of moulding it's thought for the sole purpose of ensuring survival and progress. Indigenous knowledge among the Maasai is accumulated through observation and real life experiences. One of the most important elements of indigenous knowledge systems and practices is in the human and animal health care. Worldwide, there are many different traditional healing practices designed to cure, control or prevent human or livestock diseases (Mathias, 1994; Mcorkle, 1986).

The pastoral Maasai depended solely on livestock for subsistence. Over time, they have developed impressive disease control procedures for their animals. Through trial and error the Maasai ethnoveterinary medicine have evolved into a sophisticated animal health care service whose practice is solidly based on a deep indigenous knowledge of livestock diseases and predisposing factors (Ole-Miaron, 1997). This knowledge has led to the development of traditional disease diagnostic skills. The Maasai are known to em-

ploy a dual approach involving both modern and ethnoveterinary medicine to combat disease that attack their livestock. However, recently, the pastoral Maasai is increasingly depending on modern veterinary inputs such as terramycine, acaricides and a large variety of anthelmintics while the application of ethnoveterinary knowledge is on the decline. The latter should not have been an alarm signal, however, accumulating evidence suggest that terramycine, anthelmintics and some acaricides are becoming less effective in disease treatment and control (Waller, 1997). Under the circumstances, re-examination of the Maasai ethnoveterinary disease treatment and control procedures is justified.

The concept of indigenous knowledge in association with ethnoveterinary medicine has been documented for the Fulani nomads (Leeflag, 1993); Ilkisonko Maasai (Ole-Miaron, 1997), Tanzania Maasai (Minja et al., 1997), Trinidad and Tobago (Lans and Brown, 1998) and the Karimojong of Uganda (Jost et al., 1998). Indigenous knowledge and sustainable animal production has been viewed as a stimulus to research (Otim, 1993). In the 21st century where new scientific approaches to improve animal productivity through improved modern nutrition, breeding and animal health have generated a lot of research interest in the developed world (Thacker, 1994), it might appear inappropriate to allude to indigenous knowledge as a catalyst to active research. However, due to mass failure

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of the implementation of western oriented development programs in the pastoral areas, it has become necessary to re-examine the role of indigenous knowledge in the holistic pastoral traditions and nomadic lifestyles and specifically those attributes of the pastoralist that have allowed them and their livestock to adapt to their peculiar habitats. Such attributes include amongst others traditional diagnostic skills of livestock diseases.

DATA ACQUISITION

A well structured questionnaire (open-ended interviews and guided dialogue technique) was used to interview 274 pastoralists. The survey team was made of veterinarian who doubled as the translator, a laboratory technologist, trained field assistants recruited from the local Maasai community and a community leader. The interviews were conducted in the Maasai language. The respondents were interviewed in the local 'Manyattas' (homesteads). Briefly, they were asked about their livestock disease diagnostic procedures, treatment, prophylaxis, traditional method on herbal medicament preparation, dosage and mode of administration. Plant specimens were collected, pressed and transported to the University of Nairobi Herbarium for identification. Since some pastoralist in the study area are involved in agricultural activities (agropastoralists), the data collected was divided into two groups and the pastoralists data was compared to that of the agropastoralists.

RESULTS AND DISCUSSION

Maasai Diagnostic Skills

The Maasai pastoralists have evolved a sophisticated ethnoveterinary practice comparable to modern veterinary medicine. The Maasai ethnoveterinary medicine is deeply rooted in their livestock disease diagnostic skills, which, forms the basis for treatment, control and prophylaxis of animal diseases. The indigenous knowledge on diseases is orally passed on from one generation to the next and especially from the elders to the young. Currently the fast disappearing ilterito age-set are the most experienced custodians of this knowledge.

Traditional healers rely on visual, audio and tactile senses to establish a diagnosis and on rare

occasions post-mortem examination is employed to confirm cause of death of an animal.

Table 1: The symptoms the Maasai associate with livestock diseases as a percentage of respondents (N=174)

	ECF	Anth-rax	Try-pano-somosis	FM D	MC F	Helmi-thiasis
Fever	2	6	NR	NR	NR	NR
Coughing	6	8	15	NR	14	NR
Piloerection	54	44	54	NR	58	33
Not feeding	6	9	4	50	7	NR
Swollen Glands	29	NR	NR	NR	21	NR
Diarrhoea	4	13	NR	NR	NR	21
Lameness	NR	NR	NR	100	NR	NR

Key for All the Tables

NR = None Reported

ECF = East Coast Fever

FMD = Foot and Mouth Disease

MCF = Malignant Catarrhal Fever.

Despite a rather poor knowledge on differential diagnosis, the Maasai ability to diagnose livestock diseases accurately compares favorably with that of a modern veterinarian (Ole-Miaron, personal observation). This study reveals that symptoms of disease, knowledge of known vectors of livestock diseases, knowledge on seasonality of disease outbreak and species affected by specific diseases are important tools of the Maasai traditional disease diagnostic procedures.

Symptoms, Vectors of Livestock Diseases, Effect of Season and Species Affected

Individuals who are constantly in contact with the animals are the first to detect the first symptoms of disease. Forty seven percent of the respondents (livestock owners) of the people interviewed confirmed that they detect the first symptoms of illness in their herds. An equal number also agreed that herdsboy detects the first symptoms, but only 6% agreed that women could detect disease symptoms. Table 1 shows the symptoms the Maasai associate with disease. The prevalent diseases in the study area have been discussed previously (Ole-Miaron, 1997).

The obvious lack of agreement between the Maasai disease diagnosis and modern veterinary medicine in some cases such as lack of fever in ECF and anthrax is probably due to lack of traditional instruments to quantify raise in temperature in animals. From Table 1, it appears that for the Maasai, piloerection is an important

Table 2: Maasai knowledge of known vectors of livestock diseases, seasonal effects and species affected as a percentages of the respondents (N = 174)

Vector Carrier	ECF	Anthrax	Trypanosomosis	FMD	MCF	Helminthiasis
Ticks	100	NR	NR	NR	NR	NR
Wildlife	NR	NR	NR	70	75	NR
Dust/Soil	NR	100	NR	NR	NR	100
Air	NR	NR	NR	NR	NR	NR
Unknown	NR	NR	NR	30	25	NR
Biting Flies	NR	NR	100	NR	NR	NR
<i>Season Effect</i>						
Dry season	56	62	38	6	NR	25
Wet season	41	38	38	88	73	25
Both seasons	3	NR	24	6	27	50
<i>Species Affected</i>						
Cattle	57	46	52	91	60	25
Sheep	22	13	10	NR	8	50
Goats	11	16	12	NR	8	25
Donkeys	NR	9	9	NR	NR	NR
Wildlife	11	16	12	9	24	NR

indicator of the health status of livestock. In some cases such as FMD the diagnosis based on lameness agrees favorably with the modern veterinary medicine. The Maasai do not base their disease diagnosis on the symptoms alone but also on known vectors of disease, season of disease outbreak and the livestock species affected by the diseases (Table 2).

For centuries the Maasai were convinced that the wildebeest is a silent carrier of the MCF causative agent. They have no known traditional cure for MCF, but they keep their cattle strictly away from the wildebeest during their calving season. This precautionary measure is based on the deep indigenous knowledge of the course and the vectors of MCF. The Maasai associate ticks (ilmasher) with ECF, dust (Enterit) with anthrax, tse tse fly (olkimpai) with trypanosomosis. Liverflukes (Osingiri), MCF and FMD are considered to be waterborne diseases (Table 2).

The Maasai differential diagnosis of hemoparasitic infections is rather poor, Cowdriasis and anaplasmosis are lumped together with ECF. This is an acceptable limitation arising from the fact that the Maasai rely heavily on clinical manifestation of diseases to make a diagnosis. The seasonal outbreak of diseases is an important diagnostic tool for the Maasai. They associate anthrax with the dry season (62 vs 38%). FMD and MCF are associated with the wet season (Table 2). Incidences of these disease conditions are known to increase during the wet season. Helminthiasis occur throughout the year. The

Maasai knowledge on the species affected by a particular disease condition does not greatly deviate from the published information in veterinary books (Table 2). From this study, it is evident that the Maasai utilize various techniques/information for disease diagnostic purposes. The Maasai concept on what causes disease closely resembles that of other laymen. The Maasai lack the conventional knowledge equivalent to classify disease causative agent into viruses, bacteria and fungi. Worm infestation is usually confirmed visually. This limitation did not however, stop them from developing relatively effective herbal remedies to cure livestock diseases.

The Impact of Modern Veterinary Medicine on The Maasai

Table 3: Comparison of responses between the pastoralist and the agropastoralists as percentage of respondents

	Pastoralist	Agropastoralist
Diseases identified	67	33
Use of traditional remedies	71	29
Reliance on modern remedies	35	65
Knowledge on modern remedies	55	45

Ethnoveterinary Knowledge: When the pastoralist data on the percentage of diseases identified, use of traditional remedies, reliance on modern practice and knowledge of modern veterinary drugs was compared with similar data from the agropastoralists, a clear trend on the impact of modern veterinary medicine on ethnoveterinary knowledge emerged. The prevalent diseases identified in the study area were reported previously (Ole-Miaron, 1997) and Table 3 shows that the pastoralist identified more diseases compared to the agropastoralists (67 vs 33 %). The use of traditional remedies is higher amongst pastoralists compared to agropastoralists (71 vs 29 %) and reliance on modern veterinary pharmaceutical products is higher in agropastoralist but the ability to associate new drugs with known livestock diseases is greater in pastoralists (55 vs 45 %). This is probably a reflection of their superior diagnostic skills which, allows them to match new medicines to known diseases.

When the participants were grouped into age-sets, it was observed that, in four out of the current six age-sets, pastoralist could identify all the seven diseases (see Ole-Miaron, 1997 for the

Table 4: Comparison of livestock diseases diagnostic abilities between the pastoralists and agropastoralists

Age-Set	Pastoralist	Agropastoralist
Ilterito (n=20)	20/20	20/20
Ilnyangusi (N=20)	20/20	19/20
Ilseuri (n=20)	20/20	8/20
Ilkishumu	20/20	8/20

Table 5: Comparison of modern veterinary pharmaceutical product purchased by the pastoralists compared to agropastoralists as a percentage of respondents (n= 82)

Age-Set	Pastoralist	Agropastoralist
Terramycine preparations	45	55
Acaricides	47	53
Anthelmintics	45	55

prevalent diseases in the study area) based on their diagnostic skills. On the other hand, amongst the agropastoralists, only the older age-set of Ilterito could identify all the diseases, while there was a general decline in the ability to identify livestock diseases by the younger age-sets (Table 4). This could be an indication of a breakdown in the cultural organizational structure as a result of livelihood resources diversification. This is a real threat to the ethnoveterinary knowledge base of the Maasai and hence justifying the need to preserve this knowledge. Because of the decline in the ethnoveterinary knowledge, the agropastoralist show an increased tendency to purchase modern pharmaceutical products to combat infectious diseases, tick-borne diseases and helminths (Table 5).

The most significant impact of modern veterinary medicine could be illustrated by the increasing dependence on terramycine, anthelmintics and acaricides by the pastoralist and especially the agropastoralists (Table 5).

The Maasai were positively receptive and appreciative of the government effort in the eradication of CBPP/CCPP, FMD and rinderpest and welcomed with open hands the inputs associated with modern veterinary medicine such as the antibiotic based preparation "Terramycine" which has become a household name amongst the pastoralist. The invasion of terramycine was accompanied by opportunists who made a fortune by selling the injectable antibiotics without mentioning the preferred route of aseptic administration and effective dosage.

Repeated exposure of pathogenic micro-organism/bacteria to ineffective dosages of this antibiotic led to the development of new resistant strains. Terramycine resistant organism become prevalent in the Maasai pastoral region particularly because, the Maasai treat their own livestock (Ole-Miaron, 1997). Perhaps a more serious setback is the acceptance of this antibiotic based preparations as an "*omnium panaceum*" by the pastoralist. This preparation have been injected into the children, topically applied into infected eyes and used for deworming or even bloat cases. The wholesome use of "Terramycine" in response to any manifested symptoms such as piloerection, diarrhoea and bloat have led to the erosion and regrettably atrophy of the Maasai ethnoveterinary medicine which was particularly effective in the treatment of many non-contagious disease (Ole-Miaron, Personal Observation).

The terramycine era and modern animal husbandry are directly responsible for the disappearance of the ancient pastoral tradition of decentralising stocks i.e. it was not uncommon for the Maasai to send some of his herd to relatives and friends who live further away from his settlement as a cautionary measure against disease and starvation. In case of an epidemic in one settlement region, the herd's owner was assured of a "seed stock" from which to rebuild his stock after a disaster. Therefore, as a result of modern veterinary medicine centralisation of stocks have led to overstocking and a greater disease risk with the now prevalent environmental degradation and soil erosion in the pastoral land. It is proposed that the introduction of a centralised modern veterinary services has contributed to the decrease in the pastoral movement/migration. The latter was a well-tested strategy to escape foci of animal disease and from biting insects such as tsetse flies as well as to search for the better pastures.

The Maasai cattle have some degree of tolerance to ticks. However, the uncontrolled use of acaricides by the pastoralist may result in the evolution of new strains of ticks in these areas. The acaricide abuse resulted from the lack of guidance and instruction from the drug sellers and also from the fact that the Maasai treat their own animals themselves (Ole-Miaron, 1997). Lack of enforcement of veterinary legislative controls have resulted into an invasion of the pastoralist livestock market centers by veterinary

drug hawkers. This is a dangerous activity which, could exacerbate the already alarming acaricide pollution in the pastoralist areas where human breast milk have been shown to contain traces of acaricide ingredients (Kanja, 1986).

The lack of proper guidelines on the use of the commercial anthelmintics and their high cost promote underdosing by the Maasai who treat their own livestock (Ole-Miaron, 1997). The repeated under-dosing and evolution of new strains of helminths result in anthelmintics resistance (Waller, 1997). The over-reliance on the commercial anthelmintics is at the expense of the Maasai indigenous knowledge on traditional helminths control procedures. The Maasai traditional anthelmintics which include *Albizia anthelmintica*, *Clausena spp.* and *Withania spp.* are quite effective and are currently new sources of bioprospecting for plant-based anthelmintics (Ole-Miaron, 2000). Indigenous knowledge may aid in the exploration of the full potential of the Maasai medicinal plants that are important in ethnoveterinary practice. Prior to the discovery of organic chemistry in the 19th Century, 80% of all medicines were obtained from plant materials. In Africa, herbal medicine is particularly popular and is estimated that 80% of the population resort to traditional medicine to treat human and livestock diseases. The African tradition lacks written records and one may wonder as to how traditional healers acquire knowledge of plants with medicinal value. Ethnobotanical studies reveal that the indigenous knowledge of a community is a key player in the identification of medicinal plants and such plants have been often tested by generations of indigenous people (Cox, 2000; Makhubu, 1998). This indigenous knowledge is passed on orally from one generation to the next and occasionally within a family constitute the basis for traditional bioprospecting. Traditional bioprospecting form the foundation for ethnomedicine and ethnoveterinary practice (Ole-Miaron, 1997). Traditional bioprospecting is often the lead to new product development. For a very long time modern bioprospecting which depends on scientific analysis has preyed upon traditional bioprospecting to benefit the pharmaceutical industry and not the local communities from which this plants were obtained.

In the pastoral regions, ethnoveterinary bioprospecting field surveys has been conducted in

Maasai land (Ole-Miaron, 1997). These activities are focused on the discovering of new anthelmintics of plant origin to combat anthelmintic resistance in livestock. There is a very high probability of discovering new medicines from these bioprospecting activities because, the Maasai ethnoveterinary practice is well developed and compares favorably with modern veterinary practice.

In general, indigenous knowledge could be instrumental in the development of new and better delivery methods of animal disease control programs for the pastoralists. The pastoralists have a better view and analysis of all factors of livestock diseases and the environment in which they live. The Maasai knowledge of geographic, host, vectors and reservoirs distribution of livestock diseases is of high order indeed and should be taken into consideration when animal health policies are made e.g. in the selection of disease control procedures i.e. vaccination and chemotherapy. These procedures must be reasonably affordable and acceptable to the pastoralists and should not violate their traditional values and beliefs. In addition, the consequences of any proposed animal health development programme must be fully deliberated before they are introduced to the pastoral production system.

SUMMARY AND CONCLUSION

The methods to control cattle diseases in the Maasai pastoral regions had evolved by trail and error from the prehistoric times. These methods are closely associated with the superior diagnostic skills of the pastoral Maasai. Unfortunately these superior diagnostic skills are fast disappearing together with their custodians the Ilterito age group who are currently the most experienced keepers of the Maasai indigenous knowledge. For the other age-sets Ilnyangusi, Ilseuri, Ilkishumu and the current age-set, the ethnoveterinary indigenous knowledge have been diminishing in association with an increase in the dependency on "Terramycine". Under the circumstances, a way must be found to salvage and record this priceless indigenous knowledge with the view to ascertaining it's usefulness in the designing and development of a viable and sustainable animal health program. Our ultimate goal is the improvement of the livestock productivity of the Maasai pastoralist through imp-

roved nutrition, breeding and health. While I appreciate the contribution of ethnoveterinary medicine in achieving this goal via healthier stock, we should be careful and avoid “re-inventing the wheel” but rather embrace the best of modern and ethnoveterinary medicine in order to develop a comprehensive animal health care service for the Maasai pastoralists.

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