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ORIGINAL ARTICLE

Bovine dermatophilosis: awareness, knowledge, perception and drug usage practices amongst cattle herders in Oyo State, Nigeria

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Abstract

Background: Economic and zoonotic importance of bovine dermatophilosis in tropical countries and Nigeria in particular cannot be underestimated. We therefore conducted a cross-sectional study to assess cattle breeders' awareness, perceptions and practices with regard to bovine dermatophilosis in Oyo State.

Methods: The survey was conducted from June to December 2017 across the four geopolitical zones, which includes; Ibarapa, Oyo/Ogbomosho, Oke ogun and Ibadan. A total of 400 cattle breeders were interviewed using well-structured questionnaires. The data obtained were analysed on SPSS for frequency and percentages.

Results: The results revealed high awareness of dermatophilosis among the breeders. However, 388/400 (97%) were not aware of its' zoonotic importance. Nearly 49% engaged in self-treatment, while only 44/400 (11%) sought for veterinary intervention. Majority (97%) of the respondents disclosed to have used drugs for treatment. However, 94% did not adhere to manufacturer's instruction while 8/400 (2%) were unaware of manufacturer's instruction. More than 90% were unaware of withdrawal period in administering drugs, 16/400 (4%) observed it and 16/400 (4%) did not always observe withdrawal period when administering drugs. About 96% agreed that the drugs were effective while 8/400 (2%) were not sure about drugs effectiveness.

Conclusions: Despite the high awareness of dermatophilosis by cattle rearers in Oyo state, the knowledge, practices and perception of farmers about the disease are still generally very low. Therefore, further education for the cattle breeders and the general public on zoonotic importance of bovine dermatophilosis is required.

Key words: Cattle, Zoonosis, Cattle breeders, Questionnaire, Interview

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Introduction

Dermatophilosis is a contagious zoonotic skin disease caused by gram positive bacterium (*dermatophilus congolensis*) members of aerobic actinomycete (Dalis *et al.,* 2010). It is being manifested by exudative, proliferative or hyperkeratotic dermatitis, associated by the production of crusts. (Yeruham *et al.,* 2003). *Dermatophilus congolensis* is sensitive to pH and osmotic changes, and there is no direct evidence that it multiplies in the external environment or is able to survive for long periods on the ground. Transmission is by direct contact with infected animals or indirectly via contaminated objects or flies (Quinn *et al*., 2002).

Dermatophilosis has been described as one major cattle disease that poses serious adverse socio-economic consequences to cattle breeders and government in Nigeria (Olaogun and Onwuzuruike, 2018). The clinical occurrence of dermatophilosis in cattle had been reported to be highest (48%) in Ibadan and lowest 8% in Ibarapa zones of Oyo state (Olaogun and Onwuzuruike, 2018). This disease is one important factor limiting the development of the dairy sector (Dejene *et al.,* 2012). In Nigeria, introduction of exotic breeds in order to improve meat and the development of the country dairy sector have been frustrated due to devastating effects of dermatophilosis on the mammary glands and general health of the animals. The greater incidence of dermatophilosis, failure of treatment, economic wastages associated with its management, huge economic losses associated with rejection of Nigerian hides in international trade , indiscriminate use of antibiotics and its zoonotic importance were reported (Cadmus and Adesokan,2009; Awad *et.al.,* 2008; Amor *et.al.,* 2011). Several studies have been conducted on bovine dermatophilosis in Nigeria which includes incidence and biochemical parameters associated with bovine dermatophilosis (Olaogun and Onwuzuruike, 2018), bacteria associated with bovine dermatophilosis in Nigeria (Dalis *et al.,* 2010), control strategies of bovine dermatophilosis (Oyekunle and Talabi, 2013), phylogenetic analysis of *dermatophilus congolensis* (Oladunni *et al*., 2016), bovine dermatophilosis and its effects on reproduction (Ogwu *et al.,* 1981), effects of chronic dermatophilosis on semen quality (Iliyasu and Omonike, 2015). However, there is scarcity of information on cattle breeders' awareness, attitude, perception and antibiotics usage practices among cattle breeders in Nigeria. This study therefore aimed to establish the level of awareness, knowledge, attitude and drugs use practices among cattle herders on bovine dermatophilosis in Oyo state Nigeria.

Materials and Methods

Location of Study

The study was conducted across the 4 geopolitical zones of Oyo state, Nigeria. The zones includes; Ibadan, Ogbomoso/ Oyo, Oke-Ogun, and Ibarapa, all belonging to the Yoruba family and indigenous cities in Africa. Oyo State is one of the largest states in Nigeria. It lies within longitudes 2o 48' and 4o 36' E and latitudes 7o 3' and 9o 13' N. The rainfall pattern is high with average of about 1200 – 1350 mm per annum. Temperature varies between 27^{o}C and 32^{o}C with relative humidity from 70% to 90% (Ajayi and Ibikunle, 2013).The vegetation pattern is that of rain forest in the South and guinea savannah in the North. The state is bounded in the North by Kwara State, in the East by Osun State, in the South by Ogun State and in the West partly by Ogun State and partly by the Republic of Benin.

Sample size estimation.

The sample size was calculated using the Open Source Epidemiologic Statistics for Public Health (OpenEpi) 2.3 software (Dean *et al.,* 2009), with power (hypothesized percentage frequency of outcome factor in the population or p) set at 50% and 5% margin of error at 95% confidence level. A sample size of 384 breeders was estimated; however a total of 400 breeders were interviewed with 100 in each of the four geopolitical zones of Oyo state for equal representation.

Study Design

A questionnaire based survey and interview were conducted among cattle herders in Oyo state from June to December, 2017 to determine the knowledge, awareness, perceptions and practices of cattle breeders with respect to dermatophilosis in cattle. The questionnaires were administered to 400 cattle breeders (Miyetti Allah Cattle breeder) at their kraals and cattle markets. The questionnaire was divided into four main sections: 1) General information (2) Cattle demography (3) History and knowledge of

bovine dermatophilosis (4) Practices and attitude of cattle breeders about prevention and management of dermatophilosis.

Methods

A total of 400 questionnaires were administered with 100 questionnaires in each of the four zones to the cattle breeders at their Kraal and their weekly cattle market. Igbo Ora and Igangan communities represents Ibarapa zone, Iseyin communities represents Oke-ogun zone, Oyo communities represents Oyo/ Ogbomoso zone and Akinyele and Ido communities represents Ibadan zone. All the 400 participants responded to the questionnaires, which yields a response rate of 100%.

Statistical analysis

The obtained data were recorded into Microsoft Excel 7 (Microsoft Corporation, Redmond, WA, USA) spreadsheet and transferred to EpiInfo 3.4.3 (CDC, Atlanta, GA, USA) for analysis. Descriptive analysis was performed and results expressed in frequencies and percentages.

Results and Discussion

Table 1 shows general demography of cattle breeders in Oyo State, Nigeria. Findings revealed that all respondents were male 100%. They all adopt extensive system of management with grass/pasture grazing as their main source of animal feed. 88% of the respondents had no formal education. About 62% of the respondents had more than twenty years of rearing experience; 26% had twenty years of rearing experience 11% had ten years of rearing experience while only 1% of the respondents had 5 years of rearing experience.

Table 1. General demography of cattle breeders in Oyo state, Nigeria

Variables	Categories	Frequency	Percentage
Sex	Male	400	100%
	Female	0	0%
Age	Less than 20	0	0%
	20-30	88	22%
	30-40	120	30%
	40-50	128	32%
	Above 50	64	16%
Level of education	Primary	16	4%
	Secondary	16	4%
	Tertiary	16	4%
	No formal education	352	88%
Period of rearing	5 years	4	1%
	10 years	44	11%
	20 years	104	26%
	More than 20years	248	62%
Sources of water	Well	36	9%
	Borehole	4	1%
	River/stream	360	90%
	Rural household/ backyard	0	0%
	Extensive	400	100%
System of management	Semi-intensive	0	0%
	Concentrate	0	0%
Type of feeds	Grazing grass	400	100%
	Mixed feed	0	0%

This study, to our knowledge, is the first to investigate breeders' knowledge/awareness and drugs usage practises about bovine dermatophilosis in Oyo state Nigeria. This is essential for the effective prevention and control of bovine dermatophilosis. The breeders' demographic structure in this study is similar to what have been previously described by (Abiola *et al*., 2019) in their work on Socio-Demographic Structure and Constraints of Smallholder Dairy Farmers in Oyo State, Nigeria.

This also agrees with the findings of Nyaguthii *et al*. (2019) in their work on study population of small-scale dairy farmers in Nakuru County, Kenya.

The is also similar to what have been described by Iro, 1994 in his book titled 'The Fulani Herding System'. Farmers' years of rearing experience was also similar to what have been reported by Kumar and Tripathi (2012) who reported that most farmers had 10-25 years of experience in livestock farming in their work on socio-economic profile of dairy farmers in India. The extensive system of management practiced by all the respondents is in agreement to what Shitu in 1985 described as Nigerian system of animal husbandry (Shitu, 1985).

Table 2 shows herds' demographic structure in Oyo state, Nigeria. The herd structure indicated that 55% of the breeders had 1 herd of cattle; 16% had 2 herds; 11% had 3 herds while 18% of the breeders had more than 3 herds of cattle. Cattle breeds' distribution indicated 73% Bunaji (White Fulani) breed. 11% Sokoto Gudali, 9% crosses, 5% Bunaji/crosses and 2% Bunaji/Sokoto Gudali. Age distribution of cattle showed 1- 5years represents 6%, 6-10 years represents 69%, 10-15years represents 25%.

Table 2. Demographic structure of cattle herds in Oyo state, Nigeria

Variables	Categories	Frequency	Percentage
	1	220	55%
	2	64	16%
Herd number	3	44	11%
	Above 3	72	18%
	Less than 10 animals	48	12%
	10-20animals	24	6%
Herd size	20-30animals	40	10%
	30-40animals	36	9%
	40-50animals	52	13%
	Above 50animals	200	50%
	White Fulani	292	73%
	Sokoto Gudali	44	11%
	Crosses	36	9%
Breed of cattle	White Fulani and Crosses	20	5%
	White Fulani and Gudali	8	2%
Age	1- 5years	24	6%
	5-10years	276	69%
	10-15years	100	25%
Weight	50-100kg	4	1%
	200-300kg	36	9%
	300-400kg	360	90%

The herds' demographic structure of the respondents is also similar to what have been described by various authors (Olafadehan and Adewumi, 2010). A standard herd of cattle is around one hundred heads of cattle. However, due to unrestricted grazing system, overpopulation of animals, shortage in grazing area owning to deforestation, land use conflict and the scourge of dry season, herd splitting is done in order to allow for adequate grazing.

Table 3 reveals knowledge and perception of cattle breeders about bovine dermatophilosis in Oyo state. 100% of the herders from all the four zones have heard and were generally aware of dermatophilosis.

Awareness, knowledge, perception and drug usage practices amongst cattle

Table 3. Awareness and knowledge of cattle breeders on bovine dermatophilosis in Oyo state, Nigeria

Questions	Options	Frequency	Percentage
Respondents that have heard about dermatophilosis	Yes	400	100%
	No	0	0%
Respondents that have awareness about the treatment of the disease	Yes	396	99%
	No	4	1%
Number of respondents that know the local name for the disease	Yes	400	100%
	No	0	0%
Respondents' knowledge regarding treatment option	Yes	396	99%
	No	4	1%
Prevalence reported by the respondents	2%	236	59%
	5%	108	27%
	10%	56	14%
	>10%	0	0%
Types of dermatophilosis as reported by the respondents	Generalized	4	1%
	Northern/dorsal	32	8%
	Southern/ventral	364	91%
Respondents that reported tick bite as a predisposing factor	Yes	400	100%
	No	0	0
Respondents that reported lashing with whip or beating with stick as a risk factor	Yes	16	4%
	No	384	96%
Respondents that reported fly worries or perking bird as risk factor	Yes	84	21%
	No	316	79%
Respondents that reported poor hygiene a risk factor	Yes	60	15%
	No	340	85%
Respondents that reported grazing animal where there are tall sharp pasture/trees stand as risk factor	Yes	16	4%
	No	384	96%
Respondents that agreed the condition is a herd problem	Yes	48	12%
	No	340	85%
	Unsure	12	3%
Respondents that agreed the disease is dangerous to human (zoonotic)	Yes	12	3%
	No	388	97%
Mode of transmission as reported by the respondents	Contact	4	1%
	Ingestion	0	0
	Unsure	396	99%
Number of respondents that perceived feeding as a risk factor	Yes	208	52%
	No	176	44%
	Unsure	16	4%

Across the study locations, 99% indicated that they had knowledge regarding treatment options available for bovine dermatophilosis.

Tick bite was considered as a predisposing and causal factor of the disease by 100% of the respondents; 96 % do not consider lashing with whip or beating with stick as risk factor to bovine dermatophilosis. Also, 21 % considered fly worries or perking bird; 15% considered poor hygiene and 4% considered grazing animals where there are tall sharp pasture/trees as risk factors for bovine dermatophilosis. Only 3% of the respondents considered bovine dermatophilosis as dangerous to human (zoonotic). As regard the mode of transmission, 1% considered skin contact with the lesion as the mode of transmission, none of them considered ingestion as the mode of transmission while 99% were unaware. The high awareness of bovine dermatophilosis as a cattle disease by cattle breeders in Oyo state as revealed by this study may be due to long period of existence of the disease in Oyo state and Nigeria in general as the disease was first reported in 1927 in Nigeria (Henderson, 1927). The widespread awareness may also be due to serious economic losses associated with the disease as previously described (Oduye, 1976; Lloyd, 1976).

An overall 3.93% prevalence of dermatophilosis reported by the respondents is lower than the Wet season prevalence of dermatophilosis infection in cattle from Northern Nigeria as reported to be 12% as described by (Bida, 1975) and also lower than

prevalence of 10% in draught cattle described by (Lloyd, 1976).

Also, the fact that all the respondents (100%) considered tick bite as one of the predisposing factors to dermatophilosis indicating high awareness of the disease. However, there is a defect in their knowledge as all the respondents claimed ticks are the causative agent of the disease. The level of knowledge about specific issues related to the disease was substantially lower than the general level of awareness. A similar trend was reported in Zimbabwe, that there is a decrease in knowledge when specific issues were asked about zoonotic diseases (Mosalagae *et al.,* 2010).

On zoonotic importance, 97% considered bovine dermatophilosis not to be zoonotic, as they believe that diseases of cattle are entirely different from human diseases. This is in accordance with the findings of other authors (Chikerema *et al*., 2013; pfukenyi *et al*., 2010; Tebug *et al*., 2014; Ndhlovu and Masika,2016).

Table 4 indicates attitude and practices about management of bovine dermatophilosis and drugs usage. About 11% sought for veterinarian intervention, 49% engage in self-treatment while 40% use both veterinarian intervention and self-medication. However, 97% of the respondents have used antibiotics to treat the disease while 3% have never used antibiotics to treat the disease. Antibiotics of the categories of tetracycline, penicillin and ivermectin groups were reportedly used to treat bovine dermatophilosis; of these 8% of the respondent used tetracycline alone, 16% used penicillin alone, and 18% used ivermectin alone while 11 % of the respondents have used combination of tetracycline, penicillin and ivermectin. On adherence to manufacturer's instruction, 94% did not adhere to manufacturer instruction while 2% were unaware. As regards taking withdrawal period into consideration only 4% took it into consideration and 92% were unaware. Importantly, 96% of the respondents considered the drugs to be effective while 2% of the respondents were unaware of the effectiveness. Also, 99% of the respondents considered the disease as curable while all the respondents (100%) considered the disease seldomly occurring in their herd.

The usages of ivermectin, tetracycline and penicillin as the most commonly used antibiotics reported by most respondents was not in agreement with the reports of Hamid and Musa, (2009) who reported penicillin, streptomycin and dihydrostreptomycin as mainly used for treatment of bovine dermatophilosis; and gentamycin as the most effective. However, the use of tetracycline and penicillin was consistent with findings by Adesokan *et al*., (2015) but the widespread use of ivermectin observed in our study for the treatment of dermatophilosis has not been previously reported while none of the respondents reported the use of gentamycin as reported by Hamid and Musa, (2009). Moreover, the inappropriate use of drugs like ivermectin by the breeders in this study was consistent with the findings of Peeling and Holden (2004) who reported widespread use of drugs by producers on the basis of clinical signs without the necessary advice from trained personnel. Majority of the respondents agreed to use antibiotics without recommendations or instructions from veterinarian but rather depending on information or advice from fellow breeders, drug sellers of the same tribe or interpolate from what they have seen veterinarian use for treatment in the past. The practice of inappropriate use of drugs may be due to their high level of illiteracy, poor knowledge, inadequate/unavailability of trained veterinarian, lack/ inadequate policies and poor enforcement of policies about usage of antibiotics and drugs on food animals. In addition, most respondents claimed that the drugs were effective but also acceded to sell/cull infected cattle due to frustration from treatment failure or to prevent the spread of the disease in the herd. The treatment failure can be attributed to the inappropriate use of drugs (under dosing, wrong use of drugs, wrong route of administration and non-adherence to specified regimen) which is widely practiced by majority of the breeders and may predisposes to antibiotics resistance or antibiotic residue. Also, low level of knowledge about specific practices, poor attitude and perceptions of most respondents about dermatophilosis may predispose the populace to drug resistance and anaphylactic reaction in certain individuals.

Awareness, knowledge, perception and drug usage practices amongst cattle

Table 4. Cattle breeder's knowledge and attitude about drugs use practices and management of dermatophilosis in Oyo state, Nigeria

Questions		Frequency	Percentage
Number of respondents that have sold/culled animal positive to chronic dermatophilosis	Yes	368	92%
	No	28	7%
	Unsure	4	1%
Management options as reported by the respondents	Vet intervention	44	11%
	Self-treatment	196	49%
	Vet Intervention and Self Treatment	160	40%
	Orthodox	0	0
	Herbal/ethnoveterinary	0	0
	Self-limiting	0	0
Antibiotics usage as reported by the respondents	Yes	388	97%
	No	12	3%
	Unsure	0	0
Type of antibiotics commonly used	Tetracycline	32	8%
	Penicillin	64	16%
	Gentamycin	0	0
	Ivomec	72	18%
	Tetracycline and penicillin	44	11%
	Tetracycline and Ivomec	56	14%
	Penicillin and ivomec	88	22%
	Tetracycline, penicillin and ivomec	44	11%
Number of respondents that adhere/use according to manufacturer instruction	Yes	16	4%
	No	376	94%
	Unsure	8	2%
Number of respondents that always take withdrawal period into consideration	Yes	16	4%
	No	16	4%
	Unsure	368	92%
Effectiveness of the drugs as reported by the respondents	Yes	384	96%
	No	8	2%
	Unsure	8	2%
Number of time respondents administer antibiotics before recovery	1	16	4%
	2	36	9%
	3	76	19%
	4	44	11%
	5	64	16%
	Above 5 times	116	29%
	Unsure	48	12%
Period of treatment as reported by the respondents	1 week	40	10%
	2 weeks	40	10%
	3 weeks	36	9%
	4 weeks	80	20%
	Above 5 weeks	160	40%
	Unsure	44	11%
Number of respondents that have Knowledge about the causes and treatment of the disease	Yes	388	97%
	No	8	2%
	Unsure	4	1%
Number of respondents that considered the disease curable	Yes	396	99%
	No	4	1%
Level of occurrence in the herd as reported by the respondents	Very often	0	0
	Often	0	0
	Seldom	400	100%
	None	0	0

This may be due to the inadequate number of veterinary personnel and facilities in the rural areas and less strict laws on use and handling of veterinary drugs which avail the breeder's unrestricted access to drugs.

It was also observed that the knowledge of ethno veterinary treatment is gradually fading as majority of the respondents claimed not to know any ethno veterinary treatment for bovine dermatophilosis. Those who claimed to have knowledge about the ethno veterinary treatment do not know the common name for the herbs but can recognise it when they see it. This may be due to the failure of the elders to pass the knowledge across to the younger ones, non-documentation of the knowledge and advent of veterinary drugs which are most times more effective and efficient. Other treatment options practised by the respondents include the application of gentian violet, black engine oil, mixture of salt and shear butter and the use of hot iron compress to limit and debride the lesion.

Conclusion

We therefore conclude that breeders in Oyo state Nigeria are generally aware of bovine dermatophilosis, but they possessed low/inadequate knowledge of most epidemiological factors of the disease. The breeders' indulge in inappropriate use and abuse of antimicrobial drugs, these demand for urgent intervention by the stakeholders in order to prevent antimicrobial resistance and drug residues which are of great public health challenge. We recommend improvement in training, enlightenment and advocacy on the epidemiological factors and zoonotic importance of bovine dermatophilosis by the various stakeholders.

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Conflict of interest

Authors declare no conflicts of interest

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