Methodological Approach for Sustaining Indigenous Veterinary Knowledge of Society: Case Studies to Control of Endoparasite from the Regions of Gandhinagar, Bhavnagar and Junagadh Districts of Gujarat State, India

KEYWORDS: Endoparasite, Indigenous, Innovation model, Adoption, Veterinary

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ABSTRACT *The nature of livestock system calls for different model of disease control programs that have to be sustainable, cost effective and readily available. Indigenous veterinary medications had provided necessary relief to farmers in regions where accessing quality services from conventional veterinary institutions were limited. This dynamic knowledge system needs to be strengthened, shared to younger generations for sustenance and adoption. A research study was initiated to involve farming communities in experimentation towards control of worm infestation, a framework to recognize custodians of knowledge and to share ways to scale up validated grassroots technologies. Most programs visualize generation of technology at research stations and envisage models to share to farmers. However evidence of originating technologies from farmer's field based on creative knowledge of society and involving experimentation spirit of community has been limited. During the study efficacy of two indigenous medications in significantly reducing worm infestation were also compared. The study had confirmed the role of indigenous practices at farmer's field outside the system of origin. The readiness with which community accepted, evaluated and adopted these location specific technologies needs to be emphasized. A non-linear innovation model for sustaining indigenous veterinary medications among farm animals was shared. Scientific evaluation of affordable technologies, recognizing custodian of this knowledge, sharing results to them as well as with institutions in their premises will be meaningful to take advantage of fullest potential of indigenous veterinary system.*

1. INTRODUCTION

Livestock is a major source of income generating activities and 70 percent of livestock resource is being held by small, marginal and landless farmers (Yadav et al., 2014). About 85 percent of total operation land holding of less than 2.0 hectare has been maintained by small and marginal farmers (GoI, 2014). This trend is increasing over years as the average operational holding was 1.15 hectare (2010-11) as compared to 1.23 hectare five years ago. The low availability of land holding limits agricultural activity and livestock population provides requisite source of employment. Worms are one of the major problems faced by animal husbandry sector. The importance of these ailments was underestimated as outbreaks were undiagnosed. There exists significant negative association between fluke exposure and milk yield (Howell et al., 2015). These endemic parasites affect economic gain through its own effect and incur loss by lessening host immunity indirectly. Incidences of anthelmintic resistance indicate that totally depending on chemotherapy or prophylaxis is not sustainable (Jackson et al., 2009; Amulya et al., 2015). It is appropriate to undertake scientific investigation to find new alternatives towards control of gastrointestinal worms (Botura et al., 2011).

Farmers rely on indigenous system(s) to minimize and protect their livestock. Traditional system of medicine needs to be integrated in treatment of gastrointestinal disorders in veterinary system (Stark et al., 2013). Studies indicated that as much as 83 percent of rural communities depend on herbs to control diarrhoea in animals (Offiah et al., 2011). Indigenous veterinary medications offer alternative choice as well as to complement modern medicine that may be available or inappropriate (Iqbal et al., 2005; Byaruhanga et al., 2015). Hence, socially desirable strategies need to be in place as it involves economic choice in extending quality healthcare (Tisdell et al., 1999).

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Lack of suitable technologies to meet location specific demand of farming community was also highlighted (Kadivendi et al., 2015). These creative environmental friendly, locally available technologies can lead for inclusive growth (Gupta, 2013). Knowledge about technologies and (or) practices needs to be comprehended by users for understanding its potential (Ramkumar et al., 2003). This cross site learning of technologies from different regions and people centred participatory research to ensure utilization of such technologies was stressed (Rangnekar, 2006). Hence, strengthening local knowledge systems and involving farming community to evaluate technologies by themselves are necessary for improvised animal health care.

2. Materials and Methods:

The research study aimed to understand, evaluate and share an evidence for sustaining indigenous knowledge systems. Indigenous medications in control of endoparasite identified and evaluated were compared for their efficacy with the help of livestock farmers. Stratified random sampling method was used, wherein the livestock population affected with diarrhoea was selected. The presence of parasitic egg in dung was evaluated through direct dung smear examination (Juliet et al., 2013; Kumari & Hafeez, 2005). Dung sample of cattle and buffaloes examined and confirmed for presence of parasitic egg or oocyst were purposively selected. Such activities will assist in target oriented selective treatment towards parasitic control (Molento et al., 2011).

2.1.Experimental groups and administration of medication:

An experimental research designs wherein two equivalent experimental groups viz., Group I and Group II of same size were randomly selected. Evaluation of medications was conducted at Indiranagar hamlet, Mansa taluk, Gandhinagar district of Gujarat. In Group I, test medication AHP/AM/DW/AD and in Group II, test medication AHP/DIA/RM was administered as per knowledge of indigenous healers in the regions of Junagadh and Bhavnagar districts of Gujarat (Bharwad et al., 2015; Gaikwad et al., 2015).

2.2 Post treatment evaluation and statistical analysis:

After treatment period, comparative efficacies of these two indigenous medications were evaluated. The results were statistically analysed using *t test* by comparing means of two independent samples and interpreted (Gupta, 2000). The post treatment efficacy of these indigenous medications were calculated using the formula, Efficacy (%) = Mean (Before treatment) – Mean (After treatment/Mean (Before treatment) X 100.

3. RESULTS AND DISCUSSION:

3.1 Scientific evaluation of technologies through farmers: Illustrative model for conducting trials for indigenous veterinary medication(s) system:

Sixteen animals were selected for experimentation and trials were initiated for two practices shared by communities from the regions of Bhavnagar and Junagadh districts. Eight animals were allocated for evaluating each of these indigenous medications at farmer's field. Individual visits, group discussions and village meetings were held with help of youth as they were concerned with health of animals. These sixteen animals were involved with the help of livestock owners who had readily collaborated with research team. This was due to confirming causative agents and sharing laboratory findings with them. They were very active in developing and adapting useful information (Roling, 1988). The intervention program had enabled livestock owners to understand the ailment better and for further follow-up in administering these two indigenous medications. The relevance of indigenous system in catering to community requirement elsewhere and livestock owner's role in initiating support for evaluation of technologies derived from their own society was demonstrated. The study illustrated a model wherein there were more adopters of technology immediately after identification of problem. This was in concurrence with Kebede & Zizzo (2014) wherein negative effects can be minimized when large number of people in the community adopt at early stages. The approach of originating technology from knowledge of society, utilising skills of farmers in research system and enhancing the rate of adoption of innovative technological knowledge or practices exemplifies non-linear innovation model.

3.2 Efficacy comparison of two antidiarrheal formulations shared by knowledge holders:

The indigenous herbal medication AHP/AM/DW/AD of healers viz., Sitaben Lasiabhai R. Gaikwad, Dayabhai N. Ramana, Rahametkhan P. Solanki, Lakhabhai B. Khatana, Gohil Nanuben K., Vasava Natvarbhai G. had significantly reduced Parasitic Egg Count (PEC) (Gaikwad et al., 2015). Similarly, another indigenous veterinary medication AHP/DIA/RM of Dayabhai Bharwad had significantly reduced PEC (Bharwad et al., 2015). Both the test medicinal efficacy results were published in the name of custodian of knowledge. The percent reduction of fecal egg counts was found to be 79.16 percent for AHP/AM/DW/AD and 76.56 percent for AHP/DIA/RM at 9th day of post treatment. Comparative efficacy was evaluated for recommending these indigenous technologies to farming community. The mean of two treated population did not differ significantly ($p < 0.05$) as the t calculated value was less than t table value (Table 1).

Table 1 Parasitic egg count of two populations (*AHP/AM/DW/AD* & *AHP/DIA/RM*)

SN	Parasitic Egg Count (After AD treatment)	$X_1 - \bar{x}_1$	$(X_1 - \bar{x}_1)^2$	Parasitic Egg Count (After RM treatment)	$X_2 - \bar{x}_2$	$(X_2 - \bar{x}_2)^2$
1	2	-10.5	110.25	1	-17.75	315.06
2	12	-0.5	0.25	100	81.25	6601.56
3	1	-11.5	132.25	15	-3.75	14.06
4	2	-10.5	110.25	10	-8.75	76.56
5	10	-2.5	6.25	10	-8.75	76.56
6	8	-4.5	20.25	4	-14.75	217.56
7	10	-2.5	6.25	5	-13.75	189.06
8	55	42.5	1806.25	5	-13.75	189.06
	$\sum X_1 = 100$		$\sum = 2192$	$\sum X_2 = 150$		$\sum = 7679.50$
	Mean($\bar{x}_1$)=12.5			Mean ($\bar{x}_2$)=18.75		

*[NS] $t = 0.47$ (calculated), $v=14$ $(n_1+n_2-2))$ $t_{0.05}=2.145$ (table value)

The experimental research study conducted with the collaborative role of community had found that both antidiarrheal medications were effective in minimizing endoparasitic infestation. However, these two indigenous medications did not differ in their efficacy in controlling worm infestation. Farmers try to maximize return in terms

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of short-term and long term production, hence locale specific technologies may play role in trade-offs (Klapwijk et al., 2014). Hence, identification and demonstration of location specific technologies are paramount (Ravikumar et al., 2015). Further, agriculture sector had moved into knowledge based era from resource intensive nature (Mondal & Basu, 2009). This necessitates need for development of such technologies in support with communities who can patronage them in near future.

4. CONCLUSIONS:

The study had validated claims of indigenous veterinary healers in farmer's field promoting health care of livestock with the help of local community. It necessitates sharing of research findings to stakeholders for enhancing their morale at clinical situation. Strategies need to be advanced in development of location specific technologies and in farmer's field for enhancing their availability. Mobilization of community was found paramount in adoption of innovation(s) and enhanced nature of utilization of technologies. The study calls for improvised engagement of formal institutions, more specifically research stations to support implementing activities. This enables penetration of technologies to needy locations and reassures farming communities. The study brought out evidence where creative community took lead role in sharing, experimenting and generating new technologies. This accelerates adoption of desired technologies in resource poor locale.

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