

Original Research Article

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Impact of Anthelmintic against Naturally Infected Gastrointestinal Nematodes in Ruminants of Budgam District, Jammu and Kashmir, India

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ABSTRACT

Before perform any parasitological examination, a pre-requisite questionnaire was used to collect data from the 100 livestock holder of district Budgam, Jammu and Kashmir to evaluate the knowledge about the use of anthelmintic against worm infestation in ruminants. The study revealed that 83.00 % respondent was aware of deworming and 92.00% respondent unaware of purpose of faecal examination of their livestock. Hence, a total of 537 faecal samples comprising of 159 (cattle), 133 (sheep) and 245 (goat) was collected randomly from 5 no. of villages of the study areas to record the occurrence of gastrointestinal nematodes. The coprological examination revealed overall occurrence of gastrointestinal nematodes was found to be 81.13, 84.96 and 88.98 per cent in cattle, sheep and goats, respectively. *Haemonchus* sp. was common in cattle (30.18%) and sheep (30.82%), but in case of goat it was *Trichostrongylus* sp. (24.08%). The other parasites were found to be *Oesophagostomum*, *Cooperia*, *Bunostomum* and *Trichuris*. When administered ivermectin (Inj. Ivomec) @ 200 µg/ kg BW subcutaneously, Ivermectin bolus (Endectin) @ 200 µg/ kg BW orally, Albendazole suspensions (Albomar) @ 7.5mg/kg BW orally and Fenbendazole (Fentas Bolus) @ 7.5mg per Kg BW orally the faecal egg count reduction per cent (FECR%) was found to be in sheep 98.86±1.04, 97.70±1.42, 80.72±2.18, 85.71±5.04; in goats 96.39±1.52, 97.56±1.94, 86.05±3.82 and 85.06±4.52 and in cattle 88.37±5.23, 90.00±8.75, 79.59±6.67 and 76.60±8.56 in group A, B, C and D, respectively on 14th day of post-treatment.

Keywords

GI nematodes,
Ruminants,
Anthelmintic,
FECR%

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Introduction

Krishi Vigyan Kendra (KVK) are in very much active in different districts of Jammu and Kashmir to aware various aspect like imparting training programme, dissemination of latest technologies of SKUAST, on farm

trial, front line demonstration, disease diagnostic visit etc. (Bulbul *et al.*, 2014; Bulbul *et al.*, 2015) to uplift the rural economy. Most of the livestock holder lost their economy in terms of production and productivity of ruminants due to lack of some knowledge on various diseases and their

prevention. Among the various disease producing organisms, gastrointestinal nematodes play a significant role in great economic losses to livestock through morbidity, mortality and reduce productivity (Hoste *et al.*, 2008). So, the cumulative effect of parasitism in terms of mortality, morbidity, chronic diseases and economic losses are incalculably great and undoubtedly play a key role in limiting the social and economic development of many sub-tropical and tropical countries of the world. Moreover, the GI parasitic infection in dairy animals is neglected due to the chronic nature of parasitism, but results are significant loss of production.

Therefore anti-parasitic drugs are used to control the parasitic diseases. In field condition more or less most of the para-vets either knowingly or unknowing use same group of anthelmintic regularly, use of anthelmintics in sub-optimal doses, prophylactic mass treatment of domestic animals and frequent and continuous use of a single drug as a result anthelmintic resistance (AR) is widespread worldwide (Kaplan, 2004). Hence, the present study was planned to assess knowledge level of the livestock holder on use of anthelmintic and gastrointestinal parasitism and to determine the occurrence of GI nematodes in cattle, sheep and goat and the therapeutic efficacy of different anthelmintics against naturally infected gastrointestinal nematodosis in ruminants.

Materials and Methods

A pre-requisite questionnaire was prepared to evaluate the knowledge about use of anthelmintic against worm infestation in five different villages viz. Narkara, Kralpora, Rawolpora, Badipora and Banderpora of Budgam district of Jammu and Kashmir. After that a total of 537 faecal samples comprising

of 159 (cattle), 133 (sheep) and 245 (goat) irrespective of sex and age was collected per rectally randomly from the study areas to record the occurrence of gastrointestinal nematodes. The collected faecal samples were examined by the method of sedimentation and floatation to record the occurrence nematodosis (Soulsby, 1982). The unidentified eggs were cultured for the development of 3rd stage larvae and identified as per the method of Roberts and O'Sullivan (1949).

Faecal egg count reduction test

Thirty sheep showing > 500 egg per gram (EPG); 30 goats having > 500 EPG and 30 cattle showing 150-700 EPG of GI nematodes at farmers flock were selected for conducting the efficacy trial of different anthelmintics. The study was performed using the faecal egg count reduction per cent (FECR%) over a period of 14 days of post treatment as described by Coles (1992). The selected animals were divided in to five equal treatment groups viz. A, B, C, D and E for each species. Ivermectin (Inj. Ivomec) @ 200 µg/ kg BW subcutaneously, Ivermectin bolus (Endectin) @ 200 µg/ kg BW orally, Albendazole suspensions (Albomar) @ 7.5mg/kg BW orally and Fenbendazole (Fentas Bolus) @7.5mg per Kg BW orally were administered in animals of A, B, C and D, respectively while animals of group 'E' was kept as untreated control. To determine the FECR% of GI nematodes in animals, faecal sample of each animal in the respective treatment groups were collected per rectal method in the morning hour, starting from 0 day i.e. in pre-treatment and 7th and 14th day of post- treatment. The egg per gram (EPG) of faecal samples was performed by dilution technique (Soulsby, 1982) on pre-treatment and post-treatment. Faecal egg count reduction percent (FECR %) and efficacy was calculated by using the following formula.

$$\text{Pre-treatment EPG} - \text{Post-treatment EPG} \\ \text{FECR (\%)} = \frac{\text{-----}}{\text{Pre-treatment EPG}} \times 100$$

Results and Discussion

Knowledge level

The knowledge level of the livestock holder has been depicted in Table 1. The study revealed that 75.00 and 83.00 % livestock was aware of parasitic diseases and deworming, respectively and 92% respondent expressed their view regarding unaware of purpose of faecal examination of their livestock. The study exposed that 85.00 and 65% livestock holder saw the bottle jaw in animals and reduces milk yield, rough body coat, diarrhoea, constipation etc. in same animal, respectively. Eighty nine per cent livestock keeper expressed when the para-vets were visited for any treatment they administered anti-parasitic drugs every times. Although the livestock holder found to have been aware regarding parasitic diseases and their deworming practices in ruminants, higher incidence of GI nematodes is still prevailed in the area.

This possible explanation may be contributed by the fact of different associated husbandry practices, pasture larvae burden, anthelmintic resistance etc. The similar findings were also reported by Bulbul *et al.*, (2014) who recorded 92.50% farmers were aware of deworming in Kashmir valley. The differences of the knowledge level might be due to sample sizes and method of collection of data. Almost each and every farmers did not follow any deworming schedule was reflected in our present study.

Coproexamination

The parasitological examination revealed that 460 (85.66%) animals were found to be

positive for GI nematodosis. Overall occurrence of gastrointestinal nematodosis was found highest in goats (88.98%) followed by sheep (84.96%) and cattle (81.13%).

The occurrence of GI nematodosis was found to be recorded 81.13 % in cattle with the prevalence of *Haemonchus* sp. was maximum (30.18%) followed by *Trichostrongylus* sp. (13.20%), *Oesophagostomum* sp. (10.16%), *Bunostomum* sp. (4.40%) and *Cooperia* sp. (3.14%), *Ascaris* sp. (5.03%), *Trichuris* sp. (3.77%), *Strongyloides* sp. (2.51%) and mixed infection of strongyle and others (8.17%).

In contrast to our findings Borthakur and Das (1998) in Assam, Palampalle *et al.*, (2002) in Maharastra also observed similar pattern of GI nematodosis in cattle.

In case of sheep, highest incidence was found to be of *Haemonchus* sp. (30.82%) followed by *Trichostrongylus* sp. (11.27%), *Strongyloides* sp. (9.77%), *Marshallagia* sp. (6.77%), *Oesophagostomum* sp. (5.26%), *Trichuris* sp. (3.76%) *Bunostomum* sp. (3.01%) and *Cooperia* sp. (2.25%).

Mixed infection was seen in only 12.03% samples. These findings were almost corroborated with the findings of Dhar and Sharma (1982) and Khajuria and Kapoor (2003). Makhdoomi *et al.*, (1995) have also reported similar findings in sheep in Kashmir valley.

In case of goats, maximum 24.08% cases were found to be of *Trichostrongylus* sp. followed by *Haemonchus* sp. (15.51%), *Strongyloides* sp. (10.20%), *Oesophagostomum* sp. (9.39%), *Nematodirus* sp. (6.94%), *Marshallagia* sp. (3.67%), *Trichuris* sp. (3.27%) *Cooperia* sp. (2.86%) and *Bunostomum* sp. (2.04%) while mixed infection was 11.02 per cent. These finding are quite similar to the findings of Singh *et al.*, (1999).

Table.1 Knowledge level of livestock holder on parasitic diseases

Sl. No.	Statements	Yes	No
1	Do you know about parasitism or parasitic infection	75	25
2	Have you seen bottle jaw in your animals	85	15
3	Have you seen reduce milk yield, rough body coat, diarrhoea, constipation etc. in same animal	65	35
4	Do you know about the deworming/ dosing schedule	83	17
5	How many time have you administered anthelmintic drugs (during last one year)		
a	Not remember	50	50
b	1 time	4	96
c	2 times	13	87
d	3-4 times	72	28
e	Did the para-vets administered anthelmintics every times they visited your farm to treat the animals	89	11
6	Do you know the what purpose faecal samples of animals done	8	92
7	Have you got any advice from para-vets to test faecal samples	3	97

Figures are in frequency and equivalent to per cent (Sample size 100)

Table.2 Efficacy of anthelmintics against naturally acquired nematodosis

Group	Pre-treatment	Post-treatment			
	0 day EPG	7 th Day EPG _{±SE} FECRT% _{±SE}		14 th day EPG _{±SE} FECRT% _{±SE}	
Sheep					
A	733.33 _{±60.10}	200.00 _{±28.87}	72.72 _{±3.94}	8.33 _{±8.34}	98.86 _{±1.04}
B	725.00 _{±38.20}	233.33 _{±27.89}	67.82 _{±4.14}	16.67 _{±10.54}	97.70 _{±1.42}
C	691.67 _{±50.70}	158.33 _{±32.71}	77.11 _{±4.67}	133.33 _{±16.67}	80.72 _{±2.18}
D	758.33 _{±66.37}	166.67 _{±33.34}	78.02 _{±4.99}	108.33 _{±35.17}	85.71 _{±5.04}
E	658.33 _{±55.41}	683.33 _{±60.10}	-3.80 _{±3.50}	758.33 _{±47.30}	-15.19 _{±3.87}
Goats					
A	691.67 _{±75.75}	200.00 _{±34.16}	71.08 _{±3.79}	25.00 _{±11.18}	96.39 _{±1.52}
B	683.33 _{±55.79}	216.67 _{±24.73}	68.29 _{±3.22}	16.67 _{±10.54}	97.56 _{±1.94}
C	716.67 _{±61.48}	225.00 _{±33.55}	68.60 _{±3.66}	100.00 _{±25.83}	86.05 _{±3.82}
D	725.00 _{±42.34}	233.33 _{±35.75}	67.82 _{±5.41}	108.33 _{±35.17}	85.06 _{±4.52}
E	633.33 _{±57.26}	675.00 _{±42.34}	-6.58 _{±2.97}	758.33 _{±30.05}	-19.74 _{±5.47}
Cattle					
A	358.33 _{±65.10}	133.33 _{±27.89}	62.79 _{±3.79}	41.67 _{±15.37}	88.37 _{±5.23}
B	333.33 _{±89.15}	108. _{± 20.07}	67.50 _{±8.56}	33.33 _{±16.67}	90.00 _{±8.75}
C	408.33 _{±62.48}	158.33 _{±32.71}	61.24 _{±9.36}	83.33 _{±27.89}	79.59 _{±6.67}
D	391.6667 _{±39.62}	158.33 _{±32.71}	59.57 _{±12.72}	91.67 _{±27.14}	76.60 _{±8.56}
E	383.33 _{±70.33}	408.33 _{±62.48}	-6.52 _{±4.47}	450.00 _{±81.67}	-17.39 _{±5.02}

("-" values considered as 0 in control groups)

Overall occurrence of GI nematodosis was found to be highest in goats followed by sheep and cattle might be due to different grazing habits. Our findings are slightly similar with the findings of Singh *et al.*, (1999) and Palamapalle *et al.*, (2002). *Haemonchus* sp. is more prevalent in cattle and sheep while *Trichostrongylus* in goats have the potential findings in current study. Occurrence of haemonchosis in small ruminants at Budgam district was reported by Bulbul *et al.*, (2010) in case report. Other strongyle nematodes and *Trichuris* spp. have encountered in the ruminants which affect the economic loss in terms of production and productivity. The occurrence of *Trichuris* sp. in sheep has been reported by Ahmed *et al.*, (1990) in J&K state. Khajuria and Kapoor (2003) reported 10.11% of sheep and 8.11% of goats infected with *Trichuris* sp. The faecal sample examinations in the district have not been done before treating the livestock hence non-judicious administration might be another factor for AR which enhance the higher prevalence of the GI nematodosis.

Faecal Egg Count Reduction Test:

The field trials on effect of some different anthelmintics against GI nematodes in naturally infected ruminants demonstrated significant reduction in the mean faecal egg counts for all the groups of treatment (Table 2). After administration of the different anthelmintic the EPG was found to be in sheep 8.33+8.34, 16.67+10.54, 133.33+16.67, 108.33+35.17 and 758.33+47.30; in goat 25.00+11.18, 16.67+10.54, 100.00+25.83, 108.33+35.17 and 758.33+30.05 and in cattle 41.67+15.37, 33.33+16.67, 83.33+27.89, 91.67+27.14 and 441.67+86.05 in group A, B, C, D and E, respectively. When administered Ivermectin (Inj. Ivomec) @ 200 µg/ kg BW subcutaneously, Ivermectin bolus (Endectin) @ 200 µg/ kg BW orally, Albendazole suspensions (Albomar) @ 7.5mg/kg BW

orally and Fenbendazole (Fentas Bolus) @7.5mg per Kg BW orally the FECRT % was found to be in sheep 98.86+1.04, 97.70+1.42, 80.72+2.18, 85.71+5.04; in goats 96.39+1.52, 97.56+1.94, 86.05+3.82 and 85.06+4.52 and in cattle 88.37+5.23, 90.00+8.75, 79.59+6.67 and 76.60+8.56 in group A, B, C and D, respectively on 14th day of post-treatment. In sheep 72.72+3.94, 67.82+4.14, 77.11+4.67 and 78.02+4.99; in goats 71.08+3.79, 68.29+3.22, 68.60+3.66 and 67.82+5.41 and in cattle 62.79+3.79, 67.50+8.56, 61.24+9.36 and 59.57+12.72 in group A, B, C and D, respectively on 7th day of post-treatment. Almost similar findings were also reported by Ahmed *et al.*, (1990) in Kashmir and various workers from other parts of the country.

This study demonstrated that the tested anthelmintics had an acceptable level of efficacy against GINs in ruminants. But the regular usage of the same group of anthelmintic, use of anthelmintics in sub-optimal doses, prophylactic mass treatment of domestic animals and frequent and continuous use of a single drug might be considered to the widespread development of AR in helminthes. Therefore, different groups of anthelmintic used alternatively to reduce the AR as reflected in our present study where ivermectin was more efficacious drugs against GI nematodosis. The gradual reduction of EPG following a single dose of Albendazole and complete elimination of parasitic egg was observed on 14th day of post treatment in calves (Hafiz *et al.*, 2011) unlike our findings. This might be due to attributed of AR. Singh *et al.*, (1994) observed that absence of the parasitic eggs from day 7 to 21 days in Ivermectin (S/C) treated group of sheep and goats. Bansal (1981) reported a reduction of EPG by 99.5% in Fenbendazole treated animals @ 5 mg/ Kg body weight. Administration of Ivermectin both through S/C and orally in endo-parasitism in small

ruminants was found efficacious (Bulbul *et al.*, 2011). In contrast, animals in control group showed an ascending EPG count were also successfully treated with Ivermectin @ 200µg / Kg body weight subcutaneously after completion of the trial. From the present study, it can be easily concluded that all three drugs were effective against naturally acquired GI nematodosis in ruminants is an effective anthelmintics against nematodosis in ruminants but resistance arisen might be due to faulty uses. For prevention and control of helminth parasites, appropriate anthelmintic drugs should be administered in right time with right dose in right animals through right route.

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