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Inquiry of cases of myiasis by *Dermatobia hominis* in dogs (*Canis familiaris*) of the Northern and Western zones of Rio de Janeiro city in 2000

Inquérito sobre os casos de miíase por *Dermatobia hominis* em cães (*Canis familiaris*) das zonas norte e oeste do município do Rio de Janeiro no ano 2000

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Summary

An inquiry about cases of myiasis by *Dermatobia hominis* larvae on dogs presented to 190 veterinary establishments of the Northern and Western Zones of Rio de Janeiro City in 2000 was performed. Cases were presented to 37 of 108 establishments in the Northern Zone and to 55 of 82 in the Western Zone of the city. Presence of rural or forest areas and coexistence of dogs and farm animals created an adequate ambient to flies proliferation, including the vector flies of *Dermatobia* hominis eggs. Adult, pure breed, short and dark-haired dogs were most infested. Males were most infested in the Northern Zone, while in the Western Zone no predilection for sex was noticed. Dogs kept in small farms and house yards, as adult and large breed dogs (usually for house guard), were most affected. Dorsal and lumbar regions, which are easily accessible to flies, were most infested body regions. Prevention programs against myiasis should be intensified during months of highest incidence, although sometimes it is not possible, because many clinicians reported that no month presented higher incidence than another or they did not know to answer this question. Clinicians should warn pet owners that it is necessary to correct handling and to maintain hygiene of the place where the dogs are kept, in order to avoid the existence of flies. More studies are necessary in order to identify other predisposing causes to myiasis and avoid this disease.

Key-words
Dogs.
Myiasis.
Warble fly.

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Introduction

Infestation of live vertebrate animals, including domestic animals and humans, with dipterous larvae is known as myiasis[1,2,3]. Larval stages of *Dermatobia hominis* (Linnaeus Jr., Cuterebridae)[4], the tropical warble fly or torsalo, are found in many hosts, including cattle, sheep, goats, pigs,

buffalo, dogs, cats, rabbits, man[5], wild mammals, and some birds[3]. Cattle and dogs are infected most commonly[5]. This fly is more common in forest and wood areas[3], with moderate temperature (20ºC) and high air relative humidity (85 to 95.00%)[6]. Its distribution includes southern Mexico and northern Argentina[3,5,6]. In Brazil, the myiasis caused by *D. hominis* larvae is called "berne"[6] or "dermatobiose"[7], and it is not reported only in the Northeast Region and in the State of Pará (northern Brazil), because of the hot and dry weather. It is neither reported in Chile[6]. In France, where myiasis are not common, a case of "berne" in a male adult German Shepherd that had traveled to Brazil was reported[8]. A case in a puppy Brazilian Fila, brought to Holland, was also reported[9]. Pain and local inflammation accompany larval penetration of the skin, and pus gradually forms[5]. Larva movements make the host gets unquiet and annoyed[6]. Diagnose is made by fistula and larvae observation[10]. The larva should be totally removed and the wound must be adequately treated[9,11]. Successfully prevention of myiasis in dogs was described with the use of lufenuron (10 mg/kg, oral, once a month)[12].

In the present study, we did an inquiry about the cases of myiasis by *Dermatobia hominis* larvae in dogs presented to veterinary establishments of the Northern and Western Zones of Rio de Janeiro City in 2000, so we can contribute to the understanding of the epidemiological features of this myiasis, which causes extreme discomfort of the affected animals[5, 6].

Material and Method

During January 2001, formularies were distributed to 190 veterinary establishments of the Northern and Western Zones of Rio de Janeiro City, so the veterinary clinicians could answer questions about epidemiological features of the cases of myiasis by *D. hominis* larvae on dogs observed in 2000. Questions referred to incidence of cases during 2000, phenotypical features of infested dogs (breed, hair color, hair size, sex, and age), infested body regions, and type of domicile that infested dogs lived in.

In the Northern Zone of Rio de Janeiro City, 108 veterinary establishments were included, in the districts of Acari (one veterinary establishment), Andaraí (4), Bancários (1), Bento Ribeiro (2), Bonsucesso (1), Brás de Pina (2), Cachambi (4), Cacuia (1), Campinho (1), Cascadura (1), Cavalcante (1), Cocotá (1), Coelho Neto (1), Engenho de Dentro (1), Engenho Novo (4), Grajaú (2), Guadalupe (1), Higienópolis (1), Inhaúma (1), Irajá (3), Jabour (1), Jacaré (1), Jardim América (1), Jardim Guanabara (1), Lins de Vasconcelos (3), Madureira (2), Maracanã (2), Marechal Hermes (1), Maria da Graça (1), Méier (9), Moneró (1), Olaria (2), Pavuna (2), Penha (3), Penha Circular (2), Piedade (4), Pilares (1), Praça da Bandeira (1), Ramos (2), Riachuelo (2), Rio Comprido (3), Rocha Miranda (3), São Cristóvão (1), Tijuca (8), Tomás Coelho (1), Usina (2), Vaz Lobo (1), Vicente de Carvalho (1), Vila da Penha (2), Vila Isabel (7), Vila Kosmos (1), Vista Alegre (1), and Zumbi (1).

The inquiry included 82 veterinary establishments of the Western Zone, in the districts of Anil (one veterinary establishment), Bangu (4), Barra da Tijuca (20), Campo Grande (17), Freguesia (7), Paciência (2), Padre Miguel (1), Pechincha (4), Pedra de Guaratiba (1), Praça Seca (3), Realengo (5), Recreio dos Bandeirantes (3), Santa Cruz (2), Sepetiba (1), Sulacap (2), Tanque (1), Taquara (4), and Vila Valqueire (4).

Results and Discussion

Cases of myiasis by *D. hominis* larvae on dogs were presented to 92 (48.00%) of 190 veterinary establishments included in this inquiry, although Scott, Miller and Griffin[14] have reported that myiasis are not common on dogs and cats. In the Northern Zone of Rio de Janeiro City, 108 veterinary establishments were included in this study, and cases of *D. hominis* larvae infestation on dogs were observed in 37 (34.00%). In the Western Zone, cases were observed in 55 (67.00%) of 82 veterinary establishments included in this study. In 100.00% of the 92 establishments of the Northern and Western Zones, incidence was higher in dogs than in cats.

Among the 37 veterinary establishments of the Northern Zone where cases of myiasis were presented, 27.00% of the clinicians did not know the month of highest incidence, 22.00% answered that no month had higher incidence than another, 14.00% answered January, 8.00% December, 5.00% February, 5.00% March, 5.00% July, 5.00% October, 3.00% May, 3.00% September, and 3.00% November (Table 1). According to 73.00% of the clinicians, most infested dogs lived in small farms, while 24.00% reported that they lived in houses (Table 2). Only 3.00% reported that dogs living in houses or small farms were equally infested.

Pure breed dogs were most infested according to 49.00% of the clinicians (Table 2). Among the 18 clinicians who answered that, 39.00% mentioned the German Shepherd, and 17.00% the Brazilian Fila. Mixed breeding dogs were the most affected according to 40.00% of the clinicians, and 11.00% answered that the incidence was the same for pure breed and mixed breeding dogs. Dogs with short hair were the most affected, according to 54.00% of the clinicians (Table 2), but 22.00% answered that the incidence was higher in dogs with medium hair, 19.00% in dogs with long hair, and 5.00% did not notice higher incidence in dogs with short, medium or long hair. According to 46.00% of the clinicians, dogs with

Table 1
Mentioning frequency by veterinary clinicians about the months of highest incidence of myiasis by *D. hominis* larvae on dogs presented to veterinary establishments of the Northern and Western Zones of Rio de Janeiro City in 2000

MONTH OR PERIOD	MENTIONING FREQUENCY BY VETERINARY CLINICIANS (%)	
	Northern Zone	Western Zone
No month	27	16
Did not know to answer	22	21
January	14	9
December	8	11
November	3	11
Summer months	0	10
September	3	5
July	5	2
February	5	0
March	5	0
June	0	5
October	5	0
Winter months	0	4
May	3	0
April	0	2
August	0	2
Spring months	0	2

Table 2
Mentioning frequency by veterinary clinicians about dogs presenting *D. hominis* larvae infestation and presented to veterinary establishments of the Northern and Western Zones of Rio de Janeiro City in 2000

DOGS	MENTIONING FREQUENCY BY VETERINARY CLINICIANS (%)	
	Northern Zone	Western Zone
Pure breed	49	53
Short hair	54	51
Dark hair	46	42
Male	49	38
No predilection for sex	27	40
Adult	73	71
Living in houses	24	56
Living in small farms	73	38

Table 3
Mentioning frequency by veterinary clinicians about most infested body regions in dogs presenting *D. hominis* larvae infestation and presented to veterinary establishments of the Northern and Western Zones of Rio de Janeiro City in 2000

BODY REGION	MENTIONING FREQUENCY BY VETERINARY CLINICIANS (%)	
	Northern Zone	Western Zone
Dorsal	46	35
Lumbar	25	14
Limbs	5	20
No preference	8	11
Neck	8	2
Head	5	5
Tail	3	4
Ears	0	7
Flanks	0	2

dark hair were the most affected (Table 2), whereas 35.00% mentioned light hair, and 14.00% did not observe any predilection for hair color. However, 5.00% of the clinicians did not know to answer this question. Males were the most affected according to 49.00% of the clinicians (Table 2), and females according to 8.00%. However, 27.00% of the clinicians did not notice predilection for sex (Table 2) and 16.00% did not know to answer this question. Adult dogs were the most affected according to 73.00% of the clinicians (Table 2), puppies according to 11.00%, old dogs according to 11.00%, and 5.00% answered that no predilection for age has been observed.

Dorsum was the most infested body region according to 46.00% of the clinicians, whereas 25.00% of the clinicians mentioned lumbar region, 8.00% neck, 5.00% head, 5.00% limbs, and 3.00% tail. No predilection for body region was reported by 8.00% of the clinicians (Table 3).

Among the 55 veterinary establishments of the Western Zone, 21.00% of the clinicians did not know the month of highest incidence, 16.00% answered that no month showed a higher incidence than another, 11.00% answered that November presented the highest incidence, 11.00% December, 9.00% January, 5.00% June, 5.00% September, 2.00% April, 2.00% July, and 2.00% August. It was reported by 16.00% of the clinicians that some periods of the year, without an exactly month, showed a higher incidence (10.00% reported

summer months, 4.00% winter, and 2.00% spring) (Table 1). According to 56.00% of the clinicians, most infested dogs lived in houses, 38.00% reported that they lived in small farms (Table 2), 2.00% mentioned apartments, and 2.00% reported that dogs living in houses or small farms were equally infested, while 2.00% did not answer this question.

According to 53.00% of the clinicians, pure breed dogs were the most infested (Table 2). Among the 29 clinicians who had answered that, 21.00% mentioned the German Shepherd, 14.00% the Brazilian Fila, 10.00% the Boxer, and 7.00% the Rottweiler. Mixed breeding dogs were the most affected according to 14.00% of the clinicians, whereas 31.00% answered that the incidence was the same for pure breed and mixed breeding dogs, and 2.00% did not know to answer this question. Dogs with short hair were the most affected, according to 51.00% of the clinicians (Table 2), while 20.00% answered that the incidence was higher in dogs with long hair, 14.00% in dogs with medium hair, 11.00% did not notice higher incidence in dogs with short, medium or long hair, and 4.00% did not answer this question. Dogs with dark hair were the most affected according to 42.00% of the clinicians (Table 2), whereas 25.00% mentioned light hair, and 25.00% did not notice any predilection for hair color. However, 8% of the clinicians did not know to answer this question. According to 38% of the clinicians, males were the most affected (Table 2), and females according to 11.00%. But 40.00% of the clinicians did not observe any predilection for sex (Table 2) and 11.00% did not know to answer this question. It has been reported by 71.00% of the clinicians that adult dogs were the most affected (Table 2), by 11.00% old dogs, by 5.00% puppies, and 11.00% of the clinicians answered that no predilection for age was observed, whereas 2.00% did not know to answer this question.

Dorsum was the most infested body region according to 35.00% of the clinicians, while 20.00% mentioned limbs, 14.00% lumbar region, 7.00% ears, 5.00% head, 4.00% tail, 2.00% neck, and 2.00% flanks. No predilection for body region was reported by 11.00% of the clinicians (Table 3).

Some information were spontaneously given by the clinicians of the Western Zone. One veterinary clinician reported that 90% of the pets usually presented to veterinary establishments for small animals are dogs. Another mentioned the low financial conditions of pet owners, depending on the region they live in. Besides, in some places it is possible to find cattle and horses living nearby dogs.

Presence of rural or forest areas and coexistence of dogs and farm animals as cattle, horses, and pigs, created an adequate ambient to flies proliferation, including those that play the role of *D. hominis* egg vector. Because of this, dogs that had been kept in small farms were the most infested. As urban and rural features (including the existence of cattle and horses nearby the dogs) can be found together in many areas of the Western Zone, cases of this kind of myiasis were more common than in the Northern Zone. There are forest areas in both zones, although the Northern Zone is predominantly urban (but in some areas cattle, horses, and even pigs can be found), that created an adequate environment to flies. As *D. hominis* is more common in forest and wood areas[3], the existence of such conditions in the studied regions makes possible the occurrence of myiasis by *D. hominis* larvae. Ribeiro et al.[13] have reported that dogs infested with *D. hominis* larvae and presented to veterinary establishments of the Central Zone of the city during 2000 did not come from that region, which is urban, but from small farms of other areas, as the Western Zone of the city.

Clinicians reported that myiasis by *D. hominis* larvae was more common in dogs than in cats during 2000, data also obtained by Ribeiro et al.[14] (2001) in the Western Zone and by Ribeiro et al.[13] in the Central Zone of the city, both during the same period. It can be influenced by the fact that dogs are the most presented pets at veterinary establishments in Rio de Janeiro City, because they are more populous than cats. Besides, dogs are maintained in house or small farm yards more often than cats, specially the large breed dogs used for house guard, and because of this they are more exposed to flies than cats. German Shepherd, Brazilian Fila, Boxer, and Rottweiler are very popular breeds in Rio de Janeiro City and, as they are large breeds, these dogs are often maintained in yards of small farms and houses. Frequently, adults are also kept in yards, many times for house guard, while puppies are maintained indoors. As flies can easily access yards, large breed and adult dogs are more exposed to flies and, then, to myiasis. Besides, German Shepherd, Rottweiler, and great part of Boxers and Brazilian Filas present dark hair, whereas Brazilian Fila, Boxer, and Rottweiler are short-haired dogs, that were mentioned by clinicians as the most infested dogs. Dorsal and lumbar regions are easily accessible to flies, and most clinicians reported that they were the most infested body regions.

Ribeiro et al.[14] studied the incidence of myiasis in cats of the Western Zone of Rio de Janeiro City and did not found any similar study performed in the city, although there are 27,000,000 dogs living with owners in Brazil[15] and pets are usually seen as family members that offer psychological, physiologic and social benefits to humans[16]. Besides, veterinary clinicians should warn pet owners that it is necessary to correct handling and hygiene of the place where the dogs are kept, what is recommended by Foil[9], in order to avoid the existence of flies.

Conclusions

Cases of myiasis by *D. hominis* larvae were observed in a great number of veterinary establishments, and they were more frequent in the Western Zone, which presents some rural areas. Prevention programs against myiasis should be developed and must be intensified during the months of highest incidence, although sometimes it is not possible, because according to many clinicians no month presented higher incidence than another. Besides, many clinicians did not know to answer if there was a month with higher incidence of myiasis. Dogs kept on small farms or house yards should receive more care from their owners, as they are more exposed to flies. Veterinary clinicians should warn pet owners that it is necessary to correct handling and to maintain hygiene of the place where the dogs are kept, in order to avoid presence of flies. Additional studies are necessary to conclude if hair color and size are really attractive factors to flies.

A lot of differences were observed when the answers of the veterinary clinicians were compared, indicating that dog population in the city includes a great variety of breeds, and hair color and size. Besides, it is possible to notice that clinicians had different levels of perception about myiasis. More studies should be performed, in order to identify other predisposing causes to myiasis and avoid this disease.

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Resumo

Foi realizado um inquérito sobre os casos de miíase por larvas de *Dermatobia hominis* em cães atendidos em 190 clínicas e consultórios veterinários das Zonas Norte e Oeste do Município do Rio de Janeiro em 2000. Casos foram atendidos em 37 de 108 estabelecimentos veterinários da Zona Norte e em 55 de 82 estabelecimentos da Zona Oeste do município. A presença de áreas rurais e animais como bovinos e eqüinos próximos aos cães criou um ambiente adequado à proliferação de moscas, inclusive as vetoras dos ovos da D. hominis. Cães adultos, de raça definida e de pelagem curta e escura foram os mais acometidos. Machos foram os mais infestados na Zona Norte, enquanto não se observou predileção por sexo na Zona Oeste. Cães mantidos em quintais de casas ou sítios, como os adultos e os de raça de grande porte (normalmente utilizados para guarda), foram os mais acometidos. O dorso e a região lombar foram as regiões do corpo mais afetadas, por serem facilmente acessíveis às moscas. Programas preventivos contra miíases devem ser intensificados nos meses de maior incidência, apesar de algumas vezes isso não ser possível, pois vários veterinários relataram que nenhum mês apresentou maior incidência ou não souberam responder à pergunta. Os veterinários devem alertar os proprietários que são necessárias a correção do manejo e a manutenção da higiene do local onde os cães são mantidos, para evitar a presença de moscas. Mais estudos são necessários para identificar outras causas predisponentes às miíases e evitar essa doença.

Palavras-chave
Cães.
Miíases.
Berne.

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