Research Article

Knowledge, Attitude and Practices of Pastoralists on Bovine Brucellosis in the North Senatorial District of Kaduna state, Nigeria

Hajarah Uwale Buhari[1], Shehu Naallah Alhaji Saidu[2], Garba Mohammed[3], Mashood Abiola Raji[4]

[1]Samaru College of Agriculture, Division of Agricultural Colleges; [2]Department of Veterinary Medicine; [3]Veterinary Teaching Hospital, ; [4]Department of Veterinary Microbiology, Ahmadu Bello University, Zaria, Nigeria.

Abstract | In a study to determine the status of bovine brucellosis in pastoralist herds in the North Senatorial District of Kaduna State, forty two pastoralist herds were used. A structured questionnaire was used to capture pastoralists' knowledge, attitude and practices with regards to bovine brucellosis. Most of the pastoralists interviewed were aware of bovine brucellosis while a few were not. Majority of the pastoralists reported recognizing abortion as the major clinical sign of brucellosis in cattle while, some of them reported recognizing hygroma and retained placenta as signs of bovine brucellosis. With respect to abortion, Most of the pastoralists reported having abortion in their herds while the remaining did not. In addition, those that had abortion histories reported feeding those aborted foetuses to dogs, burying them, hanging the foetuses on trees and throwing them away. Majority of the pastoralists had no knowledge on how brucellosis is transmitted among animals, while some others believed mating, consumption of contaminated water and consumption of contaminated feed respectively were the ways in which animals could contract brucellosis. A large number of the respondents believed brucellosis is not transmissible from animals to man. Only few of the pastoralists were aware of the zoonotic nature of brucellosis. In conclusion, this study reveals that pastoralists in the study area have very little knowledge about the zoonotic impact of brucellosis and their attitudes and practices promote its spread.

Keywords | Brucellosis, Pastoralists, Knowledge, Attitude, Practices

Editor | Asghar Ali Kamboh, Sindh Agriculture University, Tandojam, Pakistan.
Received | January 28, 2015; **Revised** | February 11, 2015; **Accepted** | February 13, 2015; **Published** | April 28, 2015
***Correspondence** | Hajarah Uwale Buhari, Ahmadu Bello University, Zaria, Nigeria; **Email:** buharihajarah@gmail.com
Citation | Buhari HU, Saidu SNA, Mohammed G, Raji MA (2015). Knowledge, attitude and practices of pastoralists on bovine brucellosis in the north senatorial district of Kaduna state, Nigeria. J. Anim. Health Prod. 3(2): 28-34.
DOI | http://dx.doi.org/10.14737/journal.jahp/2015/3.2.28.34
ISSN | 2308–2801

INTRODUCTION

Cattle are the most prominent of all domesticated animals in Nigeria (Tewe, 1997). They are important in many ways as they form the bulk of the 'bank' for pastoralists and more importantly provide employment for over 10 percent of the Nigerian populace who make the majority of the Fulani herdsmen. In addition, they keep cattle as symbol of status, and these cattle are the main sources of beef, milk and hides production, as well as the major source of traction power on the farm (Adekunle et al., 2002). Brucellosis is a highly contagious, zoonotic, and economically important bacterial disease of animals worldwide (OIE; 2000). It is one of the most important infectious causes of reproductive disorders in domestic animals (Megid et al., 2010). *Brucella abortus* infection in cattle is endemic in Nigeria, and results in huge economic losses due to decreased calving percentage, delayed calving, culling due to infertility, cost of treating infected animals, decrease in milk production, abortion, stillbirth and birth of weak calves as well as loss of man-hours in infected people (Ocholi et al., 2004a; Adamu, 2009).

The consequences of brucellosis in infected animals are numerous ranging from abortion, premature births, retention of placenta, orchitis and epididymitis (WHO, 2006) while in man, weakness, muscle and joint pain, headache, undulant fever, hepatomegaly and splenomegaly among other symptoms are observed (WHO, 2006).

This study was designed to investigate the pastoralists' herd structure, knowledge, attitude and practices (KAP) of pas-

toralists with respect to bovine brucellosis and to identify risk factors for the transmission of brucellosis from the responses of the Knowledge, Attitude and Practices.

MATERIALS AND METHODS

This study was conducted in the North Senatorial District of Kaduna State, Nigeria. The District comprises 8 Local Government Areas (LGAs). The state is located in the Northwest geo-political zone of the country. Four LGAs out of the 8 that constitute the North Senatorial District were selected for the study. These LGAs included Ikara, Kubau, Makarfi and Sabon-Gari. Districts were selected randomly from these LGAs and pastoralists were interviewed from the selected districts. Furthermore, herds were selected from these districts using the same random selection criterion.

A structured questionnaire was developed and was used to assess the knowledge, attitudes and practices (KAP) of pastoralists regarding brucellosis in cattle. Questions were translated into Hausa language and the pastoralists were interviewed orally. The head of each herd was used to respond to the questions in the questionnaire. Questions were mostly close-ended in order to derive maximum response that would be easy for collation and subsequent interpretation.

Data were entered into tables in Microsoft Word and in Microsoft Excel.

RESULTS

Pastoralist Herdsmen's Herd Structure

A total of 42 pastoralist herds were sampled in the study with the aim of determining their knowledge, attitude and practices with regard to brucellosis. Out of these, all herds were found to keep sheep, poultry, goats and/or dogs, in addition to keeping cattle. Furthermore, all the cattle kept by the pastoralists were of the Bunaji (White Fulani) breed (Table 1).

Majority of the pastoralists involved in the study indicated being aware of brucellosis while a few were not aware (Table 2). All the respondents from Kubau and Makarfi LGAs indicated having an awareness of the existence of brucellosis.

With regard to sources of awareness on the disease, respondents indicated personal experience over the years with their parent as the source of their knowledge on the disease in addition to the media, extension workers, and veterinary personnel (Table 2).

Concerning the signs used by the pastoralists to identify brucellosis in their herds, More than half of the respond ents indicated abortion as the main sign used. Some of the respondents indicated hygroma and retained placenta could be due to brucellosis. In addition, three respondents from Kubau LGA indicated that other traditional signs could be used to recognize brucellosis (Table 3).

Table 1: Structure of livestock holdings by pastoralists in 4 selected LGAs of the North Senatorial District of Kaduna State, Nigeria

LGA	No. of herds	No. of herds that keep the following different animal species				
		Cattle	Sheep	Goats	Dogs	Poultry
Ikara	10	10	10	10	8	9
Kubau	12	12	12	12	11	12
Makarfi	13	13	13	13	13	13
S/Gari	7	7	7	6	6	7
Total	**42**	**42 (100%)**	**42 (100%)**	**41 (97.6%)**	**38 (100%)**	**41 (97.6%)**

Table 2: Knowledge of, and sources of knowledge to brucellosis by respondents herdsmen from 4 LGAs representing the Northern Senatorial District of Kaduna State

LGA	No. of herds	Knowledge of the disease brucellosis		Source of knowledge or awareness to the disease			
		Yes	No	Experience	Media	Vet personnel	Extension workers
Ikara	10	8	2	7	3	1	2
Kubau	12	12	0	12	5	0	1
Makarfi	13	13	0	7	7	0	0
S/Gari	7	6	1	5	1	0	0
Total	**42**	**39 (92.9%)**	**3 (7.1%)**	**31 (73.8%)**	**16(38.1%)**	**1 (2.9%)**	**3 (7.1%)**

Table 3: Methods used by the respondent pastoralists to recognize brucellosis in the 4 selected LGAs of the North Senatorial District of Kaduna State, Nigeria

LGA	No. of herds	Clinical signs of brucellosis recognized by the pastoralists			
		Abortion	Retained placenta	Hygroma	Others
Ikara	10	7	6	7	0
Kubau	12	9	0	7	3
Makarfi	13	6	2	3	0
Sabon-Gari	7	3	1	1	0
Total	**42**	**25 (59.5%)**	**9 (21.4%)**	**18 (42.9%)**	**3 (7.1%)**

Table 4: Responses of pastoralist herdsmen to history of bovine abortions in herds from 4 selected LGAs in the North Senatorial District of Kaduna State, Nigeria

LGA	No. of herds	History of abortion in herd?		Period of last occurrence of abortion			Gestation stage of occurrence of abortion (trimester)		
		Yes	No	6 mo	1 yr	> 1 yr	1st	2nd	3rd
Ikara	10	8	2	3	3	2	0	3	5
Kubau	12	5	7	0	0	5	0	2	4
Makarfi	13	9	4	6	3	1	0	0	6
S/Gari	7	7	0	1	1	5	0	0	7
Total	**42**	**29 (69.1%)**	**13 (31%)**	**10 (23.8%)**	**7 (16.7%)**	**13 (31.0%)**	**0 (0%)**	**5 (11.9%)**	**25 (60%)**

Table 5: Pastoralists' knowledge with respect to brucellosis transmission in the 4 selected LGAs of the North Senatorial District of Kaduna State, Nigeria

LGA	No. of herds	How is brucellosis transmitted			
		Mating	Pasture	Contaminated water	Don't know
Ikara	10	0	3	3	7
Kubau	12	7	6	3	4
Makarfi	13	1	3	5	8
Sabon-Gari	7	0	2	0	5
Total	**42**	**8 (19.1%)**	**14 (33.3%)**	**11 (26.2%)**	**24 (57.1%)**

With regard to the question on history of abortion and time of occurrence of such abortion in the respondents' herds, Majority of the responding herdsmen could recall incidences of the occurrence of abortion in their herds while a few others could not (Table 4). With regard to the question on period since when abortion was last observed in such herds, some of the respondents indicated that the last abortion in their herds occurred six month prior to the commencement of this study. However, some other respondents reported abortion to have occurred in their herds 1 year and more than 1 year prior to the start of this study, respectively (Table 4). On the period of occurrence of abortion in relation to pregnancy, 25 (60%) of the respondents reported such abortions to have occurred during the third trimester while 5 (11.9%) other respondents reported observing it during the second trimester. None of the responding herdsmen indicated observing abortion during the first trimester of the gestation period (Table 4).

The responding pastoralists from Makarfi and Sabon-Gari LGAs indicated that they observed abortion in their cattle only during the third trimester of gestation while those respondents from Ikara and Kubau LGAs, in addition to abortion occurring during the third trimester, indicated that such abortion could also take place during the second trimester of gestation in their cattle (Table 4).

Of the 42 respondents involved in this study, few indicated that natural mating among cattle was the chief means of transmitting brucellosis. However, some other respondents considered pasture and contaminated water as the means of transmitting the disease, respectively. Many of the respondents could not indicate any knowledge of the means of transmitting the disease (Table 5).

Table 6: Pastoralists' practices with respect to breeding of cattle in the North Senatorial District of Kaduna State, Nigeria

LGA	No. of herds	Breeding bull			Implication of borrowing/lending	
		Borrow	Lend	None	Has effect	Has no effect
Ikara	10	2	2	6	5	5
Kubau	12	11	10	1	10	2
Makarfi	13	12	12	0	3	10
Sabon-Gari	7	5	6	1	0	7
Total	**42**	**30 (71.4%)**	**30 (71.4%)**	**8 (19.04%)**	**18 (42.8%)**	**24 (57.1%)**

Table 7: Pastoralists' attitude with respect to purchase and addition of new animals in the North Senatorial District of Kaduna State, Nigeria

LGA	No. of herds	Purchase of new animals			Methods of adding new animals	
		Yes	No	No Response	Quarantine	Add immediately
Ikara	10	8	2	0	1	8
Kubau	12	12	0	0	2	10
Makarfi	13	13	0	0	12	2
Sabon-Gari	7	6	1	0	5	1
Total	**42**	**39 (92.8%)**	**3 (7.14%)**	**0 (0.0%)**	**20 (47.6%)**	**21 (50.0%)**

Table 8: Pastoralists' knowledge on the transmission of brucellosis in humans in the 4 selected LGAs of the North Senatorial District of Kaduna State, Nigeria

LGA	No. of herds	Transmissibility of brucellosis to man		
		Yes	No	Don't know
Ikara	10	2	7	1
Kubau	12	0	11	1
Makarfi	13	5	6	2
Sabon-Gari	7	0	7	0
Total	**42**	**7 (16.7%)**	**31 (73.8%)**	**4 (9.5%)**

A large percentage of the respondents reported borrowing or lending their bulls for breeding. Only few of the respondents reported neither borrowing nor lending of breeding bulls. With respect to the implication of borrowing/lending of the bulls, Most of the respondents believed that the act has no effect on the health of the bulls while the remaining believed that borrowing and/or lending of breeding bulls could have a negative effect on the health and wellbeing of the herd (Table 6).

A large majority of the respondents were in the habit of purchasing and adding new animals into their existing herds while only few reported not adding newly purchased animals. As to the method of addition, half of the respondents reported adding those animals immediately after purchase while the rest reported adding the animals only after quarantining such animals (Table 7).

Thirty one of the respondents did not consider brucellosis could be transmitted from animals to man while the rest agreed that the disease could be transmitted from animals to man (Table 8). Some of the respondents did not know whether brucellosis could affect man. On the modes of transmission of the disease from animals to man, only few of the respondents from Ikara LGA indicated awareness on the possibility of transmission and incriminated milk consumption, among other means for the transmission of the disease from cattle to man could take place (Table 9). Again with regards to the signs of the disease in man, few of the respondents mentioned night sweats, weakness, and sleeplessness as some of the signs of brucellosis in man (Table 10).

A substantial number of responding pastoralists reported throwing away aborted foetuses any time their animals aborted. Some of the respondents reported hanging such aborted foetuses on trees, feeding such aborted foetuses of dogs and burying such foetuses. None of the respondents reported burning aborted foetuses (Table 11).

Table 9: Pastoralists' knowledge about sources of transmission of brucellosis in humans in the selected 4 LGAs of North Senatorial District of Kaduna State, Nigeria

LGA	No. of herds	Modes of transmission of brucellosis to man			
		Contact	Milk consumption	Meat consumption	Others
Ikara	10	0	1	0	0
Kubau	12	0	0	0	0
Makarfi	13	0	0	0	0
Sabon-Gari	7	0	0	0	0
Total	**42**	**0 (0%)**	**1 (2.4%)**	**0 (0%)**	**0 (0%)**

Table 10: Pastoralists' knowledge of clinical signs and symptoms of brucellosis in humans in the 4 LGAs of the North Senatorial District of Kaduna State, Nigeria

LGA	No. of Herds	Clinical signs of brucellosis in humans				
		Fever	Abortion	Night Sweat	Weakness	Sleeplessness
Ikara	10	0	0	1	1	1
Kubau	12	0	0	0	0	0
Makarfi	13	1	0	0	0	0
S/Gari	7	0	0	0	0	0
Total	**42**	**1 (2.4%)**	**0 (0.0%)**	**1 (2.4%)**	**1 (2.4%)**	**1 (2.4%)**

Table 11: Pastoralists' practices with respect to the disposal of aborted fetuses in the 4 selected LGAs of the North Senatorial District of Kaduna State, Nigeria

LGA	No. of herds	Method of disposing of aborted fetuses in the herd				
		Throw away	Bury	Hang on tree	Feed to dogs	Burn
Ikara	10	6	0	1	0	0
Kubau	12	4	1	1	1	0
Makarfi	13	4	2	3	0	0
S/Gari	7	5	0	2	0	0
Total	**42**	**19 (45.2%)**	**3 (7.1%)**	**7 (16.7%)**	**1 (2.4%)**	**0 (0%)**

Table 12: The respondent pastoralists' practices with respect to prevention of brucellosis in the 4 selected LGAs of the North Senatorial District of Kaduna state, Nigeria

LGA	No. of herds	Preventive measures		Preventive method used			
		Yes	No	Traditional	Quarantine	Dispose sick animals	Other
Ikara	10	3	7	0	0	0	3
Kubau	12	6	6	2	0	0	4
Makarfi	13	2	11	2	0	0	0
S/Gari	7	0	7	0	0	0	0
Total	**42**	**11(26.2%)**	**31 (73.8%)**	**4 (9.5%)**	**0 (0%)**	**0 (0%)**	**7 (16.7%)**

Some of the responding pastoralists in this study reported the use of preventive measures against brucellosis while others did not. As part of the preventive measures adopted by these pastoralists, some of them reported using traditional methods, while none of the respondents indicated using quarantine or disposal of sick animals as a means of prevention of the disease. Some other respondents reported using unspecified (undisclosed) methods as means of preventing the disease in their herds (Table 12).

DISCUSSION

From the study it was evident that pastoralists keep more than on animal species in their holdings. This agrees with

the reports of Ocholi et al. (2004b) and Junaidu et al. (2008) during a study of livestock holding by pastoralists in some Northern Stats of Nigeria. This situation could facilitate the spread of brucellosis in any given community should the organism be present, knowing that pastoralists usually live in congregations among themselves for many reasons that include security and in relation to their socio-cultural way of life.

Furthermore, from the study, the high level of their awareness (92.9%) on the disease along with its means of spread could be accounted by their listening to agricultural radio programmes by National Agricultural Extension Research Liaison Service of the Ahmadu Bello University, Zaria and the regular Veterinary Clinical services they receive from the Faculty of Veterinary Medicine of the same university. Their knowledge could also be attributed to the tradition of knowledge on animal husbandry is passed from parents to their children right from childhood (Saidu, 1990). Kaltungo (2012) also reported on the experience of small ruminant keepers towards brucellosis. The respondents' use of media outlets is understandable as, in Nigeria, the ADPs, the National Agricultural Extension Research Liaison Services (NAERLS), the National Council for Nomadic Education (NCNE), and the National Veterinary Research Institute (NVRI) have been producing radio and television programmes on livestock production technologies along with other agricultural programmes. This could give them some level of awareness on important livestock diseases including brucellosis. The lack of knowledge of the disease brucellosis in man could be attributed to the fact that the respondent pastoralists could have been ignorant about the zoonotic significance of the disease.

The fact that the respondents indicated that they were able to recognize the disease (brucellosis) in their cattle could be attributed to the fact that the pastoralists attach great importance to the welfare of their animals. Furthermore, knowing that anything that could affect the fertility and mobility of their animals could attract a lot of economic impact on the animals could make these pastoralists to look for solutions from their visiting veterinarians. Since brucellosis results in economic losses there is the tendency for them to look for solutions to avert losing their social and cultural positions since herd size is considered as a sign of position in the society (Saidu, 1990).

The results obtained from the respondents on the occurrence and time of abortion in this study corresponded with the known pattern of abortion due to brucellosis in cattle as the information indicated that most of the abortion took place during the third trimester of gestation (Kaltungo, 2012). The finding of abortion during the second trimester could also mean that there are other arbortifacient agents at play in the area of study.

From the study, most of the respondents were not aware of the use of any preventive measures against brucellosis to the extent that they did not practice quarantine of newly purchased animals nor did they dispose any sick animal for fear of spread of diseases. This could have far reaching negative effects on herds since, should any of the animals be infected with *Brucella* organisms, such infection could spread to other animals in the herds and in neighbouring herds since they practiced communal grazing. Their attitude of not vaccinating against brucellosis could be understandable, since ordinarily no scheduled vaccination against the disease is practiced in Nigeria. Their use of traditional means of prevention of the disease could be possible though there is the need for further study to confirm such information.

The results obtained in this study have also shown that the respondent pastoralists were in the habit of throwing away aborted foetuses, hanging aborted foetuses on trees and even giving such aborted foetuses to dogs. This clearly shows their ignorance of the means of transmission of the disease as well as the public health importance of such acts. This singular act is capable of spreading the disease, not only among cattle but also to other animal species and even humans. This could also means that if this occurred during the rainy season, discharges from such foetuses could find their way to communal streams to which other pastoralist herds could go for watering with subsequent acquiring of infection with the organism in the presence of cold environment devoid of too much sunlight.

The respondents' attitude of adding newly purchased animals could indicate their ignorance of the modes of transmission of diseases, especially brucellosis. Furthermore, their borrowing and lending of breeding bulls was in complete disregard to the implication of possible risks of transmission, of not only brucellosis, but also other infectious diseases. Similarly, their borrowing and lending, even with the full knowledge that they stood the risk of spreading the disease could mean that their educational level did not make them reason better. The seeming ignorance of the pastoralists on the disease in humans could, apart from ignorance, be due to their inability to have easy access to conventional hospitals and they rely more on traditional medicine in most of their activities.

CONCLUSION

There was some level of awareness of pastoralists in the study area on brucellosis in cattle but little or no knowledge about the epidemiology and public health implication of the disease agent in both animals and man.

The practices of pastoralists such as improper disposal of aborted foetuses, the immediate addition of newly pur-

chased animals into their herds and the borrowing/lending of breeding bulls pose great risk of infection in other animal species and humans.

Pastoralists and other livestock owners should be educated on brucellosis with respect to its cause, modes of transmission, signs and preventive measures to reduce the risk of infections in animals and humans.

More study needs to be done in the state to ascertain the level of bovine brucellosis as well as the pastoralists' Knowledge, attitude and practices with respect to disease transmission, traditional preventive measures against brucellosis along with possible infection of dogs with brucellosis.

CONFLICT OF INTEREST

The authors declare they have no competing interests.

REFERENCES

- Adamu NB (2009). Epidemiology of *Brucella* infection in ruminants and humans and its public health implictions in Borno State, Nigeria. Ph.D Thesis, Ahmadu Bello University, Zaria, Kaduna State. Pp. 101-200.
- Adekunle OA, Oladele OI, Olukaiyeja TO (2002). Indigenous control methods for pests and diseases of cattle Northern Nigeria. Livest. Res. Rural Develop. 14(2): 66-75.
- Junaidu AU, Oboegbulem SI, Salihu MD (2008). Seroprevalence of Brucellosis in prison farm in Sokoto Nigeria. Asian J. Epidemiol. 1(1): 24-28.
- Kaltungo BY (2012). Seroprevalence survey of brucellosis in sheep and goats in Kaduna North Senatorial District. MSc thesis. Ahmadu Bello University Zaria.
- Megid J, Mathias LA, Robles CA (2010). Clinical manifestations of brucellosis in domestic animals and humans. Open Vet. Sci. J. 4: 119-126. http://dx.doi.org/10.2174/1874318801004010119
- Ocholi RA, Kwaga JKP, Ajogi I, Bale JOO, Bertu WJ (2004a). Epidemiology and prospect for control of brucellosis in Nigeria. Vom J. Vet. Sci. 1: 78-86.
- Ocholi RA, Kwaga JKP, Ajogi I, Bale JOO (2004b). Phenotypic characterization of Brucella strains from livestock in Nigeria. Vet. Microbiol. 103 (1-2): 47-53.
- OIE Manual of standards for Diagnostic Tests and Vaccines (2000). Bovine brucellosis. OIE, Paris, Pp. 328-345.
- Saidu SNA (1990). The state of Agricultural Extension Research Liaison Service in Nigeria. Paper presented at the Continuing education programme organized by the Veterinary Council of Nigeria held at Durbar Hotel, Kaduna between 19th and 22nd April, 1990.
- Tewe OO (1997). Sustainability and development: Paradigm from Nigeria's Livestock industry. Inaugural lecture, University of Ibadan. Polygraphic Ventures Publisher, Ibadan, Nigeria.
- WHO (2006). Brucellosis in Humans and Animals. Produced in collaboration with Food and Agricultural Organization (FAO) and World Organization for Animal Health (OIE). WHO/CDC/EPR/2006. 7: 1-102.