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ABSTRACT
This study investigated the occurrence of wounds in Nigerian horses. The study population was 1,621 horses sold at the Obollo Afor horse lairage in Enugu State, Nigeria, during a 6-month period: 3 months of dry season and 3 months of rainy season (February–April and June–August 2012). A total of 207 horses were systematically sampled and subjected to a comprehensive physical examination. Those with wounds were marked, recorded, and clinically examined. Of the 207 horses sampled, 21 (10.1%) had wounds. The body distribution of the wounds was 9.5% head, 9.5% forelimbs, 19.1% hind limbs, 4.8% tail, 14.3% flank, 9.5% loin, 19.1% hip, 9.5% barrel, and 4.8% croup. The occurrence of the wounds was not significantly associated with sex or season, but the occurrence in adults was significantly ($p < .05$) higher than that in the young and aged horses. It was concluded that the occurrence of wounds is relatively high (10.1%), and mainly the hind limbs, hip, and flank of adult horses are affected. It was recommended that horse guardians and handlers should be properly educated on the care of horses.

KEYWORDS
Wounds; Nigerian horses; occurrence; Obollo Afor

Nigerian horses are a mix of Arewa and their crosses with Arabian, Dongola, and Sudanese breeds, which are commonly reared in Northern Nigeria and used in all parts of the country for ceremonial, draft, transport, food (meat), sports, and research purposes (Edwards, 1994; Garba, Sackey, Tekdek, Agbede, & Bisalla, 2011; Hendricks & Dent, 2007; Ihedioha & Agina, 2013, 2014). These Nigerian horses, like other horses, can be afflicted with numerous diseases and disorders, one of which is wounds (Egbe-Nwiyi, Kalu, & Naphthali, 2012; Garba et al., 2011; Ihedioha & Agina, 2014; Noel-Uneke, 2013).

Wounds are brought about by tears on the skin, cuts, punctures, and blunt-force trauma that lead to abrasions, puncture, incision, or laceration (Pavord & Pavord, 2006). Abrasions are non-penetrating wounds of the skin that heal quickly, but in some cases, bleeding may occur under the skin and form a hematoma that may be re-absorbed by the body. Puncture wounds are deep, penetrating wounds with small entry holes. These wounds are commonly found in the foot and may be caused by a nail, glass, broken fence rails, or farm machinery. The affected area is often deep with little drainage, and it is swollen, hot, and painful with a small purulent discharge from the hole. This type of wound usually occurs in the frog region and may become a serious danger to the coffin joint or navicular bursa. It always results in severe lameness due to infection. Incised wounds are cuts that usually heal quite quickly, although deeper cuts that penetrate through the skin require stitching to be healed. Lacerated wounds are irregular tearlike wounds caused by blunt trauma (wire). They can be grazes and scratches or present as badly broken skin on the knees and deeper tissue damage (Pavord & Pavord, 2006).

The prevalence of wounds in horses is usually high (Singer, Saxby, & French, 2003), and traumatic wounds commonly occur in horses (Stashak & Theoret, 2008). Horses are more commonly associated...
with wounds than other nonhuman animal species because of the conditions in which they are kept, the type of work in which they are involved, and their flight and fright temperament, which is their best means of defense against predators (Houpt & Lieb, 2000; Pollock, 2011). Some guardians (owners) keep their horses in bad conditions due to lack of knowledge about care and management and the economic status of guardians who mainly belong to the poorer section of the society (Kumar, 2009). Horses, especially in developing countries, are prone to injury and trauma, and they are used as pack/draft animals or to pull carts in farms, markets, and construction sites, and for carrying sand, bricks, and gravel (Kumar, 2009). Other risk factors responsible for wounds in horses include improper or poorly fitted harnesses (Kay, 2009); trailer design; transportation in overloaded trailers with sharp, protruding metal pieces (Schwean, 2005); mixing unfamiliar horses prior to shipping (Grandin, McGee, & Lanier, 1999); horse resistance to trailer loading (Shanahan, 2003); kicks, bites, and slipping/falling; their confinement and closeness to fixed like fenced barbed wire (Coomer, 2008; Owen, Singer, Clegg, Ireland, & Pinchbeck, 2010); and the presence of sharp objects such as broken bottles, nails, and pieces of barbed wire found on the floor of the stable or on the pasture (Owen et al., 2010). A search through available literature revealed only a few reports on the occurrence of wounds and associated risk factors in horses (Knubben, Furst, Gygax, & Stauffacher, 2008). The aim of this present study was to investigate the occurrence of wounds in Nigerian horses.

**Materials and methods**

**Study design and area**

The study was a cross-sectional survey of Nigerian horses at the Obollo Afor horse lairage in Enugu State, Nigeria. Obollo Afor is located between latitude 6° 54’ 56” and longitude 7° 30’ 55”. The Obollo Afor horse lairage, commonly known as Obollo Afor horse depot, is the transit and sales point for horses shipped from Northern Nigeria for use in states in Eastern Nigeria (Ihedioha & Agina, 2013, 2014). These horses are crosses between Arabian, Dongola, and Sudanese breeds; they are commonly reared in Northern Nigeria and used for ceremonial (Durbar Festival), draft (work), transport, sports, and riding purposes. In states in Eastern Nigeria, they are commonly reared for food (meat) and research purposes. The horses with wounds were sold for an average price of 36,000 NGN (230 USD), while the apparently healthy horses were sold for an average price of 45,000 NGN (286 USD).

**Study population**

The study population was 1,621 horses presented and sold at the lairage during a 6-month period from February 2012 to April 2012 (dry season) and June 2012 to August 2012 (rainy season). Of these 1,621 horses, 207 were systematically sampled for the study, including all horses sold during each research visit to the lairage. Researchers visited the horses once a week for the 6-month study period. These 207 horses were subjected to comprehensive physical examination involving the head, body condition, mucous membranes, hair, composure, posture, and gait (Radostits, Gay, Hinchcliff, & Constable, 2007; Ugochukwu, 2001).

Based on the aforementioned findings, the horses were classified as wounded or apparently healthy. Those with wounds were marked and recorded as positive. The wounds were grouped according to their physical location on the body, and when there were multiple wounds on different parts of the body, the wounds were categorized under the part of the body most conspicuously/visibly affected for ease of statistical analysis. The ages of the horses were estimated based on tooth eruption and wear (Ensminger, 1969) and were categorized/grouped into foals (aged 0–11 months), young (aged 1–4 years), adult (aged 5–12 years), and old (older than 12 years of age; Ensminger, 1990; Evans, Jack, & Jones, 2007). The sexes of all the horses sampled (both those with wounds and apparently healthy) were also documented.
**Statistical analysis**

Data on the association between sex, age, or season and occurrence of wounds were subjected to a Chi-square or Fisher’s exact test as appropriate. Significance was accepted at $p < .05$. The occurrence of wounds and body distributions of the lesions were presented as descriptive percentages and pictures.

**Ethical approval**

The handling of the horses used in this study was done humanely in accordance with the Ethics and Regulation Guiding the Use of Animals as approved by the University of Nigeria in Nsukka.

**Results**

Of the 207 horses sampled, 21 (10.1%) had wounds located on different parts of the body (Figures 1–7). The body distribution of these wounds was 19.1% hind limbs; 19.1% hip; 14.3% flank; 9.5% for each the head, forelimbs, loin, and barrel; and 4.8% each for the croup and tail (Table 1). The 21 horses with wounds included 11 females and 10 males (Table 2), and there was no significant association ($p > .05$) between sex and occurrence of the wounds (Table 3). Twenty of the 21 horses affected by wounds were adults, 1 was a young horse, and none of the horses were aged. Adult horses had a significantly ($p < .05$)

![Figure 1. Horse with physical injury on the flank region and point of the hip.](image-url)
Figure 2. A stallion with a purulent wound at the hip region.

Figure 3. A grey female horse with a chronic wound on the tail.
**Figure 4.** Fresh wounds on the loin of a bay stallion.

**Figure 5.** Acute wound on the hoof region.
higher occurrence of wounds when compared with the young horses. Twelve of the 21 horses with wounds were recorded in the dry season, while 9 were recorded in the rainy season; there were no significant associations ($p > .05$) between season and occurrence of wounds in the horses (Table 4).

**Discussion**

The occurrence of wounds in the horses studied was lower than that reported by Biffa and Woldemeskel (2006) and Knubben et al. (2008). In the current study, most injuries occurred on the hind limbs, hip region, and flank. Wounds of the distal limbs are quite common and might have been sustained by running into, brushing against, kicking at, or stepping into an object (nails, glass, broken fence rails, and farm machinery) or by the horse becoming entangled in barbed wire or rope (Laverty, Lavoie, Pascoe, & Ducharme, 1996). Horses who jump fences might sustain blunt trauma, resulting in an abrasion or penetrating wound, often in the pastern region (Lloyd, 2011). Wounds sustained on the distal limbs are usually difficult to manage due to joint movement, poor blood circulation, and minimal soft tissues between the skin and bone (Schumacher & Stashak, 2008).

The wounds on the hip region and flank (Figures 1 and 2) could be attributed to tight and poorly fitted harnesses, as well as physical trauma caused by sticks and reins used by horse owners and handlers (Kay, 2009). The chronic wound on the tail could be a case of neglect, as the horse might have sustained a penetrating wound that was left untreated (Figure 3). The wound on the loin (Figure 4) may have resulted from sharp, protruding metal pieces in an overloaded trailer and/or a collision with a barbed-wire fence. Trapping of the limb on a barbed-wire fence may be the reason for the injury sustained on the hoof (Figure 5). The acute wound on the barrel (Figure 6) could be due to penetrating objects on the floor of the transporting vehicle or broken bottles or glass on the ground of the horse depot after offloading. The horse’s resistance to trailer loading (Shanahan, 2003) and stumbling into a barbed-wire fence might have led to the abrasion present on the croup (Figure 7). The head injury (lower jaw) may have been caused by penetrating trauma from plants during grazing on pasture. Mixing unfamiliar horses prior to shipping may have led to the wounds these horses sustained (Grandin et al., 1999).
The lack of significant associations between sex and occurrence of wounds in the present study is not in agreement with Estberg et al. (1998), who reported a higher rate of injuries in male horses than in female horses. Also, the lack of significant associations between season and occurrence of wounds is in contrast with the findings of Mohammed, Hill, and Lowe (1991), who reported seasonal

<table>
<thead>
<tr>
<th>Wounds on horses</th>
<th>Number</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Head</td>
<td>2</td>
<td>9.5</td>
</tr>
<tr>
<td>Forelimbs (hooves)</td>
<td>2</td>
<td>9.5</td>
</tr>
<tr>
<td>Hind limbs (hooves)</td>
<td>4</td>
<td>19.1</td>
</tr>
<tr>
<td>Tail</td>
<td>1</td>
<td>4.8</td>
</tr>
<tr>
<td>Flank</td>
<td>3</td>
<td>14.3</td>
</tr>
<tr>
<td>Loin</td>
<td>2</td>
<td>9.5</td>
</tr>
<tr>
<td>Hip region</td>
<td>4</td>
<td>19.1</td>
</tr>
<tr>
<td>Barrel</td>
<td>2</td>
<td>9.5</td>
</tr>
<tr>
<td>Croup</td>
<td>1</td>
<td>4.8</td>
</tr>
<tr>
<td>Total</td>
<td>21</td>
<td>100</td>
</tr>
</tbody>
</table>

Figure 7. Abrasion on the croup of a male horse.

Table 1. Distribution (location) of wounds on the Nigerian horses.
differences in the occurrence of musculoskeletal injuries in thoroughbred horses. In the current study, adult horses had more wounds than young horses. This finding is in agreement with that of Estberg et al. (1998) and could be attributed to the fact that adult horses are the ones commonly used for plowing carts on farms and in construction sites, and they are the horses mainly transported for sale and/or slaughter (Kumar, 2009).

Table 2. Sex distribution of horses with wounds.

<table>
<thead>
<tr>
<th></th>
<th>Horses with wounds</th>
<th>Apparently healthy horses</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td>10</td>
<td>89</td>
<td>99</td>
</tr>
<tr>
<td>Female</td>
<td>11</td>
<td>97</td>
<td>108</td>
</tr>
<tr>
<td>Total</td>
<td>21</td>
<td>186</td>
<td>207</td>
</tr>
</tbody>
</table>

Table 3. Age distribution of horses with wounds.

<table>
<thead>
<tr>
<th></th>
<th>Horses with wounds</th>
<th>Apparently healthy horses</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Foals</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Young</td>
<td>1</td>
<td>36</td>
<td>37</td>
</tr>
<tr>
<td>Adult</td>
<td>20</td>
<td>97</td>
<td>117</td>
</tr>
<tr>
<td>Old</td>
<td>0</td>
<td>53</td>
<td>53</td>
</tr>
<tr>
<td>Total</td>
<td>21</td>
<td>186</td>
<td>207</td>
</tr>
</tbody>
</table>

Table 4. Seasonal occurrence of wounds in the horses.

<table>
<thead>
<tr>
<th></th>
<th>Horses with wounds</th>
<th>Apparently healthy horses</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dry season</td>
<td>12</td>
<td>105</td>
<td>117</td>
</tr>
<tr>
<td>Rainy season</td>
<td>9</td>
<td>81</td>
<td>90</td>
</tr>
<tr>
<td>Total</td>
<td>21</td>
<td>186</td>
<td>207</td>
</tr>
</tbody>
</table>

Conclusion

Based on the results of this study, it was concluded that there is a relatively high occurrence of wounds in Nigerian horses, affecting largely the hind-limb hooves, hips, and flanks of adult horses, with no significant associations between sex or season and occurrence of these wounds. Therefore, education and training on proper housing, handling and transportation of these horses for the owners and care staff will help prevent wounds and thus improve the health and welfare of the horses. Improvement in the health and welfare of these horses will also enable the owners to earn more profit at the point of sale, as only healthy horses wound free horses can be ridden in a variety of sporting competitions such as polo, show jumping, endurance riding and horse racing. They can be used for agriculture and transportation in less developed areas, for ceremonial purposes, for public exhibition, and in advertisements for promoting products.

Acknowledgment

We thank the head of the Obollo Afor horse lairage for permitting us to take pictures of the wounded horses.

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References


Nsukka, Enugu State, Nigeria: University of Nigeria.


