

# Prevalence of Gastrointestinal Parasites in Buffalo and Cow Calves in Rural Areas of Rawalpindi, Pakistan

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## ABSTRACT

The study was conducted to determine the prevalence and burden of gastrointestinal (GI) parasites in Cow and buffaloes Calves in rural areas of Rawalpindi. Gastrointestinal (GI) parasitic infection is a serious issue in cattle management. Effects of GI parasites may vary with age, sex of cattle, nutritional condition, and severity of infection. A total of 300 calves were used in this investigation (150 of each buffalo and cow). According to the findings, worm infection was found in 68.67% of buffalo and 51.33% of cow calves. Nematodes had the highest prevalence, followed by mixed infection and cestodes, while no calf tested positive for trematodes. Buffalo and cow calves aged 1 to 6 months had the highest incidence (79.27%, 67.11%) when compared to the age range of 7 to 12 months (55.88%, 35.14%). Grazing calves were more infectious (75.61% buffalo calves, 73.68% cow calves) than stall fed calves (60.29% buffalo calves, 28.38% cow calves). Male buffalo calves were more afflicted (70.73%) than female buffalo calves (66.18%), whereas Male cow calves were (55.26%) as compare with female cow calves (47.30%) affected.

Gastro-intestinal parasitic infection mostly associated with occurrence of diarrhea in buffaloes, which effect on the health condition and production of these animals, infections should more attention by both owners and veterinarians. The majority of farmers in the research region were completely unaware of the recommended calf care approaches and continued to use traditional methods. Calf mortality was found to be as high as 60% in the research region, with excessive worm infestation being one of the main causes, combined with a lack of preventative measures.

## Introduction

Buffaloes are predominantly used for farm power in the cultivation of rice as well as production of curd [1]. Rearing of cattle in the country is catering for draught power, milk production, and meat production [2]. Animals' gastrointestinal tracts (GIT) are home to a vast range of parasites, mostly helminthes, which

cause clinical and subclinical parasitism [3]. These parasites have a negative impact on animal health and result in significant financial losses for the cattle sector [4]. Parasitic diseases caused by intestinal parasites constitute a major impediment to livestock production [5]. All ages of cattle are affected by a diverse set of

intestinal parasites. These infections are rarely associated with high mortality of cattle [6]. However, their effects are usually characterized by lower outputs of animal products, byproducts, manure, and traction, thereby affecting the contributions of cattle in ensuring food security, especially in developing countries [7]. Helminthiasis is a well-recognized problem in free-ranging animals [8].

One or more helminthes parasites are usually infected cattle, buffalos, sheep and goats [9]. The differences in the distribution of parasitic intensity depends upon the topographic, pasturing, immunological & nutrition of the host, the intermediate host and number of infective stage or eggs ingested by the animals [10]. In the development of a profitable livestock industry worm infestation is one of the major constraints [11]. In the alimentary tract gastro-intestinal helminthiasis syndrome is always caused by a mixture of species of helminthes parasites [12]. Effect of helminthes on the production are well documented all over the world [13]. The reduction in feed intake and anorexia, loss of blood and plasma proteins in gastro-intestinal tract, alterations in protein metabolism, decrease in levels of minerals, enzymes and diarrhea, all contribute to loss in weight gain [14]. Parasitic infection is common in Pakistan [15], costing the cattle business roughly 26.5 million rupees each year [16]. Gastrointestinal parasites in calves cause lower growth and are a persistent hindrance to the development of Pakistan's livestock economy [17].

Facing water buffalo herding many obstacles of facing the economic side for educators such as by internal parasites in addition to hit the same species that infect cows such as (*Eimeriaspp*, *Cryptosporidium spp*, *Toxocaravitulorum*, *Fasciola spp* and *Trichostrongylidae*) as cause economic loss and symptoms manifested in poor growth [18], loss of appetite and digestive symptoms [19]. Although no specific number for economic losses is known [15]. It is certain that millions of rupees are wasted owing to lower milk yield, rejection of meat and edible offal's, devaluation of hides, delayed age of maturity and mortality, especially in calves, and high production costs due to medication usage [20]. Infection with gastrointestinal parasites among the important factors contributing to increased calf mortality [21]. Sub-clinical nematode parasitic infection cause great economic losses and dam milk production [22], because it affects the availability of nutrients, the development of the digestive tract and (the appropriate development of the immunity system against some diseases such as parasitosis [23].

As a result, it is critical to reduce GIT parasites by improved management [24], just as it is in developed nations, and information of the parasite's prevalence is required [25]. The frequency of GIT parasites and related predisposing factors in buffalo and cow calves in Rawalpindi rural districts are described in this research.

## Materials and Methods

### Ethical Approval

The research was conducted after approval of Institutional Ethical Committee.

### Study Area

The study was conducted in the Rawalpindi region of Punjab's rural areas (Chakri, Taxila, Kallar Syedan, Kahuta). It is situated in between latitude 33° 37' 33.8052" N and 73° 4' 17.1912" E with an average height of 602 m above mean sea level. Rawalpindi has a subtropical climate. During the study period, Rawalpindi received an annual rainfall of 989 mm. The temperature varied from -6°C to 48.8°C. The relative humidity varied from 18% to 89%.

### Study Animals

The study was conducted on n=300 calves (150 each of buffalo and cow) were randomly picked for this purpose. Animals were categorized according to sex, i.e., male and females and age, i.e., animals of 1-6 months and 7-12 months. Age, species, sex, and management information (deworming, feeding method, housing conditions, mortality rate, and diseases problem) were all documented.

### Collection of Faecal Samples

Fresh fecal samples of 300 calves (150 each of buffalo and cow) were collected randomly from different localities of Rawalpindi during February 2021 to September 2021. The faecal samples were taken directly from the animals' rectums in self-sealed sterilized polythene hand gloves and were processed. Floation technique was used for demonstrating nematode and cestode egg, as well as oocyst of coccidia and sedimentation technique, was used for detecting the trematode eggs. The ova/eggs of parasites were identified from their morphological characters. Eggs/oocysts per gram (EPG/OPG) of infection were determined by modified McMaster technique. The information gathered was evaluated using the chi-square approach and provided in tabular form.

### Data Analysis

The data gathered from the study for the prevalence of parasitic infection were analyzed by Chi-square test.

## Results

### Predisposing Factors

It was discovered that most calves, particularly male buffalo calves, were ignored at the farmer's level, and that they were feed / fodder that lactating animals refused. The majority of the calves developed pica, which resulted in worm infection. Although most farmers in the study region were aware of deworming, adoption was

quite low. Only 35% of the farmers had their calves dewormed. The dosing rate and quality of the dewormed, on the other hand, were both problematic. It was also discovered that the farmers' animals were not all dewormed at the same time. Calves letting down milk was a widespread behavior in the research region. The teats of the cows / buffaloes were not cleansed prior to being let down, and the calves consumed all of the excrement / dirt that adhered to the teats, which might lead to worm infection. The dewormers are both pricey and useless, according to the farmers' complaint. It was common practice to use Kamila as a dewormer.

### Gastrointestinal Parasite Prevalence in Buffalo and Cow Calves

Gastrointestinal parasites were found in 68.67% of buffalo calves (103 out of 150). Overall, nematodes were shown to have the highest prevalence, followed by mixed infection and cestodes. Trematodes were not discovered in any of the calves. Gastrointestinal parasites were observed to affect calves up to 6 months of age more (79.27%) than calves 7-12 months of age (55.88 %) (Table 1). Male buffalo calves were more impacted than female buffalo calves when it came to gastrointestinal parasites. (Table 2) Grazing calves were more likely than stall fed calves to

be infected with gastrointestinal parasites. Buffalos and Cow calves (75.61%) and (73.68% ) is maximum as compare to stall feeding of Buffalos and cow calves 60.29 % and 21%, respectively, were discovered infected with nematodes and cestodes (Table 3). In contrast buffalo calves had 62.90% and 12.90% of stall-fed calves tested positive for nematodes and cestodes, respectively (Table 4). Male buffalo calves 70.73% were more impacted than female buffalo calves when it came to gastrointestinal parasites 66.18%. *Strongyloides pappillosus*, *Toxocara vitulorum*, *Haemonchus contortus*, *Ostertagia ostertagi*, *Bunostmum phleboyum*, *Oesophagostomum radiatum*, *Trichstrongylus* spp., *Nematodirus* spp., *Cooperia* spp., *Trichstrongylus* spp., *Moniezia benedeni* and *Moniezia expansa*, regardless of the frequency of each species.

About 77 cow calves were discovered to have gastrointestinal parasites out of 150. Calves between the ages of 1-6 months had a greater incidence of 67.11%. However, worm infection was discovered in 35.14% of calves aged 7-12 months (Table 1). Male cow calves 55.26% were more impacted than female cow calves when it came to gastrointestinal parasites 47.30% (Table 2). Furthermore, grazing cow calf 73.68% were more affected then stall feeding 28.38% (Table 3). Nematodes had the highest prevalence, followed by mixed infection and cestodes (Table 4).

**Table 1:** Prevalence of Age wise GIT parasites in buffalo and cow calves.

Age	No of Calve Examined		No of Calves positivity (%)	
	Buffalos Calves	Cow Calves	Buffalos Positive	Cow Positive
1-6 months	82	76	65 (79.27)	51 (67.11)
7-12 months	68	74	38 (55.88)	26 (35.14)
Total	150	150	103 (68.67)	77 (51.33)

**Table 2:** Prevalence of gender wise GIT parasites in buffalo and cow calves.

Sex	No of Calve Examined		No of Calves positivity (%)	
	Buffalos Calves	Cow Calves	Buffalos Positive	Cow Positive
Male	82	76	58 (70.73)	42 (55.26)
Females	68	74	45 (66.18)	35 (47.30)
Total	150	150	103 (68.67)	77 (51.33)

**Table 3:** Prevalence of Feeding system wise GIT parasites in buffalo and cow calves.

Feeding System	No of Calve Examined		No of Calves positivity (%)	
	Buffalos Calves	Cow Calves	Buffalos Positive	Cow Positive
Grazing	82	76	62 (75.61)	56 (73.68)
Stall Feeding	68	74	41 (60.29)	21 (28.38)
Total	150	150	103 (68.67)	77 (51.33)

**Table 4:** Prevalence of various types of GIT parasites in buffalo and cow calves.

Factor		Nematodes		Cestodes		Trematodes		Mixed infection	
		Buffalos Calves	Cow Calves	Buffalos Calves	Cow Calves	Buffalos Calves	Cow Calves	Buffalos Calves	Cow Calves
Age	1-6 Months	45 (69.23)	35 (68.62)	6 (9.23)	4 (7.84)	-	-	14 (21.53)	12 (23.52)
	7-12 Months	16 (42.10)	14 (53.84)	4 (10.52)	2 (7.69)	-	-	18 (47.36)	10 (38.46)
Sex	Male	41 (70.68)	28 (66.66)	6 (10.34)	3 (7.14)	-	-	11 (18.96)	11 (26.19)
	Female	24 (55.33)	26 (74.28)	6 (13.33)	2 (5.71)	-	-	15 (33.33)	7 (20)
Feeding System	Grazing	39 (62.90)	34 (60.71)	8 (12.90)	4 (7.14)	-	-	15 (24.19)	18 (32.14)
	Stall Feeding	25 (60.97)	12 (57.14)	6 (14.63)	1 (4.76)	-	-	10 (24.39)	8 (38.09)

## Discussion

In the world many research carried out on infect the buffaloes and cow with parasites because, the buffaloes community is assumption at 185 million, in Asia are 179 million of them [26]. The argument of pathogens is reliant on the number of it and the nourishing status of the infecting buffaloes [27]. A serious parasitized of internal parasites in animals basically leads to loss of production [28]. These animals are considered among the most productive domestic animals in the poor tropical countries and are the major source of quality milk, with unique feed conversion capacity, and they produce milk more cheaply than cattle [29]. Although the parasite does not harm the host to a greater extent to cause a serious problem but in heavily infected and small aged animals the parasite could prove harmful to the host by utilizing the hosts digested food not only resulting in malnutrition but also makes host weak and more susceptible to other diseases by decreasing its immunity [30]. The distribution of gastro-intestinal parasites was 74% [31].

Most common one was protozoa, and then nematode and trematod, and the cestodes were the smallest infection rate among all [32]. In current study the trematodes were not discovered in any of the calves. Grazing calves were more impacted (73.68%) than stall fed calves (28.38%). Further investigation revealed that nematodes, cestodes, and mixed infection of nematodes and cestodes were found in 62.71, 7.14, and 32.14% of grazed cow calves, respectively, whereas nematodes, cestodes, and mixed infection of nematodes and cestodes were found in 60.97%, 14.63%, and 38.09% of stall fed calves, respectively. *Strongyloides papillosus*, *Oesophagostomum radiatum*, *Bunostomum phlebotomum*, and *Ostertagi ostertagi* were the most common species discovered, regardless of their percent frequency [33]. The greater incidence of endo parasites in this study might be linked to farmers' carelessness in calf raising and their failure to follow suggested calf management procedures [34].

It was further reinforced, that calves are a neglected class of animals at the farmer's level [35], and that they are fed low-

quality food that nursing animals avoid [36]. The high frequency of parasitism in calves in the field is mostly due to a lack of preventative measures, such as frequent deworming using a quality dewormer at the prescribed dose [37]. The results of this study are consistent with those of [38] and [39], who found that buffalo calves have a greater incidence of gastrointestinal parasites than cow calves. The different in prevalence of gastrointestinal helminthiasis from different parts of world could be due to the physiological status, age, animal spp, climatic conditions [40] and the existing Managemental practices at farm [41]. And the reflection of global climate change that has been experienced over the last several decades, which has altered distributions of organisms worldwide [42]. Also the might be due to the variation in the sampling area and the number of samples studied. The eggs found in this investigation were nearly identical to those found in previous studies [43].

In cow and buffalo calves, they found *Haemonchus contortus*, *Ostertagia ostertagi*, *Bunostomum phlebotomum*, *Oesophagostomum radiatum*, *Trichstrongylus* spp. *Nematodirus* spp. *Cooperia* spp. *Moniezia benedeni*, and *Moniezia expansa* eggs [44]. In buffalo and cow calves, [45] discovered a 64.43 % frequency of gastrointestinal parasites. *Oesophagostomum radiatum*, *Mecistocirrus digitatus*, *Bunostomum phlebotomum*, *strongyloides* spp., and *haemonchus contortus* were the most common species found [46], which accord with the conclusions of this study. The disparity in occurrence might be attributable to varying geo-climatic conditions and management strategies in the studied area [47]. However, greater rates in buffalo calves compared to cow calves may be due to variations in the two species' eating patterns and sanitary surroundings [48]. The greater occurrence of gastro-intestinal parasites in calves up to 6 months of age may be due to the calves' proclivity to lick other animals, dirt, and manure, among other things [49]. The responders agreed with this reasoning, stating that newborn calves commonly lick the mud, causing worm infection [50]. The technique of letting down milk via a calf is prevalent in the field, but teat cleaning is done after the milk is let down, and all the manure, urine, and other waste that sticks to the dam's teats is consumed by the calf, resulting in worm infection [26].



The increased incidence of worm infection in buffalo male calves might be related to farmers' disregard of buffalo male calves' management and preference for female upbringing, as heifer farming was the prevalent practice in that area [46]. Farmers were engaged in agriculture activities in the study area, and the use of cow bullocks was common [51]. The low prevalence of worm infestation in males could be due to a caring attitude [52]. Control of gastrointestinal parasitic infections in animals requires a comprehensive knowledge of the disease epidemiology and understanding of the pasture management, farm management practices, and agro climatic conditions such as temperature and rainfall [53]. The numbers of parasitic eggs and coccidial oocytes developed inside the host animals vary depending on the parasite species, level of host susceptibility, the health status of the animal, and immunological status [54]. During this study, parasitic stages of five different parasites were detected in the fecal samples. The identified parasitic stages were eggs of hookworms (*Bunostomum* spp.), whipworms (*Trichuris* spp.), amphistomes, cestodes (*Moniezia* spp.), and oocytes of protozoans (coccidians). These observations comply with the past records [54].

The greater worm infection rate in grazed calves compared to stall fed calves might be due to calves taking up worm eggs produced by diseased animals through faeces while grazing. [55] Backed up this argument by pointing out that pasture contamination is only due to eggs lost by adult animals during grazing. However, most of the cattle in non-treated farms were open grazing animals and they were almost never treated for any GI infections [27]. Grazing often encourages entering of different parasitic stages into the digestive tract of cattle through oral ingestion [16]. Fecal egg counts are highly important as an indicator to decide the period that the cattle have to be given deworming treatments [27]. This can also be used after deworming treatments to investigate the effectiveness of a particular anthelmintic [10]. Therefore, unnecessary costs of veterinary services and drugs can be reduced [2]. When using fecal egg counts, there are some limitations to determining the significance of the prevalence of flukes [4].

The number of parasitic eggs per gram of feces is influenced by the fecal consistency, total amount of feces produced, and time of the day feces were collected [11]. When the feces are dried, the parasitic eggs within the feces will be more concentrated [39]. The severity of gastrointestinal parasitic infections can be due to the vulnerability of animals to internal parasites and the poor immunity [20]. The prevalence rate and clinical diseases may vary, based on different environmental factors in different areas. The high prevalence of gastrointestinal nematodes and coccidian oocytes has been reported in tropical regions including Sri Lanka, with prevalence rates ranging from 20 to 96% [27]. Adult animals

are mostly immune, however calves became infected due to a rise in the quantity of infectious larvae [31]. The presence of dams and their calves on the pasture is likely to cause pasture contamination, which is hazardous to the calves [14].

## Conclusion

At the farmer level, the increased frequency of worm infection in cow and buffalo calves is mostly owing to the failure to follow recommended calf management procedures. Prophylactic procedures including deworming, hygiene measures, and food control can help to alleviate the condition. Future studies are required to evaluate the economic impact of GI parasites in the study area.

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