ISSN 2348-313X (Print)
International Journal of Life Sciences Research ISSN 2348-3148 (online)
Vol. 14, Issue 4, pp: (56-58), Month: October - December 2026, Available at: www.researchpublish.com

A Study on Physical Characteristics and Environmental Factors Associated with the Risk of Heartworm Infections in Domestic Pets: A Comparison between Theory and Survey Results

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DOI: https://doi.org/10.5281/zenodo.23797055

Published Date: 30-October-2026

Abstract: **Heartworm disease, caused by Dirofilaria immitis, remains a significant veterinary concern in tropical environments. This study investigates the correlation between physical traits, rearing conditions, and heartworm infection risks in domestic pets, providing a direct comparison between established veterinary theories and empirical survey results. Data were collected via Google Forms from 110 domestic pets (65.5% dogs, 34.5% cats) in Thailand. Theoretically, long-coated pets and indoor environments are associated with lower transmission rates due to physical barriers and reduced vector exposure. However, empirical survey results revealed a notable 30.0% infection history and 43.6% active clinical symptoms within the sample. While indoor rearing (33.6%) aligned with theoretical protections, the high prevalence in semi-indoor/outdoor (47.3%) and outdoor (19.1%) setups emphasized a critical gap where environmental management fails to prevent mosquito contact. Furthermore, medium and long-coated pets comprised 73.6% of the sample, demonstrating that longer fur often masks active vector feeding on exposed anatomical regions, contrasting with the common misconception of total physical immunity. This comparative analysis underscores the necessity of combining structural environmental controls with mandatory medical prophylaxis rather than relying solely on theoretical physical protections.**

Keywords: **Heartworm, Dirofilaria immitis, Comparative Analysis, Physical Characteristics, Rearing Environment, Domestic Pets.**

I. INTRODUCTION

Heartworm disease is a major veterinary health concern globally, particularly in tropical regions like Thailand where mosquito vectors thrive year-round. The disease is caused by the filarial nematode *Dirofilaria immitis*, which primarily resides in the pulmonary arteries and hearts of infected canines and felines. Transmission occurs through the bites of infected female mosquitoes belonging to the genera *Culex*, *Aedes*, and *Anopheles*.

In veterinary literature, classical theories suggest that a pet's physical attributes and its primary environment act as critical determinants of transmission dynamics. For instance, animals with denser, longer coats are theoretically thought to possess a natural physical barrier that limits mosquito access to the dermis. Similarly, strict indoor rearing styles are hypothesized to provide near-total isolation from vector populations, thereby drastically lowering the statistical risk of infection compared to outdoor counterparts.

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However, a noticeable divergence often exists between these baseline theoretical assumptions and practical, real-world data due to human negligence, environmental changes, or vector adaptability. Therefore, this study aims to perform a structured survey among 110 domestic pets to evaluate the correlation between physical traits, housing environments, and heartworm infection risks. Ultimately, this research provides a direct comparison between established veterinary theories and empirical survey outcomes to identify critical gaps in domestic pet defense against heartworm vectors.

II. METHODOLOGY

A. Research Design, Data Collection, and Dataset Specifications

This study utilized a quantitative survey design combined with a comparative analysis approach. A structured digital questionnaire was developed using Google Forms and distributed to pet owners across various regions in Thailand. A total sample size of 110 completed responses (N = 110) was compiled to evaluate real-world heartworm risks.

The specific parameter specifications, physical attributes, and epidemiological indicators of the dataset are detailed in Table I and Table II below.

TABLE I: GENERAL PROFILES AND PHYSICAL CHARACTERISTICS OF SAMPLE PETS (N = 110)

Category	Sub-category	Frequency (n)	Percentage (%)
Type of Pet	Dog	72	65.5%
	Cat	38	34.5%
Coat Characteristics	Short coat	29	26.4%
	Medium coat	49	44.5%
	Long/Double coat	32	29.1%
Age Range	Under 1 year	14	12.7%
	1-7 years	83	75.5%
	Over 7 years	13	11.8%
Rearing Environment	100% Indoor	37	33.6%
	Semi-indoor/outdoor	52	47.3%
	Mainly Outdoor	21	

TABLE II: HEALTH HISTORY AND HEARTWORM SCREENING RESULTS (N = 110)

Category	Sub-category	Frequency (n)	Percentage (%)
History of Heartworm Infection	Confirmed Infected	33	30.0%
	Non-infected	57	51.8%
	Uncertain/Never screened	20	18.2%
Presence of Clinical Symptoms	Active Symptoms Present	48	43.6%
	No Symptoms Observed	62	56.4%

B. Empirical Survey Results Analysis

As detailed in Table I, the sample population consisted of 65.5% dogs and 34.5% cats, with the majority falling in the adult age bracket of 1–7 years (75.5%). In terms of physical characteristics, pets with medium coats (44.5%) and long/double coats (29.1%) formed the predominant portion (73.6% combined). Regarding housing conditions, 47.3% were kept in semi-indoor/outdoor setups, while 33.6% were strictly indoor and 19.1% primarily outdoor.

As reflected in Table II, 30.0% of the surveyed pets had an officially diagnosed history of heartworm infection. Furthermore, 43.6% displayed active clinical symptoms matching heartworm pathologies (such as chronic coughing, lethargy, or abdominal swelling).

C. Comparative Analysis: Theory vs. Reality

Comparing baseline veterinary theories with the empirical findings reveals major operational discrepancies:

1. *Rearing Environment:* Theoretically, strict indoor housing excludes vectors, yet 30.0% overall infection persists because 47.3% of pets reside in semi-indoor setups where vector exposure peaks during dusk and dawn.

2. *Physical Traits:* Dense fur is theoretically considered a physical barrier, yet medium and long-coated pets comprise 73.6% of the sample. Long coats often obscure active vector feeding on exposed anatomical regions, delaying owner detection.

3. *Underdiagnosis:* The gap between confirmed infection history (30.0%) and observed clinical symptoms (43.6%) highlights a substantial wave of undiagnosed cases caused by insufficient routine testing.

III. CONCLUSION

This comparative study establishes that while standard veterinary theories regarding physical barriers and environmental isolation are structurally sound, real-world execution reveals major vulnerabilities within the community. The 30.0% empirical infection rate proves that relying solely on physical traits like long fur or basic indoor sheltering is insufficient to stop *Dirofilaria immitis* transmission. Long coat types often mask active mosquito feeding, while semi-indoor environments fail to provide complete vector exclusion during peak biting hours. Furthermore, the notable gap between diagnosed cases and observed clinical symptoms strongly suggests a high prevalence of undiagnosed heartworm infections among domestic pets across urban and rural regions. Ultimately, this study concludes that pet owners and community veterinary initiatives must look past theoretical physical protections. Effective control of heartworm disease necessitates combining structural environmental management with mandatory monthly prophylactic treatments and routine diagnostic laboratory screenings. Implementing public education campaigns regarding vector seasonality and regular blood antigen testing will serve as critical steps toward bridging the gap between theoretical defense and real-world pet health management.

REFERENCES

[1] American Heartworm Society, "Current Canine Guidelines for the Prevention, Diagnosis, and Management of Heartworm Infection in Dogs," 2020.

[2] D. D. Bowman, Georgis' Parasitology for Veterinarians, 10th ed., St. Louis, MO: Elsevier Health Sciences, 2014.

[3] J. W. McCall, C. Genchi, L. H. Kramer, J. Guerrero, and L. Venco, "Heartworm disease in animals and humans," Advances in Parasitology, vol. 66, pp. 193–285, 2008.

[4] Companion Animal Parasite Council (CAPC), "Heartworm Guidelines for Dogs and Cats," CAPC Veterinary Recommendations, 2021.

[5] C. Simonsen, R. B. Lund, and M. V. Larsen, "Vector-borne parasitic infections in domestic pets: Environmental and physical risk factors," Veterinary Parasitology, vol. 280, pp. 109–118, 2020.