



## Short Communication

### Comparative Efficacy of Two Dose Levels of Albendazole against Naturally Acquired Nematode Infections in Goats

Habibun Nabi<sup>1\*</sup>, Khalid Saeed<sup>1</sup>, Muhammad Lateef<sup>1</sup>, Aneela Zameer Durrani<sup>2</sup>, Muhammad Haroon Akbar<sup>1</sup>, Muhammad Imran Rashid<sup>1</sup>

<sup>1</sup>Department of Parasitology, University of Veterinary and Animal Sciences, Lahore, Pakistan; <sup>2</sup>Department of Clinical Medicine & Surgery, University of Veterinary and Animal Sciences, Lahore, Pakistan.

\*Corresponding author: [habibunnabi30@gmail.com](mailto:habibunnabi30@gmail.com)

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#### ABSTRACT

The small ruminants are threatened by a number of health hazards around the globe, however, gastrointestinal nematodes are considered most dangerous. These infections are controlled mainly by variety of chemotherapeutic agents. This study was designed to ascertain the therapeutic level of Anthelmintics in goats owing to the fact that these are metabolized rapidly in goats than that of sheep and in turn require a higher dose for effective parasite-control. A total of 30 naturally infected goats, with natural gastrointestinal nematode infestation, were selected for therapeutic trial. These animals were randomly divided into three equal groups and were called Group A, B and C and were treated with different level of Albendazole (Albasym®). Animals in group A were treated with a dose rate of 1 ml/20 Kg body weight (recommended dose), group B was treated with 1.25 ml/20 Kg body weight, whereas animals in group C served as negative control. Percent reduction in eggs per gram of faeces (EPG) was calculated on day 0, 7<sup>th</sup>, 14<sup>th</sup> and 28<sup>th</sup> post medication. Non-significant difference ( $P>0.05$ ) in egg reduction at recommended dose and at higher dose was observed while significant ( $P<0.05$ ) reduction in egg shedding as compared with control group was recorded. The EPG reduction at day 7 post medications at recommended dose and higher dose was 98.81% and 100%, respectively while reduction at day 14 post medication was 95% and 99.93%, respectively. Data shows that higher dose of Albendazole resulted in 93% reduction in EPG while 81% reduction was recorded at recommended dose level at 28<sup>th</sup> day post medication. Taken together higher dose is more effective than recommended dose in the control of goat nematodes, however, it required to be investigated the long-term effects on the resistance development and continuity to such therapeutic effects in future.

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Pakistan has a large population of livestock and is well adapted to the environmental conditions of the country. Among the livestock species, goat has the largest share i.e. 58.3 million from which we get 21.99 thousand tons of hair and 0.590 million tons of mutton annually (Economic survey, 2011). Parasitic nematodes are substantial causes of decreased productivity and wastage in goats (Tefara et al., 2011). For its prevention and treatment wide variety of anthelmintics belonging to various biochemical groups have been used in goats. Due to environmental toxicity and poor efficacy organophosphates and chlorinated hydrocarbons are now rarely used (Smith and Sherman, 2009). Currently, broad-spectrum anthelmintic group (i.e. Benzimidazoles) is most commonly being used in food animals including goats. Because of increasing reports of anthelmintic resistance, its continuous use is now questioned (Hose et al., 2005). Anthelmintic resistance was recorded in field due to traditional treatment, low protein diet and inadequate dose level of anti-parasitic agents (Charles et al., 1989). Goats metabolized some anthelmintics to a great extent than that of sheep which results in low concentration of anthelmintics in plasma. This situation might be overcome by treating goats with higher dose rate of anthelmintics than that

of sheep (Hessenny et al., 1993) to maintain a therapeutic threshold in plasma. The present study was aimed to study the effect of two concentrations of Albendazole in controlling the nematode parasites in goats.

The study was conducted in district Swat situated north to province Khyber Pakhtunkhwa, Pakistan. Goats were selected in and around 50 km from Saidu Sharif, Swat, Pakistan. The study period was 4 months i.e. February to May 2012. One hundred and fifty (150) faecal samples were collected from naturally infected goats. From each animal, 10 gram faecal sample was collected per rectum in a zip lock bag. Samples were stored in a refrigerator at 4 °C for examination on the same day or next day. Samples were brought to Veterinary Research Institute (VRI) Balogram, District Swat, Khyber Pakhtunkhwa for diagnosis of nematode infections. The collected faecal samples were examined qualitatively by direct microscopic examination and flotation technique while quantitatively by McMaster egg counting technique (Urquhart et al., 1996).

Among naturally infected goats, 30 were selected for therapeutic trial. These animals were randomly divided into three equal groups (A, B and C) having 10 goats each. Animals from group A were administered Albendazole (Albasym, Symans Pharmaceuticals Ltd Lahore) at manufacturer's recommended dose i.e. 1 ml per 20 kg body weight. Animals from group B were administered 25 % higher than recommended dose of same preparation i.e. 1.25 ml per 20 kg body weight. The animals in group C were not treated with any drug and served as negative control. Quantitative method of faeces was performed to determine eggs per gram (EPG) of faeces on 0, 7th, 14th and 28th day post medication. Faecal samples from each animal were examined to determine the

group EPG and to evaluate the efficacy by the following equation.

$$\text{Clearance \%} = \frac{a-b}{a} \times 100$$

a = Mean EPG of the group recorded at zero day

b = Mean EPG of the group recorded at day of observation (Abouzeid et al., 2010)

SPSS (Statistical package for social science, Country?) version 16 was use for data entry and analysis. Further multiple comparison tests were applied to see the level of significant between the groups.  $P \leq 0.05$  was considered as level of significant.

Table 1: Comparative efficacies (%) of two doses level of Albendazole in goats at different day's interval

Drug	Days after treatment					
	7 Day		14 Day		28 Day	
	EPG	Efficacy (%)	EPG	Efficacy (%)	EPG	Efficacy (%)
Albendazole recommended dose 1 ml/20 Kg body weight	10 ± 21.08	98.81	40 ± 39.44	95.24	160 ± 180.73	80.95
Albendazole 25 % higher than recommended dose 1.25 ml/20 Kg body weight	0.00 ± 0.00	100 %	5.0 ± 15. 81	99.93	50.0 ± 33.33	93.90

Table 2: Multiple comparisons between treatment and control groups

Group of Treatment	Group of Treatment	p-value
Normal Dose 1 ml/20 Kg body weight	25% High Dose	0.842
25% Higher than recommended Dose 1.25 ml/20 Kg body weight	No treatment given	0.000*
No treatment given	Normal Dose	0.842
	No treatment given	0.000*
	25% High Dose	0.000*

The mean EPG of group A recorded on day 0, 7th, 14th and 28th was 840, 10, 40 and 160, respectively. The percent efficacy of normal dose of Albendazole on day 0, 7th, 14th and 28th was 0%, 98.81 %, 95.24 % and 80.95 %, respectively. Group B animals which were treated by 25 % high dose of Albendazole i.e. 1.25 ml/20 kg body weight orally and the mean EPG recorded on day 0, 7th, 14th and 28th was 1065, 0, 05, 50, respectively. The percent efficacy of higher Albendazole dose on day 0, 7th, 14th and 28th was 0 %, 100 %, 99.93 % and 93.90 % respectively. The percent efficacy and mean EPG after treatment the goats with recommended and higher dose of Albendazole are shown in Table 1. Recommended and higher Albendazole dose resulted in significant reduction in FEC on 28 day post-treatment as compare to control group. No significant difference ( $p > 0.05$ ) was found among the normal and higher dose level of Albendazole however significant ( $p < 0.05$ ) difference was found among control group and two treatment group (Table 2).

Several studies have been conducted on percent efficacy of Albendazole (Ijaz et al., 2008; Waruiru, 2002; Ponroy et al., 1998). Previous study indicates that if goat was treated with two times greater dose of Oxfendazole against resistance GIT parasites FECR was improved by 13% (Sangster et al., 1991). Similarly 94% efficacy of Albendazole was recorded 14th day post treatment in goats in and around Lahore (Ijaz et al., 2008). Similarly 100% efficacy of Albendazole was recorded against goat parasites in Kenya (Waruiru, 2002; Ponroy et al., 1998). Combine effect of different drug also indicates that Albendazole was more effective as compared to other drugs. Albendazole, Levamisole and Closantel and Ivermectin efficacy against resistant strain of *Haemonchus contortus* in sheep was evaluated and found that Albendazole was 99% effective in reducing worm burden in animals as compared to other (Waruiru, 1997).

On the other hand lower efficacy of Albendazole in sheep and goat was recorded in different parts of the world that ranged from 14–49 % against GIT nematodes (Guimaraes et al., 2011; Njoroge et al., 2005; Keyyu et al., 2002). Lower efficacy may be due to continuous use of Albendazole or prevalent of resistance parasites in study population. It was studied that continuous administration of Fenbendazole round the year decreases its efficacy up to 57% (Zajac and Gipson, 2000). It has also been observed that anthelmintc resistance mainly developed due to avoiding recommended anthelmintic dose and rotation of different anthelmintic classes (Herd, 1993). As goat metabolize anthelmintic to a greater extent thus required higher dose as compare to other animals to maintain the plasma threshold for effective parasitic control (Hessenny et al., 1993).

In this study lower efficacy of recommended dose on 28th day post medication indicated that recommended dose has lower suppressive effect on the egg shedding where as higher dose still has suppressive effect on faecal egg count. The present study indicated that 25% high dose level of Albendazole is more effective than normal dose of Albendazole. It is concluded from the present study that increasing the dose rate in goats than recommended dose induced some improvement in Albendazole efficacy against gastrointestinal nematodes of goats. It has been clearly demonstrated by the present experiment that increasing the dose level than normal recommended dose is not so much effective but it is necessary to further evaluate Albendazole efficacy against susceptible and resistance strain of gastrointestinal parasite of goats.

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