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ORIGINAL ARTICLE

Potential Impact of Husbandry Practices on the Welfare and Productivity of Draught Cattle in Rural Communities around Zaria, Nigeria

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SUMMARY

A survey of the draught cattle husbandry practices and the potential impact of such practices on the health and productivity as it relates to work hours of these cattle was carried out during the months of November – March (dry season) and during the months of June-September (wet season) in seven rural communities around Zaria. It was observed that these animals are kept under a typical traditional husbandry system, where no special housing or periodic health care is provided for these animals. Consequently, common health conditions seen were more during the dry season, (64.75%) than during the wet period (38.72%). The clinical parameters of the apparently healthy draught cattle as compare to those clinically sick showed significant changes in the age, weight, working hours and work output. The variation in the body weight showed that clinically sick cattle with diarrhea had significantly ($P<0.05$) lower weight than those with injuries, and mixed conditions. The body temperatures of those injured and with mixed conditions were significantly ($P<0.05$) higher than those with diarrhea and other conditions. It was concluded that clinically sick cattle showed loss of weight, worked less hours and consequently less output than the healthy cattle. Factors that affect the health management of draught animals such as the availability of quality food supply, the level of hygiene, the prevalence of diseases and available veterinary services were noticed to be present in these communities. The draught animal survival ability rather than productive ability was the dominating factor in most husbandry practice in these communities, with the animals surviving under sub-optional productive state in conjunction with stress of diseases on one hand, and poor nutrition on the other hand.

Key words: Draught Cattle, Husbandry, Health, Workhours, Wet, Dry Months.

INTRODUCTION

Draught animals are economically important, and are kept either as a source of investments, or insurance against disaster (Smith, 1981), they also have a high socio-cultural value to their owners (Gefu, 1987; ILCA, 1990) and are either food themselves or are beast of burden to ease human hand labour in farming and transportation (Chantalakhana and Bunyavejehewin, 1994) or can be said to be particularly important

for food security in smallholder farming systems (FAO, 2010; FAO, 2014) The importance of draught cattle and the heavy demand on these animals to help increase agricultural production requires that these animals be given good care and attention to reduce disease and cut down losses. Indeed, a large number of production problems including infectious diseases are observed to affect draught animals' health and productivity, (Pearson et al., 1999) and the working conductions of draught animals greatly exacerbate diseases in these animals, therefore it has been suggested that the application of improved technology and better management through improved feeding and health services could improve the welfare of these animals (Ramaswamy, 1994). This paper takes a look at the husbandry system of draught cattle in some rural communities around Zaria, and the effect of these practices on the welfare and work hours of these very important animals.

MATERIALS AND METHODS

Study area/design

The study area was eight (8) rural communities around Zaria in Kaduna state of Nigeria. The State is located within the guinea savannah vegetation of Nigeria and Zaria is located at the northern part of the State. The study area lies between latitude 11^0 and 10^0 north of the equator and latitude 9^0 and 6^0 east of the meridian (modified Zaria topographic map 1965 edition) (Figure 1). The rainfall is seasonal with the highest annual peak at the month of august with the average height of 146m, the humidity is also highest in august with 75.6% and lowest in December-January with 38.2%. The mean minimum and maximum temperatures are 10.7^0C and 38.75^0C respectively. The area is composed mainly of Grasslands with farming and cropping systems being the dominant and main source of lively hood. These communities were accessible by motor bikes or cars, and owners of work bulls willing to participate by including their animals in the project

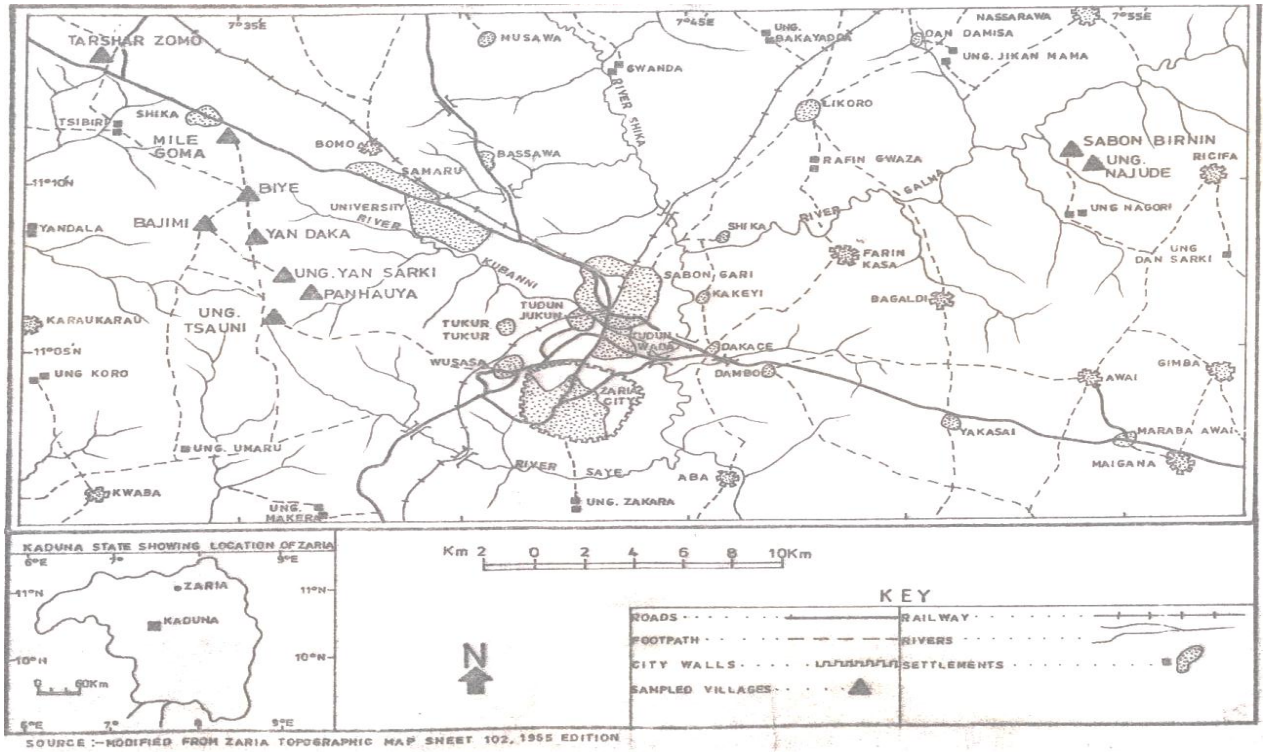

Figure 1: Zaria and its Environs showing the sampling villages
Source: Modified from Zaria topographic map sheet 102, 1965 edition

were interviewed and a minimal token benefits or rewards such as free treatment of any clinically diagnosed disease condition of the work bulls was used as incentives to encourage participation. The field work took place during the months of November – March (dry season) when the draught cattle were apparently resting from vigorous farming activities, but occasionally use for transportation and wetland farming and the months of June – September (wet season) when the animals were actively involved in farming activities. A cross sectional study design was used for this study. The Eight locations [Ungwa Najude, Ungwa Sauni, Yandaka, Yansarki, Panhauya, Biye, Mile Goma and Tashar Zomo] were visited.

Questionnaire design and administration

A semi structured open ended questionnaire was administered to draught cattle owners and their handlers. Verbal consent of each handler or owner was sort days prior to the commencement of research. A total of the three hundred and forty-four (344) questionnaire were administered by the researcher, who translated the questions and filled-in the questionnaire. Data collection from the owners of each draught cattle was on the working hours per day and the estimated work output per pair of animals. Also the type of feeds and feeding methods that are employed by owners, the common health conditions of these animals and the traditional management of these problems were asked of them. The data were collected by the researcher filling-in the questionnaire, since most the handlers and animal owners could not write and mostly spoke Hausa language. The husbandry system was observed by the researcher and documented during the administration of the questionnaire.

Physical examination of draught cattle

The animals were physically restrained by the farmers and the livestock attendants for detailed physical examination and clinical data collection. The age, sex, weight and rectal temperature were obtained and each male checked for the castration status. The animals were also examined for ectoparasites and injuries. The ageing of the animals was done by examination of teeth for erupted permanent incisors only (Akerejola and Ojo, 1976), while the body weight was based on the heart girth and body length of animals (Williamson and Payne 1978). The body temperature of each animal was measured using clinical thermometer and traumas observed were classified based on location on the body of the animal.

Statistical analysis

Statistical analysis was done using Microsoft excel windows 7. The clinical data are shown as both Mean and Standard Deviation. In the injury survey amongst work bulls, the demographic data is shown as percentage prevalence and chi-square significant test was used to determine the correlation coefficient between work and incidence of injury observed in the animals.

RESULTS

Number of draught cattle and classified husbandry practices

A total number of fifty-six (56) owners having a total number of one hundred and thirty-nine (139) during the months of November –March, while ninety (90) owners having a total of two hundred and four (204) during the months of June-September having bulls and cows were sampled. The ratios of the animals per farmer for the two periods were 2.48 (139/56) and 2.26 (204/90) for the dry and wet periods respectively. Female animals were noticed to be used for ploughing in some of the villages and more were seen during the working period 4.41% (9/204) than during resting period 2.87% (4/139).

There were no observed housing facilities for these working animals. Farmers with large number of animals were seen to keep them in groups under large trees between

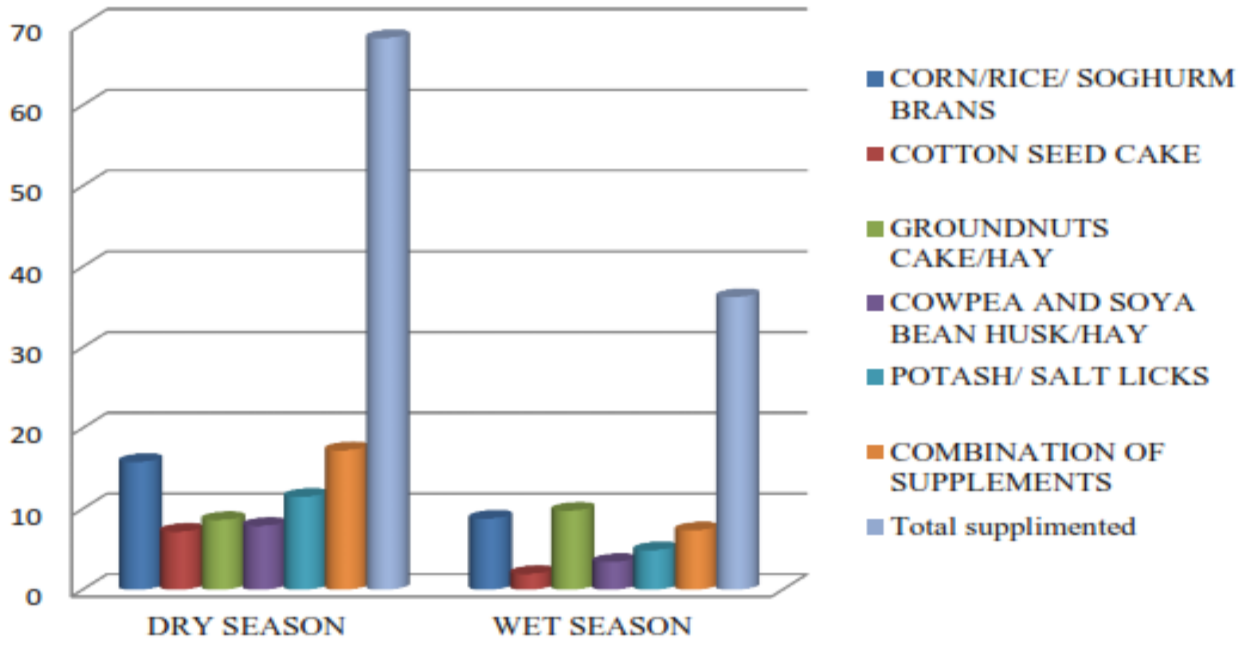

Figure 2: Percentage distribution of the types of feed supplements during the dry and wet season

compounds, or behind their houses. The sources of water in these communities varied, from streams, ponds, to wells and boreholes. The draught animal husbandry systems observed were semi-intensive and extensive types. More than half the draught animals under the semi-intensive received feed supplements during November- March than those during the June-September periods 68.35%/38.85%(95/54) and 36.27%/63.73%(74/130) More animals (68.35%) received feed supplements during the dry months, than during the wet months (36.3%), so also more farmers (9.8%) gave groundnuts hay and or cakes at these time because of availability, while during the dry period more (17.27%) farmers used more of mixed supplements (Figure 2)

Health problems identified by owners during the survey

The common health conditions seen during the survey were diarrhea, injuries (trauma), skin problems, respiratory problems, bloat and a combination of ectoparasitism with any of these problems. More problems were seen during the dry season (64.75%) than during the wet period (38.72%). The major problems seen were diarrhea, injuries and mixed conditions during both periods. The physical parameters of the apparently healthy draught cattle as compare to those clinically sick showed significant ($p<0.05$) changes in the age, weight, working hours and work output. The variation in the body weight of the clinically sick cattle shows that the animals with diarrhea had significantly ($P<0.05$) lower weight than those with injuries, other lesions and mixed conditions. The body temperatures of those injured and with mixed conditions were significantly ($P<0.05$) higher than those with diarrhea and other conditions. (Table I).

It was observed that more clinically sick animals were young animals with a mean age of 3years. These also affected the working hours per day and consequently the work output of the sick animals significantly. The significantly ($P<0.05$) higher mean work hours in the apparently healthy animals is an indication that these animals are seasoned workers owned by farmers who could afford to keep them all through the year and hire them for work

TABLE I: Common health problems of draught cattle identified during survey and how the owners managed these problems

s/no	Health Problems	WET PERIOD (n=139)		DRY PERIOD (n=203)		Management Practices
		No Sick	% Sick	No Sick	% Sick	
1.	Injuries	30	21.58%	27	13.30%	Penicillin injections Use of engine oil on wounds Herbal mixtures (lalle)
2	Diarrhea	13	9.35%	33	16.26%	Drenched with Madachi (Khaya senegalensis) Antihelminthics purchased from market
3	Bloat(cumburi ciki)	2	1.44%	0	0	Drenched with palm oil
4	Respiratory conditions(huhu)	4	2.88%	6	2.96%	Oxytetracycline injections
5	Skin Lessons(kirchi)	3	2.16%	5	2.46%	Oxytetracycline injection Penicillin injections use of palm oil on wounds
6.	Mixed Condition	27	19.42%	19	9.36%	Manual removal of ticks Hot potash on animal stall Oxytetracycline injection
7	Total	79	56.83%	90	44.33%	

TABLE II: Mean (X ± SD) changes of the physical parameters of clinically sick draught cattle as compare to those apparently healthy **NOT MENTIONED IN TEXT**

s/no	Physical Parameters	Apparently Healthy (N=169)	Clinically Sick (N=174)
1	Age (yrs)	3.88 ±2.05	3.36* ± 1.59
2	Weight (kg)	268.6 ±57.3	253.7* ±71.3
3	Body temperature (T^o)	37.81 ±2.99	37.90 ±1.96
4	Working days/week	3.88 ± 2.06	4.16 ±1.72
5	Working Hrs/day	5.57 ±1.72	5.08* ±1.79
6	Work output /day	1.71 ± 0.74	1.43* ± 0.87
7	Working Season	2.15 ±1.07	1.77* ±0.99

*significant at P<0.05

during the rains Table II. The mean weight for the clinically sick animals was significantly (P<0.05) less than those with apparently good health. These suggest a strong relationship between the ages, the weight of the animal; the working hours and work output of draught cattle. Since for most animals, working hours are dependent on age, the younger animals (less than 2 years) spending less time than the older animals of 3years and above and the time is further shortened if and when the animals are sick. Most animals less than 3 years were learners on the job while the older ones are seasoned workers and so are able to spend more time working than those less than 3 years of age

TABLE III: The effect of health problems identified on the mean values of the physical parameters of the draught cattle surveyed **NOT MENTIONED IN TEXT**

s/no	Physical Parameters	Weight (Kg)	Temp (^{O}C)	Age (Yrs)	Working Days/Wk	Working Hours/Day	Work Output/Hrs (Hectares)
	Health Problems						
1	Injuries (N=57)	283.9± 46.7	38.1±0.52	3.98 ±1.25	4.25 ± 2.02	5.95 ± 1.75	1.95 ± 0.83
2	Diarrhea (N=46)	**257.4±59.9***	37.9±0.75	3.88 ±1.35	3.26 ± 1.19	**5.01± 1.80***	1.54± 0.71*
3	Mixed (N=46)	268.5 ±57.7	38.1±0.71	3.79 ±1.14	4.38 ±2.09*	5.62 ±1.62	1.57 ± 0.62
4	Others (N=19)	268.3± 51.1	**35.8± 8.95***	3.94± 0.73	3.11 ± 1.97	5.89 ± 1.13	1.86 ± 0.59

*significant at P<0.05

TABLE VI: Socio-demographic characteristics and health seeking parttern in draught cattle during the wet and dry seasons

S/no.	Characteristics	Wet season		Dry season		Total %
		NO.	%	NO.	%	
A	Sex					
	Male	89	98.89	83	96.51	97.73
	Female	1	1.11	3	3.49	2.27
B	Age group					
	1-2yrs	12	13.33	10	11.62	12.50
	3-4yrs	50	55.56	42	48.84	52.27
	>4yrs	28	31.11	34	39.53	35.23
C	Work hours/day					
	1-3hrs	10	11.11	4	4.65	7.95
	4-6hrs	67	74.44	56	65.12	69.89
	>6hrs	13	14.44	26	30.23	22.16
D	Health seeking pattern					
	Traditional (Herbs) medicine	36	40.00	23	26.74	66.74
	Direct drug purchase	20	22.22	35	40.69	31.25
	Visit to quacks	22	24.44	18	20.93	22.72
	Visit to veterinary clinic	2	2.22	4	4.65	3.41
	No treatment given.	10	11.11	6	6.97	9.09

(Tables II and III). More injury cases (68.25%) were recorded during the dry season and then (40.18%) cases during wet season when the animals were actively ploughing. Most of the injured animals were males (98.86%), with a mean age of 3.78years, with ages between 3-4yrs (52.27%) having suffered most injuries. This age group also formed 69.88% of those working for more than 4-8hrs/day. These injuries took place on the farm (57.95%), at transportation (28.41%) and due to fights amongst animals (13.64%). The location of the injuries on the body of the animals was seen to be related to cause of injury. Wounds due to poor harnessing and whip were highest 43.18% (76/176) followed by injuries on the leg area due implements and rough terrains 36.36% (64/176) (Table IV).

Health seeking pattern

The health seeking pattern shows that 90.91% of animals injured or sick were treated by owners either by the use of herbs (34.09%), direct purchase of drugs (31.25%), or visit to quacks (22.72%). Only 3.41% visited any veterinary clinic and 9.09% did not receive any treatment. Higher number of owners sought for treatment for animals during the dry season than during the working period. Indeed, the habit of direct purchase of drugs was common during the resting period, while the use of herbs was common during the wet season.

DISCUSSION

There was increased numbered draught cattle surveyed during the wet months of June-September with concurrent increase in the number of farmers willing to participate in the research. The increases could have been probably due to more farmers having better awareness of the potential benefit of the research to the health of their animals. The bulls were not castrated since most farmers claimed that castration makes the animal lazy and also reduces the market value if and when the farmers needed to sell the animals. The ratio of draught animals per farmer during both seasons is an indication that most farmers had at least a pair or more of draught animal. The farmers having more than a pair were observed to hire or share with those that have less or none at all. This supports the observation in1987 by Gefu, and similarly Gefu and Otchere in 1994 that having more animals is a reflection of the economic and hence the social standing of the farmer in the community. The sharing or hiring of these animals may be a way for most farmers to cope with the prevailing economic state of unequal distribution of wealth within the community, therefore farmers of less economic state are saved the expenditure of keeping draught animals but can hire. It was observed that these processes of hiring also create opportunity for employment for ploughmen in the community (Singh and Partarp, 2003). Few female animals were seen to be used for ploughing and this is understandable since the use of bulls for farming is the norm in these areas. The use of female animals for ploughing seems to be very unpopular, but the higher numbers of female animals seen during the working period, may be suggest that farmers may use cows out of desperation when there is higher labour demand. This was also observed by Chimonyo (1998) and Chimonyo *et al.* (1999), even so the use of cows in farming by farmers seems logical and economical considering the multi-potential of cows in providing draught power, calf and milk for the farmers.

The draught animal husbandry practice in the study area was found to be the same for all the villages involved. Fewer numbers of farmers practiced semi-intensive management system during the wet season, allowing the animals to graze in-between work and confining them in the owners' compounds or under some nearby tree at night fall, and give feed supplements such as crop residue and / or cottonseed cake and salt licks, while during the dry season most

farmers were noticed to keep farm residues for these animals. The farmers practicing complete extensive management, allowed all animals to graze natural pasture without giving any feed supplementation, this form of management was most common during the dry season were animals were doing minimal work and so were allowed to graze the wet lands, while those practices at the wet season took advantage of abundant pasture and so allowed animals to graze only in between work. Most farmers were observed to have stored up crop residues under shades, in rooms or within the compound as feed supplements, during the dry season while during the wet season the animals were allowed to graze in between working hours and were stall-fed with some concentrates or salt licks be. The need to feed concentrates is recognized by farmers, but most farmers give concentrates only on working days and even that is very much dependent on its availability, which also depends on the farmers' economic standing. The similar management practices and hence the lack of variation observed in this study probably stems from the apparent lack of difference in the cultural and farming practices of the natives of this study area, a location within the same geographical zone.

Survey of the housing facility for work bulls revealed that most farmers did not have specific housing facilities for their animals. The animals were either housed in a yard inside the compound as part of the household to prevent theft and fight or tittered at a nearby big tree, which provides shade for the animals. These arrangements are seen mainly with farmers with larger number of work animals and it is very much dependent on the security situation. Housing is very important for draught animals, since their ability to tolerate heat varies (Pearson and Vall, 1998), for instance dehydration and heat stress are said to be serious welfare issues for equids working in developing countries (Pritchard *et al*., 2006) and exposure to cool dry weather exposes them to diseases (Djang-Fordjour *et al.,* 2003). Indeed Makki (2014) also reported that in Shambat, Nile Valley Sudan most of the farmers poorly manage their animals, and this was reflected in low working speeds and field efficiencies. In this study however most farmers were seen working these animals in the early hours of the day and the cooler hours of the evenings while resting them under available tree shades during the hot afternoons.

Indeed, most owners had knowledge of some health care for the common health problems observed, and thus indicating that most owners of draught animals recognized certain diseases in their animals and the owners either engaged the services of unqualified personnel (quacks), or used herbs or personally purchased drugs in the markets and administer themselves to their animals. The effects of such practices are that animals are either administered mainly expired drugs or low doses of drugs, propagating probable drug resistance amongst these animals hence the increase resistance to anti-microbial agents among Nigerian livestock is reported (Ibrahim et al., 1986, Kudi, 1998). More farmers were seen to practice some form health care during the dry season than during the wet season, due to the farmers having less workload, more time to visit markets and search for drug sellers. Likewise, the higher number of attention from quacks at this time could be due to easier access to the villages when the rains have stopped. Similarly, the less attention for the health practices on their animals during the wet period is explainable, farmers having busy working schedules and roads not so good. Indeed, most farmers are aware of the consequences of clinical disease; hence the attempt to prevent and control acute diseases by self-medication is understandable (BVA Trust Project, 1982).

Clinically more animals were seen with skin lesions likely to be dermatophilosis during the wet season than the dry season; but the disease is said to more prevalent during the

wet season (Blood *and Radostits* 1985), and few animals were diagnosed as having respiratory conditions similar to Contagious Bovine Pleuro-Pneumonia (CBPP). There is need for extensive studies on the prevalence of infectious diseases to confirm the magnitude of these conditions amongst draught cattle in these areas. Large number of draught animals was notice to harbor ticks and mites; though the infestation was not severe, because most Farmers were in the habit of manually removing the ticks on these animals. It is noteworthy that these parasite as vector of some infectious diseases (Fabiyi, 1984; Jawara, 1990) could pose a serious problem by transmitting and spreading of these diseases such as Babesiosis and Anaplasmosis to these animals.

The physical examination of draught cattle was the most useful way to observe the types of lesions caused by trauma (injuries) and the contributory factors to work-related accidents, since there was no available veterinary record in relation to work bulls' health in the area of study. The behavior of draught cattle influenced by many factors including environment, hard work, fatigue, and bad weather, were seen as contributory factors to type and severity of injuries observed. Other injuries due to implements or sharp objects on the farm were as a result of poor farm clearing and also due to poor harnessing, the back wound were due to whipping and lashing of this animals, thus agreeing with Ramaswamy (1998) and Hovel (1998) that injuries on draught animals are due to brutality and excessive straining of this animals. The contributory factors to injuries such as "unsuitable method of work" and "harness design deficiency" without a technical investigator added little to our understanding of the mechanism behind the accidental injuries caused by these agents. However, it was observed that the chance of incurring injuries by these agents was related to the age of draught cattle and the time spend on the task. Therefore, the reductions of time spend on task especially for beginners and the use of mature cattle could greatly reduce the risk of injuries in these animals.

CONCLUSION

This survey has shown that most farmers had and used their own draught animals for transportation to nearby markets, for ploughing and hauling of farm produce to the house and the clinically diagnosed conditions seen had significant impact on the physical data of draught cattle and consequently the work and work output. Survey also showed that farmers often gave medications to their animals and these could be attributed to the lack of veterinary care extended to these communities, and the farmers' inability to afford these services hence the visits of quacks is most welcomed by them, only very few farmers resorted to veterinary attention when the cases were considered very severe by the farmer. Therefore, the need to educate the draught animal owner on the effect of sub-clinical diseases on productivity and the role of health management programme necessary for effective production, also veterinarians should join draught animal researchers, and help make detailed recommendations on the disease control and production programme necessary to maximize productivity of draught animals.

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