Validation of Selected Ethno-veterinary Practices through Farmer Participatory Research Approach in Jalpaiguri District of West Bengal

Sourav Chandra[1], A. Chakrabarty[1], S. Biswas[2*], C. Guha[3] and S. Sarkar[3]

[1]Department of Veterinary Medicine, Ethics & Jurisprudence, West Bengal University of Animal and Fishery Sciences, Belgachia, Kolkata, West Bengal (700 037, India
[2]Uttar Banga Krishi Viswavidyalaya, Majhian, South Dinajpur, West Bengal (733 133), India
3Department of Veterinary Preventive Medicine, West Bengal University of Animal and Fishery Sciences, Belgachia, Kolkata, West Bengal (700 037, India

Article History

Manuscript No. 326
Received in 29th July, 2012
Received in revised form 9th October, 2012
Accepted in final form 2nd Decemebr, 2012

Correspondence to

E-mail:sbiswasvet@gmail.com

Keywords

Ethno-veterinary, validation, FPR, ITK

Abstract

The study was conducted in high altitude, densely tribal populated, forest fringe areas of sub-Himalayan Terai agro-climatic zone of Jalpaiguri district of North Bengal. The study was confined in the Maynaguri and Metiali block of Jalpaiguri district, mainly focusing on the villages. A sample of 65 resource persons was fixed for collection and documentation of ethno-veterinary practices or Indigenous Technical Knowledge (ITK) in livestock and wildlife in forest fringe areas of the district. At the end of the survey in total 105 ethno-veterinary practices used in livestock and wildlife were collected for proper documentation. Out of 105 documented ITKs, 10 ranked ethno-veterinary practices with five replications in each case were brought under validation through clinical trial using both ethno-veterinary and allopathic medicine by the 10 experimenter resource person following Farmer Participatory Research (FPR) approach. From the 10 best selected ITKs three were taken into consideration. Data collected from the respondents on several criteria were subjected to one way analysis of variance. To test the difference of mean amongst alternatives, multiple range test, i.e. Honest Significant Difference (HSD) Tukey's test was used. The study revealed that ethno-veterinary medicine comprised of indigenous ingredients was favourably accepted by the mahouts and farmers to treat *Sajan* in elephant, external non-specific wound in cattle and yolk-gall in cattle owing to its household availability of ingredients, least side-effect, easy availability and less cost involvement made the present medicament viable option. Through, trial this may be concluded as considering many fold beneficial criteria, ethno-veterinary practice using indigenous technique was better alternative as farmers' choice in the study area.

1. Introduction

Traditional veterinary medicine has been in use in India for time immemorial, where West Bengal being the ancient center. This provides valuable alternatives to and is complement to modern veterinary medicines. This is increasingly evident, where Indigenous Technical Knowledge (ITK) is of specific value in developing countries like India. Most of the ethno-veterinary practices are location specific, not scientifically documented and validated but have tremendous results. There is need to develop methodologies for studying and documenting the ethno-veterinary practices through systemic planning. The present study was aimed at advocating strategies for higher adoption of ITKs and their blended technologies in Veterinary practices. So, this study envisaged finding the ethno-veterinary practices available in the forest fringe areas of Terai region of North Bengal as well as collecting and documenting the ethno-veterinary medicinal practices existed in animal husbandry and wildlife with testing of scientific validity of such practices. This study was formulated some recommendations based on clinical validation trial and subsequent monitoring of the validated practices for wider diffusion of ethno-veterinary medicine.

2. Materials and Methods

The study was conducted in the Jalpaiguri district of West

Bengal, India. The studied area belongs to high altitude, densely tribal populated, forest fringe areas of sub-Himalayan Terai agro-climatic zone of North Bengal. Considering the limitation of time, manpower and other resources with a research student and being the intensive nature of the present investigation, the study was conducted purposively in the Maynaguri and Matiali block of Jalpaiguri district, mainly focusing on the villages, which were at forest fringe areas and under activities and/or adopted by Krishi Vigyan Kendra (Farm Science Center), Jalpaiguri. The villages were selected keeping in view the objective of the present study. The locale of the study in ethno-veterinary medicine is highly important as the practices here are very much location specific and changing with availability of natural flora and fauna, and also socio-cultural characteristics of its practitioners. A sample of 65 resource persons was fixed for collection and documentation of ethno-veterinary practices in livestock and wildlife in forest fringe areas of the district. The selected respondents were interviewed through the structured schedule. At the end of the survey in total 105 ethno-veterinary practices used in livestock and wildlife were collected for proper documentation. The documented practices were then categorized according to its uses, chief organ of action and species of animal involved enlisting through generation of ailments list related to remedial Ethno-veterinary practices. The diseases or in broader use of practices were then ranked through card scoring method by the selected key informants. Out of 105 documented ITKs, 10 ranked ethno-veterinary practices with five replications in each case were brought under validation through clinical trial using both ethno-veterinary and allopathic medicine by the 10 experimenter resource person following Farmer Participatory Research (FPR) approach. From the 10 best selected ITKs three were considered for study. Data collected from the respondents on several criteria were subjected to one way analysis of variance. Analysis was carried out separately for each group of data under each criterion under a particular disease, studied. To test the difference of mean (significant/non-significant) amongst alternatives, multiple range test, i.e. Honest Significant Difference (HSD) Tukey's test was used.

3. Results and Discussion

3.1. Validation trial on treatment of Sajan

The validation trial on treatment of *Sajan* (skin crack or wound condition in the foot pad of elephant) using mixture of indigenous ingredients (*Jaam* bark, *Curjolata*, *Bheloa* fruit, *Gurjolata*, alum boiled in tortoise shell) is presented in Table 1.

The observations revealed that the effectiveness, i.e. number of animals responded or cured off satisfactorily of the mixture of indigenous ingredients in elephant was less than treating with allopathic medicine. The previous experience and present trial observation of the elephant rearer (*mahout*) was same and did not differ significantly (p<0.05), but both differed significantly from allopathic medicine used for the purpose. The quickness in healing of *Sajan* in elephant was same in case of allopathic and ethno-veterinary medicine used in the study and farmer's perception in this respect was wrong. In practical validation trial, it was found to take same time for treating *Sajan* by allopathic or ethno-veterinary medicine. For this reason, quickness criteria differed significantly between farmer's perception and observation during both allopathic or ethno-veterinary trial, but allopathic and ethno-veterinary trial did not differ significantly (p<0.05) between them. Farmers' perception found incorrect, which might be due to their infrequent experience. Though *Sajan* is common in elephant but did not come under treatment frequently by human intervention, so mahouts were found little bit inexperienced in treating *Sajan*. Besides, the extent of skin crack or wound in the present cases were more, that might took long duration for complete healing, as recorded here. Use of indigenous ingredients caused no side-effects compared to more adverse effects by using allopathic medicines. In this regard, mahout's perception and observation was faultless. Thus, side-effect criteria did not differ significantly between farmer's perception and actual observation, but both differed significantly (p<0.05) from allopathic wound healing drugs.

It was found that the ease in preparing the present multi-ingredient medicinal mixture in farmer's perception and during ethno-veterinary trial was very less compared to using allopathic medicine. So, *mahout*'s perception in the matter and actual observation did not differ significantly in between but compared to Allopathic medicine both differed significantly (p<0.05). The availability of all the ingredients of mixture as perceived and as observed with Allopathic medicine as well did not differ significantly (p<0.05) amongst themselves. The important medicinal plants mainly found in deep forest, so their availability was similarly troublesome as in the case of getting allopathic medicine in the forest area. In case of cost effectiveness, indigenous ingredients as perceived and as felt in ethno-veterinary as well as allopathic medicinal trial were different and thus differed significantly (p<0.05) amongst themselves. The allopathic wound healing lotion/ointment for an elephant was naturally involved more costing than indigenous ingredients. Further, the cost effectiveness was high as perceived by the mahouts but it differed significantly while use in the present study. This again might be owing to infrequent case handling of same nature by the mahouts. This is rational to happen so far as wildlife is concerned.

It is clear from Table 1 that ethno-veterinary medicine comprised of indigenous ingredients was favourably accepted by the farmers to treat *Sajan* in elephant owing to its least side-effect, easy availability and less cost involvement. Besides, allopathic was more effective, quick in action, easy to prepare.

The experience gained from discussion with farmers might be concluded as indigenous ingredients in treating *Sajan* in elephant seemed to be viable option as it was more cheaper, easily available and having least side-effects. The majority of ingredients used in wildlife ethno-veterinary medicine were being borrowed from human herbal medicine, whereas others have evolved by observing the wildlife feeding in the forest. Observant mahouts noticed that elephants ate the same plant wherever certain symptoms were displayed. Thus, experience gathered by mahouts in the similar observations, use in treating elephants. Lans et al. (2001) reported that many *mahout* preferred western veterinary medicine because of the convenience to avoid effort in gathering, preparing and administering the ethno-veterinary medicine in wildlife. However, the elephants, with its unique physiology, was also prone to variety of disease/ailments specific to species and as a result, elephant remedies with ingredients common to human medicine were often well-studied. Some of the wild medicinal plants were being depleted in wild condition (Kar, 2004) and thus in depleting use in ethno-veterinary resulting to lower efficacy. *Gurjolata* (creeper herbs) used in the present medicament was one of the threatened medicinal plant of Darjeeling Himalays (Chhetri et al., 2005). This wild herb (*Tinospora cordifolia*) was also reported to use against skin infection and infestations (IIRR, 1994; Mathias et al., 1998). Bedi (2008) documented the medicinal value of such herbs in the tribal hills of Gujarat. Use of *Jaam* (*Syzygium jambos*) root and bark paste in treating wound was also documented by De et al. (2004). *Bheloa* (*Semecarpus anacardium*) seeds were reported to alleviate swelling of limb joints in rheumatism and leprotic wounds (Chakraborty and Bhattacharjee, 2006) amongst tribes. Tortoise shell contains many medicinal elements (Sabinet, 2008). Tortoise shell was also reported to use against skin sores (Leung, 2004), warts and other skin problems (Ross, 1979). Exactly this mixture of medicinal plants or ingredients against *Sajan* in elephants was not reported earlier in the study area.

3.2. Validation trial on treatment of external wound

The result of validation trial on treatment of external wound by application of indigenous medicament using bark of mango, *Kadam* with silk cotton seed mixture in cattle was given in Table 2.

The effectiveness, i.e. number of animals responded satisfactorily was greater in allopathic medicine, though it perceived to be more effective by the farmer but not so observed in ethno-veterinary trial. The effectiveness was nearly close in farmers' perception and as resulted in allopathic medicinal trial, but was less by using indigenous medicament. Thus, effectiveness as perceived and as observed in ethno-veterinary trial differed significantly, eliciting farmers' misperception. This may be due to the fact that diagnosis of wound on its various classifications was needed, which might not be clear to the farmers. Same medicament may be of use in certain type of wound but not for all types of wound, as have been done in present trial by the farmers. In some cases, which were not healed up by the medicament might have some underlying infectious cause to be treated with specific medicines. However, effectiveness of allopathic medicine differed significantly both from farmers' perception and observation in ethno-veterinary trial. It is important to record the more quickness in healing of wound was observed by using indigenous medicament, signifying its non-specific superficial wound healing quality. This quickness was even more than that was perceived or experienced previously by the farmer, but their perception did not differ significantly ($p<0.05$) with the result as seen in allopathic medicinal trial. Present medicament so differed significantly in terms of quickness from allopathic medicine and as perceived previously by the farmers. Regarding side-effects farmers' perception, observation in ethno-veterinary and allopathic trial differed significantly ($p<0.05$) and showed overall lesser side-effects

Table 1: Clinical trial on treatment of Sajan using mixture of Jaam bark, Bheloa fruit, Gurjolata, alum boiled in tortoise shell

Criteria/trial group	Effectiveness	Quickness	Side-effects	Ease in preparation	Availability	Cost effectiveness
Before trial	7±0.00[a]	6±0.00[a]	10±0.00[a]	6±0.00[a]	8.8±0.20	10±0.20[a]
Allopathic medicine	8±0.00[b]	9±0.00[b]	4.8±0.20[b]	10±0.00[b]	7.2±1.11	5±0.20[b]
Ethno-veterinary medicine	7±0.00[a]	9±0.00[b]	10±0.00[a]	5.8±0.20[a]	7.8±0.20	8.4±0.20[c]

[a, b, c]=Mean±standard errors with dissimilar superscripts in columns differ significantly at $p<0.05$ level; n=5

Table 2: Clinical trial on treatment of external wound by application of bark of mango, Kadam with silk cotton seed mixture in cattle

Criteria/trial group	Effectiveness	Quickness	Side-effects	Ease in preparation	Availability	Cost effectiveness
Before trial	8±0.00[a]	7.4±0.40[a]	9±0.00a	6.8±0.20[a]	9±0.00[a]	10±0.20[a]
Allopathic medicine	7.8±0.20[a]	8±0.00[a]	8±0.00b	9±0.00[b]	7±0.00[b]	4.2±0.20[b]
Ethno-veterinary medicine	6±0.00[b]	9±0.00[b]	9±0.00c	6±0.00[c]	8±0.00[c]	9±0.20[c]

[a, b, c]=Mean±standard errors with dissimilar superscripts in columns differ significantly at $p<0.05$ level; n=5

in all the three results. Though farmers' perception and trial result were similar but considering the individual treated cases they differed significantly ($p<0.05$).

The ease in preparation of the present multi-ingredient medicament was less than in farmers' perception and during Allopathic trial and these easiness differed significantly ($p<0.05$) amongst the three groups of observation. The easiness as perceived and as found during trial differed significantly in ethno-veterinary trial, may be due to unavailability of seed of silk cotton plant during the season of experimentation. However, allopathic medicine for such wound healing was found to be easier to prepare. The availability of all the ingredients of medicament as perceived was higher than practically observed during trial. And availability was least in case of allopathic medicine. Thus, this criterion was significantly different ($p<0.05$) amongst the three groups of study. In case of cost effectiveness, indigenous medicament was high scorer than allopathic medicine. The perception of the farmer about cost effectiveness was also higher than observed in ethno-veterinary trial. This might be due to purchasing of silk cotton seeds, which they previously procured free of cost during flowering season from their proximity. Thus all the three groups under study differed significantly ($p<0.05$) amongst themselves so far as cost effectiveness is concerned.

A perusal of Table 2 shows the acceptance of indigenous medicament by the farmers for its quickness in healing, less side-effects, availability of ingredients and cost effectiveness. Allopathic medicine was more effective, easy to prepare. The experience gained from discussion with key participants revealed that because of household availability of ingredients, less costly material use, least side-effects and less durative considerations made the present medicament viable option for treatment of external non-specific wound in cattle.

Use of mango (*Mangifera indica*) leaf to cease bleeding was reported by Mathias et al. (1999). Feeding juice of *Kadam* (*Neolamarckia cadamba*) leaves with lime water was reported to cure swelling of abdomen (Bandyopadhyay and Mukherjee, 2005). The ethno-medicinal information on silk cotton (*Bombax mamabaricum*) was documented by Basu (2003). Cotton seed was also reported to have many ethno-veterinary uses (Nagnur et al., 2006). Silk cotton seed paste was recorded for its curing effect in small pox like skin diseases (Chakraborty and Bhattacharjee, 2006). The bark of silk cotton trees had bone healing ability in ethno-veterinary medicine (Jain and Srivastava, 2003). Exactly this mixture of medicinal plants or ingredients against external wound in cattle was not reported earlier in the study area.

3.3. Validation trial on treatment of yolk-gall

The result of validation trial on treatment of yolk-gall by indigenous technique using mustard oil and *Akanda* leaves latex in cattle is reproduced in Table 3.

The effectiveness, i.e. number of animals responded satisfactorily of using the indigenous technique in treating yolk-gall was greater than allopathic medicine, though it perceived to be more effective by the farmer but not observed that much in ethno-veterinary trial. The allopathic medicine was least effective in treating such cases. The effectiveness, when considered individually all the three groups differed significantly amongst themselves. Farmers' previous experience was found incorrect as it differed significantly ($p<0.05$) from present trial observation, might be due to his over perception. The quickness or duration of curing off the cases were more or less similar in all the three groups under study, so did not differ significantly ($p<0.05$), though the quickness in indigenous technique trial was slightly less. In relation to side-effects farmers' perception, observation in ethno-veterinary and allopathic trial differed significantly ($p<0.05$) amongst themselves. The actual result on side-effect of farmers' perception and observation was same and slightly less compared to allopathic technique.

The ease in the practice of indigenous technique in alleviating yolk-gall was more than allopathic technique but similar as farmer perceived. The allopathic technique differed significantly ($p<0.05$) from farmers' perception and ethno-veterinary practice, but not significantly differed between farmers' experience and observation. The cause of such observation, might be allopathic technique required more scientific and sophisticated surgical instruments with their maintenance of antiseptics, etc. where as those were at all followed in present ethno-veterinary practice. The availability of all the material for ethno-veterinary practice was very easy and scored more. Though the farmers' perception was slightly higher but it did not differ significantly ($p<0.05$) during trial, but both perception and observation was significantly different from allopathic technique. The high cost effectiveness of using indigenous

Table 3: Clinical trial on treatment of yolk-gall using mustard oil and Akanda leaves latex in cattle

Criteria/trial group	Effectiveness	Quickness	Side-effects	Ease in preparation	Availability	Cost effectiveness
Before trial	10 ± 0.00^{a}	10 ± 0.00	8 ± 0.00^{a}	8 ± 0.00^{a}	10 ± 0.00^{a}	10 ± 0.20^{a}
Allopathic medicine	8 ± 0.00^{b}	10 ± 0.00	7 ± 0.00^{b}	4 ± 0.00^{b}	7 ± 0.00^{b}	7 ± 0.20^{b}
Ethno-veterinary medicine	9 ± 0.00^{c}	9.8 ± 0.20	8 ± 0.00^{c}	7.8 ± 0.20^{a}	9.8 ± 0.20^{a}	10 ± 0.20^{a}

a, b, c=Mean±standard errors with dissimilar superscripts in columns differ significantly at p<0.05 level, n=5

materials for the ethno-veterinary practice differed significantly (p<0.05) from allopathic trial. In the regard, farmers' perception and observation in the ethno-veterinary trial was the same and did not differ significantly.

A perusal of Table 3 shows the greater acceptance of indigenous technique against yolk-gall treatment by the farmers for more effectiveness, less side-effects, ease in preparation or practice, availability of materials and high cost effectiveness. Allopathic medicine was only quicker to cure off the yolk-gall in cattle. So, experience gained during discussion and through the trial this may be concluded as considering many fold beneficial criteria, ethno-veterinary practice using indigenous technique was better alternative as farmers' choice in the study area.

Use of ethno-veterinary manipulative practice in treating skin diseases or maturing the abscess like in the ways as had been done in the present trial was also reported by Kemparaja et al. (1998). Such ethno-veterinary surgical management practices were also recorded by Mathias et al. (1999). Use of *Akanda* (*Calotropis gigantea*) leaves latex in treating arthritis was recorded by De et al. (2004). It was also documented to heal up wound when used singly (De et al., 2004). Ethno-veterinary medicinal use of *Akanda* leaves was also reported by Jain and Srivastava (2003). The latex of *Akanda* was reported to completely cure external wound by Ghosh (2003). *Akanda* leaf was known for its rheumatic pain relieving capacity (Chakraborty and Bhattacharjee, 2006). Mustard (*Brassica nigra*) was reported to have wound healing ability (Mathias et al., 1998). Sher and Hussain (2008) recorded the medicinal value of mustard in removing skin rashes and also wound healing as antiseptic agent. Joshi and Joshi (2008) noted the use of mustard in healing skin cracks and other skin problems. Exactly this mixture of medicinal plants or ingredients and such practice against yolk-gall in cattle was not reported earlier in the study area.

3.4. Monitoring and feedback of validated cases of ethno-veterinary practices through FPR

All the experimental cases validated were brought under monitoring process through visits by the researcher along with key-participants at least once in a week up to thirty six weeks during post-trial period. No cases were relapsed and responded very well with the use of ethno-veterinary medicine.

4. Conclusion

The contribution of ethno-veterinary medicine in terms of rural livestock and wildlife development is very significant. The study revealed that ethno-veterinary medicine comprised of indigenous ingredients was favourably accepted by the farmers to treat *Sajan* in elephant owing to its least side-effect, easy availability and less cost involvement. Similarly, external use of bark of mango, *Kadam* with silk cotton seed mixture in non-specific wound in cattle and application of mustard oil and *Akanda* leaves latex on yolk gall in cattle was more readily accepted by the farmers owing to its household availability of ingredients, least side-effect, easy availability and less cost involvement made the present medicament viable option. So, through trial this may be concluded as considering many fold beneficial criteria, ethno-veterinary practice using indigenous technique was better alternative as farmers' choice in the area of study. Finally it was suggested that the development plans should accommodate for the ethno-veterinary practices of rural people. National developmental strategies must be formulated to emphasize ethno-veterinary practice in the country.

5. References

Bandyopadhyay, S., Mukherjee, S.K., 2005. Ethno-veterinary medicine from Koch Bihar district, West Bengal. Indian Journal of Traditional Knowledge 4(4), 456-464.

Bedi, S.J., 2008. Ethnobotany of Ratan Hills, Gujarat, India. Economy Botany 32(3), 278-284.

Chakraborty, M.K., Bhattacharjee, A., 2006. Some common ethnomedical uses for various diseases in Purulia district, West Bengal. Indian Journal of Traditional Knowledge 5(4), 554-558.

Chhetri, D.R., Basnet, D., Chiu, P.F., Kalikotay, S., Chhetri, G., Parajuli, S., 2005. Current status of ethnomedical plants in the Darjeeling Himalaya. Current Science 89(2), 264-268.

De, A., Arya, H.P.S., Tudu, B., Goswami, A., 2004. Indigenous technical knowledge in animal husbandry. Livestock Research for Rural Development 16(8), 56.

Ghosh, A., 2003. Herbal folk remedies of Bankura and Medinipur districts. Indian Journal of Traditional Knowledge 2(4), 393-396.

IIRR, 1994. Ethno-veterinary Medicine in Asia: an Information Kit on Traditional Animal Health Care Practices. The International Institute of Rural Reconstruction, Silang, Philippines (4 Vol.), 72.

Jain, S.K., Srivastava, S., 2003. Some folk herbal medicines for possible use in veterinary practices. Indian Journal of Traditional Knowledge 2(2), 118-125.

Joshi, A.R., Joshi, K., 2008. Ethnomedical plants used against skin diseases in some villages of Kali Gandaki, Bagmati and Tadi Likhs watersheds of Nepal. Available from http://www.anadakunji.com.np, accessed on May 13.

Kar, A., 2004. Common wild vegetables of Aka tribe in Arunachal Pradesh. Indian Journal of Traditional Knowledge 3(3), 305-313.

Kemparaja, B.K., Narainswami, V., Kulkarni, V., 1998/1999b. In: Mathias, E., Rangnekar, D.V., McCorkle, C.M. (Eds.),

Ethnoveterinary Medicine: Alternatives for Livestock Development. Proceedings of International Conference, November 4-6, 1997, BAIF Development Research Foundation, Pune 2(2).

Lans, C., Harper, T., Georges, K., Bridgewater, E., 2001. Medicinal and ethnoveterinary remedies of hunters in Thailand. BMC Complementary and Alternative Medicine 1, 10.

Leung, 2004. Leung's Chinese herb news. Tortoise Shell 7(2), 1-42.

Mathias, E., Jayvir, A., 1998. Prospects of Ethnoveterinary Medicines. In: Indian Agricultural Directory, Rashtra Deepika Publication, Kerala, 526-534.

Mathias, E., Rangnekar, D.V., McCorkle, C.M., 1998/1999b. Ethnoveterinary Medicine: Alternatives for Livestock Development. Proceedings of International Conference, November 4-6, 1997, BAIF Development Research Foundation, Pune 1(2).

Nagnur, S., Channal, G., Channamma, N., 2006. Traditional dairy herd management practices during pregnancy and calving. Indian Journal of Traditional Knowledge 5(2), 243-244.

Narienswami, B.K., 1998/1999b. In: Mathias, E., Rangnekar, D.V., McCorkle, C.M. (Eds.), Ethnoveterinary Medicine: Alternatives for Livestock Development. Proceedings of International Conference, November 4-6, 1997, BAIF Development Research Foundation, Pune 2(2), 61.

Ross, M.S., 1979. Warts in the medical folklore of Europe. International Journal of Dermatology 18(6), 505-509.

Sabinet, 2008. website: sabinet.co.za/inages/ejour/linge/life_v4_1G25.pdf, accessed on May 15.

Sher, H., Hussain, F., 2008. Ethnobotanical evaluation of some plant resources in northern part of Pakisthan. Available from www.siu.edu/viebl/leaflets/sher.htm, accessed on May 13.