

ASSESSMENT OF THE TYPE AND PERCENTAGE OF DOGS' FLEA IN GUARD DOGS IN TABRIZ CITY, NORTH-WEST OF IRAN

Pouya Motameni¹, Ali Shabestari Asl¹, Yagoub Garedaghi²

1- Department of Clinical Sciences, Collage of Veterinary Medicine, Tabriz branch, Islamic Azad University, Tabriz, Iran

2- Department of Parasitology, Collage of Veterinary Medicine, Tabriz branch, Islamic Azad University, Tabriz, Iran

ABSTRACT: Flea allergy is the most common cause of itch and scratching of the body in cats and dogs. The main purposes of this study were the assessment of flea infestation percentage and the type of fleas that isolated from guard dogs. Cat and dog, human and rodent flea is determined in this study. Four categories of severe, moderate, mild, and non-existent of flea infestation are chosen in this category. The severity of pollution in guard dogs was classified in 4 categories. The number of zero intensity was 28, the mild infestation was 18, the moderate infection was 24 and at the sever infestation was seen in 50 dogs. The highest rate of contamination in guard dogs were belonged to *Pulex irritans*. According to our findings 35 dogs (47%) were polluted with this kind of flea. The second pollution in guard dogs was with *Ctenocephalides canis* (n=21, 28.38%). The third more isolated flea species is related to *Xenopsylla cheopis* which isolated from 12 dogs (16.22%), and *Ctenocephalides felis* that found just from 6 dogs (8.11%). Unfortunately, the percentage of flea infestation in our study was high. All routine and important fleas were isolated from examined dogs. With regard to caring for the dogs, we must admit that, in the majority of the guard dogs, because they are kept outside the house, no suitable conditions were observed and, only in very few instances the quality level of caring for these dogs was relatively ideal. Meanwhile, dog's owners must be informed about flea sensitivity and its potential ability to transmission of disease to their pets or infestation of their area and its potential capability for make some errors in human sanitation.

KEYWORDS: Dogs' Flea, Guard Dogs, Tabriz, Iran.

INTRODUCTION

Flea allergy dermatitis, or severe allergy to flea bite, is the most common skin disease in small animals (Ettinger, 2005). Flea allergy is the most common cause of itch and scratching of the body in cats and dogs (Andrea et al., 2009). When a flea bites a domestic cat or dog, it injects a small amount of its saliva to the skin. Flea allergy dermatitis (FAD) is an increased severe allergic reaction towards one or more components present in fleas, especially their saliva (Andrea et al., 2009). Fleas' saliva contains histamine-like compounds, proteolytic enzymes, and blood anticoagulant substances (Andrea et al., 2009). These substances are transferred to the host during nourishment and, in sensitive animals, act as an inflammatory or anti-genic agent (Andrea et al., 2009). Following a flea bite different immune reactions take place including immediate or delayed allergic reactions, late phase reactions with IgE mediator, and strong basophilic allergic skin reaction. It appears that dogs with atopic dermatitis are prone to

developing flea allergy dermatitis (Melinda et al., 2004).

Fleas are very skilled blood sucking insects that are considered a foreign parasite on the warm-blooded hosts (Chin et al., 2010). Although nearly 2500 species and sub-species of fleas have been identified, only a few of the domestic mammals have been reported (Smith et al., 2004; Wilkerson et al., 2004). The cat flea is a species that is seen frequently, and has the capability of causing infestation in cats, dogs, and all house pets. When an adult flea finds a host, the feeding begins almost immediately. The adult fleas feed off of the capillaries' blood, and inject their saliva into the bite wound in order for it to act as the anticoagulant substance and strong allergy to flea bite appears in the form of external dermatitis in animals that have developed an allergy to the antigens present in the saliva of the flea (Bichard, 2006).

Fleas can cause allergic skin diseases in cats and dogs, and can transfer various contagious diseases to cats, dogs, and humans (Bichard, 2006). The cat flea can easily feed off of humans.

Therefore, the attack of fleas, by itself, can be cause for alarm. Flea allergy dermatitis (FAD) is the most common veterinary skin allergy in the world (Bichard, 2006). Most dogs (61 percent) develop clinical symptoms between the age of 1 and 3, and these symptoms are not common in puppies less than 6 months of age. Strong allergy is developed toward some of the proteins present in the saliva of fleas; the level of this sensitivity might decrease with increase in age and regular contact (Chin *et al.*, 2010). The clinical symptoms are: salivary spots, papules, clotting, scratches, and a wedge-like shape above the lumbosacral region, hind legs, near the tail, under the belly and around the navel. Cats and dogs contract alopecia and their skins develop abscess and turn dark, secondary infection occurs which leads to an odor specific to the spread of *Intermedius Staphylococcus* and *Malassezia Pachydermatis*. Many cats and dogs infected with FAD might experience a recurrence of the attack of tapeworms of type *Dipylidium Caninum* which results from devouring fleas. The diagnosis of FAD is made based on clinical symptoms, the age at which it began, the disparity of skin waste, the appearance of fleas, and the presence of fleas' feces (Ettinger, 2005). In dogs, the most prevalent signs observed for flea allergy include biting and scratching around the buttock, tail end, and the groin region, the development of "severe moist dermatitis", and contraction of secondary skin infections. It has been proven that the involvement of the tail end and the posterior lumbar region is the main indicator in the diagnosis of FAD (Ettinger, 2005). The posterior thighs, inner thighs, and the belly are repeatedly infected, but the severity of the infection in them is less than that in the posterior lumbar. The main purposes of this study were the assessment of flea infestation percentage and the type of fleas that isolated from guard dogs.

MATERIAL AND METHODS

2.1. Sampling

The period of sampling was taken from February, 2011 to September 2012 in Tabriz city, North-West of Iran. The range of the ages of the dogs in sampling is from 3 months to 13 years. In this study, data was written in the distinct table and then the data was analyzed by statistically programs. All data was given from owners and by clinical examinations. After collecting of data, we try to find the communication between breed, age, types of hairs, sex and roaming with infestation of fleas.

2.2. The range of infection

The range of flea infection in dogs was recorded. Four categories of severe, moderate, mild, and non-existent are chosen in this category. In severe cases, the fleas are found, in large numbers, in the hair, under the belly and inner thigh regions and are visible with naked eye, and capturing them was done easily and in the shortest time possible. In a moderate case, following little examination through the hair, the flea would be found and captured. In cases of mild infection fleas were very scarce in number and, after a long search, the flea or their feces would be found, and the number of fleas was limited.

2.3. Signs and symptoms

In this study, the related signs of flea infestation are recorded in two categories, the primary signs and the secondary signs (FAD symptoms). The primary symptoms related to fleas include itching, chewing, hair loss, skin irritation and biting of the tail and secondary signs related to FAD include, alopecia, dermatitis, the signs of hypersensitivity and skin lesions.

2.4. The method of fixing and preparing the samples

Dehydration of the fleas with ethanol of increasing percentages of 50 to 100 percent absolute was kept in every percentage of alcohol for 10 to 20 minutes. It would then be made clear using lacto phenol, and then flea placed in a glass and fixed.

2.5. Diagnosis of flea species

For diagnosis of the fleas, we separated them in two groups include without Ctenidia (*pulex* and *xenopsylla*) and with Ctenidia (*ctenocephalides canis* and *ctenocephalides felis*) fleas. Cat and dog fleas (*Ctenocephalides felis* and *Ctenocephalides canis*) are separated by the head shape (*ctenocephalides canis* showing the horizontal genal ctenidium, composed of eight to nine spines, the first spine being only about half as long as the second and the strongly-rounded head. This flea has a pronotal ctenidium also. *ctenocephalides felis* showing the horizontal genal ctenidium, composed of eight to nine spines, the first spine being about as long as the second and the elongate head. This flea has a pronotal ctenidium also). *pulex* and *xenopsylla* fleas are separated by showing the absence of Genal and pronotal ctenidia, also Mesopleural rod absent in *pulex* and Mesopleural rod present in *xenopsylla*.

RESULTS

In this study the most guard dogs have short hair. From 120 dogs that were studied, 72 dogs

have short hair. The age of guard dogs that we studied were between 3 month and 13 years old. All 120 dogs were free roaming (Figure 1). Because of having a tendency to keeping male guard dogs, the most of dogs was male. According to our findings 77 dogs were male and 43 dogs were female (Figure 2). The highest rate of contamination in guard dogs were belonged to *Pulex irritans*. According to our findings 35 dogs (47%) were polluted with this kind of flea. The second pollution (contamination) in guard dogs was with *Ctenocephalides canis*. From separated fleas, just 21 dogs (28.38%) have shown this kind. The third one is related to *Xenopsylla cheopis* which isolated from 12 dogs (16.22%). The last one was *Ctenocephalides felis* that found just from 6 dogs (8.11%) (Figure 3). The severity of pollution in guard dogs was classified in 4 categories. The number of zero intensity was 28, the mild infestation was 18, the moderate infection was 24 and at the sever infestation was seen in 50 dogs (Figure 4).

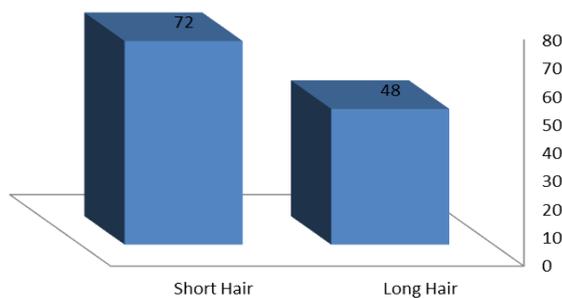


Figure 1: The type of hairs in examined dogs

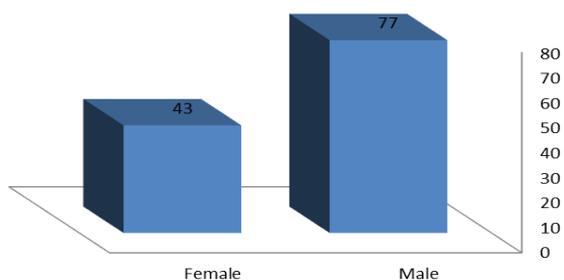


Figure 2: The sex of examined dogs

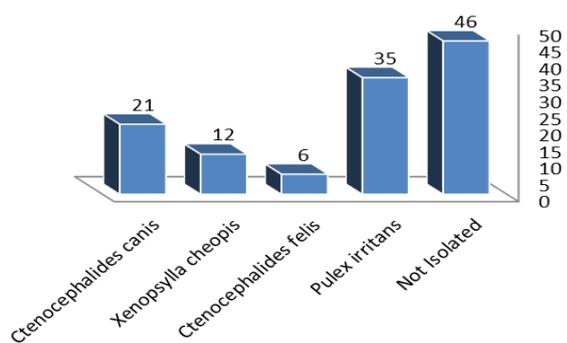


Figure 3: The type of isolated fleas from examined dogs

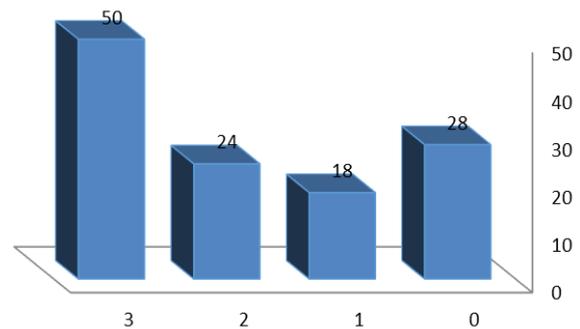


Figure 4: The severity of flea infection in examined dogs

DISCUSSION

The main purposes of this study were assessment of flea infestation percentage in guard dogs and to find the type of fleas that are capable for infestations. Lack of information about the type and range of flea infestation with regards to its high incidence was the main reason for this study. Meanwhile, the consequences of flea infestation were seen in numerous dogs and in many of them, the signs of FAD were more expectable. Furthermore, there is a direct and close-knit connection between flea infection and the social sanitation and manner of caring for the dogs.

The true flea infestation of guard dogs was high (76.67%, n=92) but the isolation of fleas from these dogs showed 61.67% (n= 74) of infestation. This matter showed that low incidence of fleas or bathing of the dogs can be lead to fault in isolation of fleas but the finding of flea feces from dog's skin can be respectable for incidence of fleas and therefore, isolation of fleas feces showed better results to finding of infestations. Sometimes, newly bathing or anti-ectoparasite therapy can responsible for lack of true infection diagnosis and consequently, to make an error in FAD diagnosis or other dermatological signs of flea infections (Ettinger, 2005).

The types of flea infestation in our study were so differ from other reports (Rinaldi *et al.*, 2007; Aldermir, 2007). In many studies, infestation to *Ctenocephalides felis* was the most prevalent type of flea infections (Tavassoli *et al.*, 2010; Kumsa *et al.*, 2011) but in our study, *Pulex irritans* was the main isolated species. This matter shows 2 major problems. First, this flea is a human specific species, human adapted and able to make an infestation in human being but it can be a revers zoonotic disease and can infested dogs and other animals. Second, it has a great problem as in social hygiene and have a potential capable for spreading to others or to transmit dangerous diseases (Ettinger, 2005; Richard, 2006).

The results of our study showed that there are no correlation between sex and age with flea

infestation ($p < 0.05$). Infection was prevalent in both sex and even in new born puppies. It seems that new born puppies can be infected at the maternal nursing time and they are acceptable their infestations from infected mothers and areas. It is proved that isolated fleas from skin of dogs only offering of 1% count of region infection. Therefore, the obtaining of fleas by puppies can be a part of regional or maternal infection ([Ettinger, 2005](#); [Počta and Svoboda, 2007](#)).

There was no correlation between of hair cover type and flea infestation ($p > 0.05$) and there was no differences between flea infection in long hair and short hair animals. But, there was a correlation between roaming and crowded places and non-roaming and separated dogs ($P < 0.05$). The results of our study showed that the burdens of infestation in non-roaming and separated dogs are so milder than the crowded places and free roaming dogs ($P < 0.05$). This matter showed the area infestation and lack of good sanitation in dogs that they kept in crowded places. It shows that flea infestation easily can transmitted and can infest all animals in the same region and for this reason, all of dogs that they were kept in the same area showed signs of infection.

The burdens of infection in guard dogs graded in 4 steps and unfortunately, the sever infestation (3+) were seen in the majority of dogs (50 dogs). Mild (2+) and low (1+) infestation were seen in 24 and 18 dogs, respectively. This matter showed that sever infestation was more prevalent in guard dogs, especially in dogs that were kept in crowded places whit low sanitation. There was correlation between low sanitation (especially rare bathing) and crowded dogs place (as like as kennels) with burdens of flea infestation ($P < 0.05$). Mild infection was seen in the separated dogs or them were kept with better sanitation in contrast with sever infected dogs.

With regard to the presence of the signs of FAD the realization was made that the majority of the dogs with fleas had signs of a high percentage of flea bites.

In the present study, it was concluded that, with the increase in flea infection, the occurrence of primary and delayed signs in dogs increases such that, with the increase in age, the occurrence of FAD in dogs increases. This is due to the increased contact of these animals with fleas and the lack of timely treatment with regard to fleas in order for them to have ample time to develop antibodies against the saliva of the flea ([Daivid et al., 2013](#)), and showing allergic reactions in these patients. For this reason, signs of FAD in puppies less than 6

months of age are extremely rare ([Ellen et al., 2005](#)).

According to the results of this study it was determined that in dogs with flea infection level of low to moderate in contrast severe infections, there is a significant difference in the presence of FAD ($P < 0.05$). It was concluded that with increase in age and percentage of infection, the occurrence of FAD symptoms also increases. This indicated that in majority of affected dogs signs of FAD were present. The majority of dogs, in addition to being infected with fleas, suffered from allergic reactions ([Garedaghi, 2011](#)).

In the primary infection there are only normal signs of infection by fleas such as itching and hair loss, but in long term and widespread infection the symptoms of the disease Flea Allergic Dermatitis (FAD) are also noticeable. In the examination of these factors, the most common condition in the first infection consisted of itching, hair loss, and irritation of skin, but in 31 dogs there were also signs indicating the disease FAD which included skin sores and other skin conditions such as sores, rash, and allergy. Of 92 infected dogs 87 showed signs of itching, 76 showed signs of hair loss in addition to itching, 42 showed signs of skin irritation in addition to itching and hair loss, 31 others, in addition to the above cases, also had signs of the disease FAD, which included skin sores and skin rashes along with allergy. In 18 dogs, in addition to the above problems, biting of the tail and legs was observed.

With regard to caring for the dogs, we must admit that, in the majority of the guard dogs, because they are kept outside the house, no suitable conditions were observed and, only in very few instances the quality level of caring for these dogs was relatively ideal. Meanwhile, dog's owners must be informed about flea sensitivity and its potential ability to transmission of disease to their pets or infestation of their area and its potential capability for make some errors in human sanitation.

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