

Association of Dog Husbandry Practices with Risk of Zoonotic Diseases in and Around Ambo Town, Central Ethiopia

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ABSTRACT

This study was conducted from November 2014 to March 2015 in and around Ambo town, central Ethiopia with the aim of assessing dog husbandry practices that favor the spread of zoonotic disease and to evaluate the characteristics of the dog population and its husbandry practices. A random house-to-house self-administered interview was conducted with a pre-tested structured questionnaire to obtain information on the dogs' age, sex, housing status, vaccination status, purpose of keeping, way of feeding, and to assess dog-keeping zoonotic disease-related awareness of dog owners. For this purpose, 200 dog-owning households in and around Ambo town were interviewed. In this study, 179 (89.50%) of the dogs were local breed types dominated by male, 158 (79%) dogs. Out of the 200 households surveyed, 170 (85%) kept dogs strictly for security reasons. The majority of the dogs 124 (62%), were free-roaming and 6 (3%) live outdoor only. About 142 (71%) dogs were provided with home-cooked human food. Most of the households 109 (54.50%), clean dog houses daily. The most common means of dog feces disposal was into the hole, 91 (45.50%). But a significant number of the households threw dog feces into a toilet 3 (1.50%). In this study, many households 132 (66%) reported never practiced deworming. The limited number of owners, 23 (12%) of the owners disposed their dead dogs to the disposal area. In the present study, the majority of the households 139 (69.5%) vaccinated their dogs. The current dog husbandry practices in and around Ambo town are likely to favor the spread of dog-related zoonotic diseases. Thus, awareness should be created including educational intervention involving veterinarians and public health professionals as well as routine veterinary care are necessary to reduce the risk of exposure to zoonotic disease from dogs.

Keywords: Ambo, Dogs, Factors, Management, Relation, Zoonosis

ABBREVIATIONS

CSA: Central Statistical Agency; HIV: Human Immunodeficiency Virus; m.a.s.l: Meters above Sea Level; NGO: Non-Governmental Organization.

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INTRODUCTION

Dogs are the most common animal species kept in households around the world. In many industrialized countries, dogs are of significant importance to humans as pets or considered as part of the family [1,2]. These animals are kept for various reasons such as companionship, security, pleasure, protection and comfort [3]. In many developing countries data on dog ownership and population is scarce. However, it is believed that most dogs are kept for companionship, security and breeding purposes [4].

Pet ownership is common anywhere in the corners of the world [5]. The study conducted by [6] estimated that 56% of Canadian homes have at least one dog or cat. Pet ownership has been shown to have mental and physical [7], particularly among children, the elderly and mentally retarded individuals [8]. However, despite these benefits, there are also potential health hazards associated with pet ownership and contact.

Dogs serve as companion animals and have probably the closest contact with man. The number of dogs in Ethiopian households is increasing and many families keep one or more dogs either as hunting or guard dogs. In Ethiopia increased numbers of dogs are seen around abattoirs, butcher shops, marketplaces and streets [9].

Pet zoonosis is an emerging public health issue, especially as pet ownership increases and pet definitions expand to include new and exotic animals. There are many companionship and psychological benefits to human contact with pets; however, pets are known reservoirs of zoonotic diseases. In Ethiopia, many pet owners are often unaware of the risks pets may pose and, as a result, engage in husbandry and hygiene practices that increase the likelihood of acquiring [10,11].

People can acquire pet-associated zoonotic organisms through the skin and mucous membranes (via animal bites, scratches, or direct or indirect contact with animal saliva, urine and other body fluids or secretions), ingestion of animal fecal material, inhalation of infectious aerosols or droplets, and through arthropods or other invertebrate vectors [12]. Although any exposed person can become infected with a zoonotic pathogen, risks are particularly high for those with a compromised or incompletely developed immune system, such as the young (< 5 years), elderly (\geq 65 years), pregnant and those with immune function-reducing conditions or treatments (example: diabetes, cancer, infection with human

immunodeficiency virus (HIV), chemotherapy) [13].

The increased disease risk for children is additionally imparted through closer physical contact with household animals, reduced hand hygiene and behaviors that include pica and exploration of the environment through mouthing. Not only are these groups at increased risk for infection with a zoonotic pathogen, but infection with many zoonotic pathogens is more likely to result in severe disease in high-risk groups. Pets often have frequent, close interactions with household members, such as licking of hands and sleeping in beds [14], which can further increase pet-associated disease risks.

There are potential risks to human health by the dog due to the possibility of the transmission of [2]. In urban settings, where the number of domestic animals has been increasing, dog feces represent an important pollution factor. Moreover, vehicular traffic, as well as the wind, can help spread viable pathogens present in dog feces, contaminating food that may later be a source of infection [15]. Parasite eggs can also be carried into human houses if adhered to shoes or animals' paws [16].

Despite the high risk for pet-associated disease in people, pet husbandry and infection practices have not been thoroughly investigated. Studies that have examined these topics, have noted the frequency of close contact between pets and people (e.g., licking of hands and sleeping in household member beds) [17], pet ownership patterns by individuals at higher risk of disease [18], and poor husbandry and infection control practices within pet-owning households (example, frequency of preventive veterinary care) [19], and poor hand hygiene [17] and husbandry practices [20]. In Ethiopia there are little attention given to dog husbandry practice and low awareness of different dog-related zoonotic disease [11]. However, dog husbandry and dog-related zoonotic disease awareness-related information are lacking in Ambo town. Therefore, the objectives of this study were:

- To assess dog husbandry practices that favor the spread of zoonotic disease in Ambo town.
- To evaluate the characteristics of the dog population and dog husbandry practices in the study area.

MATERIALS AND METHODS

Study Area

This study was conducted in and around Ambo town situated at 8°56'30" - 8°59'30" N latitude and 37° 47'30" -37°55'15" E longitude in central, Ethiopia, 114 kilometers west of Addis Ababa. The altitude of the area ranges from 1380-3030 m.a.s.l, characterized by warm temperate weather conditions which is locally called Bada-dare (mid-altitude). The temperature ranges from 15°C-29°C with an average temperature of 22°C. It receives a mean annual rainfall ranging from 800-1000mm with an average of 900mm. The highest rainfall concentration occurred from June to September and the mean monthly relative humidity varies from 64.6% in August to 35.8% in December, which is comfortable for human life. The soil types encountered are Red soil (36.25%), Black soil (34.37%), and Brown soil (29.38%) [21].

Study Population

All households owning dogs in and around Ambo Town were included in the study.

Study Design

A random house-to-house questionnaire-based study was conducted from November 2014 to March 2015. A total of 200 questionnaires were administered to household members of the community in and around Ambo. A pre-tested structured questionnaire was prepared in the local language to obtain information on dog's age, sex, housing status, vaccination status, purpose of keeping, way of feeding, and to assess dog-keeping zoonotic disease-related awareness of dog owners.

Data Collection

The data was collected using a self-administered

questionnaire. A random house-to-house survey using a pre-tested questionnaire consisting of two parts was conducted. The first part captured information on household and dog characteristics such as the household's location, level of education of household head and number of dogs owned. The second part focused on practices identified elsewhere to favor the spread of zoonotic disease transmission such as dog's living space, defecation areas, feces disposal methods, and veterinary care.

Data Entry and Statistical Analysis

The collected data was clarified and code was given. Coded data was stored in a Microsoft Excel 2007 spreadsheet and transferred to the Stata® software package (version 9.0; Stata Corporation, College Station, USA) for statistical analysis. Descriptive statistical analysis was applied to determine the frequencies and the findings were presented using tables and figures.

RESULTS

A total of 200 households, owning 158 (79%) male and 42 (21%) female dogs were interviewed. All dog owners agreed to participate and completed the questionnaire. In the study area, significantly more individuals kept dogs for hunting and security reasons 170 (85%), whereas 20 (10%) of dog owners kept dogs for companionship and security, and 10 (5%) were kept for companionship only. Additionally, when dog owners asked about the way dogs were kept, the households reported that 124 (62%) of the dogs were free roaming (both indoor and outdoor systems) and 70 (35%) were kept indoors. However, only 6 (3%) were kept outdoors (Table 1).

Table 1. Characteristics of dog population owned by households in and around Ambo town

Variables	Number (%)
Breed of dog	
Exotic	3 (1.5%)
Local	179 (89.5%)
Cross	18 (9%)
Sex	
Male	158 (79%)
Female	42 (21%)
Reason for keeping the dog	
Companionship	10 (5%)
Security	170 (85%)
Both companionship and security	20 (10%)
Way of dog-keeping	
Indoor only	70 (35%)
Outdoor only	6 (3%)
Spend both time indoor and outdoor	124 (62%)

Out of two hundred, 142 (71%) households provided their dogs with home-cooked human food while 34 (17%) household provided their dogs with leftovers. In this study, 109 (54.5%) of the households cleaned the house of dogs

daily. About 37 (18.50%) of the households cleaned their dog's houses once in two weeks time. And also most of the owners, 165 (82.5%) provided clean water, but small number of dogs, 35 (17.5%) drunk water from where they got.

Table 2. Dog husbandry practices

Variables	Numbers (%)
Feed	
Commercial canned/ dry food	5 (2.5%)
Home-cooked dog food	12 (6%)
Home-cooked human food	142 (71%)
Raw meat	7 (3.5%)
Leftover	34 (17%)
Water	
Cleaned water	165 (82.5%)
From it found	35 (17.5%)
Cleaning of the dog house	
Daily	109 (54.50%)
Every several days	9 (4.50%)
Weekly	35 (17.50%)
Once in two weeks	37 (18.50%)
Greater than every two weeks	4 (2.00%)
Only when the dog gets dirt	6 (3.00%)

The most common means of disposal of dog feces was in hole 91 (45.50%). About 60 (30%) of households reported that they did not have fixed area for their dogs' feces disposal, 24

(12%) thrown to the environment and 22 (11%) disposed it in the garbage. However, 3 (1.50%) of them answered that they dispose it in to the toilet (Figure 1).

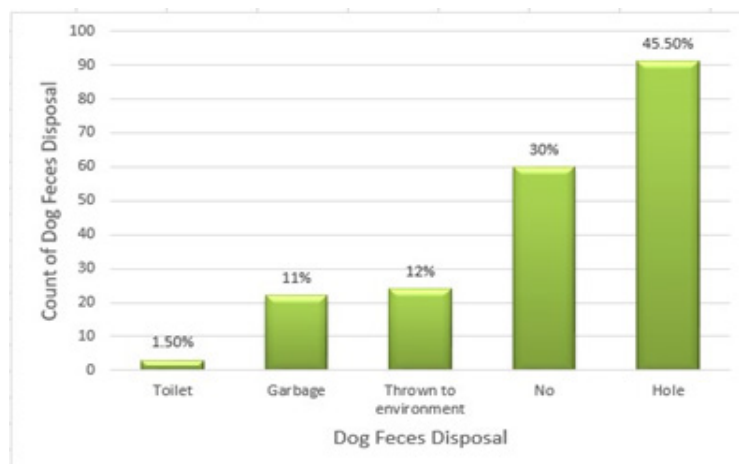


Figure 1. Household methods of dog feces disposal.

In this study, the most common means of disposal of the dead dog is given to hyena, 91 (45%) and throw in to the hole, 86

(43%). However, some of them, 23 (12%) of the owners taken to the disposal area (Figure 2).

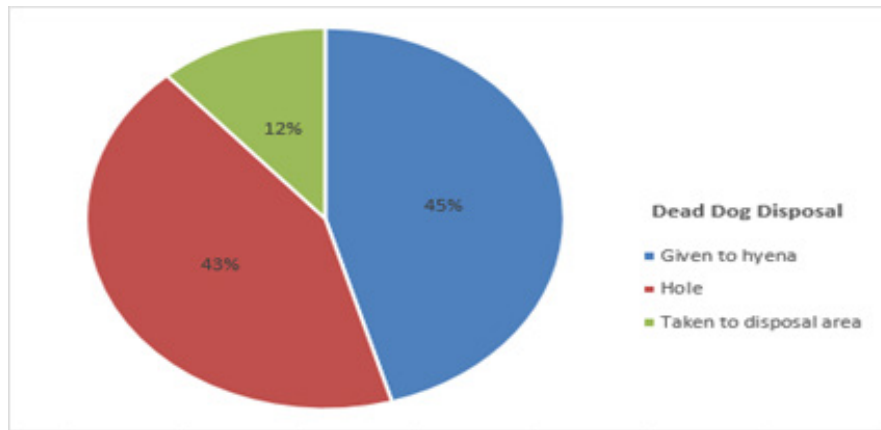


Figure 2. Households methods of dead dog disposal.

Out of 200 households, 132 (66%) of them reported they never dewormed dogs and the rest households reported that they had dewormed at least once in a year 28 (14%), while 25 (12.5%) indicated dogs were dewormed every six months. Most households, 176 (88%) reported that dogs did not have a specific area to defecate but 24 (12%) of the households said that dogs had fixed areas for defecation. Similarly, most

of the owners 139 (69.50%) did not vaccinate, and only 61 (30.5%) of them vaccinated their dogs.

On the other hand, 64 (32%) of the households managed their diseased dogs by their bare hands and 26 (13%) of them used protective materials. However, 110 (55%) of them did nothing.

Table 3. Husbandry practices in relation to the spread of zoonotic disease

Variables	Numbers (%)
Deworm	
Every six month	25 (12.50%)
At least once in the year	28 (14.00%)
Rarely consulted by a veterinarian	4 (2%)
Greater than two years	11 (5.50%)
None	132 (66%)
Fixed area for defecation	
No	176 (88%)
Yes	24 (12%)
Vaccination	
No	139 (69.50%)
Yes	61 (30.50%)
Contact during managing a diseased dog	
By bare hand	64 (32%)
Using some protective materials	26 (13%)
Do nothing	110 (55%)

DISCUSSION

In this study, the population of local dogs owned per household was high similar to the findings by [11] from Mekelle. But the report from Yaounde, Cameroon showed the low population of local breed dogs. The population of male dogs in this study

was higher than the female population which is supported by different studies by [22,11].

In Ambo, most of the households kept dogs for security reasons in agreement with what has been reported by [23], however, as report from Mekelle by [11], the dogs kept as

companionship which was higher than the present study, but according to the report by [22] from Yaounde, Cameroon, the number of the dogs used as companionship was low as compared to the present study. Regarding the keeping of dogs, in Ambo most of the dog populations were free roaming (both indoor and outdoor systems). And Endrias et al. [23], also reported that dogs were kept free but the dog populations reported were higher than the present study result which might be related to the difference in increased awareness of dog husbandry practices in the community.

According to the result of the present study majority of the dogs were fed with home-cooked human food and leftovers, but the report from Ontario, Canada by [24] showed majority of the dogs were provided with commercial canned/dry food. However, the difference in the feeding style might be due to the levels of education, levels of income, standard, and quality of life.

According to the previous study done in the area where the present study was conducted, the households cleaned their dogs' houses at intervals of 1-2 months [23], but in the present study, many households cleaned dogs' houses once in two weeks. The difference between these findings could be the result of veterinary health intervention and increased awareness of zoonotic disease by the people. However, a study conducted in Ontario, Canada revealed majority of the households clean dog houses on a weekly and daily basis [24].

A report from Yaounde, Cameroon revealed that the most common means of dog feces disposal was into the garbage bin, but in the present study, the most common means of dog feces disposal was into holes and external environment. And most households deworm dogs at least once in a year [22] which was different from the findings of the present study where most dogs were not dewormed. However, the difference might be due to the low level of awareness about zoonotic disease transferred from dogs to humans in Ambo.

According to the result of this study, the majority of the dogs did not deworm, but report from Yaounde, Cameroon indicated that the majority of the dogs did deworm at least once in the year. Most households declared that dogs did not have specific area to defecate which was in agreement with report from Yaounde, Cameroon [22]. The difference between these studies might depend on the awareness of households regarding keeping dogs.

CONCLUSION AND RECOMMENDATIONS

In this study, dog husbandry practices noted are likely to favor the spread of dog-related zoonotic diseases to humans as compared to many previous studies. Most households allow dogs to roam freely, especially during the night and dogs do not have separate housing. There was also a little attention given to proper disposal of dog feces and dead dogs which is a potential threat for the spread of zoonotic infection.

Based on the above conclusion, the following recommendations are forwarded:

- ✓ Training on dog husbandry practices should be given to the households.
- ✓ Awareness creating interventions about dog-related zoonotic diseases should be provided to the households by a collaboration of veterinarians and other concerned bodies to reduce the risk of dog management associated zoonosis.

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