

Assessment of the Knowledge Attitude and Perception (KAP) of Camel Trypanosomosis (Surra) Among Camel Marketers in Northern Nigeria

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Abstract. Camel trypanosomosis (surra) is endemic in most camel producing areas of Nigeria resulting in severe socioeconomic impact on the livelihood of farmers. A study was designed using a structured questionnaire to assess the Knowledge, Attitude and Perception (KAP) of camel trypanosomosis among 100 respondents in two camel producing states of northern Nigeria. A high level of awareness of the disease was found among the respondents; 84% in Kano and 88% in Katsina state. All the respondents identified biting flies as the principal vector of camel trypanosomosis with high preponderance during the rainy season. The clinical signs respondents associate with the disease include; emaciation by 44% of respondents in Kano and 36% in Katsina, reduction in the hump size by 28% of the respondents in Kano and 36% in Katsina state. Other signs are, lacrimation reported by 36% of respondents in Kano and 20% in Katsina and anaemia by 12% of respondents in Kano and 38% in Katsina state. To treat the disease, few of the respondents; 10% in Kano and 18% in Katsina use conventional drugs like diminazene aceturate (Berenil[®]) while the majority uses traditional preparations like potash, *Kaya senegalensis* and garden egg. Similarly, fly control measures were mostly attempted by traditional methods such as smoking or application of ashes to animals. Only 18% of respondents used insecticide sprays. Few of the farmers; 22% in Kano and 26% in Katsina state seek for veterinary attention in the treatment of camel trypanosomosis while the majority; 64% in Kano and 74% in Katsina state resorted to selling off the affected camels. Despite the high level of awareness on camel trypanosomosis among the respondents, their poor attitude to seeking veterinary care for their animals needs to be improved. The statistical findings show no level of significant ($P > 0.05$) in the respondents Knowledge, Attitude and Perception in the two study areas.

Keywords: Surra, KAP, Questionnaire survey, Nigeria, herbs

Introduction

In northern Nigeria camels served as desert dairy due to the important multipurpose roles it plays in the transportation of grain, water, and other goods as well as for milk and meat production. In addition, camels play a central role in providing draught power and determining the wealth and social status of pastoralists. Allen *et al.* (1992) reported that camel is an important part of the culture and agriculture of many countries and has existed as far back as the history of human civilization. They have a unique anatomical and physiological, adaptive characteristics of the harsh climatic condition of the desert areas (Rabana *et al.*, 2011).

Generally, the diseases of camels have not been extensively researched compared to other livestock diseases probably owing to the hostile environment in which the camel lives and the non-sedentary nature of the herds (Mohammed *et al.*, 2007). However, Trypanosomosis caused by *Trypanosoma evansi* (surra) has been documented in camel producing areas all over the world for more than 100 years (Indrakamhang, 1998). It is mechanically transmitted by different vectors including biting flies such as Tabanidae, Stomoxys, hence, the risk of other livestock species getting infected with *T. evansi*, especially sheep and goats that are usually herded together with camels is high (Desquesnes *et al.*, 2013) Therefore, the disease is

important not only in camels but other domestic animals as well (Hoare, 1996). The symptoms and socioeconomic impacts of the disease is well recognized by camel farmers and marketers. In Nigeria, in addition to the use of camel for transportation and draught power, camel meat is becoming popular with the increasing demand of animal protein by the teeming population.

Several control measures for Surra are available but none has achieved the desired results so far. Thus the need for an integrated approach that will involve camel farmers and marketers in the decision making, planning, implementation and evaluation. Specifically, decisive role in the epidemiology of Surra. Therefore, it is envisaged that the inclusion of livestock marketers in the control of Surra may facilitates effective implementation of control measures and limit the spread of Surra (Maigari *et al.*, 2015). The camel marketers may help in identifying endemic regions and assist in convincing camel farmers in adopting effective control measures. Therefore, engaging them in an interactive session with aim of evaluating their KAP would assists in devising appropriate control strategies that are practicable. Hence, the study was aimed at determining the Knowledge, Attitude and Perception of camel Trypanosomosis (surra) among camel marketers in northern, Nigeria.

Materials and Methods

Study Area

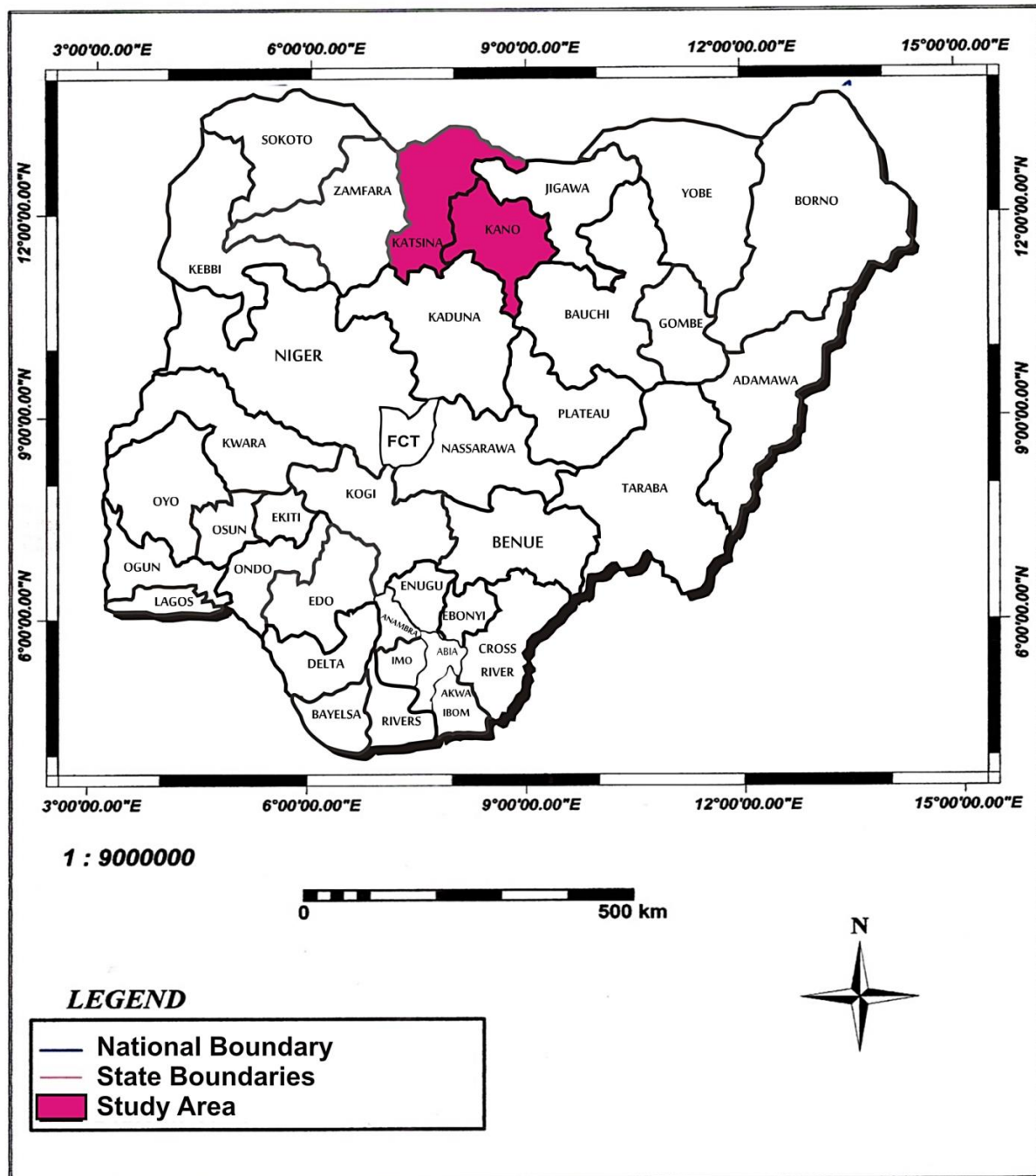
The study was conducted among camel marketers operating in the central abattoirs of Kano (12.200N, 8.516E) and Katsina (12.989 N, 7.600E) states. The camels were brought in from different parts of Nigeria as well as from neighboring countries of Niger, Chad and Cameroun Republic.

Administration of Questionnaire

Interviews were conducted in Hausa language to the respondents in the 2 study areas. Pretest interviews were conducted with 5 copies to ensure that questions were comprehensive and acceptable. The questionnaires were administered by the researchers, and veterinary assistants. The parameters assessed were knowledge, attitude and Perception (KAP) on Surra. Under knowledge, respondents were assessed on the knowledge of some camel diseases common in their locality, they were also ask specifically of surra, and the biting flies found among their camels, a pictures of six different biting flies were shown to them and they were ask to identify the ones common with their camels. On attitude the respondents were asked on the actions taken when camels are infected with surra and also on measure taken to prevent flies bites or surra in the areas. Regarding question on perception the respondents were asked on the perceived clinical symptoms of the disease, and on perceived seasons of the year in which surra is common and also on the method of treatment used. A total of 100 respondents (camel owners, butchers, meat and milk sellers), with 50 drawn from each of the 2 states were recruited for the study.

Data Analysis

Data was entered, coded and summarized using Microsoft excel (2007) spreadsheets and then analyzed by using Epi info 7 software (CDC, 2014). The coding involved assigning codes to open ended responses after structuring them. Descriptive analysis concentrated on frequencies and percentages, the t-test was used to determine the level of significance in terms of Knowledge, Attitude and Perception in the two study areas.



SOURCE: National Centre For Remote Sensing Jos, Nigeria.

Figure 1. Map of Nigeria showing the two study areas

Results

Socio Demographic Characteristics

A total of 99 persons participated in the questionnaire survey, 49 of them from Kano and 50 from Katsina state. The socio-demographic information on the respondents in the two states was presented in table 1. All the respondents in the two study states were male as the females declined to participate in the study.

In Kano study area 44% of the respondents were within the ages of 41-50, followed by 34% of those between 31-40 years of age. Only 4% of respondents were below 20 years of age. Similarly, in Katsina study area 48% were those of ages 31-40 followed by 40% of those within

41-50 years. The least were those of between ages 51-60 and constituted 12% of the respondents (Table 1).

Majority of the respondents in both study areas had Quaranic education compared to western education (Table 1).

Table 1. Socio demographic characteristics of the respondents

Variables	KATSINA STATE		KANO STATE	
	N	%	N	%
Age (In years)				
Below 20	2	4	0	0
21- 30	1	2	0	0
31- 40	17	34	24	48
41-50	22	44	20	40
51- 60	7	14	6	12
TOTAL	49		50	
Gender				
Male	49		50	
Female	0		0	
Educational level				
Islamic/ Quaranic	45	90	24	48
Primary/ Secondary	5	10	22	44

Knowledge of Camel Trypanosomosis (Surra)

The majority (94-98%) of respondents in the two states are aware of the diseases that affect camels. Some of the common disease conditions that affects camels mentioned by respondents in both states includes; anaemia, Swollen body and Sammore (Table 2). High proportions (84-88%) of respondents were particularly aware of the disease called surra. The local names given to the disease include Lea (2%), Jola (12%), Hanta (10%), Kenye (8%), and Ciwon Jini (14%).

Using a pictorial guides the respondents identified *Tabanids*, *Stomoxys*, *Chrysops* and *Hippoboscids* as possible vectors of Surra. All the respondents in the two study areas (100%) agreed that biting flies are common with higher prevalence during the rainy season. The statistical analysis shows that there is no significant difference ($P > 0.05$) in the knowledge of the disease in Kano and Katsina states.

Table 2. Respondent's knowledge of camel trypanosomosis

Questions	KANO STATE		KATSINA STATE	
	N	%	N	%
Are you aware of some camel diseases				
YES	48	96	47	94
NO	2	4	3	6
If yes mention some				
Anaemia	13	26	10	20
Kenye	7	14	0	0
Kirichi	1	2	0	0
Swollen body	3	6	2	4
Worms	2	4	2	4
Sammore	2	4	2	4
Amanas	0	0	1	2
Kazuwa	0	0	1	2
Huhu	0	0	2	4

Have you heard of surra?				
YES	42	84	44	88
NO	6	12	6	12
If yes, which animal does it affect?				
Camel	42	84	40	80
Cattle	21	42	6	12
Horses	0	0	2	4
Donkey	0	0	10	20
Local names				
Lea	1	2	0	0
Jola	6	12	0	0
Sammore	7	14	10	20
Hanta	5	10	0	0
Kenye	4	8	0	0
Ciwon Jini	0	0	7	14
Mention the types of flies you find in your camels				
Tabanus	39	78	44	88
Stomoxys	34	68	37	74
Chrysops	19	38	16	32
Hippoboscids	4	8	43	86
Are there biting flies in your areas?				
YES	50	100	50	100
NO	0	0	0	0
Which season have you noticed the biting flies?				
Wet	30	60	28	56
Dry	2	4	0	0
Both	18	36	22	44

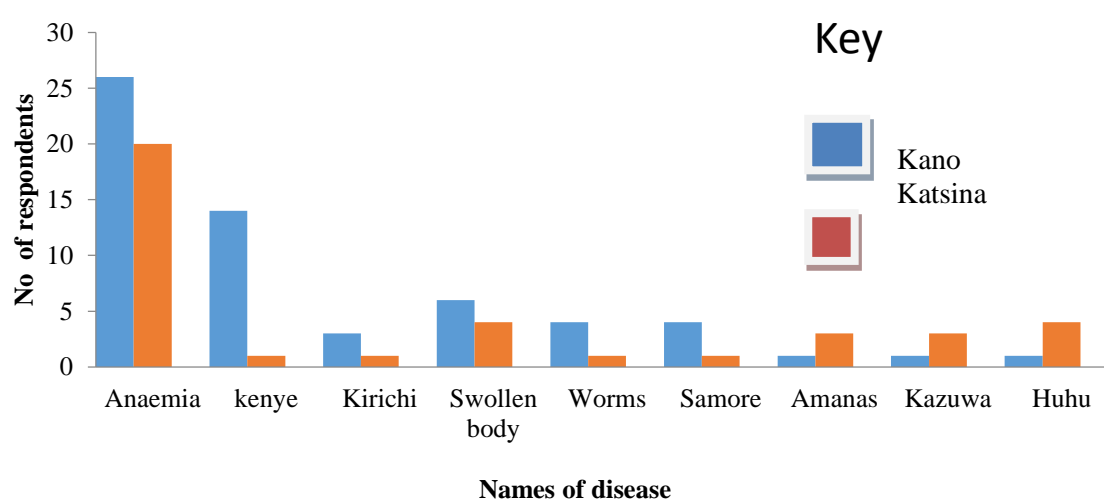


Figure 2. Knowledge of camel disease in the two states

Respondent's Attitude to Camel Trypanosomosis

Most of the respondents practiced mix livestock rearing. In both the two study areas, majority of the respondents developed the attitude of selling their camels whenever it is infected with surra, only few of them employ the services of the veterinarian to treat the condition. Furthermore, most of them use traditional methods for the treatment of the condition and camels as well as for fly control as a means of reducing the incidence of Surra. Although most of them could not vouch for the efficacy of these approach. Some respondents advocates for bush clearing and improved sanitation as control measures (Table 3). The statistical analysis shows that there is no significant difference ($P > 0.05$) in the knowledge of the disease in Kano and Katsina states.

Table 3. Respondent's attitude to camel trypanosomosis

Questions	KANO STATE		KATSINA STATE	
	N	%	N	%
When a Camel has Surra, what actions do you take?				
Taken to Veterinarian	11	22	13	26
Taken to a herbalist	0	0	0	0
Nothing is done	32	64	37	74
I don't Know	1	2	0	0
What species of animals do you rare alongside with camels?				
Cattle	9	18	7	14
Sheep	25	50	46	92
Goats	32	64	33	66
Dogs	0	0	0	0
Are there any measure taken to prevent fly bites or surra in your areas?				
YES	42	84	32	64
NO	4	8	12	24
If YES what are those measures.				
Confinement	1	2	1	2
Used of drugs	4	8	4	8
Bush burning	9	18	0	0
Bush clearing	12	24	0	0
Smoke	19	38	14	28
Spraying of Ashes	11	22	5	10
Use of Madaci	2	4	0	0
Use of Insecticide	9	18	9	18
Injection	9	18	8	16
I don't Know	8	16	16	32
Do you think those measures are effective in preventing the biting flies or surra?				
YES	29	58	26	52
NO	2	4	2	4
I don't know	11	22	19	38

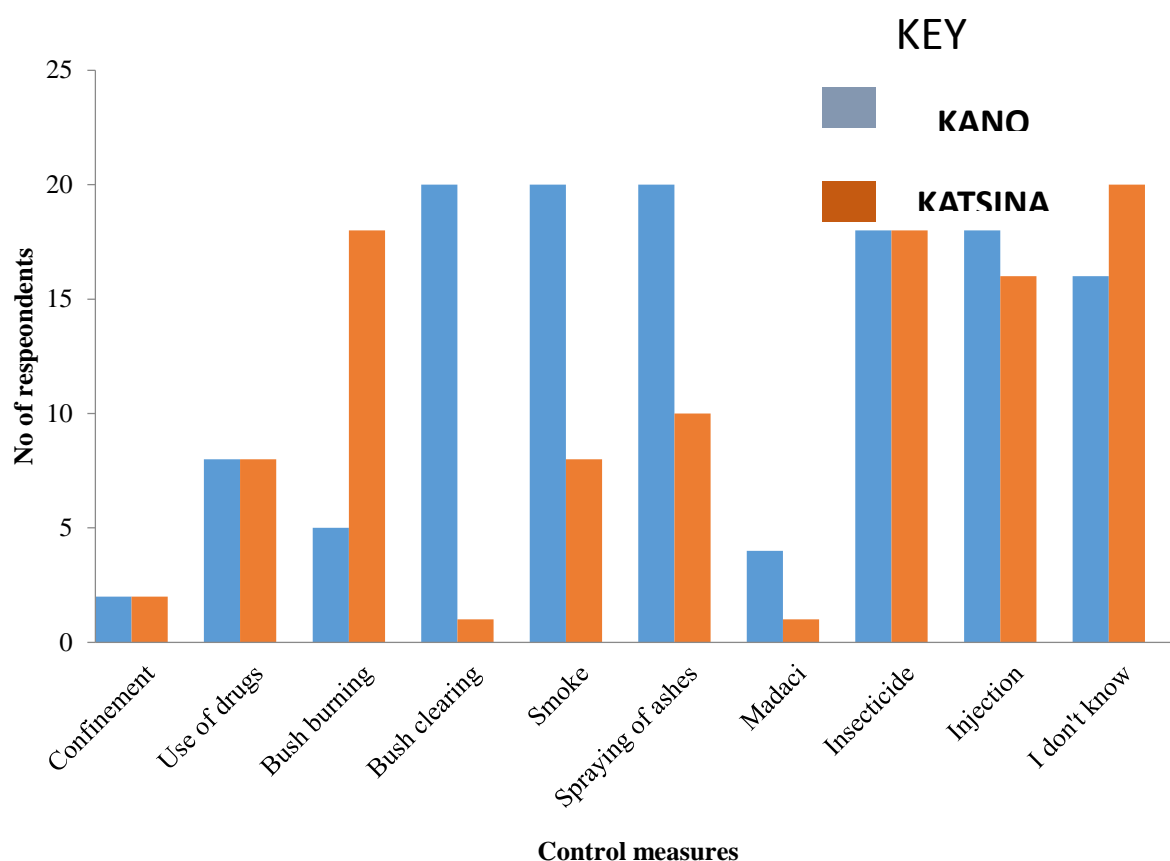


Figure 3. Respondents' methods of flies control in the two states

Respondent's Perceptions of Camel Trypanosomosis

Majority of the respondents (84%) perceived surra to be an important disease of camels with a season pattern of occurrence. The respondents had a good perception of the symptoms and signs of surra. Overall, most of the respondent associated symptoms such as emaciation reduction in the size of the humps, Lacrimination and anaemia with Surra (Table 4). Equally most of the respondents attributed the disease transmission to biting flies. There is no significant difference ($P > 0.05$) in the respondent's perception of surra in Kano and Katsina states.

Table 4. Respondent's perception of camel trypanosomosis

What symptoms have you observe with camels consistent of surra	KANO STATE		KATSINA STATE	
	N	%	N	%
Emaciation	22	44	18	36
Reduced humps	14	28	18	36
Restlessness	5	10	2	4
Weakness of the body	7	14	2	4
Sitting Quietly	10	20	0	0
Loss of hairs	2	4	0	0
Fever	5	10	0	0
Anaemia	6	12	19	38
Walking slowly	8	16	1	2
Lacrimination	18	36	10	20
Unable to walk	0	0	1	2

Poor milk Production	0	0	2	4
Poor meat Production	0	0	2	4
Poor growth rate	0	0	5	10
Darwa	1	2	2	4
Pica	1	2	0	0
What do you think causes the disease in camels?				
Biting flies	41	82	39	78
Other parasite	8	16	19	38
Witch craft	0	0	0	0
I don't Know	0	0	2	4
Do you consider Surra as an important disease for camels?				
YES	42	84	42	84
NO			2	4
What season of the year have you noticed surra more common in your area?				
Dry Season	9	18	5	10
Wet Season	26	52	34	68
Dry and Wet Season	7	14	7	14
Why do you think it occurs during this season?				
Raining Season	9	18	17	34
Fresh Grass growing	11	22	0	0
Weather	8	16	16	32
Dust	2	4	0	0
What else do you think should be done to prevent camel in your area from flies bite or surra?				
Quick treatment	3	6	1	2
Giving them Injection	0	0	1	2
Spraying of chemicals	0	0	2	4
I don't know	36	72	28	56
What trypanocides do you used in treating your camels?				
Drugs	1	2	0	0
Kanwa (Locally made Potash)	6	12	10	20
Samorin	3	6	4	8
Berenil	5	10	9	18
Madaci (<i>Kaya senegalensis</i>)	4	8	0	0
Gauta (Garden egg)	4	8	0	0
How frequent do you administer the trypanocides?				
When symptoms appear	4	8	9	18
Always	5	10	5	10
Quarterly	9	18	5	10
Monthly	1	2	0	0

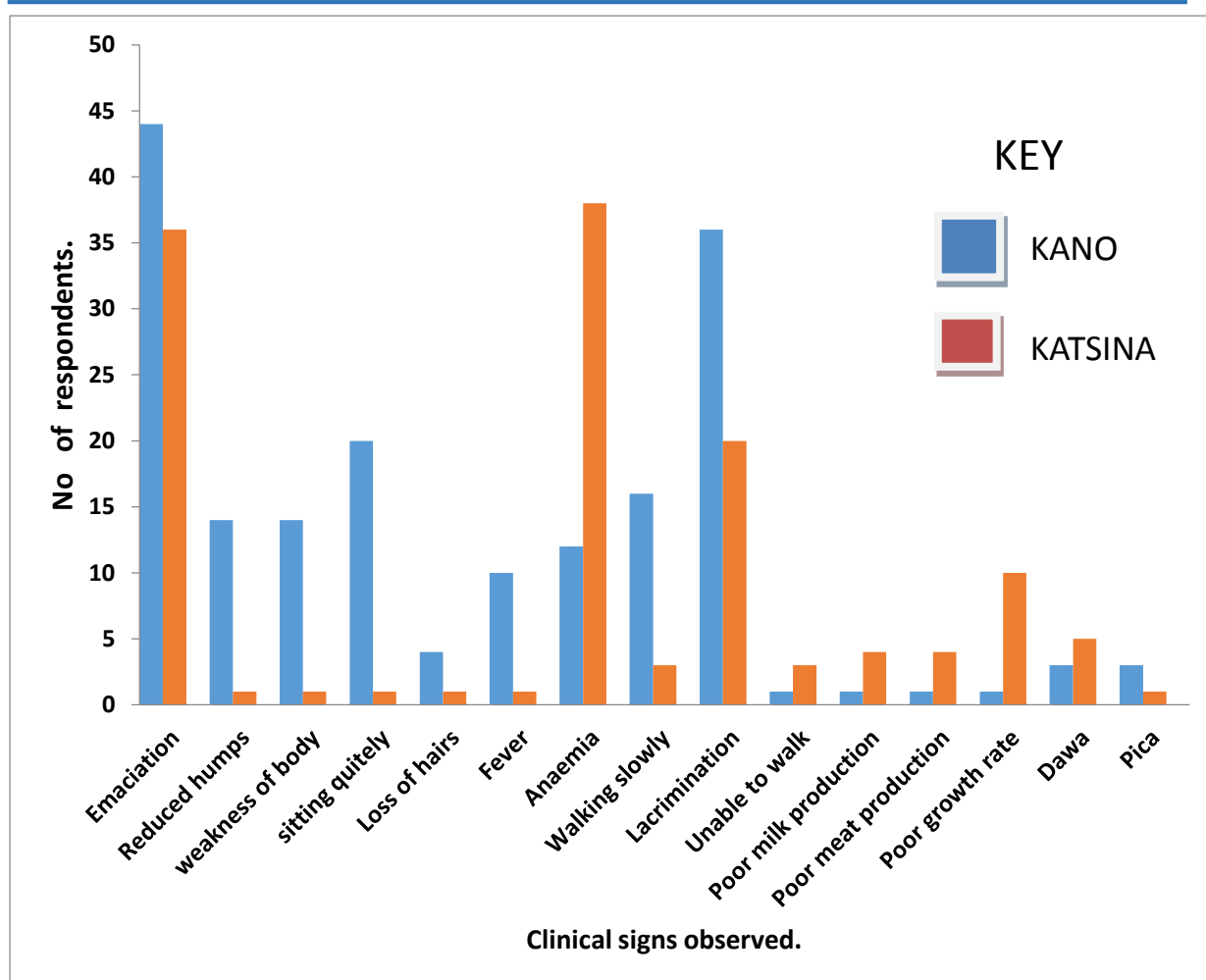


Figure 4. Respondents' clinical signs observed

Discussion

Indigenous knowledge (IK) among farmers has been known to influence traditional livestock rearing practices. In this study, majority of the respondents possess good knowledge of Surra, an important disease affecting camel production in Nigeria. The ability of the respondents to mention some of the classical signs of Surra attests to their awareness of the disease. This could be as a result of the economic importance associated with the disease. Although other animal species such as cattle, horses, donkeys, sheep and goats are also raised in the study areas, respondents allude that camels are comparatively more prone and severely affected by surra. This submission is in concord with the observation that *Trypanosoma evansi* infection is the main parasites of camels in Africa and the Middle East (Desquesnes *et al.*, 2013). Interestingly, Surra is known by local names such as *Sammore* suggestive of the similarities between the clinical condition in camels and African Animal Trypanosomosis (AAT) in other livestock. The association between the prevalence of Surra and biting flies and the rainy season reported by respondents in this study is similar to the report of Kula *et al.* (2017).

Although most of the respondent are aware of the socio economic impact of Surra, their attitude towards the treatment of infected camels is worrisome. Most of them do not attempt any treatment regimen, some resort to traditional remedies while very few seek for expert services from the veterinarians. The resultant effect being that the affected animals do not recover most of the times eventually leading to their being sold for meat at a reduced price. Consequently, the farmers do not obtain the desired economic benefit from rearing the camels

thereby affecting their livelihood. In addition, selling of diseased animals for human consumption has a negative effect on the quality of the meat sold to consumers exposing them to the risk of contracting zoonotic diseases. The use of traditional medicine in the treatment of Surra has been reported (Rutto *et al.*, 2013). Although the use of traditional medicine in veterinary practice has a long history, it has some limitations. First there is a chance of misdiagnosis of the disease condition. Secondly, the active ingredients and their toxicity are not usually known and the dosage and duration of treatment are not scientifically determined. Therefore, the efficacies of such treatment are not easily verifiable under field condition. Although the respondents in this study did not mention why they did not patronize qualified veterinarians for the treatment of Surra, the reason may not be unconnected to the cost of treatment. However, seeking for veterinary services for the treatment of Surra will be justifiable in the long run, since the condition respond well to trypanocides. Therefore, efforts should be made to educate camel farmers to seek for veterinary services in the management of Surra. On the other hand, the government should provide accessible and affordable veterinary services to farmers. This way there will be synergy towards adopting an integrative approach for the effective control of Surra in Nigeria.

Conclusions

In conclusion, camel marketers and farmers have high level of awareness of Surra, but poor attitude towards the treatment of the condition resulting in economic loss. A collaborative effort between the relevant government authorities and the farmers is recommended for the control of the condition.

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