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Research Article

Patterns of use, gathering, processing and administration of herbal and alternative medicines among people and livestock in Kenya: a study of local knowledge for One Health

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Background

Although much has been written about efficacy of various herbal and plant-based medicines, significantly less is known about patterns of use in humans, and even less about how these are used in livestock. This paper addresses that gap in our knowledge through an empirical, ethnographically informed study of indigenous medicines in one rural and one urban site in Kenya.

Methods

The study utilizes a One Health perspective in order to better understand the intersection of human, animal and environmental health, and focuses on patterns of use in people and their livestock. An ethnographically-informed methodology is employed, including observations, key informant interviews, narrative interviews and focus group discussions. Convenience and snowball sampling were used to identify and recruit participants.

Results

Gendered uses and administration of medicines, and gendered knowledge custodianship are identified. Practices of gathering and processing plant-based medicines are discussed. A wide variety of common illnesses are reportedly successfully treated by herbal medicines in both study sites, including general pain relief, wound healing, fevers, stomach problems, infertility and skin disorders, and many of these curatives are administered to both humans and livestock.

Conclusions

By spotlighting first-person narratives gathered over an extended period in the field, this paper sheds light on the importance of understanding local realities for policy, interventions and broader public health debate surrounding access to and use of herbal medicines.

Indigenous, herbal and complimentary medicines are a key way in which many people access medical care and maintain wellbeing globally.[1] Despite good coverage of biomedicines for humans and livestock across the African continent, use of herbal curatives is still widespread.[2] There is plenty of discussion of efficacy in the existing literature in a global context[3,4] but what we know less about are specific patterns of use, and the reasons for this on a local scale. Studies have shown that animals will self-medicate with plants[5] indicating that even they are tacitly aware of the efficacy of plants in healing and maintaining wellness. Herbal medicines are acknowledged as a way of increasing equity in health coverage in areas where access to care is an issue.[6] Given the acknowledgment of both efficacy and equity in herbal curatives, this paper aims to address the lack of knowledge of broader patterns of use in rural Kenya for both humans and animals.

Herbal and indigenous medicines are an important part of health seeking and healing in Kenya.[7] Much research has been done documenting the ethnobotanical knowledge of geographically isolated Kenyan communities[8-11] but less is known about how and why people use herbal medicines, especially in contexts where biomedicines are widely available.[9] There is some research detailing the ways in which over-harvesting of medicinal plants might negatively impact the environment.[12] Many studies are focused on efficacy or the potential for testing efficacy of plants as medicines[13] and often claim poor access to biomedicines as the primary reason for use of herbal medicines.[12] Rarely, studies acknowledge the use of herbal medicines when biomed-

icines fail to address health problems.[14] Fewer studies address the complex and multiple reasons for use of herbal medicines over biomedicines in contexts where both are available.[6,15]

Overall our knowledge of ethnobotanicals for use in livestock in Kenya is poor. However, we know that a large proportion of livestock owners use herbal medicine in their animals for a variety of reasons[6] and that others use herbal concoctions as pesticides on their crops.[8] Few studies discuss reasons why farmers might use herbal medicine for livestock illness, but this seems to be due to a lack of access to veterinary services in many cases and suggested that existing knowledge of herbal medicine led to a delay in farmers reporting animal sickness.[16] Some studies suggest a potential loss of ethnoveterinary knowledge due to the increasingly sedentary nature of living.[17] There seems, therefore, to be a glaring gap in our knowledge and understanding of how farmers and livestock owners in Kenya and elsewhere make decisions regarding the types of medicines to use for their animals.

In Kenyan studies of herbal or indigenous medicine, gender is rarely a focus. There are some notable exceptions although most of these are specifically focused on women's role as birth attendants, rather than any knowledge they might have outside of the sphere of maternal health.[18,19] This should be addressed as understanding the types of knowledge held by men and women can assist in providing equitable access to care for all.

Another issue for herbal and indigenous medicine in Kenya is that of regulation. I have recently discussed this elsewhere , but it is further acknowledged that the existing regulatory framework is insubstantial and inadequate, allowing 'quacks' to proliferate the market for herbal medicines.[7] This is clearly dangerous and increases the risk to the health of vulnerable people. By better understanding how Kenyans make choices about their health and treatment options, we can provide policy makers with a robust body of evidence from which to create solid legislative foundations to protect patients and their families.

This study employs the approach of One Health to shed light on patterns of use. That is, that human, animal and environmental health are intrinsically linked. Herbal medicines are a quintessentially One Health issue, as they straddle the human-animal-environment intersection. Given the existing literature, this study aims to fill a gap in our knowledge about how, when and why people choose to use herbal medicines, even in places where they have access to biomedicines.

METHODS

STUDY AREA

Fieldwork was conducted in two areas of Kenya during a six month period in 2019. The first is a group of rural villages in Coast Province called Kasigau in Taita Taveta County. The Taita region is characterized by small-scale subsistence agriculture and livestock ownership. Most families own chickens, and others keep goats, cattle and occasionally fat-tailed sheep. The primary crop is maize, with others like beans, millet, yams and green grams also commonly grown. Inhabitants of the study area are primarily Christian. There is a local livestock officer who is responsible for a vast area and uses his own motorbike to get around. There are few locations where farmers can access veterinary medicines, and the health centre for human patients is understaffed and poorly stocked with medicines. The nearest hospital is 75km away, as is the nearest qualified vet.

I have worked in this community for around 15 years as a researcher and so am well known to the inhabitants. This positionality was important in gaining access to participants and to the field, as indigenous medicines can be controversial and sometimes conflated with witchcraft in rural and particularly religious areas, leading to fear, misunderstandings and a reluctance to discuss openly. For this study, although I am known in the community, I spoke to individuals with whom I had not previously had interactions, and many did not know me or know of me.

I speak fluent Kiswahili and so have no need for a translator but do use a young male assistant to help in locating willing participants and informing people about the study. He was given a small financial reimbursement for his time daily, and I paid for fuel for his motorbike which we used to reach participant's homesteads.

The second study site is an urban area and a suburb of Nairobi in Kajiado North County, called Ongata Rongai. The area is characterized by rapidly constructed, unplanned and informal housing, and very dense population. The population is mixed but the majority are low income families with a growing middle class and a small number of wealthy inhabitants. I also live in Ongata Rongai, in a neighbouring sublocation to the one which I chose as the second study site, which is called Kware. I was not known to any participants with whom I interacted prior to this study. Residents of Kware mostly run small shops or businesses, own livestock, or work in Nairobi city, and have migrated here for work from rural areas.

When I began fieldwork in Kware, I was not known to the community, and as far as the subchief could remember, I was the first researcher to visit them. Here, I was asked by the subchief to employ two of her office administrators as my research assistants: one female and one male, both well known, trusted and respected in the Kware community, and able to locate participants for the study. They were both given a small financial reimbursement each day for their time and travel expenses.

DATA COLLECTION

I used ethnographically-informed methods to collect narrative data about patterns of use of indigenous medicines. These included key informant interviews, narrative discussions, focus groups, observations and participation in daily activities. Ethnography traditionally is about time spent in the field, and depth of relationships and interactions with participants. It advocates for more organic connections between researcher and participant, through more equitable relationships, and a move away from the typical hierarchy of academic and respondent. Typically ethnography allows

the participant to become the teacher and the researcher becomes the student. I used both convenience and snowball sampling to identify and recruit participants for the study.

KEY INFORMANT INTERVIEWS

I identified a number of key informants to speak to, by using my personal relationship with the community to locate healers willing to speak to me, or through my assistant's local knowledge. These informants were not known to me prior to this study, and they are people who have specialist knowledge of herbal medicines and included around ten healers who treat humans and/or livestock with plant derived medicines. My other key informant was the livestock officer in Kasigau as he has detailed knowledge of how people use herbal medicines for ailments in their livestock. These interviews were audio recorded. Occasionally a small financial gift was given to participants as a thank-you for their time, depending on whether this could be seen as appropriate – in some cases it might have been seen as offensive or bribery and so I was guided by my assistants on this. There was no strict interview guide or list of questions, but several themes were used to guide general topics of discussion. These included how medicines were harvested, prepared and administered, what illnesses were treated, whether they treated both humans and livestock, and their perceptions of biomedicines and indigenous healing. Interviews took place mostly in their homes from where they make and administer medicines, but in some cases on their farms.

NARRATIVE DISCUSSIONS

Much of my fieldwork involved conversations with farmers or people who have used herbal medicines for themselves or their livestock. These discussions were mostly participant-led, and I allowed the participants to speak freely without the constraints of questions. I did have a list of themes to cover, so that I could prompt questions if the conversation struggled to flow: for example, ideas around indigenous and biomedicines, what types of illnesses they sought treatment for in themselves and their livestock, and what general perceptions they had around both indigenous and biomedicines. Generally, the discussions were around the topics of how, when and why people sought herbal medicines. Approximately 20 of these detailed discussions took place. These interviews were audio recorded, or detailed notes were written during and after the discussion. Interviews took place either in their homes or on their farms, wherever was convenient for them.

FOCUS GROUPS

I organized two focus groups, one with men and one with women, in each study site to discuss ideas surrounding herbal medicines. The groups were separated by gender as cultural norms often prohibit men and women openly speaking their minds in front of each other.[20] Each group had around ten participants, and participants were recruited by my assistants randomly selecting individuals, but were not picked because of any known link to herbal medicines. Focus group discussions took place in either a central, open location in the village often used for meetings in the case of Taita, or in a community hall in the case of Kware. The focus groups were audio recorded and I translated and transcribed them at a later date. Participants were given a small financial renumeration for any travel expenses they might have incurred to attend.

OBSERVATIONS AND PARTICIPATION

Through my interactions with key informants, I then chose three with whom to work more closely. One was a male healer, specializing in healing asthma and lung conditions; one was a male healer who specializes in livestock respiratory problems; finally I spent a week with the livestock officer in Kasigau, assisting him daily with a community-organized chicken vaccination program. This allowed me to speak to many farmers in a short period of time about their experiences using herbal medicines for their livestock. I occasionally paid for fuel for the officer's motorbike and gave small financial gifts to others with whom I spent longer periods of time, as a renumeration for any work or time lost.

ANALYSIS

I translated and transcribed all recorded and written field notes from the study. I analyzed the narrative data thematically, firstly by noting emerging themes, and then by looking purposively and specifically for descriptions of patterns of use, gathering, processing and administration of herbal medicines, as I found these to be discussed by almost every participant. This is a saturation of responses which indicates a certain level of importance in the collective consciousness and experience of my participants.[21] In analysis, we will inherently perform bias: of course we select data which we find interesting or particularly illustrative of a point, but when we use a number of methods to elicit data and find the same themes across all the data, we can be confident that we are minimizing bias in our analysis.[22]

ETHICS CONSIDERATIONS

Ethical clearance for the study was gained through ILRI IREC and a NACOSTI permit was granted prior to any field activities taking place. Oral recorded informed consent was gained before any interaction between researcher and participant, and the study and expected outputs thoroughly explained in Kiswahili. No names of participants were recorded unless with express permission, in order to maintain anonymity.

FINDINGS

PATTERNS OF USE IN PEOPLE

In order to better understand the ways in which people use herbal medicines for themselves, I wanted to know how the choice is made between using herbal or biomedical treatments. There was a general fear or distrust of biomedical

treatments due to the belief that they contain many 'chemicals' and are often 'fake' or counterfeit. These findings are described in detail elsewhere[6] but here it is important to note that these perceptions were common in narratives from the field, as well as ideas about herbal healing traditions:

> *"...people like the local medicines because even if they have money to buy the modern ones, their families have been using these for generations, it's just normal for us to use them. People trust it, they believe in the local medicines. They work. It's nothing to do with money." [Female livestock owner and healer, Kasigau, 11/11/2019]*

GATHERING AND HARVESTING

Most healers said that they are the ones gathering and harvesting the herbs and plants for their medicines. Some said they gather from near their homes, while others had to travel to get ingredients. In urban Kware, people utilized the few remaining pockets of riparian forest to collect herbs:

> *"I go myself to the forest, I cut the trees and then I come back here to sell to people. It is me myself doing it. It's not very far, where I get them from." [Male herbalist, Kware, 8/9/2019]*

Although others acknowledged that in urban spaces, accessing herbs and plants was challenging:

> *"Nairobi is difficult because there is no place where you can find those trees. You must leave town to find them." [Male herbalist, Kware, 17/9/2019]*

Other healers in Kware could not find the plants they needed close by and had to travel long distances to harvest them:

> *"I have to go to Western to collect the trees. I go myself to get them because other people wont know exactly what it is I need. So its better if I go myself, I travel up there, then I know this tree treats such and such, this tree treats such and such. Usually I come back with two big sacks of trees..." [Female herbalist, Kware, 17/7/2019]*

This was not an issue in rural Kasigau:

> *"It is found close to your homestead and it works." [Female livestock owner and herbalist, Kasigau, 11/11/2019]*

However, some plants grew at altitude and a hike was needed to collect them:

> *"These leaves are only found up the mountain and not low down." [Female focus group participant, Kasigau, 26/6/2019]*

PREPARATION AND ADMINISTRATION

There were various key ways of preparing and administering herbal medicines reported by participants. Boiling and soaking/steeping the herbs to make a drinkable tea was most common, followed by grinding and pounding to make a powder either for oral consumption or to rub onto wounds.

> *"You grind them together, you remove the bark from this one and you grind them... it is a good way to take that medicine. Then this one is for malaria. You boil it and take a cup of the liquid, and then the malaria is finished." [Male herbalist, Kware, 8/9/2019].*

> *"So I get the branches which I dry, and once it has dried then I pound it a bit, I put it in a cooking pot, then I get really hot charcoal and put on top of it. Then the smoke makes it burn. Then once it is properly burned you can stir it and it is just like ashes." [Female herbalist, Kware, 17/7/2019]*

Different medicines had different ways to prepare and administer:

> *"...there are some you boil and some you just soak them in water. It depends on the medicine." [Female livestock owner and herbalist, Kasigau, 11/11/2019]*

For livestock the main way to administer was by mixing herbs or plants into their drinking water:

> *"I use moringa and aloes. I boil them together. And for goats and cattle I treat worms. There's a tree called* Kihorohoro *which I use to treat worms. For goats I give three spoons and for cattle one whole glass. This is the dosage. But also you can leave it out for them. So you can fill one karai and that will do all of your goats. They will drink it." [female livestock owner, Kasigau, 11/10/2019]*

Other, less common modes of administration included washing bodies with medicinal liquids:

> *"So I look for the place where this plant is growing, or I get my son to go and find it, and then I pound it. Then I just put some in this water, and if you wash your head with it, then you feel ok...So I wash their heads with this, or the whole body. They can wash with this water, without using soap." [Female herbalist, Kware, 17/7/2019]*

WHAT HUMAN ILLNESSES CAN BE TREATED USING HERBAL PREPARATIONS?

A wide variety of illnesses were reported by participants to be successfully treated using herbal medicines. For some, this was due to genuine efficacy of the herbs, and for others this was more complex:

> *"You know, all medicine is helped by belief in it. It doesn't matter if it is herbal or it is from the hospital. Belief is very important. Your faith. Your faith in it will heal you. And that's the truth." [Male herbalist, Kware, 17/9/2019]*

Herbal medicines were popularly used for 'malaria' or fevers:

> *"...there is* mwarobaini *[neem] which we use as a pesticide on our crops and it also can be used to help blood, malaria, and fevers. But there's another one called* bachia *which is the malaria tree and we use to treat malaria." [Male livestock owner and herbalist, Kasigau, 11/11/2019]*

> *"Like if you have malaria, then you boil some water and you dip this one [aloe], cut into pieces, and then you drink the water. It relives the pain and stops any coughing. It helps, yeah. But there are different aloe veras. Some are medicinal, some are ornamental and there are others which are poisonous. So I know four types of them. There was a time we had gone for a seminar about these aloe veras, and I came to understand more about them." [Male livestock owner, Kware, 8/9/2019]*

Similarly popular were medicines for diarrhea and stomach aches:

> *"Then the next most popular is mkigondo – the Sodom apple, it is good medicine for the stomach." [Male livestock owner and herbalist, Kasigau, 11/11/2019]*

> *"Even myself if I have an upset stomach then I use the local one for myself." [Male livestock owner, Kware, 8/9/2019]*

Herbal curatives were commonly used for general muscle aches and pains:

> *"But mostly we find it is the younger people who are doing the day labouring, the heavy work: they like to use this medicine for pain because it is very effective. Pain relief is the most popular medicine that we make." [Male livestock owner and herbalist, Kasigau, 11/11/2019]*

Sore throats and respiritiory issues have a particular form of treatment, and this powder can be used for other issues too:

> *"Then there's another one we use for sore throats, the one which you lick. It stops the coughing. You can also give it to children. You can put it on wounds, swellings, and it helps with the evil eye." [Female herbalist, Kware, 17/7/2019]*

It was also common for women with fertility issues to use herbal curatives and visit a herbal medicine practitioner to access effective medicine. It is thought that prolonged use of oral contraceptives was a cause of infertility, and one female healer in Kware was specializing in issues related to women and children:

> *"The main one [reason for visits] is to lack a pregnancy. Some people have stayed for many years. Then sometimes someone will want to have a baby but the ways are closed. So then it's important for them to get this medicine, and once they have this medicine I wash their stomach properly, and then once they begin to use the medicine, which I make here – I will give them two glasses of it, then in a very short time they will be pregnant and later coming to show me their child." [Female herbalist, Kware, 17/7/2019]*

Stomach ulcers were thought to be related to pregnancy in some cases, but could also be treated with herbal medicines:

> *"...mostly it is when women are really being disturbed by the stomach, but also this big sack here of plants, this I use to treat ulcers and so many people come here with ulcers. Even women who are big with child, they can take this one. Often when the pregnancy is far along you find women being disturbed by ulcers, so then I make this one and they can take it. It's not harsh. I make it so it's almost like black tea." [Female herbalist, Kware, 17/7/2019]*

GENDERED PATTERNS OF USE

In almost all cases, it was the job of the male head of households to administer medicine to livestock. This was reported by both men and women:

> *Administration of medicines [for livestock] is usually done by the men in the household [Female livestock owner, Kware, 7/8/2019]*

> *"Only men can decide when and what to treat animals with." [Men's focus group participant, Kasigau, 26/6/2019]*

Regarding medicines for family members, men and women had knowledge about different plants for different illnesses. Women reported specific knowledge about issues related to women's and children's health:

> *"Women ask advice from each other and they know the best for their kids. You cannot ask men for this knowledge. Women will say go and see mama so and so, and you can get treatment." [Women's focus group participant, Kasigau, 26/6/2019]*

> *"Then a tree called porozi is used to induce abortion. You boil and drink and then the pregnancy will be gone. Even vipapa [aloes] can have the same effect. Only women know this and only women can do this work." [Women's focus group participant, Kasigau, 26/6/2019]*

Similarly, men had knowledge specific to issues related to men's health and issues which more often affected them:

> *"For headaches, fever, men know all the trees. Also for man strength [erectile disfunction] migraines, men know how to pound these roots and mix with water to treat it. Also treatment for swollen testes. Men can know the medicines to prevent miscarriages, and to help with the aches and pains of old people, these are 'panadol ya kienyeji' [local Panadol]. They also know the medicines for removing pus or wax in the ears. Medicines used for toothache – you inhale the steam of certain plants, and that dudu [insect] causing the toothache is gone." [Men's focus group participant, Kasigau, 26/6/2019]*

Despite both men and women clearly having knowledge of herbal medicines, women who were known to practice indigenous methods of healing were fearful of accusations of witchcraft:

> *"The woman who lives in this village was being called a witch. Women are afraid to practice these things because of that...If you are a witch then people will cut you up with a machete." [Women's focus group participant, Kasigau, 26/6/2019]*

It was much less risky, they said, for men to practice indigenous healing as they were unlikely to be accused of witchcraft.

PATTERNS OF USE IN LIVESTOCK

Farmers and livestock owners described to me the types of illnesses which they treat in their livestock using herbal medicines, how they prepare them, and how they are administered. Some of these indicate convergent uses in humans and livestock, especially the use of aloes. However, one particularly interesting theme which recurred was the idea of treating like with like – a core value of homeopathy. In this context, people explained it thus:

> *Local variety livestock can be treated with local medicines, and 'grade' [improved] breeds have to be treated with biomedicines. [Women's focus group participant, Kasigau, 26/6/2019]*

A similar theme of treating 'organic' bodies with 'organic' or 'natural' substances was also recurring throughout narratives, as we will see in the following sections.

WHAT LIVESTOCK ILLNESSES CAN BE TREATED USING HERBAL MEDICINES?

Various different methods were reported to treat common illnesses in livestock. Stomach problems such as diarrhea and worms were routinely treated at home using plants found close by:

> *By burning maize cobs and grinding them, you can use this paste to treat diarrhoea in goats. [Female livestock owner, Kware, 7/8/2019]*

> *So I can treat kideri [cholera] in chickens. I use moringa and aloes. I boil them together. And for goats and cattle I treat worms. There's a tree called Kihorohoro which I use to treat worms. For goats I give three spoons and for cattle one whole glass. This is the dosage. But also you can leave it out for them. So you can fill one karai and that will do all of your goats. They will drink it." [Female livestock owner, Kasigau, 11/10/2019]*

Sometimes, less typical concoctions were reportedly made to treat illness in livestock:

> *For bloat in goats, you mix the soot from the kitchen roof with your own urine in a bottle, and they drink it. For retained placenta in goats and cattle you mix soot from the kitchen roof with omo [soap/washing powder] and put it in their mouths, then the placenta will come out." [Women's focus group participant, Kasigau, 26/6/2019]*

One of the main plant-based curatives used very commonly for all livestock is aloe. This was commonly used in both study sites. Farmers described how they use if for different ailments in many types of livestock:

> *"There are particular seasons where livestock get some kinds of viruses. Then we take aloe vera and we boil it, we mix it with water, and chillis, and it treats that." [Men's focus group participant, Kware, 20/8/2019]*

> *Chicken owners use aloes for treating most illnesses in their stock. [Male livestock owner, Kasigau, 19/6/2019]*

Indeed, the method of administration seems to be the same for all participants. Aloe is cut and placed into livestock drinking water:

> *"This one, there is a bucket I use for them for their drinking water over there, I put water in it and I cut the aloes into pieces, then we use water which might have been used for boiling beans or maize, the one my wife has been using. This water, if we put it with the aloe, then the sheep and goats don't know there is aloe in it and they will just go and drink it. But if it is a serious case then I put that mixture in a bottle and give them like that to make sure they have taken it." [Male livestock owner, Kware, 8/9/2019]*

This treatments was given to chickens, goats and sheep, and is said to treat a number of ailments, including coughs, diarrhea, fevers and worms.

> *"I have aloe vera. Let me show you. This one in case the sheep have diarrhoea, I can use them for coughs, I put them in their water, and they will drink it when it is inside the water." [Male livestock owner, Kware, 8/9/2019]*

Interestingly, the knowledge and administration of herbal medicines for livestock was very strongly gendered. Making and administering herbal medicines are the task of men, and the knowledge of these medicines is largely possessed by men too:

> *"You know the things that are mostly for men to know are the medicines of the livestock, it is this kind of research [knowledge] which we were given by our fathers very long ago." [Men's focus group participant, Kware, 20/8/2019]*

One woman who had knowledge of herbal medicines for livestock explained that she had attended a seminar in order to gain this knowledge – it was not inherited as it seemed to be for male participants.

> *"...I know a few for livestock. Like the treatment for worms to give to goats. The stomach is very swollen. You must pound the leaves of the tree, steep it in water and then they must drink it. This washes the stomach and they get diarrhoea and then the worms come out. Then it is finished." [Female livestock owner and herbalist, Kasigau, 11/11/2019]*

For many, the reason for using herbal medicine for livestock was a matter of access and financial capability:

> *"The local medicine is simple, often free (if you have that knowledge) and people are trying to save money. The main challenge with local medicine is you can't know the dosage to give. With local medicines you either overdose or you don't give enough. And then you can be heard saying oh this healer has misled me. A huge percentage of livestock owners use local medicines until they run out of effective options, then they try the stuff from the agrovet." [Men's focus group participant, Kasigau, 26/6/2019]*

Particularly for farmers and herders living far from towns, this knowledge was important for the survival of their animals, as agroveterinary shops were many miles

away, and there was no access to a government livestock or veterinary officer:

> *"If you [men] are in the bush you cannot get clinical medicines, you need to know how to use the trees and plants around you...It is about availability of the medicines." [Men's focus group participant, Kasigau, 26/6/2019]*

DISCUSSION

Many of these narratives presented here indicate that herbal medicines are widely used for human and livestock health in contemporary Kenya, in both rural and urban contexts. Partly this is due to a lack of access to biomedicines, whether due to financial capabilities or geographical constraints, but this is not the only reason. Importantly, patterns of use of indigenous medicines are highly gendered, and use of medicine is strongly influenced by beliefs which closely resemble homeopathic strategies, more specifically the idea of treating like with like. Furthermore, patients did not trust 'chemicals' in biomedicines, or ingredients which they did not recognize. I discuss this in detail elsewhere.[6] Despite advances in recent decades in the proliferation of biomedicines and veterinary medicines into even the most geographically isolated of communities, this has not necessarily resulted in use of biomedicines across the board. Complex factors are at play which influence decision making and patterns of use of indigenous healing and biomedicine, and to oversimplify these would be to misunderstand local realities.

For livestock it remains the preserve of male heads of households to make decisions regarding administration of veterinary medicines for livestock. Women professed to have little or no knowledge of livestock medicine, be it indigenous or biomedicines, and claimed to have no agency in administration of medicine for livestock. Obviously this was not the case in female headed households but where men were present, women tended to defer to them.

Men and women held specific knowledge of indigenous medicine, and this knowledge was not purely the preserve of those practicing healing commercially. Most participants, and especially those who were older, had knowledge of plants for healing. This knowledge reflected societal gender roles. Not surprisingly, women had specific knowledge of plants which reflected women's role as care givers and mothers: plants for healing common children's ailments, and for women's health including abortion-inducing plants, plants to assist menstrual problems, and plants to aid fertility. For men, their knowledge reflected what was considered to be masculine roles: 'hard work' and physical labour leading to aches and pains, and plants to increase 'man strength' (erectile disfunction).

Indigenous medicines are used for many common complaints in human health: stomach problems, aches and pains, fevers and coughing are reportedly successfully treated with herbal concoctions. For more urgent or serious issues, patients would be more likely to use biomedicine or attend hospital.

These factors, including financial constraints, indigenous belief systems, geographical location, gender, and proliferation of counterfeit medicines, combine to create complex dynamics affecting individual decision-making regarding use of medicines.

STRENGTHS AND LIMITATIONS OF THE STUDY

This study is, like any ethnographic study, subject to a certain level of bias. We are also human beings and not research-automatons, and therefore will always perform and develop some kind of relationship with our participants and the communities in which we work for numerous reasons including our positionality, our personal backgrounds, etc. Instead of seeing this as a limitation, we can use these relationships to establish important rapport with participants in our research, and to learn more about our participants' lives.[23] Ethnography, and indeed any social science research cannot, I believe, be seen as 'neutral' or free from bias,[24] but by introducing rigor in the form of transparency of methods and limitations of our approach, we can counteract this. The other way we can control for bias is through triangulation of our methods: in this study, I use four different ways of finding out about patterns of use of indigenous medicines. When we use a number of different methods and still produce the same findings and saturation of responses, then we can assume a certain level of shared experience across participants and respondents.[25]

CONCLUSIONS

Narrating how and why people use herbal medicines for themselves and their livestock is important in understanding the context in which people and livestock access healing, and the processes involved in this. It is clear that culturally appropriate and locally recognized methods of treating certain illnesses maintain a strength in the collective consciousness. What people consider to be 'the old ways' are still the go-to method of healing for a family members' stomachache, a fever, a cow's extended labour, or a coughing goat. When we shed light on these practices we can better provide for and understand circumstances in which people make choices regarding their health and the health of their animals. This study is important for human and animal healthcare providers across Africa in understanding peoples' health choices for themselves and their livestock, and in particular why they might favour one type of medicine over another, and indeed in understanding pluralistic pathways to health and wellbeing.

Herbal medicines are widely used, both in settings where biomedical care is available, and where it is not, for humans and for livestock. The current lack of effective regulation or policies and their enforcement ensuring safety of herbal medicines is problematic. The potential dangers to humans and livestock using either ineffective or potentially poisonous levels of herbs cannot be overstated. Given the continued widespread use of herbal medicines throughout Kenya,[10,12,14,18] there is a need for a government-level push to ensure effective and safe medicines are available to all,[7] especially so in contexts where people fear biomedicines due to widespread infiltration of counterfeits.[6]

Herbal and indigenous practitioners could be vital sources of primary healthcare when properly trained and equipped: their local knowledge and situation within most communities make them ideally positioned in ensuring access to care for all humans and their livestock, especially so given the very low numbers of qualified biomedical doctors in Kenya.[26]

Going forward, it is clear that we need larger scale research into the extent of use of indigenous medicines, the efficacy of herbal medicines especially for livestock which is a neglected area of study, as well as robust policy to ensure safety or both herbal and biomedicines for humans and livestock.

AVAILABILITY OF DATA AND MATERIAL

The datasets generated and analysed during the current study are not publicly available due to content which might identify individuals within the full recorded narratives but are available from the author on reasonable request.

ETHICS APPROVAL AND CONSENT TO PARTICIPATE

This research project was reviewed by the ILRI Research Ethics Committee (approval code ILRI-IREC2018-18) and the University of Liverpool Ethical Committee (approval code 4548 2018), and I gained a NACOSTI permit to undertake research in Kenya (license number NACOSTI/P/19/31684/30102). Consent to participate was gained through oral recorded consent prior to interviews and focus groups, due to low levels of literacy in some cases, and the need for sensitivity to this.

CONSENT FOR PUBLICATION

Consent for publication was not required as no personal identifying materials or information are included in this manuscript.

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AUTHORSHIP CONTRIBUTIONS

As the single author of this paper, I declare that I also designed, conducted and analyzed the original research for this article.

COMPETING INTERESTS

The author completed the Unified Competing Interest form at www.icmje.org/coi_disclosure.pdf (available upon request from the corresponding author) and declares no conflicts of interest.

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