Journal of Veterinary Behavior (2010) 5, 324-338

ELSEVIER

Journal of
Veterinary Behavior
Clinical Applications
and Research

RESEARCH

The roles of equine ethology and applied learning theory in horse-related human injuries

Lesley A. Hawson[a], **Andrew N. McLean**[b], **Paul D. McGreevy**[a]

[a]*Faculty of Veterinary Science, University of Sydney, New South Wales, Australia; and*
[b]*Australian Equine Behavior Centre, Broadford, Victoria, Australia.*

KEYWORDS:
horse;
injury;
equitation;
training;
ethology

Abstract Horse-related injuries to riders, handlers, and veterinarians can be both serious and long-term in their effects on the victim. This review of literature covering horse-related injuries to human beings sought to identify rider and handler injury incidence and the relationships between antecedents and demographics of incidents. Review and evaluation of previously recommended prevention strategies were also undertaken.

There was evidence that recent technological advances in protective equipment may have mitigated some injuries but the frequency of the incident has not changed. Despite several authors acknowledging the important role the horse played in many of the incidents, there was little specific detail about this role recorded. The emerging field of equitation science will contribute important insights that make horse-use safer by reducing the "unpredictability" aspect of horse–human interactions.

Introduction

Despite millennia of horse domestication and training, horse-riding and handling is still acknowledged as a dangerous pastime (Nelson and Bixby-Hammett, 1992; Abu-Zidan and Rao, 2003; Lim et al., 2003; Jagodzinski and DeMuri, 2005; Seibenga et al., 2006; Ball et al., 2007; Mayberry et al., 2007; Kiss et al., 2008; Bilaniuk et al., 2009). Although injuries incurred in horse-related incidents can be very serious and even fatal, recreational equestrian activities continue to grow in popularity in many parts of the world. Recent advances in learning theory and ethology as applied to horses in the form of equitation science are likely to reduce the injury risk to people involved with horses, for example, by clarifying ethological challenges at the horse–human interface (McGreevy et al., 2009). Demystifying horse-training should make horse interactions with human beings more predictable. Although the mechanisms that underpin effective training are being more broadly accepted, there is also opportunity for exploration of the communication processes between the 2 species (Feh and de Mazières, 1993; McGreevy et al., 2004; Keeling et al., 2009; McGreevy et al., 2009). To this end, we reviewed the data published in English over the past 20 years to collate the data available on injuries to human beings in horse-related incidents. We sought to identify any consistent trends in the demographics of those injured, causes of injury, risk factors for injury, role of personal protective equipment, and recommendations by authors of the articles for prevention of injury. We were particularly interested in identifying horse-related causes for human injuries.

Address for reprint requests and correspondence: Lesley A. Hawson, Faculty of Veterinary Science, University of Sydney, NSW 2006, Australia.
E-mail: lhawson@gmail.com

1558-7878/$ - see front matter © 2010 Elsevier Inc. All rights reserved.
doi:10.1016/j.jveb.2010.06.001

Materials and methods

A review of the articles cited was undertaken through the Web of Knowledge and Scopus databases using "horse-related injuries" and "equestrian injuries" as the search terms. We excluded articles that specifically covered the racing industry, as our aim was to target the sporting and leisure horse industry. We clustered data into the following 4 broad categories:

- Adult and child riders and non-riders (19 articles)
- Adult-only riders and non-riders (4 articles)
- Child-only riders and non-riders (3 articles)
- Veterinarians (2 articles)

Non-riders included horse handlers and bystanders. Veterinarians were included as a specific occupational group to compare whether handling injuries differed from handling injuries to owners. Because all articles reviewed used different measures for evaluating incident rates and injury severity, we tried to express as many of the variables as was possible as simple percentages. We also reviewed Australian Government statistics on horse-riding demographics using reports 4177.0 and 4901.0 downloaded from the Australian Bureau of Statistics website.

Results

Demographics of horse-riders

In its analysis of participation in sports, the Australian Bureau of Statistics (ABS, 2007) defines people aged >15 years as adults. It reports that the most populous cohort participating in horse-riding among persons aged >15 years was in the age group 35 to 44 years (27%), followed by the 25 to 34 years age group (20.6%). The 45 to 54 years age group made up 19.1% of horse-riding participants and the 18 to 24 year age group made up 16.4%. The 15 to 17 and the 55 to 64 years age groups made up 9.7% and 7.1% of the horse-riding participants, respectively. There were no data available from this resource on the age distribution of children involved in equestrian activities. Females made up 80% of adult (aged >15 years) participants in equestrian activities (ABS, 2007) and 86.8% of equestrian participants aged <15 years (ABS, 2009).

Demographics of those injured

Studies of adults and child riders only (Table 1) reported a bimodal pattern to injury frequency, with most injuries occurring in the second and fifth decades of life (Loder, 2008). Females predominated in younger age groups but males were more highly represented in older age groups. Some authors reported that although fewer males appeared in younger age groups, they often presented with more severe injuries as compared with their female counterparts (Jagodzinski and DeMuri, 2005; Cuenca et al., 2009). In the non-veterinary adults-only studies (Table 2), average age was reported to be within the fourth and fifth decades. Bilaniuk et al. (2009) found that patients older than 50 years were more likely to sustain fractures of ribs and thoracolumbar vertebrae, whereas patients younger than 50 years were more likely to present with concussion and fractures of the upper extremities. Upper extremity injuries also figured prominently in studies of equestrian-related trauma in children, with contusions, abrasions, and fractures showing a broadly equal frequency.

Patients aged <35 years were represented in greater numbers as compared with other age groups (Tables 2 and 3). Females represented 20% and 26%, respectively, of those injured in the veterinary studies (Table 4). No age-related data were recorded in these 2 studies.

Causes of injuries

The most common mechanism of injury in the studies, except for the veterinary-specific studies, was falling and/or being thrown from the horse (range, 46%-83% of incidents). Injuries among non-riders were most often caused by kicks (range, 0.8%-41% for riders and handlers, 7%-82% handler and bystanders). Veterinarians reported that 79% of injuries were caused by kicks (Lucas et al., 2009). Bites did not figure highly as a cause of injury.

Risk factors for injury

Jagodzinski and De Mura (2005) found significant risk factors for horse-related accidents included being female, participating in English-style riding, and riding 15 to 24 hours per month. Kiss et al. (2008) found that children who owned horses (or whose families owned horses) were more likely to receive injuries during handling.

Most of the studies found that riding incidents typically occurred within 3 years of the rider's first horse-riding experience. Clarke et al. (2008) showed that novice riders (categorized as those with fewer than 100 hours riding experience) were more vulnerable to accidents than riders with greater experience. In an earlier study, Ingemarson et al. (1989) had found that young horses and horses whose height was >148 cm were associated with an elevated risk of injury. They also observed lower risk in trotting than the galloping gaits.

Williams and Ashby (1995) reported that horse-related accidents were more common in warmer than in the cooler months. Accidents most often occurred in a field or paddock. This study also found horse behavior to be the most significant factor in horse-related incidents and that the majority of case reports alluded to the horse showing a fear response. Ball et al. (2007) also reported some factors related directly to the horses involved in their data set. In