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Frequency of nose and tail injuries in cattle and water buffalo at livestock markets in Bangladesh

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Abstract

A total of 560 cattle and water buffalo were examined at livestock markets in Bangladesh. The aim was to assess the frequency of nose and tail injuries that could have occurred during handling and transport. The frequency of nose piercing was 64%, and 69% of the cattle and 54% of the water buffalo had rubbing or tearing injuries at the nostrils from nose ropes fitted through the pierced hole. Almost half of the nose-pierced animals (47%) had lacerations and ulcerations where the nose rope had rubbed against the nose. Pus at the nostril was observed in 56% of the animals, and 57 and 58% had severe and extended nose injuries, respectively. Nose injuries were more severe in imported Hariana cattle compared with exotic and local breeds. In cattle plus water buffalo, 39% had tail injuries of which the two major abnormalities were absent tail end (2%) and kinked tail (98%). Tail injuries were more common in cattle (51%) than water buffalo (15%). Among the cattle breeds, the frequency of tail injuries in Hariana was 65%. In conclusion, the cattle and water buffalo experienced a number of serious injuries and this calls for greater attention to be paid to handling methods in draught animals in south Asia.

Keywords: *animal welfare, cattle, injury, livestock market, nose, tail*

Introduction

In south Asia, two methods exist for controlling movement in draught water buffalo and cattle which can be of concern in terms of welfare. Firstly, many cattle and water buffalo undergo nose piercing through the septum with a hot iron rod before a nose rope is run through the hole. The nose rope is permanently fastened around the back of the head, below the base of the horns, and is used as a nose twitch through twisting of the rope by hand at the cheek to exert pressure on the septum. This makes the animal more tractable and more easily led by hand when the twisted nose rope is pulled. The second method is tail twisting which is also used in other countries (Gregory *et al* 2009). It occurs when handlers want to encourage movement during draught work, when an animal refuses to move or when there are difficulties in loading or unloading animals onto and off vehicles. Both methods operate on the principle of applying pressure to sensitive regions of the animal. Both the tail and the nose of the bovine are well innervated and it is recognised from clinical practice that they are sensitive to a range of potentially painful stimuli (Getty 1975). Although it can be argued that tail twisting may not itself be aversive when applied gently, it is generally understood that strong pressure can cause pain, especially when the tail is broken (Pajor *et al* 2003). Similarly, open wounds at the nostril are likely to be painful when rubbed by the rope.

The aim of this paper was to examine a number of the consequences of inappropriate use of such methods and, in particular, the injuries they can cause. When the head rope is fastened too tightly the rope can abrade the nostrils during normal head movement, and excessive manual twisting of the head rope can result in tears to the lateral margin of the nostrils, especially on the side where the rope is twisted. Excessive tail twisting can result in a dislocation which can subsequently set to form a kinked tail. In this study, the frequencies of nostril injuries and kinked tails were examined in imported and local cattle plus imported water buffalo. This study also provided an opportunity for assessing the frequency of tail-end loss. The imported animals came mainly from India and the assessments were made at two livestock markets in Bangladesh.

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Materials and methods

In this paper, a nose rope is the term used for a rope passed through a hole in the septum and around the back of the head, a neck rope describes a rope that passed around the neck of the animal and was used for securing the animal to a head rail (doga) and a head rope is a rope that is secured to the animal as a head halter.

A total of 560 cattle plus water buffalo were examined at two city livestock markets in Bangladesh (Sagorika in the Chittagong Division and Gabtali in the Dhaka Division). The markets were selected because they were large by national standards with a high proportion of their throughput coming from India. All 560 animals underwent a tail examination, and 357 had their noses examined. There were 288 imported cattle (Hariana 243, Exotic non-descriptive [ND] 45) and 80 cattle of local breed, and it was assumed that all 192 water buffalo were imported as relatively few water buffalo are bred within Bangladesh.

At both markets, the animals were tethered alongside one another by neck ropes secured to a head rail. The head rails were made of bamboo and known locally as a 'hyne' or 'doga'. There were up to 100 animals secured to each doga. A two-stage sampling procedure was used to select individual animals for examination. Every second doga was chosen, and within each doga alternate animals were selected for examination with up to 30% of the animals within each doga chosen.

Examination of nose piercing

Noses were examined in 368 cattle and 192 water buffalo by a veterinarian. Of these, 254 cattle and 103 water buffalo had pierced noses and a detailed examination of injuries was undertaken. The approach used was based on the descriptions by Venugopalan (1997) and O'Connor (1980). The septum and nares were assessed for recent and longer-term injuries. Recent injuries included bleeding, hyperaemia, laceration and ulceration, whereas longer-term injuries were those that had healed with scarring. Where the perforation in the septum was no longer circular in shape (eg it had progressed to an ovate, keyhole, acuminate or cuneate shape) it was recorded as extended. Where the rope lesion at the lateral aspect of the nostril had formed an elongated slit it was recorded as extended. Pus at the injured areas was recorded where present. Injury severity was scored as low, moderate or severe. A severe injury was large, covering part of the septum or the side of nostril with an ulcer, pus or blood. A moderate injury was small with no extending tear or abrasion, and a low injury score was one where the injury in the septum had healed and did not extend in size beyond the original perforation or there was limited scarring at the nares. Where a head rope was present, the composition of the rope was recorded. Where a nose rope was not present, the septum was examined for a perforation and any associated injury where a nose rope would previously have been present.

Assessment of the tail

Tails were examined for injuries in 368 cattle and 192 water buffalo. They were assessed for number of kinks where adjacent vertebrae were misaligned, position of the kinks along the length of the tail, and shortening, which was presumed to be due to amputation in cases of tail-end necrosis or gangrene.

Statistical analysis

In the present study, different categorical explanatory variables (eg type of animals, type of nose ropes etc) were compared with categorical response variables (tail injury, nose injury etc). To find out the relationship between categorical explanatory and outcome variable, Pearson's Chi-square and Fisher's Exact tests were used. The recorded questionnaire data were entered into an Excel® 2000 spreadsheet (Microsoft Corporation, Redmond, Washington, USA) and the collated data transferred to STATA (Stata Statistical Software Release 9.2, Stata Corp, City Texas, USA) and GraphPad® Software (www.graphpad.com/quickcalcs/index.cfm) for analysis.

Results

Nose injuries

The overall frequency of nose piercing was 64% (95% CI 59–67; n = 560). It was 69% (95% CI 64–73; n = 368) in cattle and 54% in water buffalo (95% CI 46–60; n = 192) ($P < 0.001$). Cotton nose ropes were more common than nylon (Table 1; $P < 0.001$). The main lesions were lacerations at the lateral aspect of the nostrils and the septum hole, and ulcers. Relatively few (3%) of the lesions were bleeding, but 44% had pus discharge. Fifty-eight percent of the nose-pierced animals had extended injuries. Septum perforations were more prone to extension than lesions at the sides of the nostrils ($P < 0.001$). Old injuries (scars) were relatively infrequent compared to fresh injuries (laceration plus ulceration plus bleeding; $P < 0.001$).

There were more severe lesions in cattle than in water buffalo (Table 2). Among the cattle breeds, severe nose injuries were more common in Hariana than the exotic ND plus local breeds ($P < 0.01$).

Comparing the two species, water buffalo were more prone to lacerations but less prone to ulcers than cattle (Table 3). Old injuries (scars) were less common in Hariana than in the Exotic ND and local cattle.

Considering cattle and water buffalo together, the frequency of severe nose injuries was higher in males (59.5%) than females (30.6%; $P < 0.01$).

There were no significant differences in the severity or frequency of nose injuries between animals fitted with cotton compared to nylon nose ropes ($P > 0.05$).

Tail injuries

In the cattle which underwent tail examination, 98% were male, and in the water buffalo 50% were male. Among the males, 74% were castrated, where 95% were tail injured.

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Table 1 Frequency of injuries in nose-pierced cattle and water buffalo, and the types of nose rope used.

Variable	n	Category	Frequency (%)	95% CI
Type of nose ropes	357	Cotton	193 (54.1)	48–59
		Nylon	105 (29.4)	24–34
		None*	59 (16.5)	13–20
Type of injury	357	Laceration	167 (46.7)	41–51
		Ulceration	166 (46.5)	41–51
		Bleeding	12 (3.4)	1–5
		Scar	12 (3.4)	1–5
Pus at injured area	357	Present	158 (44.3)	39–49
		Absent	199 (55.7)	50–60
Degree of injury	357	Low	12 (3.4)	1–5
		Moderate	143 (40.1)	35–45
		Severe	202 (56.5)	51–61
Extended injury	357	Absent	149 (41.7)	36–46
		Present	208 (58.3)	53–63
Location of extended injury	208	Septum	72 (34.6)	28–41
		Side of nostril	41 (19.7)	14–25
		Both	95 (45.7)	39–52

* Nose had been pierced but no nose rope present.

Table 2 Frequency of nose injury scores in nose-pierced cattle and water buffalo.

Species	Animal type	Number of animals	Injury score (%)		
			Low	Moderate	Severe
Cattle	Hariana	212	3 (1.4)	73 (34.4)	136 (64.2)[a]
	Exotic ND	35	4 (11.4)	14 (40.0)	17 (48.6)[a]
	Local	7	2 (28.6)	5 (71.4)	0 (0)[b]
	All cattle	254	9 (3.6)	92 (36.2)[x]	153 (60.2)[x]
Water buffalo	All buffalo	103	3 (2.9)	51 (49.5)[y]	49 (47.6)[y]

[a, b, c] Cattle type means in a column without a common superscript were significantly different at $P < 0.05$.
[x, y] Species means in a column without a common superscript were significantly different at $P < 0.05$.

Table 3 Frequency of different types of nose injury in nose-pierced cattle and water buffalo.

Species	Animal type	Number of animals	Type of injury (%)			
			Laceration	Ulceration	Bleeding	Scar
Cattle	Hariana	212	85 (40.1)	117 (55.1)	7 (3.3)	3 (1.4)[b]
	Exotic ND	35	17 (48.6)	14 (40.0)	0 (0)	4 (11.4)[a]
	Local	7	5 (71.4)	0 (0)	0 (0)	2 (28.6)[a]
	All cattle	254	107 (42.1)[x]	131 (51.6)[x]	7 (2.8)	9 (3.5)
Water buffalo	All buffalo	103	60 (58.3)[y]	35 (34.0)[y]	5 (4.8)	3 (2.9)

[a, b, c] Cattle type means in a column without a common superscript were significantly different at $P < 0.05$.
[x, y] Species means in a column without a common superscript were significantly different at $P < 0.05$.

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Table 4 Frequency of tail injuries in cattle and water buffalo.

Species	Animal type	Number of animals	Tail injured animals (%)
Cattle	Hariana	243	158 (65.0)[a]
	Exotic ND	45	23 (51.1)[a]
	Local	80	8 (10.0)[b]
	All cattle	368	189 (51.3)[x]
Water buffalo	All water buffalo	192	29 (15.1)[y]

[a, b, c] Cattle type means in a column without a common superscript were significantly different at $P < 0.05$.
[x, y] Species means in a column without a common superscript were significantly different at $P < 0.05$.

Figure 1

Extended injury at the side of the nostril.

Based on breed, most (78%) of the cattle were imported, mainly from India, and the rest were local. The cattle were predominantly Hariana (Table 4).

Tail injuries were present in 39% (95% CI 34–43) of the cattle plus water buffalo, with the two main forms of injury being kinked tails (98%) and absent tail ends (2%). In general, kinked tails lacked movement at the kink when manipulated by hand. In the kinked tails, single (60%) and multiple (40%) numbers of bends were found in the proximal region (2%), the middle-to-distal region (94%) and at both regions (4%) of the tails. Tail injuries were present in over half the cattle (51%, 95% CI 46–56), and they were more common than in water buffalo (15%, 95% CI 10–20) ($P < 0.001$). There were fewer tail injuries in local compared with imported cattle, and tail injuries were more common in the Hariana breed compared to the exotic ND plus local breeds ($P < 0.001$).

The frequency of tail injuries was higher in male cattle plus water buffalo (92.2%) than female (7.8%; $P < 0.001$).

Discussion

Most of the cattle and water buffalo examined in this study were castrates imported from India where they would have been used as draught animals. The cattle were mainly Hariana, and the exotic animals included the Gir breed from India, Bhutan or Nepal. Local cattle in Bangladesh were, by comparison, small animals, less suitable for draught purposes. In south Asia, castrated water buffalo are used principally for cultivating rice paddies and pulling carts. The methods used for controlling these draught animals can cause injuries to the nose and tail.

Examples of situations in which tail twisting is a normal procedure in draught animals during soil cultivation are as follows. It is used to encourage an animal to move when its feet are stuck in the mud while preparing a paddy bed for planting. It may also be used for encouraging the slower partner in a pair of draught animals to move faster during ploughing, especially when turning at a headland. After ploughing, mud is removed from the animals by washing them in a pond, and tail twisting is often needed to encourage them to enter the washing pond. Cattle or water buffalo are also used for threshing grain from rice straw. The straw with grain is laid on a patch of hard ground and 4 or 5 animals that are tied together are driven around the area using a stick and tail twisting. Tail twisting is used when getting the group started and the slowest member of the group is likely to receive the most tail twisting. At livestock markets, tail twisting is used when loading and unloading trucks and when trying to get a fallen or recumbent animal to stand.

Situations when tension is applied to the nose rope in draught animals include leading them by the head from one place to another, changing the direction of the animal and controlling their movement during difficult procedures, such as drenching for mouth lesions in cases of foot and mouth disease. When animals are moved on foot along busy roads, nose-rope twisting is used to guide and control their movement. At the markets it was sometimes observed that when an animal was reluctant to feed, the stockman tried to encourage them to feed whilst holding the nose ropes. The rationale behind this was to encourage a full rumen and hence a better appearance in the animal. Animals are left standing at the market for long periods and sometimes they lay down at the head rail, but the stockmen suddenly pulled on the nose ropes to get them to stand up when potential customers approached. As a prelude to bartering, an animal is often shown to the buyer by leading it around an open space near the head rail. This allows a better display of the animal and here again the trader manipulates the animal's movement with the nose rope.

This study showed that tail and nose injuries were quite common. Sixty-two percent of the cattle plus water buffalo

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had moderate to severe nose injuries and 39% had tail injuries. The tail injuries and the more severe forms of nose injury were more common in cattle than in water buffalo. The reasons for this difference were not established in this study, but they may have been due to three factors. Firstly, Hariana cattle are larger than water buffalo and when this causes trepidation among the handlers it could result in more robust handling methods and greater injury to the cattle. Secondly, Hariana cattle can move more quickly than water buffalo, and this could also result in more forceful control methods. Thirdly, water buffalo are generally docile animals when not aroused, and so there may be less perceived need for harsh restraint. Instead, they are more likely to experience stick injuries to get them to move faster (Alam *et al* 2008).

Examples of an enlarged slit injury at the side of the nostril and an enlarged hole at the septum are shown in Figures 1 and 2. Fifty-eight percent of the nose-pierced animals had enlarged wounds in this region, or enlarged holes had developed where the rope passed through the septum. The injuries suggest excessive application of pressure when twisting the rope to control the animals' movement. The septum of the nose is relatively sensitive to pressure and the principles in using this rope to control movement are similar to those for fitting a bull with a nose ring. Only mild pressure need be used when leading or arresting movement in an animal. The injuries could be avoided if suitable alternative restraining methods were developed. In this respect, it might be worth developing a head rope that can be easily fitted around large horned animals instead of using nose piercing and a nose rope.

It was evident that in some animals the injuries may have been aggravated by using ropes made of nylon instead of cotton, but overall there was no significant difference in the frequency of the nose injuries between the two materials. Nylon rope has a relatively hard outer layer which could abrade the nose during rubbing, whereas cotton is smoother and less likely to cause rubbing injuries. Thirty-five percent of the animals that were fitted with nose ropes had nylon ropes.

An example of an injured tail is shown in Figure 3. Most of the tail injuries were kinks associated with dislocation of the coccygeal vertebrae, and no doubt occurred when the tail was being twisted. Four animals had lost the end of their tails, and this presumably occurred when tail necrosis developed after a blood clot had lodged in the tail artery (George *et al* 1970). Tail necrosis can be associated with tail gangrene and this may lead to septicaemia and sickness in the animal.

Figure 2

Extended injury at the septum.

Figure 3

Highly kinked tail that deviated from normal alignment.

Animal welfare implications and conclusion

Injuries sustained by draught bovines from yokes, harnesses and crude handling methods are well recognised, but there have been few attempts at assessing their frequency (Ramaswamy 1998). The conclusion from this study was that there were some common nose and tail injuries in cattle and water buffalo presented at livestock markets in Bangladesh. Ulcerations, lacerations and extended injuries were the main problems at the region of nose piercing. Kinked tails were particularly common in draught Hariana cattle. Thought needs to be given to reducing the risk of all these injuries. These welfare issues have never received attention from planners or decision-makers in India and Bangladesh at the professional level. They need to be addressed and, in particular, there needs to be improved awareness in south Asian communities about considerate handling of draught animals.

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