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# Prevalence and control practices of gastrointestinal helminths of camel in district tharparkar, sindh Pakistan

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## Abstract

The present study was conducted for Prevalence and control practices of GIT helminths of camels. Internal parasites causes economic losses in terms of productivity. The study was carried in District Tharparkartaluka wise. Results revealed an overall prevalence of 23.33%, and 30.00%, 23.33%, 13.33% and 26.66% in Diplo, Chachro, Mithi and Nagarparkar respectively Differentcontrol practices for GIT helminths were also recorded. Sex-wise prevalence was higher for females (25.00%) and lower in males (21.66%). Body status wise showed 31.42% (Weak), 21.53% (Fair) and 15.00% (Fatty). Among 28 infected camel 17 (60.71) had medium EPG (501-1500), 8 (28.58) had lower EPG (<500) and 3 (10.71) had highest EPG (>1500). Among the infected camels, Genus wise frequency was higher for*Haemonchus* (39.28%) and lowest for *Ostertagia*(14.28%).Farming wise prevalence was recorded highest for Group F comprising mixed species of livestock reared with camel (80%), whereas the lowest value was for Group A comprised the camels reared as only specie (12%). Among sources, self-treatment was (44.44%), followed by visit to wise man (18.88%), visit to veterinary hospitals (11.11).Among the Ethno-veterinary practices the higher frequency was recorded for *Brassica campestris* (25.56%), *Fesula assafoetida*, (20.00%),*Azardirachta indica* (12.23%), *Citrullus colocynthis* (7.77%) and Salt (4.44%), whereas allopathic was recorded to be (30.00%). 27 owners respondedfor different allopathic anthelmintics.The most frequently usedwas Nilzan plus (9) and Nilverm (7), whereas the lowest was Ivermectin (3).It was concluded that the highest rate of infection was in Diplo taluka and the lowest was in Mithi. Females were more susceptible to GIT helminths as compared to males.

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## Introduction

Tharparkar is an arid zone of Sindh, Pakistan having an area of 19,638 km$^2$.It remains one of the country's backward regions. Indicators of health, education and other determinants of well-being are short. Sporadic and scanty rain fall, decreased water resources, transient and incoherent grazing, and reliance on exploitative economy even for everyday needs are the permanent features of thari livelihood(Rajar *et al.*, 2007). Farmers keep camels and other livestock as security against crop failure as a means of saving and to have a source of supplementary income (Aujla *et al.*, 1998).

Among livestock, camel playan important role in livelihood of human population of Thar region. The Camel (*Camelus dromedaries*) have also an important role in the survival and economy of the pastoral society by providing milk, meat, transportation and socio-cultural aspects, compensation for blood, dowry and the like (Bekele., 2002).Camel contributes 2% share towards the total milk production (0.79 million tons per annum) in the agriculture countries.

The existing population of camel in Pakistan is more than one million and constitutes about 5.1% of the 17.44 million global populations, which is increasing at the rate of 1.62% per year (Anwar and Khan, 1998).

Factors like constant exposure to parasitic infection, variable geo-climatic conditions and lack of knowledge of farmers regarding gastro-intestinal diseases play an important role in the proliferation of helminths and their diseases (Durrani, 1991).

The gastro-intestinal helminths adversely affect the nutritional status of the animals and lower the resistance against other diseases (Irfan, 1984). Among domestic animals, camel is known to accept a lot of parasitic infections.

It is also known to be infected with various helminths which can cause diarrhea and other clinical signs and in severe cases, these internal helminths are generally known to add to a great loss of production.

These helminths also have zoonotic implication to those who work closely with camels (Mahmuda *et al.*, 2014).

Camel can acquire helminth infection by grazing on infected pastures or by consumption of infective larvae with drinking water resulting in colic, fever, skinniness along with growth disorders and diarrhea (Blood *et al.*, 1979). Gastro-intestinal helminths may assume much more significant role in camel husbandry because helminths not only decrease the productivity and performance of camels but also predispose to other Infectious diseases (Birhanu *et al.*, 2014).

The economic losses caused by gastro-intestinal helminths are multifarious dropped abundance, reduced work capacity, automatic culling, reduction in food efficacy and lower weight gain, lower milk production, treatment cost and mortality in heavily parasitized animals. (Regassa, 2006). Various anthelmintic and herbs such as neem are used expansively to control helminths in animals and are especially useful in domestic farm livestock and those species that graze on pasture and inevitably ingest the infective stages of the helminths (Garedaghi *et al.*, 2011).

Therefore, the current study was conducted to estimate the prevalence, identify the genus level or species diversity of internal helminths and control practices in camels of District Tharparkar, Sindh Pakistan.

## Materials and methods

*Study area*

The study was conducted to record the prevalence and control of gastro-intestinal helminths in camel (*Camelus dromedaries*) in Four Taluka's/Tehsils (Mithi, Diplo, Chachro and Nangarparker) of Tharparkar district, Sindh (Fig.1).

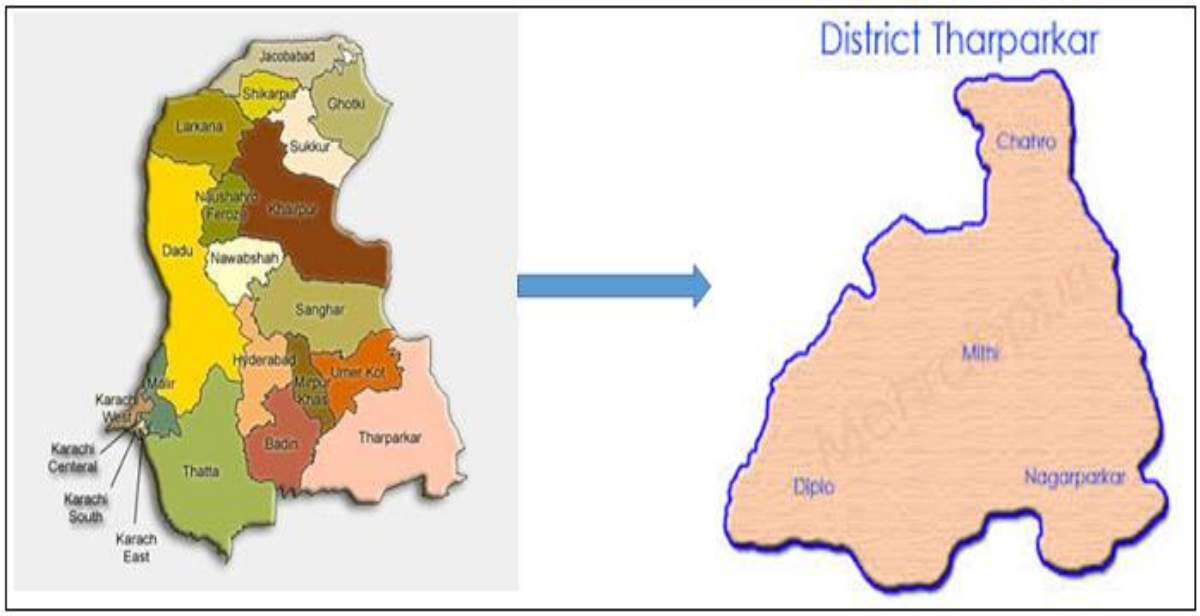


**Fig. 1.** Map of Sindh Pakistan showing District Tharparkar.

showing District Tharparkar.

*Sampling*

A total of 120 faecal samples of camels were collected randomly from 4 tehsils (Talukas) of district Tharparkar (Table1).

Samples were preserved in 10% formalin in air tight container and brought to the Department of Veterinary Parasitology, Faculty of Animal Husbandry & Veterinary Sciences, Sindh Agriculture University, Tando Jam, for further investigation.

All fecal samples were examined according to the techniques given by Thienpont*et al.* (1979) and Urquhart*et al.* (1988).

*Microscopic diagnosis*

Faecal samples were examined by three methods *viz.* Direct Smear,floatation and sedimentation Method.

*Counting of eggs*

The samples found positive for helminth infection were subjected to stoll method (Thienpont *et al.* 1979, and Chatterjee, 1987) for quantitation of the eggs per gram (EPG).

At least two preparations ware be examined and calculated as:

Eggs per gram (EPG) = N × 100

N= Total number of eggs counted.

*Identification of eggs*

The eggs were identified according to the keys as described by Thienpont *et al.* (1979) and Soulsby *et al.* (1982).

*Descriptive survey*

A questionnaire (Appendix-1) was used to collect the detail information on common control practices for helminths in camel by interview from owners.

The research protocol was divided into segments in the following way:

Prevalence of gastro-intestinal helminths infection in camel in district Tharparkar.

Gender wise prevalence of gastro-intestinal helminths infection in male and female camel in district Tharparkar.

Body status wise prevalence of gastrointestine helminths infection**.**

Frequency percentage of severity of gastro-intestinal helminths Infection in camel at Tharparkar.

Frequency percentage of types of gastro-intestinal helminths in camel at Tharparkar.

Farming wise prevalence of gastro-intestinal helminths infection.

Frequency of different sources applied for the treatment of camels.

Ethno-veterinary practices and allopathic drugs reported by the camel owner for the treatment of G.I.T. helminths.

*Data management and statistical analysis*

Data ware first entered into MS Excel Program (Microsoft Corporation, USA). Data analysis was performed using the SPSS package for Windows.

**Results and discussion**

The results revealed overall 23.33% prevalence of gastro-intestinal helminths in camels. Therate of helminths in four tehsils/talukas of District Tharparkar was recorded as 30.00, 23.33, 13.33 and 26.66% inDiplo, Chachro, Mithi and Nagarparkar, respectively (Table2). The Proportion of camel helminthosis in all tehsils/taulkas was non-significant at P>0.05 level (Chi square =2.000, df =3, P=0. 5724).

**Table 1.** Distribution of Sampling.

| Animal | Sex | Mithi | | | | Chachro | | | | Nangarparkar | | | | Diplo | | | | G. Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | V1 | V2 | V 3 | Total | V1 | V2 | V 3 | Total | V1 | V2 | V 3 | Total | V1 | V2 | V 3 | Total | |
| camel | Male | 5 | 5 | 5 | 15 | 5 | 5 | 5 | 15 | 5 | 5 | 5 | 15 | 5 | 5 | 5 | 15 | 60 |
| | Female | 5 | 5 | 5 | 15 | 5 | 5 | 5 | 15 | 5 | 5 | 5 | 15 | 5 | 5 | 5 | 15 | 60 |
| Total | | 10 | 10 | 10 | 30 | 10 | 10 | 10 | 30 | 10 | 10 | 10 | 30 | 10 | 10 | 10 | 30 | 120 |

V=Village.

**Table 2.** Prevalence of gastro-intestinal helminths infection in Camel of district Tharparkar.

| S.No | Tehsil | No of examined animals | Animal infected | Prevalence % |
|---|---|---|---|---|
| 1 | Diplo | 30 | 9 | 30.00 |
| 2 | Chachro | 30 | 7 | 23.33 |
| 3 | Mithi | 30 | 4 | 13.33 |
| 4 | Nagarparkar | 30 | 8 | 26.66 |
| Total | | 120 | 28 | 23.33 |

Chi square =2.000, df =3, P=0. 5724 :( Non-significant at P<0.05).

The frequency percentage of prevalence of infection of gastro-intestinal helminths in camel was higher in Diplo (32.14%), followed by 28.58, 25.00 and 14.28% in Nagarparkar, Chachro and Mithi tehsil/talukas of District Tharparkar(Fig. 2).

The gender wise prevalence of infection in camel was determined as 21.66 and 25.00% in male and female respectively. The fraction of infection in male and female camel was non-significant at P>0.05 level (Chi Square=0.273, df=1, P=0.9651).

**Table 3.** Gender wise prevalence of gastro-intestinal helminths infection in Male and Female Camels in district Tharparkar.

| S No. | Sex | Examined animals | Infected animals | Percentage |
|---|---|---|---|---|
| 1 | Male | 60 | 13 | 21.66 |
| 2 | Female | 60 | 15 | 25.00 |
| Total | | 120 | 28 | 23.33 |

Chi square =0.273:df =1:P =0.9651 :( Non-significant at P>0.05)

The overall Gender wise infection frequency in diseased camel was determined to be higher in female (53.57%) as compare to male (46.43%). The difference in prevalence of gastro-intestinal parasitic infection in both sex was non-significant at P<0.05 level (Chi Square=0.273, df=1, P=0.9651).

**Table 4.** Body status wise prevalence of gastro-intestinal helminths infection.

| S. NO | Body Status | CAMEL | | |
|---|---|---|---|---|
| | | Animal Examined | Animals Infected | Percentage |
| 1 | Weak | 35 | 11 | 31.42 |
| 2 | Fair | 65 | 14 | 21.53 |
| 3 | Fatty | 20 | 3 | 15.00 |
| Total | | 120 | 28 | 23.33 |

Chi square =5.898, df =2, P = .0.0524:( Non-significant at P>0.05).

Association of gastrointestinal helminths infection with body status. According to data the infection rate was high (31.42%) noted in weak animal as compare to fair (21.53%) and fatty (15.00%) camels(Table 4). The difference of infection between body condition was statically observed as non-significant at P <0.05 level (Chi square = 5.898, df =2, P = 0.0524).

The severity of infection was categorized as high (>1500) medium (501-1500) and low (<500).

**Table 5.** Frequency percentage of severity of gastro-intestinal helminths Infection in camel at Tharparkar.

| S. NO | Severity of infection | Camel | |
|---|---|---|---|
| | | Animals infected | Frequency |
| 1 | High (>1500 EPG) | 3 | 10.71 |
| 2 | Medium (501-1500) | 17 | 60.71 |
| 3 | Low (=<500 EPG) | 8 | 28.58 |
| Total | | 28 | 100 |

Chi square = 0.0101, df =2, P =0.9506 :( Non-significant at P<0.05).

The high severity of helminths was recorded in 10.71% in sampled camel. The medium and low severity was noted in 60.71 and 28.58% during study period(Table-5).The difference was statistically non-significant at P >0.05 level (Chi square = 0.0101, df =2, P =0.9506).

The helminths genus wise frequency percentage observed in overall infected camels, Among the observed helminths species, the *Haemonchus* was higher (39.28%) followed by *Trichostrongylus, Stronglyloides* and *Ostertagia* found as 28.58, 17.86 and 14.28% respectively (Table 6).

**Table 6.** Frequency percentage of types of gastro-intestinal helminths in camel at.

| S.No | Type of helminths | No of parasite | Frequency % |
|---|---|---|---|
| 1 | Haemonchus | 11 | 39.28 |
| 2 | Trichostrongylus | 8 | 28.58 |
| 3 | Stronglyloides | 5 | 17.86 |
| 4 | Ostertagia | 4 | 14.28 |
| Total | | 28 | 100 |

Effect of type of farming on prevalence of GIT helminths. Toatal 120 animals were examined at 36 farms. The visited farms were divided in 6 categories viz. A, (only camel), B, (Camel with sheep), C, (Camel with goat), D, (Camel with sheep and goat), E, (Camel with cattle) F, (Camel with sheep, goat, and cattle). Prevalence was higher (80%) in group F and lowest (12%) in group A. whereas 30, 20, 30 and 13.34% in group B, C, D and E respectively(Table 7).

**Table 7.** Effect of type of farming on prevalence of GIT helminths.

| Groups | Type of farming | No of herd | No of animal examined | No of infected | Prevalence% |
|---|---|---|---|---|---|
| A | Camel | 14 | 50 | 6 | 12.00 |
| B | Camel+sheep | 3 | 20 | 6 | 30.00 |
| C | Camel+goat | 2 | 15 | 3 | 20.00 |
| D | Camel+sheep+goat | 3 | 10 | 3 | 30.00 |
| E | Camel+cattle | 5 | 15 | 2 | 13.34 |
| F | Camel+cattle+sheep+goat | 9 | 10 | 8 | 80.00 |
| Total | | 36 | 120 | 28 | 23.33 |

Frequency of the sources for treatment of helminths showed that the frequency of farmers was higher (44.44%) who used self-treatment. The frequency of owner who visited the government veterinary hospitals for treatment was lower (11.11%), whereas other respondent reported that they had visited Veterinary Technician (12.23%), local wise man (18.88%) and visit to other fellow camel owners (13.34%) (Table 8).

**Table 8.** Frequency of different resources, applied the treatment of camels.

| S.No | Treatment sources | No of people | Frequency % |
|---|---|---|---|
| 1 | Visit Vet Hospital | 10 | 11.11 |
| 2 | Visit to Vet Technician | 11 | 12.23 |
| 3 | Visit to wise man | 17 | 18.88 |
| 4 | Visit to fellow owner | 12 | 13.34 |
| 5 | Self | 40 | 44.44 |
| | Total | 90 | 100 |

The data regarding ethno-veterinary practices for the treatment of gastro-intestinal parasites showed 5 traditional recipes in the study area, 4 were based on plant species and 1 was based on non-herbal materials/practices For herbal treatments, 25.56% used Sarsoo (*Brassica campestris*) while 20, 12.23, 7.77 and 4.44% used Heeng/badbudar (*Ferula assafoetida*), *neem* (*Azadirachta indica*), Tooh (*Citrullus colocynthis* ) and salt, respectively (Table 9).

**Table 9.** Ethno-veterinary practices reported by the camel owner for the treatment of gastrointestinal helminths.

| S. No | GIT practices/Remedies | Urdu Name | Frequency of report | % |
|---|---|---|---|---|
| 1 | *Brassica campestris* | Sarsoo | 23 | 25.56 |
| 2 | *Ferula assafoetida* | Heeng, badbudar | 18 | 20.00 |
| 3 | *Azadirachta indica* | Neem (Juss) | 11 | 12.23 |
| 4 | *Citrullus colocynthis* | Tooh | 7 | 7.77 |
| 5 | Salt | Namak | 4 | 4.44 |
| 6 | Allopathic treatment | | 27 | 30.00 |
| | | Total | 90 | 100 |

Out of 90 respondent only 27 (30%) farmer used allopathic medications for control of gastro-intestinal helminths in camel. For allopathic treatment, 7, 3, 8 and 9 owners reported Nilverm, Ivermectin, Zanil, and Nilzan plus, respectively for the treatment of gastro-intestinal parasites in camels (Table10).

The current population of camels in Pakistan is more than one million and constitutes about 5.1% of the 17.44 million total populations, which is increasing at the rate of 1.62% per year (Anwar and Khan,

1998). The results of the present study showed that helminthiasis was an important health disease in camel resulting in economic losses in terms of poor health, low productivity and treatment costs.

Among 120 feacal samples from four Tehsil/ Talukas of Tharparkar, 28 samples were found positive by having gastro intestinal helminths with 23.33% prevalence percentage. Similar studies were carried out in camels by Robin *et al.*, (1989); Mehfooz *et al.*, (2006)Solanki *et al.*, (2013); Ararsa *et al.*, (2014); Demelash *et al.*, (2014);) Regassa *et al.*, (2015); Mehmuda *et al.*, (2014) they found 99, 73, 73.8, 78, 80, 100and 68.01 percentage prevalence respectively in camels.

**Table 10.** Use of different anthelmintics for the treatment of gastro-intestinal helminths of camels.

| S. No | Treatment | Rout of administration | People interview |
|---|---|---|---|
| 1 | Nilverm | Oral | 7 |
| 2 | Ivermectin | S/C | 3 |
| 3 | Zanil | Oral | 8 |
| 4 | Nilzan plus | Oral | 9 |
| Total | | | 27 |

The findings of the present study are in disagreement with the above mentioned studies and lower than their overall infection rate. The relative differences of gastro intestinal parasitism recorded in the above mentioned studies might be probably related to the number of adult helminths established in the gastro intestinal tract, level of host immunity, stage of parasite infection and lack of improvement in animal health management programs or non-adoption of the modern animal health care programs by camel owners.

*Gender-wise prevalence*

Gender-wise prevalence of gastro-intestinal helminths was higher in female hosts compared with the males. Prevalence of female was 53.57%, followed by male 46.43%. Similar findings were also reported by Gull and Fox (1992). But some researchers observed prevalence and intensity of infection (faecal egg counts) higher in males as compare to females, except during the lambing periods. But the present study revealed that there was no significant difference ($P>0.05$) in prevalence of parasite between male and female, However intensity of infections showed significant association with sex showing high faecal egg count in female than male ($P<0.05$) Gull and Fox (1992). This could be attributed to the fact that female animals are highly suffered by stresses that may lower their immunity than males even if they have equal option of exposure to parasite with males.

*Body status wise prevalence*

The body status wise prevalence of gastro-intestinal helminths was found higher in weak camels (34.42%) followed by fair (21.53%) and fatty (15.00%), which is in line with (Ararsa *et al.*, 2014) who reported higher infestation in poor body conditioned camels (77.27%), followed by medium conditioned (76.82%) and good (70.97%). In another study (Demelash *et al.*, 2014), reported higher prevalence rate for medium (20.19%) good (19.92%) and poor (14.29%). This could be attributed to the fact that loss of body condition in camels could be due to several other factors such as seasonal and climatic changes, feed and simultaneous development of other diseases.

*Severity wise prevalence*

Disease severity wise prevalence was observed higher for medium infected camels (having parasitic burden between 501-1500 EPG) followed by less/low infected camels (having parasitic burden less than 500), whereas the camels having higher EPG (>1500) was observed to be less frequent. The highest frequency showed by those camels

possessing medium type of egg burden could be attributed to the fact that these animals were kept in unhygienic houses.

*Area wise prevalence*

The area wise prevalence rate of gastro-intestinal helminths in the present study was found with some variations. The infection rate recorded was 30.00, 26.66, 23.33 and 13.33% in Tehsil Diplo, Nagarparkar, Chachro and Mithi respectively. The difference between area wise prevalence in term of helminths was found statistically non-significant ($P > 0.05$). The area wise difference in the present study was supported by Ararsa *et al.*, (2014), who had also found a non-significant difference ($P > 0.05$) among six different origins. Their observed prevalence percentage at Surupha, Bake, Dide-Hara, Dherito, Harro-wayu, and Areri was 65.7, 73.8, 70.3, 79.2, 74/0 and 78.6 respectively.

*Genus wise prevalence*

During the present study, a total of 28 gastro-intestinal helminths of four different types were identified in camels viz.*Haemonchus*, *Trichostrongylus*, *Stronglyloides* and *Ostertagia*. The same species of helminths were also recorded by Khan *et al.* (2010), who have found the species *Trichostrongylus*, *Stronglyloides, Haemonchus* and *Ostertagia* in domestic animals of District Toba Tek Singh, Punjab, Pakistan. The results of Solanki *et al.* (2013) are also somehow in line with the current study, who has noticed all the three species of helminths in infested camels except *Ostertagia*. Moreover, the species observed in the present study was in disagreement with Borji *et al.* (2010) and Anvari *et al.* (2013) who had identified *Haemonchus* and *Trichostrongylus* species from infected camels. These differences may be possible due to country to country variation in the infestation rate and variation in agro-ecological conditions between countries, which favor or disfavor to survival of helminths eggs or larvae, levels of hygiene's and husbandry practices. Moreover, the occurrence of helminths associated with nutritional status, level of immunity, rainfall, humidity and temperature difference and season of examination on the respective study areas (Ararsa *et al.*, 2014).

*Farming type wise prevalence*

Among farming wise prevalence the higher prevalence was found for camels dwelling with cattle, sheep and goat (Group F) followed by camel+sheep (Group B), camel+sheep+goat (Group D), camel+goat (Group C), camel+cattle (Group E). Whereas the camel which were kept alone showed the lowest prevalence of helminths (Group A). This highest prevalence observed for Group F may be due to low space for each animal, collective feeding and sharing of drinking water which can be a direct source the transfer of infection from one animal to another. The higher prevalence noted for Group B (camel+sheep) may be due to the physical morphology of sheep skin which possess a higher chance of carrying different eggs of helminths as compared with the goat in which the prevalence was lower in the present study as compared to camel+sheep.

*Sources of treatment*

Among the sources applied for treatment the highest frequency was calculated for self-treatment, followed by visit to a Wiseman, other owner, visit to veterinary technician. Whereas the lowest frequency was recorded for the people who visit to veterinary hospitals. Since Tharparkar is among rural backward areas and there is a lot of scarcity of medicine and other facilities so most of the people rely on self-medication for their animals using traditional methods of treatment. Whereas veterinary hospitals are less with no adequate facilities of treatment. Secondly hospitals were situated far away from the study area and due to the lack of awareness most of the people did not consider it essential.

Among the anthelmintic drugs used by the owners the most frequently reported anthelmintic was Zanil which is well-known anthelmintic and also a cheap one as compared with Nilverm which is costly, in the present study people interviewed were lowest for ivermectin.

**Conclusion**

The overall prevalence of gastro-intestinal parasite was 23.33% in camel.

Highest rate of infection was found in Diplo Taluka/Tehsil 30.00%.

Among tehsils/talukas Diplo, Chachro, Mithi and Nagarparkar, the rate of gastro-intestinal parasite infection was highest in Diplo and lowest in Mithi.

Females were more susceptible to gastro-intestinal parasite infections as compared to males. Only few owners do recognize the effect of gastro-intestinal helminths causing poor health condition.

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