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EVALUATING THE SURFACE BODY PARASITES OF DOMESTICATED GOATS AND DOGS, AND THEIR ASSOCIATED ZOONOTIC RISK FACTORS IN EMUGHAN

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Abstract

A study to determine the surface body parasites of domesticated dogs and goats was conducted in selected communities within the Emughan clan of Abua/Odual Local Government Area, Rivers State, Nigeria. A total 150 domesticated animals compress of 75 dogs and 75 goats were samples and investigated using force, combing and brushing of the animal skin. The overall infestation was 81.3%, showing high prevalence of surface body parasites in the study area. High rate of infestation was recorded in animals from Egunughan 23.0%, Aminiboko 22.0%, Owerewere 19.0% while Obragh 8.0% was least infested. While the commonly infective animal was Dog which harbor 43.3% of total infestation. However, the most prevalence surface body parasite observed in this study was Tick 49.2%, followed by Flea, 38.0% and Lice, 12.0%. Although the rate of infestation was not statistically significant per parasite but was significant against animal and community investigated. From the result of this study, it can be stated that lack of awareness on infection pathway between human and domesticated animals account for about 85% zoonosis in the study area.
Key words: Emughan, Flea, Lice, Surface body, parasite, Zoonosis

Introduction

Domestic animals including dogs, goats and cats constitute an integral part of our society including the people of Emughan communities in Abua. Virtually every home in Emughan domesticates one or more types of animals with a unique motive. To some, these animals are for company while others used these animals for security and hunting especially dogs and cats; another group of people in the study area sees domesticating animals as a means of livelihood as the animals serve a dual purpose of pet and source of income.

Beneath the cogent reasons for domesticating animals, lies the risk of contracting parasitic infections (zoonosis) that ordinarily would have been avoided without domesticated animals. Domestic animals have been reported as a major route of zoonosis around the world and constitute a public health threat (Zygener & Wedrychowicz, 2006; Fentahum *et al*., 2012); most often in Africa as they houses certain surface body parasites including lice, mites, tick and fleas that may serve as vectors of serious parasitic infections.

Surface body parasites represent a significant animal group externally parasitic to other animals more especially vertebrates. The interrelationship between these parasites and their host may be extremely intricate (Schulze *et al*., 2001; Sheahram *et al.,* 2012); this is because they fold up as vectors of pathogenic microbes, and in certain cases serves as a reservoir of infections (Chio *et al*., 2000; Cook, 2008). As disease vectors, they exhibit a significant influence on the inter relationship between animals and human populations.

According to Bynu *et al*. (2002), surface body parasites are responsible for the transmission of about 75% veterinary infections of public health importance including murine typhoid and plague. This group of animals are adequately suited which may inhabit the body surface of other animals mostly higher vertebrates. They possess the potency as to alter the health and general well-being of animals including domesticated species, those in the bush and commercial stocks (Chio *et al*., 2000; Cook, 2008). Infestations of surface body parasites may results to reduction in meat quality, milk production and overall animal performance in livestock. Chio *et al*. (2000), reports that theses parasites are essential causes of skin injuries in diary and domesticated animals all over the world. The injuries they inflict on animals may be life threatening especially anaemia in juvenile and weak animals. Some time their infections may zoonotic hence creating a public health concern. Grisi *et al*. (2002) states that surface body parasites including tick are the remote cause of a variety of economic losses. These losses occur directly from blood extraction or indirectly as they transmit disease causing pathogens. More so, their feeding pattern facilitates reduction in hide and live quality in animals. They act as intermediate host to several pathogens including filarids and may transit protozoa, bacteria or virus (Fueherer *et al*., 2012; Ebrahimzde *et al*., 2016). A variety of significant skin disease in sheep and dogs which a time may result to hypersensitivity are traceable to surface body parasites including fleas, lice, mite and tick (Ebrahimzde *et al*., 2016).

Tick is responsible for serve dermatitis (Seegers, 2000). They may directly inflict injury to host animal predisposing them to secondary infections and some cases inciting paralysis (Rand *et al*., 2004; Zysyk *et al*., 2005). *Borrelia*, the causative agent of relapsing fever in human is transmitted by tick (Zysyk *et al*., 2005).

Fleas are capable of spreading disease causing organisms among animals including bacteria, cestodes and virus (Jafari *et al*., 2008; Xhaxhin *et al*., 2009). Saliva from flea on the skin of host animals may result to itching and skin inflammation (Chesney, 1995). Zoonotic infections such as bubonic plague, murine typhoid are traceable to flea infestation from cat (Chesney, 1995; Ross and Piper, 2005).

Lice causes' excessive irritation on host, their chewing habit may further exposes host to secondary bacterial infections (Ogbonda, 2007). These animals are obligate parasites that feed on blood, causing serious skin damage to their host. They make host skin unpleasant to look and also reduce its market value (Sheahram *et al*; 2012).

Several researches have been done on the surface body parasites of mammals yet none has been conducted in the study area. However, this study is aimed at evaluating the surface body parasites of domesticated goats and dogs and their associated zoonotic risk factors in Emughan communities.

Materials and Methods

This study was conducted in Emughan clan in Abua/Odual Local Government Area, Rivers State, Nigeria. Emmughan is compressing of seven communities among which five communities including Aminiboko, Emesu, Egunughan, Obrany and Owerewere were randomly selected for the present study. Emughan is located at 4^{o}39.409'N and 5^{o}37.068'E. Emughan is about 127 KM away from Ayama, the head quarters of Abolga. The area experience two seasons (dry and rainy seasons). It has an annual average temperature of 28^{o}C – 34^{o}C with a relative humidity of about 85% and average rainfall of 300 mm which is typical of tropical rain forest. The inhabitants of Emughan are farmers mostly on crops and domesticated livestock however there is no house whole without a dog, and goat or both.

In this study, 150 domesticated animals (75 dogs and 75 goats) were randomly selected and examined for surface body parasites. The sexes of the animals and present body conditions were also noted for each animal examined in each community. The sex and body condition of the animals was determined by physical observations.

Each of the animal body was thoroughly examined for surface body parasites, and parasites attached to the skin were collected using a force, brushing of the skin and combing. These parasites were stored in specimen bottles and preserved in 20% formalin and were transported to the laboratory for identification.

The surface body parasites were identified on account of their observable physical features by the use of hand lens and a light microscope of x10 and x40 objectives.

Simple percentage of n/N x100 and ANOVA was used for data analysis and to ascertain the significant level of parasites actual incident on the investigated animal as against the sampled communities.

Results

Infestation load of surface body parasites recorded in each sampled community

In the present study, a total of one hundred and fifty (150) domesticated animals compressing of dogs and goats were randomly selected and examined for the presence of surface body parasites in five communities in the Emughan clan, Abua/Odual Local Government Area. The overall infection rate was 77.3% with uneven infestation rate of 22.0%, 19.3%, 15.3%,

12.6% and 8.0% for Aminigboko, Owerewere, Egunughan, Emesu and Obrany communities respectively.

Table 1: Infestation load of surface body parasites recorded in each sampled community

Community sampled	Number of animals examined	Infected (%)	Tick	Flea	Lice
Aminigboko	35	33 (22)	25	91	13
Owerewere	35	29 (19.3)	63	17	20
Egunughan	36	23 (15.3)	17	41	0
Emesu	27	19 (12.6)	37	24	6
Obrany	21	12 (8.0)	41	66	16
Total	150	116 (77.3)	183	239	44

Population of surface body parasites in relation to the domesticated animal

The domesticated animals selected for this study were 75 dogs and 75 goats across the surveyed communities. The observed parasites identified on the body surface of these animals were recorded against each of the animal. In Dogs, 75; a total of 69 were infected with different surface body parasites while from the total number of Goats (75) examined; only 53 were infected with a variety of surface body parasite as shown in table two.

Table 2: Population of surface body parasites in relation to the domesticated animal

Domesticated animal	Number examined	Infected (%)	Tick	Fleas	Lice
Goat	75	51 (34.0)	11	198	15
Dog	75	65 (43.3)	172	41	29
Total	150	116 (81.3)	183	239	44

Population of surface body parasites in relation to sex of animal

Among the 150 (75 dogs and 75 goats) domesticated animals examined, show the incidence of ectoparasite fauna of the domesticated dogs examined in relation to sex. Among the 362 domestic dogs investigated, 266 were male while 96 were female. 247 males representing 68.2% were infected and 62 female, 17.1% catch the parasites.

Table 3: Population of surface body parasites in relation to animal sex

Animal			Infected		Tick	Flea	Lice
	Examined	Infected	Male	Female			
Goat	75	51	33	18	172	41	29
Dog	75	65	44	21	11	198	15
Total	150	116	77	39	183	239	44

Total assemblage of surface body parasites in the study

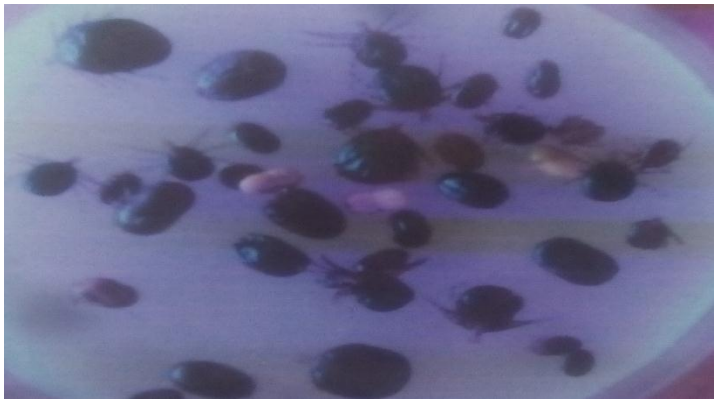
In this study, a total of 366 surface body parasites including Tick, Flea and Licewere reported across the five communities were domesticated dogs and goats were sampled. Among the 366 surface body parasites recorded in this study, 50% were Tick, 36.9 % were Flea and 12% were Lice.

Table 4: Overall infestation of surface body parasites in the study

Parasite	**Sampled communities**					**Total (%)**
	Obrany	Aminigboko	Owerewere	Egunughan	Emesu	
Tick	41	25	63	17	37	183 (50)
Flea	23	41	17	31	27	139 (36.9)
Lice	16	13	20	0	6	44 (12)
Total	**80**	**79**	**100**	**48**	**70**	**366**

Plat 1: Flea (*Ctenocephalides canis***)** from Dog/ Goat/Cat

Plat 2: Lice (*Linognathus* spp) from cat /Dog/Goat



Plat 3: (Tick *Ixodes* spp) from Dog/ Goat/ Cat

Discussion

In this study, two commonly domesticated animals, dogs and goats in Emughan clan were examined for surface body parasites. The overall infestation was 81.3%, showing high prevalence of surface body parasites in the study area. This result is in conformance with Ebrahimzale *et al*. (2005) and Tesfaye *et al*. (2011); which reported high prevalence of ectoparasites on domestic animals in a similar study else were. The high occurrence of these surface body parasites in the present study may be attribute to animal rearing model adopted by animal owners which are mostly non intensive model.

The result in table 1 showed that Aminiboko, 20.0% recorded the highest infestation rate closely followed by Egunughan, 18.0%, Emesu 17.3%, Owerewere 14.6% while Obrany 11.3% had the least number of surface body parasites recorded. This result concurs with Ebrahimzade *et al*. (2015); Xhaxhiu *et al*. (2009) which reported uneven distribution of outer skin parasites among sampled regions else were in the world. This observation may be attributed to the cultural aim of domesticating the animals and pattern of care for the animals in the study area. In the study area, dogs are mostly reared for hunting while goats are fed in the field which makes the animals vulnerable for infestation by surface body parasites.

In Aminiboko community, Dogs are domesticated for hunting and goat are left stray for feeding; which are features exposing the animals to infestation of surface body parasites. The rate of infestation in Obrany community was low when compare with those of the other sampled communities. This observation is due to the improved life style of the inhabitants of the Obrany people which directly influences the reason and pattern for domesticating animals. In this community, domesticated animals are often subjected to veterinary treatment, observe good sanitation within animal houses and animals owners adopt intensive model in rearing their animals. This result suggests that stray animals are vulnerable while confined animals with good sanitation and intensive care reduces chances of infestation. This observation agrees with Brysona *et al*. (2000).

Table 2 showed that 69 (46.1%) of the 75 dogs examined were infected while 53 (35.3%) of the 75 Goats were infected. Prevalence of infection was high in dogs, 46.7%. This result agree with Xhaxhiv *et al*. (2009) which recorded high prevalence of ectoparasites in Dogs against the occurrence on Cats in Albamia. The high occurrence of surface body parasites on Dogs may be attributed to the stray life pattern observed among the Dogs in the study area. The infestation rate in Goats 43.4% was relatively high. This observation indicates that Goats in the study area are vulnerable to surface body parasites. This result may be attributed to the unrestricted field feeding by Goat owners, poor sanitation on animal houses by Goat owners, absence of veterinary visit. This result agrees with the postulation that poor hygiene predisposes animals to parasitic infections (Natala *et al*., 2008; Mosallanejad *et al*., 2011; Seyoum *et al.,* 2015).

Infestation of animals in relation to sex showed that 39.3% male and 17.2 female Dogs catches surface body parasites. The overall prevalence by sex was statistically significant ($p<0.05$). The high prevalence of surface among male Dogs could be ascribed to the purpose of domesticated them by owners as security and hunting apparatus for owners. However, the low assemblage of surface body parasites on female Dogs could be attributed to the fact that female Dogs are most a times kept in cages and are fed by owners unlike males which are mainly domesticated for the sole aim of security and hunting. This result agree with Bekele *et*

al. (2011) and contras with Xhahiv *et al*. (2009). A similar trend was seen also in the occurrence of surface body parasites in Goats, with infestation rate of 17.2% and 13.9% for male and female Goats respectively. Nevertheless, the difference in the actual incident of occurrence was significant between Dogs and Goats. This observation disagrees with Ebrahimzade *et al*. (2016). In this, a major factor contributing to high infestation of surface body parasites on domesticated animal is unrestricted field feeding.

The most prevalence surface body parasite encountered in this study was Tick representing 49.2% of the total occurrence closely followed by Flea 38.0% while Lice occurrence were 12.0%.The high assemblage of Tick in this study may be attributed to its ability to infect a host at all stage of their life cycle. This result indicates that the climatic condition of the study area is typical of tropical rain forest which is favorable for Tick rapid survival. Result of the present study disagrees with a previous report from South Korea which recorded high prevalence of Flea against Tick (Chang *et al*., 1999). This disparity may not easily explain but could be ascribed to variations on weather conditions of the different study locations.

The distribution of surface body parasites in this study is in connection with the relative life habit of the inhabitancy. For instance, Emesu community; a mini urban with more wealthy and educated people and possibly with awareness of zoonosis recorded less number of surface body parasites unlike Owerewere and Aminaboko (Typical village) with just little or no information about zoonotic infections. This observation suggests that adequate enlightenment and awareness on the detriment of zoonosis may reduce infections of public health importance emanating from close association of domestic animals and owners. This scenario is in conformance with Shoorijeh *et al*. (2008) and Mosallanejad *et al*. (2011).

Conclusion

Domesticating animals in an intensive system couple with good sanitation and awareness on risk behavior for zoonosis is a significant model in reducing or eradicating human infection emanating from affiliation with domestic animals. Lack of awareness on infection pathway between human and domesticated animals account for about 75% zoonosis in the study area.

References

Alasaad, S., Rossi, L., Heukelbach, J., Pérez, J.M, Hamarseh, O., Otiende, M, Zhu, X.Q. (2015). The neglected navigating web of the incomprehensibly emerging and re emerging *Sarcoptes* mite. *Infection, Genetics and Evolution*, 17, 253–2592

Arlian, L.G, Morgan, M.S. (2017). A review of *Sarcoptes scabiei*: past, present and future *Parasites and Vectors,* 10, 297-285.

Bekele, J., Turiku, M., & Abebe, R (2011). External parasite infestation of small ruminant in wolmena district of Oromiya region, central Ethopia. *Journal of Animal and Veterinary Advance,* 10(4):518-523.

Beugnet F, de Vos C, Liebenberg J, Halos L, Larsen D, Fourie J. 2016. Efficacy of afoxolaner in a clinical field study in dogs naturally infested with *Sarcoptes scabiei*. *Parasite,* 23, 26.

Bryson, N. R., Horak, I.G., Hon, E.W., & Louw, P.J (2000). Ectoparasites of Dogs Belonging To People In Resource Poor Communities in North West Province South Africa.*Journal Veterinary* 21(3), 175-179.

Bryson, N.R., Horak, I.G., Hohn, E.W & Louw, J.P (2000). Ectoparasites of dogs belonging to people in resource poor communities in north west province, *South Africa. Journal of South African veterinary association,* 71(3), 175-79.

Ebrahimzada, E., Fattalin, R., & Ahoo, M.B (2016). Ectoparasite of stray dogs in Mozandaran, Gilan and provices, north and central of Iran. *Journal of Arthropod born disease,* 10(3),364-369.

Fentahun,T.,Fasil, W., Mersha, C., & Malede, B (2012). Prevalence of ectoparasites in small ruminants in and around Gondar town. *American Europian Journal of Science and Research*, 7(3), 6-12.

G. Horak, L. J. Fourie & L. E. O. Braack. (2005). Small Mammals as Host of Immature Ixodid Ticks. Onderstepoot Journal of Veterinary Research 72: 255-261.

Hasan, M., M. Abubakar., G. Muhammad., M. N. Khan &M. Hussain. (2012). Prevalence ofTicks Infesta tion (Rhipicephalus sanguineus and Hyalomma anatolicum anatolicum) in Dogs in Punjab, Pakistan. *Veterinarian Italiana,* 48(1), 95-98

Hill PB, Lo A, Eden CAN, Huntley S, Morey V, Ramsey S, Richardson C, Smith DJ, Sutton DC, Taylor MD, Thorpe E, Tidmarsh R, Williams V. 2006. Survey of the prevalence, diagnosis and treatment of dermatological conditions in small animals in general practice. *Veterinary Record*, 158, 533–539.

Kebbi, R., Nait-Mouloud, M., Hassissen, L, &Ayad, A., (2019). Seasonal activity of ticks infesting domestic dogs in Bejaia province, Northern Algeria.p34.

Mosallanejad, B.A., & Katvandi, N (2011). A survey of ectoparasite infestation in companion dogs of Iran. *Journal of Arthropod born disease*, 6(1), 70-78.

Natala, A.J., Okubajo, O.O., Ulayi, B.M., Owolabi, Y.N., Jatau, I.D & Yusuf, K.H (2009). Ectoparasites of domestic animals in Northen Nigeria. *Journal of Animal and Plant Science,* 3:238-242.

Nyangiwe, N. (2007). The Geographic Distribution of Ticks In The Eastern Ragion of Eastern Cape Province. Thesis Master Veterinary Science. Faculty of Veterinary Science. University of Pretoria. Pretoria.p 34.

Omudu, E. A., G. Okpe and S. M. Adelusi. (2010). Studies on dog population in Makurdi, Nigeria: A survey of ectoparasite infestation and its public health implications. *Journal of Research in Forestry, Wildlife and Environment*, 2(1), 94-106.

Pawelczyk O., Pająk C., & Solarz, K. (2016). The risk of exposure to parasitic mites and insects occurring on pets in Southern Poland. *Annals of Parasitology*, 62, 337–344.

Shahram, J., Nadi, M., Shahrokh, R.B., Mahdiyeh, R., Pedram, M., & Morteza, H. (2012). A survey of ectoparasite infestation in dogs in Tehran, Iran. P68.

Shoorijeh, J.S., Rowshanghagrodashti, A., Tamadon, A., Moghaddar, N., & Behzadi, M.A (2008). Seasonal frequency of ectoparasite infestation in dog from shiraz, south Iran. *Turkey Journal Veterinary Animal Science*, 32(14), 309-313.

Tesfaye, A., & Chanie, M (2011). Ectoparasites are major skin disease of dogs inGonder,Amhara national regional state, Ethopia. *International Journal of veterinary Advancement,* 3(5), 392-96.

Xhaxhiv, D., Kusi, I., Raptid, D., Visser, M., Knaus, M., Lindner, T., & Rehbein, S. (2009). Ectoparasites of dogs and cats in Albainia. *Parasitology Research*, 105 (6) 1577 1587.

Zygner, W., & Wedrychowk, H (2006). Occurrence of hard tick in dogs from warri saw area. *Annual of Environmental Medicine,* 13(2):355-359.