Ethanoveterinary Studies Among Farmers in Dindigul District Tamil Nadu, India

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Abstract: The codified medical systems include Ayurveda, Siddha, Sowa-rigpa and Unani systems of medicine, with their sophisticated theoretical foundations. The vast knowledge in the codified traditions has been documented in tens of thousands of medical manuscripts. It is not commonly known that these systems cover all basic aspects and branches of medicine, from general medicine to specialised fields like paediatrics, psychiatry, ENT, ophthalmology and surgery. They even cover plant and veterinary medicine (vrksh and pashu ayurveda). The present study is to investigate plants to used for animal ailments, ethnoveterinary medicinal plants in Dindigul District, Tamil Nadu state, India.

Key words: Medicinal plants • Ophthalmology • Ethnoveterinary • Dindigul district

INTRODUCTION

Livestock production systems in our country have been mostly primitive and unorganized. The animals are an adjunct to food crop production, which is necessarily a major occupation with the farmers. Livestock plays a subsidiary role in the farm as far as food production is concerned, though, their role in absorbing the huge quantities of crop residues, horse grains, cereal by products and farm leaf-overs and returning valuable manure to the soil to sustain their fertility for generations is significant. The contribution of farm power and transport by the large livestock is quite considerable, though farm mechanism is replacing bullock power in the country quite rapidly.

A low input, low output production system as noticed with livestock may be sustainable for the poor farmers but not efficient biologically or on economic terms. The production of livestock products is through an extensive, multi-location system which keeps millions of farmers occupied. In South India, many livestock owners, especially those who are poor and live in remote areas, use ethno veterinary medicine (EVM) for the primary healthcare of their animals.

In India, women are closely linked to and involved in livestock management. Extent and nature of their involvement vary with their socio-economic status, region and the type of animal [1]. By and large women carry out most of the critical activities related to livestock production, including cleaning, feeding, milking and care of the newborn and sick animals. There the work is well shared since livestock keeping is their main source of occupation and income. The condition is revised amongst tribal communities where women are also required to take care of sale and purchase activities [2].

The livestock owners in India have been using traditional medication based on plant formulations since time immemorial. The unique advantage is that India is one of the world’s 12 mega-diversity countries accounting for 8% of global plant genetic resources and higher share of microorganisms [3].

Farmers identified diarrhea, pneumonia, fever, bloat and loss of appetite as common and important ailments. In addition to these, women also mentioned contagious diseases. They generally felt that these were incurable, like enterotoxaemia in small animals and hemorrhagic septicemia in large animals. An important disease periodically occurring in these areas is foot-and-mouth disease (FMD), but it does not cause mortality or serious damage to local cattle and the women use traditional treatment methods for rapid healing of the ulcers caused by FMD. This objectives of this study to identify indigenous animal healthcare technologies practiced by farmers in Tamil Nadu, India.

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MATERIALS AND METHODS

An ex pest facto research design was adopted to assess the ethno-veterinary medicines in ten villages of Dindigul district of Tamil Nadu, India. In all 150 farmers were selected and twenty indigenous practices were documented. A pre-structured questionnaire was prepared and given to the personnel having reasonable knowledge of ethno-veterinary medicine. The instrument was given to fifty “judges” who were clinicians and pharmacologists from veterinary colleges and institutions. The responses were scored 3 (valid), 2 (cannot say) and 1 (not valid). The maximum and minimum validity sures obtained were 180 and 60 respectively for any practice.

The area is agriculturally quite fertile and main crops include pearl-millet, sorghum, mustard, wheat, legumes, maize, sesame and cotton. Livestock includes sheep, cattle, goat, buffalo and donkey in order of decreasing importance. The population, a complex mosaic of different caste and tribal groups, relies on animal husbandry to varying extents. Small-scale goat husbandry is widespread, even among poor people, including tribals. Cattle and buffalo ownership is largely restricted to land-owning, agricultural castes, such as Naidus, Gounders, Kurumbars. Donkeys are owned only by the lower social strata, i.e., scheduled castes and tribal groups. The Raika pastoralists are regarded as experts in all matters relating to animal keeping, including tracking and healthcare. Besides owning large numbers of livestock (rather than land), they also act as village cowherds and as care-takers in cow-sanctuaries (gaushalas).

Animal Healthcare Choices: When an animal falls sick, the livestock owners of the Godwar area have four options for providing healthcare. This section briefly outlines the different options. Box I at the end of this section summarizes the determining the choice of animal healthcare providers.

Option 1. Self-treatment: Especially sheep and camel owners resort to self-treatment. This is partly due to the fact that they operate under migratory conditions, but also because they themselves have the largest amount of knowledge and experience in this respect. Sheep breeders regularly de-worm their animals with commercial anthelmintics and are very partial to the injection with tetracycline which they tend to overuse. They often administer it without clear indication of infectious disease - they see it almost as a cure-all for whenever the animal is doing poorly.

Option 2 Consulting a Local Healer (‘Ved’ or ‘Guni’): Practically in every village, there are individuals who are regarded as especially knowledgeable or skilled in the treatment of animal diseases. Usually they keep animals themselves and most of them belong to the pastoral communities. Sometimes their reputation extends only to their own village and they will be consulted only occasionally. Others draw clients from great distances and operate very much like a veterinary practitioner.

Their degree of specialization varies. A few are generalized and treat humans as well as animals. Some of them are specialized in certain types of afflictions (such as fractures or birthing problems), types of treatment (e.g. firing or massage), or certain species, usually buffaloes and cows.

Option 3. Visiting a Spirit-medium (‘Bhopa’): Another option in the case of animal disease is a visit to the bhopa. The bhopa is a spirit-medium, i.e., a person in whom a god (devta) becomes manifest after he has aroused himself into a state of trance. In this condition the bhopa is endowed with supernatural powers and can provide help and give advice in important matters. Frequently, the bhopa also belong to the pastoral castes. They may herd animals in daily life, but hold regular trance sessions at fixed days in the lunar cycle.

Option 4. Calling a Veterinary Doctor or Compounder: All 20 local livestock owners said that they had never consulted a representative of orthodox veterinary medicine, such as a doctor or compounder. This may not give quite the right impression. The average livestock owner will not consider taking his animal to a veterinary hospital and he will be extremely reluctant to call a veterinary doctor to his house. But the surgical camps that are sometimes organised by the government veterinarians are often very popular, because they provide the opportunity for animals which require more complicated surgical interventions, such as tumours and foreign bodies, to be taken care of.

Local Materia Medica: The healers interviewed during the study utilised about 50 different ingredients for manufacturing their own medicines. These ingredients include spices, products of cultivated plants, herbs and uncultivated plants, as well as animal and mineral products.
**RESULTS**

Management of Gastro-intestinal Disorders

Inappetence: Farmers feed a mixture of *thalai suruli* (*Pandanus odoratissimus* Roxb.) leaves, *Piper nigrum* (milagai; black pepper), *Allium sativum* (poondu; garlic) and *Cuminum cyminum* (jeera; cumin) to their animals. About 55% of the scientists agreed that the practice is valid. Few scientists opined that *P. nigrum* must be avoided since it is a severe irritant (Table 1).

Farmers feed their animals with a mixture of *P. nigrum* L., *Capsicum frutescens* L. (bell pepper; milagai), *Leucostaphyllum alston* (pirandi) young leaves and *Curcuma domestica* Val. (turmeric). About 58% of the scientists were not able to comment on the validity of the practice.

The paste of *kalatharathi* leaves, *C. cyminum* and *kadamilagu* along with dung of Equidae family was believed to cure inappetence. About 58% of the scientists could neither indicate this practice as valid nor invalid.

A mixture of *Grewia flavescens* (pulipirandi) paste was fed to the animal for three days by the farmers. As many as 68% of the scientists could not say about validity of the practice. Farmers believe the moderately ground leaves of *pekkam mutukai* (*Citrullis colocynthis* Schrad.) fed to the animal can enhance appetite. About 78% of the scientists could not comment on the validity of the practice. Majority of the farmers in study locale feed their animals with ginger, pepper, salt and jaggery. About 78% of the scientists felt the practice is valid (Table 2).

<table>
<thead>
<tr>
<th>Animal husbandry practices</th>
<th>Frequency of adoption by farmers¹</th>
<th>Valid</th>
<th>Cannot say</th>
<th>Not valid</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inappetence</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Feeding a mixture of <em>thalai suruli</em> leaves, <em>Piper nigrum,</em></td>
<td>108</td>
<td>22</td>
<td>16</td>
<td>2</td>
<td>100</td>
</tr>
<tr>
<td><em>Allium sativum</em> and <em>Cuminum cyminum</em></td>
<td>(90)²</td>
<td>(55)</td>
<td>(40)</td>
<td>(5)</td>
<td>(55)</td>
</tr>
<tr>
<td>Feeding a mixture of <em>P. nigrum</em>, <em>Capsicum frutescens</em>, <em>Leucostaphyllum alston</em></td>
<td>120</td>
<td>12</td>
<td>23</td>
<td>5</td>
<td>87</td>
</tr>
<tr>
<td>young <em>C. cyminum</em> and <em>Curcuma domestica</em></td>
<td>(100)</td>
<td>(30)</td>
<td>(58)</td>
<td>(13)</td>
<td>(48)</td>
</tr>
<tr>
<td>Feeding a paste of <em>kalatharathi</em>, <em>C. cyminum</em>, <em>kadamilagu</em> with dung of equidate family</td>
<td>89</td>
<td>6</td>
<td>23</td>
<td>11</td>
<td>75</td>
</tr>
<tr>
<td>(74)</td>
<td></td>
<td>(15)</td>
<td>(58)</td>
<td>(28)</td>
<td>(42)</td>
</tr>
<tr>
<td>Feeding the above contents along with <em>Grewia flavescens</em> or puli pirandai for 3 days</td>
<td>119</td>
<td>11</td>
<td>27</td>
<td>2</td>
<td>89</td>
</tr>
<tr>
<td>(99)</td>
<td></td>
<td>(28)</td>
<td>(68)</td>
<td>(5)</td>
<td>(49)</td>
</tr>
<tr>
<td>Feeding 2 or 3 leaves of <em>pekkam mutukai</em> moderate grinding</td>
<td>83</td>
<td>4</td>
<td>31</td>
<td>5</td>
<td>79</td>
</tr>
<tr>
<td>(69)</td>
<td></td>
<td>(10)</td>
<td>(78)</td>
<td>(13)</td>
<td>(44)</td>
</tr>
<tr>
<td>Feeding ginger, pepper, salt and jaggery</td>
<td>108</td>
<td>31</td>
<td>8</td>
<td>1</td>
<td>110</td>
</tr>
<tr>
<td>(90)</td>
<td></td>
<td>(78)</td>
<td>(20)</td>
<td>(3)</td>
<td>(61)</td>
</tr>
<tr>
<td>Bloat</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Feeding leaves of <em>Caralluma adscendens</em> i.e., 3, 5, 7 or 9</td>
<td>111</td>
<td>4</td>
<td>28</td>
<td>8</td>
<td>76</td>
</tr>
<tr>
<td>(92)</td>
<td></td>
<td>(10)</td>
<td>(70)</td>
<td>(20)</td>
<td>(42)</td>
</tr>
<tr>
<td>Diarrhea</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Feeding <em>Sida acuta</em> leaves, flowers of <em>Musa paradisiacal</em> (50 g) and buttermilk</td>
<td>120</td>
<td>20</td>
<td>17</td>
<td>3</td>
<td>97</td>
</tr>
<tr>
<td>(100)</td>
<td></td>
<td>(50)</td>
<td>(43)</td>
<td>(8)</td>
<td>(54)</td>
</tr>
<tr>
<td>Feeding <em>S. acuta</em> leaves alone</td>
<td>119</td>
<td>4</td>
<td>31</td>
<td>5</td>
<td>79</td>
</tr>
<tr>
<td>(99)</td>
<td></td>
<td>(10)</td>
<td>(78)</td>
<td>(13)</td>
<td>(44)</td>
</tr>
<tr>
<td>Feeding a mixture of flowers of <em>M. paradisiacal</em> leaves of <em>Peper betle</em> and <em>C. cyminum</em></td>
<td>116</td>
<td>17</td>
<td>21</td>
<td>2</td>
<td>78</td>
</tr>
<tr>
<td>(97)</td>
<td></td>
<td>(43)</td>
<td>(53)</td>
<td>(5)</td>
<td>(43)</td>
</tr>
<tr>
<td>Purgatives</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Giving castor oil to the animals</td>
<td>90</td>
<td>13</td>
<td>18</td>
<td>9</td>
<td>84</td>
</tr>
<tr>
<td>(75)</td>
<td></td>
<td>(33)</td>
<td>(45)</td>
<td>(23)</td>
<td>(47)</td>
</tr>
</tbody>
</table>

1. Total number of farmers = 120
2. Responses from scientists were scored 3 (valid), 2 cannot say and 1 (not valid)
3. Figures in parentheses are percentages
Table 2: Scientists rationale on farmers’ practices for general health care in animals

<table>
<thead>
<tr>
<th>Animal husbandry practices</th>
<th>Frequency of adoption by farmers&lt;sup&gt;2&lt;/sup&gt;</th>
<th>Valid</th>
<th>Cannot say</th>
<th>Not valid</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Management of body temperature</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Menthol (CH&lt;sub&gt;3&lt;/sub&gt;OH) and neem oil is rubbed over the surface</td>
<td>80</td>
<td>18</td>
<td>17</td>
<td>5</td>
<td>93</td>
</tr>
<tr>
<td>of the body</td>
<td>(67)</td>
<td>(45)</td>
<td>(43)</td>
<td>(13)</td>
<td>(52)</td>
</tr>
<tr>
<td>Coconut oil and <em>Psoralea corylifolia</em> are boiled and the oily</td>
<td>73</td>
<td>3</td>
<td>15</td>
<td>22</td>
<td>61</td>
</tr>
<tr>
<td>solution obtained after cooling is applied over the surface of</td>
<td>(61)</td>
<td>(8)</td>
<td>(38)</td>
<td>(55)</td>
<td>(34)</td>
</tr>
<tr>
<td>the body</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Treating Mastitis</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>Caralluma</em> sp. is mixed with ghee and after proper grinding</td>
<td>107</td>
<td>7</td>
<td>27</td>
<td>6</td>
<td>81</td>
</tr>
<tr>
<td>the paste is applied over the udder</td>
<td>(88)</td>
<td>(18)</td>
<td>(68)</td>
<td>(15)</td>
<td>(45)</td>
</tr>
<tr>
<td>The paste of <em>appa kolai</em> leaves is to be applied over the udder</td>
<td>116</td>
<td>7</td>
<td>26</td>
<td>7</td>
<td>80</td>
</tr>
<tr>
<td></td>
<td>(97)</td>
<td>(18)</td>
<td>(65)</td>
<td>(18)</td>
<td>(44)</td>
</tr>
<tr>
<td><em>Semberallai</em> (<em>Nerium oleander</em>) tuber is crushed to a</td>
<td>86</td>
<td>7</td>
<td>26</td>
<td>7</td>
<td>80</td>
</tr>
<tr>
<td>paste and applied over the udder</td>
<td>(72)</td>
<td>(18)</td>
<td>(65)</td>
<td>(18)</td>
<td>(44)</td>
</tr>
<tr>
<td>Paste of lotus leaves is applied on the udder</td>
<td>77</td>
<td>6</td>
<td>27</td>
<td>7</td>
<td>79</td>
</tr>
<tr>
<td></td>
<td>(64)</td>
<td>(15)</td>
<td>(68)</td>
<td>(18)</td>
<td>(44)</td>
</tr>
<tr>
<td><strong>Deworming</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Three of four bulla <em>Aloe vera</em> or <em>A. barbadensis</em> are fed after</td>
<td>119</td>
<td>17</td>
<td>14</td>
<td>9</td>
<td>88</td>
</tr>
<tr>
<td>removing outer layer of the leaf</td>
<td>(89)</td>
<td>(43)</td>
<td>(35)</td>
<td>(23)</td>
<td>(49)</td>
</tr>
<tr>
<td>Copper sulfate and water in 1:9 ratio is fed</td>
<td>107</td>
<td>28</td>
<td>10</td>
<td>2</td>
<td>106</td>
</tr>
<tr>
<td></td>
<td>(89)</td>
<td>(70)</td>
<td>(25)</td>
<td>(5)</td>
<td>(49)</td>
</tr>
<tr>
<td><strong>Ecto-parasiticide</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>Acorus calamus</em> is obtained by grinding and then applied over</td>
<td>72</td>
<td>32</td>
<td>7</td>
<td>1</td>
<td>111</td>
</tr>
<tr>
<td>the affected area of the skin</td>
<td>(60)</td>
<td>(80)</td>
<td>(13)</td>
<td>(3)</td>
<td>(62)</td>
</tr>
</tbody>
</table>

1. Total number of farmers = 120
2. Responses from scientists were scored 3 (valid), 2 cannot say and 1 (not valid)
3. Figures in parentheses are percentages

**Bloat:** Farmers believe that feeding leaves of *Caralluma adscendens* R. Br. (*mual kathu*, *mual kurabu*) in odd numbers, i.e. 3, 5, 7 or 9, can relieve bloat. It was found that 70% of the scientists could not comment on the validity of the practice.

**Diarrhea:** Respondents in the study locale adopted the practice of feeding *Sida acuta* Burm. f. (*Palam passi*) leaves along with flowers of *Musa paradisiacal* L. (banana) (50 g) and buttermilk to control diarrhea. At least 50% of the scientists indicated the validity of the practice. Most of the farmers feed *S. acuta* leaves alone to control diarrhea. About 78% of the scientists could not comment on the validity of the practice.

A mixture of flowers of *M. paradisiacal*, leaves of *Piper betle* (betel) and *C. cyminum* was used. About 53% of the scientists could neither say the practice was valid nor invalid.

**Purgative:** Respondents practiced feeding their animals with the oil obtained from *Ricinus communis* L. (*koalai thalai, kottamuthai*; castor) for its purgative action. About 45% of the scientists could neither say the practice was valid nor invalid.

**General Health Care Management**

**Management of Body Temperature:** It was documented that the farmers use menthol and neem (*Azadirachta indica* A. Juss.) oil for reducing the body temperature. At least 45% of the scientists agreed that the practice was valid with the total validity score being 93. They opined that menthol might act as a coolant and refrigerant and by sublimation process the temperature may be reduced.

The farmers adopted the practice of treating hypothermic condition by using the oily suspension obtained from coconut oil and *Psoralea corylifolia* L. after boiling. Majority (55%) of scientists were of the opinion that the practice is not valid. The validity score of the practice was 61. Only three scientists shared the view of the farmers that because of heat transfer and sublimation process the temperature of the animal may be reduced.
Table 3: Extensively used traditional treatment methods for six common ailments in dairy cattle as identified and prioritized by women

<table>
<thead>
<tr>
<th>No.</th>
<th>Ailments</th>
<th>Traditional treatments</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Mastics</td>
<td>Applying turmeric on udder.</td>
</tr>
<tr>
<td>2.</td>
<td>Foot and mouth ulcers</td>
<td>Walking animals on hot sand and applying sand to wounds externally; applying linseed oil and turmeric externally; applying kerosene if the wounds are infested with maggots.</td>
</tr>
<tr>
<td>3.</td>
<td>Tympany</td>
<td>Drenching linseed oil along with a mixture of ginger, turmeric and asafetida; keeping the animal’s mouth open by tying a piece of wood into it</td>
</tr>
<tr>
<td>4.</td>
<td>Reaction of placenta</td>
<td>Feeding bamboo leaves or a mixture of oil bran and bajra (finger millet) grain.</td>
</tr>
<tr>
<td>5.</td>
<td>Amenorrhoeus</td>
<td>Feeding of forest tree seed.</td>
</tr>
<tr>
<td>6.</td>
<td>Diarrhoea</td>
<td>Drenching about 1 kg fruit pulp extract of Aegle marmelos and mango seed kernal for 2-3 days.</td>
</tr>
</tbody>
</table>

Table 4: Fruit, flower and vegetable plants used to treat animal ailments

<table>
<thead>
<tr>
<th>No.</th>
<th>Ailments</th>
<th>Botanical plant name</th>
<th>English plant name</th>
<th>Plant type</th>
<th>Use</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Bleeding</td>
<td>Mangifera indica</td>
<td>Mango</td>
<td>Fruit</td>
<td>Tenders leaf is applied on wound</td>
</tr>
<tr>
<td>2.</td>
<td>Worm infestation</td>
<td>Daucus carota</td>
<td>Carrot</td>
<td>Vegetable</td>
<td>Whole carrot is fed</td>
</tr>
<tr>
<td>3.</td>
<td>Worm infestation</td>
<td>Cucurbita pepo</td>
<td>Gourd</td>
<td>Vegetable</td>
<td>Seeds are fed</td>
</tr>
<tr>
<td>4.</td>
<td>Tick infestation</td>
<td>Annona squamosa</td>
<td>Custard apple</td>
<td>Fruit</td>
<td>Paste of seeds is applied</td>
</tr>
<tr>
<td>5.</td>
<td>Maggot wound</td>
<td>Annona squamosa</td>
<td>Custard apple</td>
<td>Fruit</td>
<td>Paste of leaves is applied</td>
</tr>
<tr>
<td>6.</td>
<td>Footrot</td>
<td>Jasminum auriculatum</td>
<td>Jasmine</td>
<td>Flower</td>
<td>About 50 g of leaf paste is applied</td>
</tr>
<tr>
<td>7.</td>
<td>Diarrhoea</td>
<td>Murraya koenigii</td>
<td>Curry leaf</td>
<td>Spice</td>
<td>About 50 g of leaves are crushed in water and drenched</td>
</tr>
</tbody>
</table>

**Treating Mastitis:** The farmers in the study locale adopted the mixture of paste from ghee and leaves of Caralluma sp. to cure mastitis. It was found that 68% of the scientists could neither say the practice was valid nor invalid. The validity score of 81 was secured by the practice. Few scientists agreed upon the fact that the contents may have anti-inflammatory effect.

The paste of appa kolai leaves was applied over the udder. Majority (65%) of scientists could not comment on the validity of the practice. A validity score of 80 was assigned to the practice. Few agreed that the paste may contain anti-inflammatory activity and one scientist expressed that the paste even cures thelitis (obstruction in leaf canal leading to mastitis).

The farmers adopted the practice of applying the paste obtained from the roots of Nerium oleander L. (oleander) on the udder. About 65% of the scientists could not comment on the validity, although the practice secured validity score of 80. Anti-inflammatory effect was suggested by as a many as six scientists.

The paste of lotus leaves or puli thamarai was applied on the udder and adopted by the farmers. Majority of the scientists (68%) could not judge the practice as valid or not valid. Six scientists agreed that the paste may contain anti-inflammatory activity.

**Deworming:** The farmers adopted feeding the animals with three or four bulbs of Aloe vera L. or A. barbadensis Mill. after removing the hard outer layer of leaf. Majority of the scientists (43%) agreed that the practice is valid, with the practice securing the validity score of 88.

Farmers used copper sulfate and water in 1:9 ratio as a dewormer. Majority of the scientists (70%) agreed that the practice is valid. The validity score assigned to the practice was 106.

**Ecto-parasiticide:** For killing the external parasites the farmers employed the application of Acorus calamus L. (vasambri) powder over the affected area of the skin. It was found that 80% of the scientists accept the practice as valid with the validity score of the practice being 111 (Table 3 and 4).

**Treatment 1:** Extract the juice from about a handful leaves of Securinega robovates and mix it with about 250 ml of curd. Drench the whole amount twice a day for two days. (Source: Ramasamy, Kanakkampatty village).

**Treatment 2:** Prepare powder from 200 g of dried leaves of Punica granatum or crush fresh leaves. Force feed twice a day for two days. (Source: Veluchamy Gounder, Vilavathampatty village).

**Treatment 3:** Take 100 g of leaves of each Psidium guajava and Securinega robovates and press out their juice. Mix the juice with jaggery, water or curd and drench once a day for two days (Source: Murugan, Manoor village).

**Treatment 4:** Mix 20 g of Cuminum cyminum seed powder with 100-250 ml of water and drench once a day for three days. (Source: Muthusamy gounder, Puliyampatty village).
Table 5: Scientific relevance scores of indigenous animal healthcare practices of 150 sheep farmers in Dindigul district

<table>
<thead>
<tr>
<th>Disease</th>
<th>Indigenous practice</th>
<th>% of respondents practicing</th>
<th>Scientific relevance score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bloat</td>
<td>Giving a mixture of mustard oil, a cucumber species, common salt and whey.</td>
<td>93.33</td>
<td>0.72</td>
</tr>
<tr>
<td></td>
<td>Giving a mixture of warm oil and water.</td>
<td>86.66</td>
<td>0.54</td>
</tr>
<tr>
<td></td>
<td>Introducing soap solution into the rectum through the anus.</td>
<td>28.00</td>
<td>0.48</td>
</tr>
<tr>
<td>Diarrhoea</td>
<td>Giving barley flour mixed with rice starch (i.e., water left after cooking rice).</td>
<td>73.33</td>
<td>0.54</td>
</tr>
<tr>
<td></td>
<td>Feeding Dalbergia sissoo leaves mixed with barley flour</td>
<td>66.00</td>
<td>0.42</td>
</tr>
<tr>
<td>Enterotoxaemia</td>
<td>Giving oil and turmeric</td>
<td>60.66</td>
<td>0.22</td>
</tr>
<tr>
<td></td>
<td>Giving soap solution</td>
<td>24.66</td>
<td>0.20</td>
</tr>
<tr>
<td></td>
<td>Cutting the sheep’s ear and tail</td>
<td>92.00</td>
<td>0.14</td>
</tr>
<tr>
<td>External and internal parasites</td>
<td>Applying turpentine oil on wounds</td>
<td>29.33</td>
<td>0.62</td>
</tr>
<tr>
<td></td>
<td>Giving blue vitriol solution</td>
<td>44.00</td>
<td>0.50</td>
</tr>
<tr>
<td></td>
<td>Feeding papaya seeds to kill internal parasites</td>
<td>26.66</td>
<td>0.34</td>
</tr>
<tr>
<td></td>
<td>Rubbing kerosene oil on the body</td>
<td>14.00</td>
<td>0.30</td>
</tr>
<tr>
<td>Fever</td>
<td>Giving alum mixed with human urine</td>
<td>68.00</td>
<td>0.10</td>
</tr>
<tr>
<td>Foot and mouth disease</td>
<td>Allowing sick animals to stand on hot sand an hour daily for 6-7 days</td>
<td>58.00</td>
<td>0.44</td>
</tr>
<tr>
<td></td>
<td>Spreading water from boiling fish on the paddock floor</td>
<td>54.66</td>
<td>0.08</td>
</tr>
<tr>
<td></td>
<td>Burning clothes stained by the mensens of a women</td>
<td>13.33</td>
<td>0.04</td>
</tr>
<tr>
<td>Footrot and ecthyma</td>
<td>Washing affected parts of hoof and mouth with alum water.</td>
<td>60.66</td>
<td>0.72</td>
</tr>
<tr>
<td></td>
<td>Putting then a paste of butter and on the affected portion</td>
<td>32.00</td>
<td>0.62</td>
</tr>
<tr>
<td></td>
<td>Applying a paste of oil and turmeric on the affected portion.</td>
<td>64.66</td>
<td>0.52</td>
</tr>
<tr>
<td>Haemorrhja. Septicaemia</td>
<td>Putting a paste Carum bulbocastanum on the affected portion</td>
<td>11.33</td>
<td>0.10</td>
</tr>
<tr>
<td></td>
<td>Giving alum</td>
<td>13.33</td>
<td>0.38</td>
</tr>
<tr>
<td></td>
<td>Giving a solution of blue vitriol in water</td>
<td>8.00</td>
<td>0.36</td>
</tr>
<tr>
<td>Itching</td>
<td>Rubbing on a paste of gandraph (sulphur), common salt and oil.</td>
<td>16.66</td>
<td>0.64</td>
</tr>
<tr>
<td>Indigestion</td>
<td>Giving castor oil</td>
<td>76.00</td>
<td>0.70</td>
</tr>
<tr>
<td></td>
<td>Giving a mixture of rock salt, turmeric and kartumba</td>
<td>92.66</td>
<td>0.64</td>
</tr>
<tr>
<td>Inducing heat</td>
<td>Giving (Carum bulbocastanum) with oil cakes</td>
<td>32.60</td>
<td>0.60</td>
</tr>
<tr>
<td></td>
<td>Giving the leaves of Acacia nilotica</td>
<td>42.00</td>
<td>0.40</td>
</tr>
<tr>
<td>Jaundice</td>
<td>Giving a mixture of Commelina benghalensis, whey and common salt</td>
<td>42.00</td>
<td>0.38</td>
</tr>
<tr>
<td></td>
<td>Tying a talisman (tabeez) around the neck of sheep</td>
<td>78.00</td>
<td>0.00</td>
</tr>
<tr>
<td>Mastitis</td>
<td>Washing the teats with the water from boiling neem leaves</td>
<td>48.00</td>
<td>0.60</td>
</tr>
<tr>
<td></td>
<td>Applying a paste of common salt and butter on the affected portion of teats</td>
<td>45.33</td>
<td>0.24</td>
</tr>
<tr>
<td></td>
<td>Putting dry red chillies on the fire after taking them over the sheep</td>
<td>50.66</td>
<td>0.02</td>
</tr>
<tr>
<td>Nematodiases (bottle jaw)</td>
<td>Giving tobacco powder and blue vitriol mixed with water</td>
<td>22.00</td>
<td>0.64</td>
</tr>
<tr>
<td></td>
<td>Giving a mixture of cluster bean (Cymopapis tetragonoloba) gram and red chillies</td>
<td>32.00</td>
<td>0.24</td>
</tr>
<tr>
<td></td>
<td>Giving kerosene oil</td>
<td>64.66</td>
<td>0.18</td>
</tr>
<tr>
<td>Pneumonia</td>
<td>Giving aloe (Aloe perfoliata) with turmeric</td>
<td>19.33</td>
<td>0.38</td>
</tr>
<tr>
<td></td>
<td>Giving a mixture of turmeric, alum and caraway</td>
<td>33.33</td>
<td>0.34</td>
</tr>
<tr>
<td></td>
<td>Rubbing salt on the body</td>
<td>46.66</td>
<td>0.14</td>
</tr>
<tr>
<td>Retention of placenta</td>
<td>Giving a boiled mixture of Zizyphus jujuba milk and gur</td>
<td>87.30</td>
<td>0.50</td>
</tr>
<tr>
<td></td>
<td>Giving boiled water of rotten bamboo</td>
<td>73.30</td>
<td>0.22</td>
</tr>
<tr>
<td>Sheep pox</td>
<td>Keeping the affected animal in the shadow away from other animals.</td>
<td>39.3</td>
<td>0.68</td>
</tr>
<tr>
<td></td>
<td>Giving barley flour mixed with water</td>
<td>56.00</td>
<td>0.14</td>
</tr>
</tbody>
</table>

**Treatment 5:** Feed a handful of Bambusa spinosa leaves once day for two or three days (Source: Rasu, Thoppampatty village).

**Treatment 6:** Take a handful of Acacia arabica leaves, grind them into a powder and mix the powder with jaggery into a bolus. Feed the bolus once a day for two days. (Source: Susheelamma, Paraipatty village).

**Indigenous Technologies for Health Coverage in Sheep:**
Over time and through trial and error, sheep farmers Tamil Nadu have developed a wealth of animal healthcare practices. Such indigenous knowledge is based on experience and time-tested [4]. It is important to document it in order to understand its scientific rationale, accelerate technological change, enable better understanding of technology and the development of new concepts, increase a awareness among the young generation, develop appreciation for the traditional systems and revive and restore pride among the farmers themselves [5]. Besides, understanding the technology of the clientele helps ascertain the degree and direction of change.
Table 6: Spices/seeds used by healers in Dindigul district in the preparation of medicines

<table>
<thead>
<tr>
<th>S.No</th>
<th>Tamil</th>
<th>English</th>
<th>Latin</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Kadugu</td>
<td>Mustard</td>
<td>Brassica sp.</td>
</tr>
<tr>
<td>2</td>
<td>Milagai</td>
<td>Red pepper</td>
<td>Capsicum annuum</td>
</tr>
<tr>
<td>3</td>
<td>Manjal</td>
<td>Turmeric</td>
<td>Curcuma longa</td>
</tr>
<tr>
<td>4</td>
<td>Perungayam</td>
<td>Asafoetida</td>
<td>Ferula asafoetida</td>
</tr>
<tr>
<td>5</td>
<td>Milagu</td>
<td>Black pepper</td>
<td>Piper nigrum</td>
</tr>
<tr>
<td>6</td>
<td>Vendayam</td>
<td>Fenugreek</td>
<td>Trigonella foenumgraecum</td>
</tr>
<tr>
<td>7</td>
<td>Sukku</td>
<td>Dried ginger</td>
<td>Zingiber officinale</td>
</tr>
</tbody>
</table>

Table 7: Cultivated plants used by healers in Dindigul district in the preparation of medicines

<table>
<thead>
<tr>
<th>S.No</th>
<th>Tamil</th>
<th>English</th>
<th>Latin</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Vengayam</td>
<td>Onion</td>
<td>Allium cepa</td>
</tr>
<tr>
<td>2</td>
<td>Poondu</td>
<td>Garlic</td>
<td>Allium sativum</td>
</tr>
<tr>
<td>3</td>
<td>Kadugu</td>
<td>Mustard oil</td>
<td>Brassica sp.</td>
</tr>
<tr>
<td>4</td>
<td>Tea</td>
<td>Tea leaves</td>
<td>Camellia theifera</td>
</tr>
<tr>
<td>5</td>
<td>Parthi</td>
<td>Cotton flowers</td>
<td>Gossypium indicum</td>
</tr>
<tr>
<td>6</td>
<td>Maruthani</td>
<td>Old henna leaves</td>
<td>Lawsonia alba</td>
</tr>
<tr>
<td>7</td>
<td>Pugaillai</td>
<td>Tobacco</td>
<td>Nicotiana tabacum</td>
</tr>
<tr>
<td>8</td>
<td>Karumbu</td>
<td>Sugarcane</td>
<td>Saccharum officinale</td>
</tr>
<tr>
<td>9</td>
<td>Chakkarai</td>
<td>Sugar</td>
<td>Saccharum indicum</td>
</tr>
<tr>
<td>10</td>
<td>Nallennai</td>
<td>Sesame oil</td>
<td>Sesamum indicum</td>
</tr>
<tr>
<td>11</td>
<td>Ell Poo</td>
<td>Sesame flowers</td>
<td>Sesamum indicum</td>
</tr>
</tbody>
</table>

through formal research [6]. It is likely that adoption rates can be improved through selecting indigenous practices of scientific relevance and modifying, testing and re-applying them.

\[ P_i = \sum_{x_i} 0 \leq P_i \leq 1 \quad \text{i} = 1, 2N \]

Where:

- \( N \) = Number of respondents
- \( x_i \) = 2 i-th practice is relevant
- = 1 of if I-th practice is somewhat relevant
- = 0 if i-th practice is irrelevant

The outcoming values of the scientific relevance scores \( P_i \) ranged between 0 and 1, with 1 = relevant and 0 = irrelevant.

Through the interviews with the 150 respondents, 189 indigenous practices were identified. For each practice, the percentages of farmers practicing it and the scientific relevance score were calculated. Table 5 presents the data for more than 40 practices against 17 disease conditions.

Out of the 189 technologies, 71 were practised by more that 50% of the respondents. For 27 the scientific relevance score was greater than 0.5, indicating a reasonable scientific basis for testing, modification and adoption. But because the scientific relevance score is an indication, but not an objective measure of a practice’s scientific validity, some selected technologies will be scientifically tested.

The selection for this will be based on the scientific relevance score. The methodology will depend on the occurrence of disease. Control group method will be used for disease affecting a large number of animals simultaneously. Technologies for diseases occurring only in few animals will be studied with the case study method.

After studying the existing technologies in depth and understanding their scientific basis, we will include them in an improved package of sheep health technologies. This will make a very strong case for re-orienting the sheep health research to give highest priority to the identification, testing and modification of traditional sheep health technologies practised by the sheep farmers. Propagating the modified and tested technologies to farmers through a video film will help overcome difficulties in treating sick animals quickly and at a low costs (Table 5, 6 and 7).

**DISCUSSION**

Medicinal plants, since times immemorial, have been used in virtually all cultures as a source of medicine. The widespread use of herbal remedies and healthcare preparations, as those described in ancient texts such as the vedas and the bible and obtained from commonly used traditional herbs and medicinal plans, has been traced to the occurrence of natural products with medicinal properties.

The use of traditional medicine and medicinal plants in most developing countries, as a normative basis for the maintenance of good health, has been widely observed [7]. Furthermore, an increasing reliance on the use of medicinal plants in the industrialized societies has been traced to the extraction and development of several drugs and chemotherapeutics from there plants as well as from traditionally used rural herbal remedies [8]. Moreover, in these societies, herbal remedies have become more popular in the treatment of minor ailments and also on account of the increasing costs of personal health maintenance. Indeed, the market and public demand has been so great that there is a great risk that so great that there is a great risk that many medicinal plants today, face either extinction or loss of genetic diversity.
Promising ethnoveterinary practices should be considered as one alternative among several. This means they have to be measured against the same criteria as outside technologists: efficacy, ease of preparation, availability, affordability, effect on the environment and cultural appropriateness. The last point is especially important if practices are to be transferred from one place to another, but within a community, too, practices can become in appropriate due to rapid change. Finally, the most suited practices—whether local or introduced—should be selected, if necessary tested, improved or blended with outside technologies and promoted. They goal is the development of a healthcare package that is as effective as possible while meeting the expectations and needs of the clientele.

However, measuring ethnoveterinary medicine against the same criteria as for other technologies does not necessarily mean using the same methods. Many study methods used for western science fail to give justice to local practices because they investigate individual aspects rather than systems as a whole. An example is the performance of indigenous breeds: if we study only production, local breeds will always lose against high-producing imported breeds. But if both input are considered, or the different functions local breeds are fulfilling are added up, the balance may tip in favour of the local breed.

Few ethnoveterinary remedies have been tested clinically in livestock species (rather than in laboratory animals); more such studies are needed. To get the true picture of a remedy’s efficacy, it is important that such studies follow as closely as possible the local way of preparation and application; this is to ensure that the results reflect the efficacy of the remedy and are not influenced by other preparation or application methods. More field projects are needed that study the application of ethnoveterinary medicine and that develop approaches for building on the local system and using selected practices either alone or blending them with outside technologists.

**CONCLUSION**

Information from studies on efficacy and field application need to be appropriately packaged and made available to groups involved in promoting ethnoveterinary medicine. For field-level healthcare providers, information materials need to provide details about practices, technologies, remedies and methodological approaches. They need to be written up in simple, easy-to-understand language, free of scientific jargon. Governments and decision makers in development are busy and have to deal with many subjects (many that they consider more important than ethnoveterinary medicine). Therefore information materials for them need to be short, informative and impressive, so as catch their attention and provide a maximum of information on the efficacy and potential of ethnoveterinary practices in a small space.

Such information materials and other advocacy work are essential to improve the recognition of the value of ethnoveterinary medicine and to elevate its status. They will also help open the way for integrating ethnoveterinary medicine into university and college curricula—another important step in facilitating the application of ethnoveterinary medicine at the field level.

A perusal analysis depicts that adoption of these plant-based formulations was high. The scientific community could not reject them. They felt the need for testing these practices at the research stations and analyzing the pharmacological implications. The improvements brought about through informal research systems have been insignificant. Therefore, integrating farmer’s knowledge with formal research system will ensure desired progress.

**ACKNOWLEDGEMENT**

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**REFERENCES**