

Original Article

Flea Infestation in Farm Animals and Its Health Implication

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Abstract

Background: Most fleas infest their host temporarily then pass to another of the same kind, while others move from one to a different host species. Although the comprehensive list of fleas reported from Iran, but there still exists considerable gap in our knowledge of zoonotic aspect of flea infestation. The present study was undertaken to determine correlation between domestic animals and man as host of fleas.

Methods: The questionnaires on the base of flea infestation of animals flock and animal care- man were prepared and distributed to veterinary stations of all provinces. A total of 553 questionnaires sheets and 168 flea samples were collected from sixteen provinces.

Results: One hundred fifty six specimens of *Pulex irritans* were collected from sheep, goats, cattle, chicken and human, which consisted of 92.8% of all recovered fleas. Chickens infested by three species of fleas including *Pulex irritans* (84.6%), *Ctenocephalides canis* (12.9%) and *Ceratophilus gallinae* (2.5%).

Two hundred and eighty nine cases of animal and 244 cases of human infestation were recorded among the suspicious populations, the most prevalence of infestation was found in sheep and goat herds whilst chicken flocks infested with the lowest rate and cattle were infested moderately. The major health problem was occurred in farmers, animal care-men and their relatives. The observations showed they had different skin reactions to flea's bites.

Conclusion: The results showed that fleas are approximately a widespread parasite of farm animals and it seems that they may play an important role in occurring of zoonotic infestation in Iran.

Keywords: Flea, Farm animal, Human, Iran

Introduction

Fleas transmit pathogens of numerous diseases that affect man and domestic animals. Most fleas infest their host temporarily then pass to another of the same kind, while others move from one to a different host species. Flea infestations and associated hypersensitivity responses have normally been described as a major parasitic and clinical problem of companion animals (1). In some locations, they represent over half of all the dermatological cases presented to small animal clinics, they are normally limited to hosts with nests or lairs as this can provide conditions for the completion of their life cycle (2). Consequently, they are not usually thought

to be significant pests of large domesticated animals. Nevertheless, there are reports of flea infestations on livestock including horses (3), goats (4, 5), sheep (4, 6), cattle (7) and wild ruminants (8). *Ctenocephalides felis*, *C. canis* and *C. felis strongylus* are frequently recognized in small ruminants (9-11). In cattle, reports of fleas are less frequent and *C. felis* has been reported from the USA, Japan, and Brazil (7, 12, 13).

Although the comprehensive list of fleas reported from Iran (14-16), but there still exists considerable gap in our knowledge of zoonotic aspect of flea infestation. The present study was undertaken to determine correlation between domestic animals and man as host of fleas.

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Materials and Methods

This study was carried out in all provinces of Iran, the questionnaires on the base of flea infestation of animals flock and animal care-man prepared and distributed to veterinary stations. Under these circumstances, suspicious flocks and their care-men were inspected to flea infestation. Infested animals were restrained and flea samples were collected using metal combs (11 teeth per cm). Dead chickens were placed in closed plastic bag containing immersed cotton with formalin. Men were examined for flea's bites. Collected fleas were placed in labeled jars containing 70% ethanol, fleas were subsequently examined by stereoscopic microscope (Zeiss) according to the identification keys (17-19).

Results

A total of 553 questionnaires sheets and 168 flea samples were collected from sixteen provinces; data were analyzed according to the hosts and the geographical distribution. Two hundred and eighty nine cases of animal and 244 cases of human infestation were recorded among the suspicious populations. All cases from East Azerbaijan, Kohgilouyeh, Lorestan, Kordestan, Ghom and Markazi provinces were highly infested but Kerman, Semnan, Fars,

Zanjan and Ghazvin showed the lowest rate of infestation. Interestingly, wherever the animal infestation rate was high the fleas easily transmitted to human (Table 1). The most prevalence of infestation was found in sheep and goat herds whilst chicken flocks infested with the lowest rate and cattle were infested moderately (Table 2).

A total of 168 fleas were obtained from the study area, a total of 156 specimens of *Pulex irritans* were collected from sheep and goats, cattle, chicken and human, which consisted 92.8% of all recovered fleas. Chickens infested by three species of fleas including *Pulex irritans* (84.6%), *Ctenocephalides canis* (12.9%) and *Ceratophilus gallinae* (2.5%).

The clinical signs were observed mainly in goat and sheep with restlessness and weakness, which accompanied with patchy alopecia and skin hardness in limbs.

The major health problem was occurred in animal care-men and their relatives, the observations showed they had different skin reactions to flea's bites, some were highly sensitized and others none sensitized to flea's bites. The legs and ankles were most often bitten; characteristically, two or three bites in a row. A small red spot with a light-colored center was appeared where the mouthparts entered the skin; there were multi foci of swollen and erythematous skin with intense itching.

Table 1: The geographical distribution of fleas' infestation in human and animal

Provinces	No. of Samples	Animals infestation		Human infestation	
		No.	%	No.	%
Tehran	10	8	80	6	60
East Azarbijan	26	26	100	23	88.5
Hormozgan	16	12	75	10	75
Kohgilouyeh	30	30	100	29	96.7
Lourestan	8	8	100	8	100
Kordestan	5	5	100	5	100
Ghom	12	12	100	12	100
Markazi	31	31	100	31	100
Khorasan South	53	49	92.4	42	79.24
Khorasan Razavi	97	96	98.9	78	88.4
Isfahan	8	3	37	-	-
Kerman	82	2	2.4	-	-
Semnan	55	2	3.6	-	-
Fars	25	2	8	-	-
Zanjan	74	2	2.7	-	-
Gazvin	23	1	4.3	-	-

Table 2: The prevalence of fleas' Infestation of farm animals and human in sample area

Hosts	Fleas infestation				
	No. of Infested cases	%	<i>Ctenocephalides canis</i>	<i>Pulex irritans</i>	<i>Ceratophilus gallinae</i>
Sheep & goat	203	35	-	+	-
cattle	123	21	-	+	-
chicken	11	2	+	+	+
human	244	42	+	+	+

Discussion

The results showed that the main flea infesting farm animals was *P. irritans*, this finding is not in argument with other reports from Nigeria (20), Tanzania (21) and Lybia(22). The results showed that the most prevalence of infestation

was found in sheep and goat herds whilst chicken flocks infested with the lowest rate.

The highest degree of flea infestation was seen in farms practicing an intensive management system. Housing plays an important role in the development of fleas since it enables eggs to develop in litter containing organic matter with

many hosts available on emergence. The condition allows manure to accumulate in animal houses results in increased warmth and humidity, with favors the proliferation of fleas (6, 23) and the abundance of organic matter provides nutrition and protraction for the developing larvae. This was confirmed by the finding of eggs and larvae at a depth of up to 3 cm in the litter of intensive farms (22).

The clinical signs have been occasionally seen in infested farm animals, emaciation, pallor of the mucous membranes and edema of the lower limbs have been seen in animals showing intense itching and self-excoriation., these observations were similar to those reported by Kaal *et al.* 2006 (22). In a flea-infested household, one or two individuals may show severe irritation from the bites; whereas others may not even realize fleas are present (24).

The results showed that some people were attractive to fleas and most often, their legs and ankles had been bitten. Characteristically, they suffered from irritation, itching and rash. Palmer *et al.* 1998 believed that the first bite stimulates little response because this is the first exposure to saliva, which contains low molecular weight anticoagulant that will be responsible for latter reaction. A moderate urticaria is the usual sign of flea activity once the initial wheal have subsided (24). Some investigators recommended animal dipping or spraying with pyrethroids should be accompanied with application of insect growth regulator in animal house (25). In conclusion, fleas are approximately a wide-spread parasite of farm animals in Iran. In addition to *P. irritans* infestation, *C. canis* and *C. gallinae* are zoonotic flea infestation.

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The authors declare that there is no Conflict of Interests.

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