

RESEARCH ARTICLE

ETHNOVETERINARY PRACTICES AMONG SMALL RUMINANT FARMERS IN SOUTHERN LOWLANDS OF GANDAKI PROVINCE, NEPAL

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ABSTRACT

This field-based survey intended to document different ethnoveterinary practices commonly used by small ruminant farmers of Southern lowlands of Gandaki province. Altogether 231 small ruminant farmers keeping sheep and goats, 79.2% (183 of 231) females and 20.8% (48 of 231) males, were enrolled in this study. Information about use of ethnoveterinary practices was gathered through in-person interviews using pre-structured questionnaire on participatory basis of farmers. Informant Consensus Factor (Fic) was used as the statistical tool for the study. Altogether 32 botanicals from 22 different families and 10 chemical products used are documented to be used for ethnoveterinary practices in small ruminants. Among these botanicals, 10 are herbs, 8 shrubs and 14 trees and 22 dichotomous and 10 were monochotomous plants. 57 ethnoveterinary practices recorded in the study. They were mostly used for digestive system disorder 35.1% (20 of 57) such as diarrhea 25.0% (5 of 20) and bloat 20.0% (4 of 20), skin pathologies 14.0% (8 of 57) such as burn 37.5% (3 of 8), and myiasis 25.0% (2 of 8), respiratory system disorder 14.0% (8 of 57), cuts and wounds 10.5% (6 of 57), reproductive system disorder 8.8% (5 of 57), and bones fractures 5.3% (3 of 57). The category that had the highest informant consensus factor (Fic) value was whole plant of *Cannabis sativa* for respiratory problems (Fic= 0.91). Out of 46 ethno botanical treatment practices, 36 were shoot parts mainly leaves, bark, flower and stem, 7 were root parts and 3 whole plant. This study shows that ethnoveterinary practice is common among small ruminant farmers of Southern lowlands of Gandaki province, Nepal. Considering the historical use of such practices in other parts of the country as well, exploring pros and cons of ethnoveterinary medicine would benefit in their rational uses.

KEYWORDS

Cannabis sativa, ethnoveterinary medicine, small ruminants, Gandaki province

1. INTRODUCTION

Small ruminants are integral socio-economic components of rural society in Nepal. Their contribution to overall agriculture value and rural economy is significant. Therefore, the health and productivity of these animals have considerable impact on overall national economy (Panthi et al., 2016). These small scaled livestock farmers in rural area have been using sustainable indigenous knowledge, skill and practices on treatment and prevention of animal diseases since time immemorial. The information flows predecessor's generation to generation in the form of inherited culture. Ethnoveterinary practices is one of the major ancient healing systems for animals in those area (Confessor et al., 2009). It is considered as viable alternative to conventional allopathic veterinary medicines which cannot fully address those local pathologies. Scarcity of modern allopathic medicines, their erratic supply and unavailability of veterinary services also promote intensive use of ethnoveterinary practices (Marandure, 2016). Although the method cannot fully treat acute infectious disease its efficacy against minor diseases and chronic problems is satisfactory. A number of plant species, chemicals have been identified for treating wide range of pathology in those animals. Locally available products are major components of ethnoveterinary practices and the nature, frequency and method of administration can change in relation to geography, time and knowledge. It is freely available and easy to prepare with low technical sophistication (Khan et al., 2019).

Very limited attempts have been made for recording these practices. It is

crucial to learn, evaluate and promote these practices. In absence of proper documentation, scientific validation, rapidly changing social dynamics and environmental condition have caused this information to progressively vanish from the culture. Therefore, it is critically urgent to scientifically collect and organize the data relating for maintenance of ethnoveterinary practices. The present study was designed to compile and document different ethnoveterinary practices used by small scaled farmers primarily raising sheep and goats in southern lowlands of Gandaki Province Nepal. This is an attempt to promote and develop the conservation of ethnoveterinary medicine to save it from extinction. The study also focuses on classifying effective cures from placebo and providing baseline information as well. Proper knowledge on the matter not only deepens our understanding on the matter but also explores and gives a suitable alternative to existing problems.

The study area is important habitat for diversity of flora and fauna many of which are used for medicinal purpose. Animal husbandry particularly small ruminants is main occupation in the study area due to adequate fodder availability and agricultural land. Survival based farming with multiple species integration aided by cut and carry of fodder is characteristic to farming in the area. The marginal communities have domesticated some medicinal botanicals nearby so that they are available when required.

2. METHODS AND METHODOLOGY

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2.1 Study Area

This field-based study was conducted in Southern lowlands of Gandaki province, Nepal. Administratively the area is Nawalparashi east district divided into 8 local bodies with area of 1,043.1 sq km and population 310,864. The area is focal point for agriculture and livestock keeping. Geographically it is located in inner Terai on foothills of Mahabharat and Siwalik mountain ranges. River Narayani flows on eastern part. Sheep and goat farming are alternative occupation of tribal villages on Narayani bank and hills of Devchuli. This region is important in term of goat and sheep farming as it marks the end of Plain and start of mountain in northern part.

Demography of Respondents:

- Total Respondents: 231
- Responses used in the study: 210
- Female: male respondents= 183:48
- Average age of respondents= 42.524.67 ± 2.41 years.
- Average flock size of small ruminants= 11.94 ± 0.97 heads.

2.2 Study Procedure

Information on ethnoveterinary practices was collected by semi-structured questionnaire on participatory basis of farmers who keep small

ruminants in study area. During winter of 2019 researchers visited the site and organized several focal discussions and key informant interviews concerning the illness and remedies in small ruminants particularly sheep and goats. Information on product used, part of botanical, body system associated and disease targeted were noted. Possible care was made to validate the obtained information through repeated queries with multiple respondents. The local name of botanicals and other products were identified scientific name was assigned to them using existing publications.

2.3 Tools

Informant Consensus Factor (Fic): Fic is used to determine homogeneity of Information for particular use and for quantification of recorded data. The Value ranges from 0 to 1, where high value indicates particular treatment approach used by high proportion of informants.

Mathematically,

$$Fic = \frac{\text{No of respondents using that treatment}}{\text{Total no of respondents using ethnoveterinary treatment}}$$

3. RESULTS AND DISCUSSION

A detailed study list of both botanicals and chemicals used in ethnoveterinary practices along with their local name, scientific name, family part used and action for different pathologies are presented below.

Table 1: Botanicals

S.No	Local & Common name,	Scientific Name	Family	Part Used	Act on	Action	Fic
1	Kagati (Citrus)	<i>Citrus reticulata</i>	Rutaceae	Leaves, Bark, Juice	Digestive system	Indigestion, Diarrhea	0.62
					Skin	Ectoparasite	0.07
2	Ganja (Cannabis)	<i>Cannabis sativa</i>	Cannabaceae	Dry leaves, root, Buds, whole plant	Respiratory system	Cough, Pneumonia, Asthma	0.91
					Digestive system	Diarrhea	0.39
						Hypothermia	0.10
3	Lasun (Garlic)	<i>Allium sativum</i>	Amaryllidaceae	Cloves	Digestive system	Organophosphate Poisoning, Plant Poisoning	0.50
						Goiter	0.01
					Digestive system	Bloat	0.15
4	Surti (Tobacco)	<i>Nicotina tobacum</i>	Solanaceae	Leaves	Skin	Ectoparasite	0.79
5	Besar (Turmeric)	<i>Curcuma longa</i>	Zingiberaceae	Rhizome	Cut and Wounds	Prevent Infection	0.70
					Reproductive system	Mastitis and udder inflammation	0.22
6	Aamba (Guava)	<i>Pisidium guajava</i>	Myrtle	Leaves	Digestive system	Abdomen pain	0.38
					Digestive system	Endoparasites	0.33
7	Timur	<i>Zanthoxylum armatum</i>	Rutaceae	Seeds	Digestive system	Diarrhea, Bloat	0.17
					Respiratory system	Cough	0.06
8	Ghantiphul	<i>Hibiscus rosa-sinensis</i>	Malvaceae	Flower, Leaves	Digestive system	Constipation	0.74
9	Badahar	<i>Artocarpus laucha</i>	Mulberry	Leaves	Reproductive system	Retention of Placenta	0.71

Table 1 (Cont.): Botanicals

10	Banmara	<i>Argentina adenophora</i>	Asteraceae	Leaves Juice	Cut and Wounds	Prevent Bleeding	0.77
11	Titepati	<i>Artemisia vulgaris</i>	Asteraceae	Leaves	Skin	Ectoparasite	0.28
12	Gidari		Verbenaceae	Bark		Heat stroke	0.10
13	Jimmu	<i>Alium hypsistum</i>	Amaryllidaceae	Leaves	Respiratory system	Cough	0.27
14	Pyaj (Onion)	<i>Alium cepa</i>	Amaryllidaceae	Stem, Leaves	Digestive system	Indigestion	0.22
15	Pipal	<i>Ficus religiosa</i>	Moraceae	Bark	Skeletal system	Fracture	0.54
16	Methi	<i>Trigonella foenum-graecum</i>	Fabaceae	Seeds		Hypothermia	0.09
17	Aru	<i>Prunus persica</i>	Rosaceae	Leave Juice	Cut and Wounds	Myiasis	0.51
18	Rukh Kathar (Jack Fruit)	<i>Artocarpus heterophyllus</i>	Moraceae	Leaves	Respiratory system	Cough	0.44
19	Tori (Mustard)	<i>Brassica nigra</i>	Brassicaceae	Seed, Oil	Digestive system	Diarrhea	0.59
20	Aap (Mango)	<i>Magnifera indica</i>	Anacardiaceae	Leaves	Skin	Promotes Healing	0.18
				Seed	Digestive system	Diarrhea	0.34
21	Pudina (Mint)	<i>Mentha arvensis</i>	Laminaceae	Leaves	Digestive system	Promote appetite	0.22
22	Aduwa (Ginger)	<i>Zingiber officinalis</i>	Zingiberaceae	Rhizome	Respiratory system	Cough	0.51
					Digestive system	Bloat	0.11
23	Baas (Bamboo)	<i>Dendrocalamus strictus</i>	Poaceae	Leaves	Reproductive system	Retention of Placenta	0.62
				Young Stem	Skeletal system	Fracture	0.15
24	Bethe	<i>Chenoposium album</i>	Amranthaceae	Leaves	Digestive system	Parasite	0.40
25	Neem	<i>Azadirachta indica</i>	Meliaceae	Leaves	Skin	Ectoparasite	0.57
					Digestive system	Parasite	0.52
26	Potato	<i>Solanum tuberosum</i>	Solanaceae	Tuber	Skin	Burn	0.20
27	Tomato	<i>Lycopersicum esculentum</i>	Solanaceae	Fruit	Skin	Burn	0.15
28	Aakashbeli	<i>Cuscuta reflexa</i>	Convolvulaceae	Whole Plant		Lameness	0.04
						Hyperthermia	0.02
29	Kyamuno	<i>Sygyim jambos</i>	Myrataceae	Leaves	Respiratory system	Cough	0.28
30	Amriso	<i>Thysanolaena latifolia</i>	Graminae	Root	Digestive system	Abdomen Pain	0.38
31	Khanyo	<i>Ficus semicordata</i>	Moraceae	Leaves	Digestive system	Bloat	0.18
					Reproductive system	Retention of Placenta	0.25
32	Saal	<i>Shorea robusta</i>	Dipterocarpaceae	Leaves	Skin	Burn	0.46

Different botanical parts are used for ethnoveterinary practices in the study area. Altogether 32 botanicals from 22 different families are documented to be used as small ruminants' ethnoveterinary practices. These families includes 3 botanicals each from Amaryllidaceae, Moraceae and Solanaceae family, 2 botanicals each from Asteraceae, and Zingiberaceae family while all other families include single plant. 10 herbs, 8 shrubs and 14 trees are documented to be used in ethnoveterinary

practices. Among these botanicals 22 are dichotomous and 10 are monocotomous. The study documents 46 uses of 32 different plants in ethnoveterinary practices. In most of them shoot parts (36 of 46) are used by the farmers, few roots parts (7 of 46) and some whole plant (3 of 46) are also used. Among the shoot parts 16 botanicals are used for leaves, 7 for fruits, 2 for bark and 1 each for flower and stem.

Among ethnoveterinary practices recorded in the study 17 are used for

digestive system disorder. 5 of these remedies were used for diarrhea alone and 4 for bloat. Similarly, 8 ethnoveterinary practices are used for skin pathologies like burn, myiasis, ectoparasite etc. 6 of them were used for respiratory system disorders mainly cough, 4 for reproductive system disorder mainly Retention of Placenta, 3 for cuts and wounds and 2 for bones fractures. In the study as high as 7 ethnoveterinary practices are used as antiparasitic agent. Informant consensus factor Fic used to

determine the preference of ethnoveterinary practices reveals dry leaves of *Cannabis sativa* used by maximum number of respondents for respiratory problems like cough and pneumonia with Fic 0.91. Other ethnoveterinary practices with high Fic include leaves juice of *Argentina adenophora* used for Cut and Wounds to prevent bleeding with Fic 0.77, flower and leaves of *Hibiscus rosa-sinensis* for constipation with Fic 0.74 and leaves of *Artocarpus laucha* for retention of placenta with Fic 0.71.

Table 2: Ethno Chemicals

S.No	Item	Preparation	Use		Fic
1	Marcha (Yeast activator)	Mashed	Respiratory system	Cough, Pneumonia	0.82
2	Jaad/Cut (Grain Remnant)	Whole		Growth Promoter	0.55
3	Fitkiri (Potassium Alum)	Topical	Cut and Wounds	Hemostatic	0.39
4	Vinegar	Fluid	Digestive system	Bloat	0.59
5	Maha (Honey)	Fluid	Respiratory system	Cough	0.67
			Cut and Wounds	Promotes Healing	0.38
6	Kalo nun (Black Salt)	Powder	Digestive system	Flatulent	0.49
7	Dahi (Curd)	Wholesome	Digestive system	Digestive stimulant	0.80
8	Matitel (Kerosene)	Fluid	Cut and Wounds	Myiasis	0.32
9	Anda (Egg)	Wholesome	Skeletal system	Fracture	0.18
10	Teel (Oil)	Fluid	Reproductive system	Mastitis	0.55

Additionally, the study documents 10 chemical products used for ethnoveterinary practices to treat small ruminants. Among them yeast activator (common additive used for alcohol fermentation) is used by majority of respondents for respiratory system disorders like cough, pneumonia with Fic 0.82. Other treatments with high Fic also include using curd as digestive stimulant, kerosene as magotocidal in wounds and oil massage in mastitis.

Similar studies have been carried by other scholars in different parts of Nepal. The landscape of the country is such that the microclimate favors several ecosystems to flourish within small geographical area. A study by some researcher in Jumla district documented 42 medicinal plants and parts used as ethnoveterinary medicine (Gyawali and Paudel, 2017). Among them 8 are also included in present study with similar and dissimilar uses. The study documents vinegar used for poisoning, oil for external wounds *Zanthoxylum armatum* against annelids in nostrils, which are not in agreement to present study. Although use of *Artimisia vulgaris* as antiparasitic agent, *cannabis* for cough and diarrhea are in agreement with the present study. Similarly, another study by in Parbat district documented 21 plant species belonging to 19 families to be used as ethnoveterinary treatment (Malla and Chhetri, 1970). Among them 4 are also indicated in presented study. Another study by in Morang district documented altogether 37 plant species (both wild and cultivated) as the botanical sources of crude drugs belonging to 35 genera and 24 families used for the twenty-one common ailments of domestic cattle (Raut and Shrestha, n.d.).

4. CONCLUSION

The present study addresses the urgency to document the ethnoveterinary knowledge. With changing global scenario regarding threats of emerging and reemerging livestock diseases these traditional assets will be our prime weapon. These will serve long term benefits both in terms of economy and availability. A complete database of ethnoveterinary practices and medicinal plants and chemicals is advised for comprehensive in vitro pharmacological studies and further research.

The study also evidences necessity of detailed study on biological and cultural assets for livestock treatment approaches in rural area.

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