Journal of Agromedicine

ISSN: 1059-924X (Print) 1545-0813 (Online) Journal homepage: https://www.tandfonline.com/loi/wagr20

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To cite this article: Deborah B. Reed PhD, RN , Scott P. Novak MA & Robin L. Heath MA (1998) Farm Youth and Horse-Related Injuries, Journal of Agromedicine, 5:1, 45-57, DOI: 10.1300/J096v05n01_06

To link to this article: https://doi.org/10.1300/J096v05n01_06

Published online: 11 Oct 2008.

Farm Youth and Horse-Related Injuries: A Case for Safety Helmets

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ABSTRACT. Horses are found on many farms and are used by children and youth for recreation and farm work. This presence increases exposure to activities that carry inherent risks for injuries from bites, kicks, and falls from horses. This paper advocates the use of safety helmets as a passive measure to prevent severe injuries, such as head trauma, that result from horse-related incidents. We use data drawn from members of eight 4-H horse clubs in Kentucky to explore possible explanations for low rates of helmet use. The results are compared with findings from existing literature, and intervention strategies for increasing use of safety-approved equestrian helmets are outlined. We suggest that the participant's risk perception involved in assessing the dangers for any given riding activity correlates with the person's view of helmet use. Further, helmet use is not

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This study was supported by the Southeast Center for Agricultural Health and Injury Prevention, Bluegrass Chapter of Farm Safety 4 Just Kids, and the Kentucky Safe Kids Coalition, Division of Maternal-Child Health.

Journal of Agromedicine, Vol. 5(1) 1998

only a function of risk perception associated with the riding activity, but the negative stereotypical image of helmets as well.

KEYWORDS. Injury, horses, children

INTRODUCTION

In 1985, Cogbill, Busch and Stiers reported that in a rural Wisconsin Level II trauma center, 32% of all hospital stays incurred by farm children (N = 105) over a 6 1/2 year period were the result of horse-related incidents.[1] Despite this considerable rate, there remains a paucity of literature on the relationship between equestrian activities and injuries sustained by farm children. These injuries included soft tissue damage (hematomas, contusions, lacerations, and puncture wounds), fracture or dislocation, sprain, concussion, or internal injury.[2] Without a helmet, the injury severity and mortality associated with an individual being thrown from a horse is comparable to being struck by a car.[3]

Bixby-Hammett and Brooks (1990) state that approximately 20% of horse-related injuries are to the face and head.[4] Equestrian helmets are readily available and specifically designed to provide protection and comfort for the rider. However, unlike bicycle helmets, safety-approved equestrian helmet use remains relatively low. A study by Bond et al. (1995) has already established an association between equestrian helmet use and decreased frequency and severity of central nervous system injury,[3] and as Nelson and his colleagues (1992, 1994) note, bicycle helmets have greatly reduced head injuries among bicyclists and equestrian helmets may do the same for horseback riders.[5,6]

This paper advocates the use of safety helmets which meet the criteria of the American Standard Testing Materials (ASTM) and approved by the Safety Equipment Institute (SEI) as a passive measure to prevent head injuries among riders. In Kentucky, recent surveillance of farm-related injuries to children demonstrated that animals constituted the second leading cause of injury among children

ages birth to 17 years.[7] Horses are found on many farms and are used by children for recreation and farm work thereby exposing them to the inherent risks of injuries from bites, kicks, and falls from horses. The purpose of this study was to gain a fuller understanding of attitudes and behaviors regarding helmets and riding behavior. We surveyed members of eight 4-H horse clubs in Kentucky as to their use and attitudes regarding riding helmets. The results are compared with findings from existing literature, and intervention strategies for the increased use of safety-approved equestrian helmets are outlined. We suggest that the participant's risk perception involved in assessing the dangers for any given riding activity is associated with the person's view of helmet use. Further, helmet use is not only a function of risk perception associated with the riding activity, but of the stereotypical image of helmets as well.

OVERVIEW OF THE PROBLEM

As previously stated, residents of farms and ranches are exposed to horses as commodities, as work animals, and for recreational purposes. Over 30 million Americans enjoy the sport of horseback riding.[8] The prevalence of serious injury due to horse-related activities is not well documented, but is estimated to surpass that for auto racing or motorcycle racing.[9] In a recent National Electronic Injury Surveillance System (NEISS) report comparing 18 sports in terms of injuries that resulted in hospital emergency department visits, an estimated number of 2.2 horseback riding injuries per 100,000 individuals led to hospitalization or fatal injuries. This rate equals that of football, and is preceded only by bicycles and accessories at 8.6, all terrain vehicles, mopeds and minibikes at 3.0 and playground equipment at 2.9.[10]

Few equestrian organizations, with the exception of the United States Pony Club, and the Combined Training Association, have policies that mandate safety helmet use.[11] The American Horse Shows Association mandates hard hats for junior hunter and jumper and hunt seat equitation classes but does not mandate safety helmets. Furthermore, policies regarding safety helmet use would be nearly impossible to enforce, except in cases of organized events. Nearly half of the equestrian injuries reported through the NEISS in

1987-1988 occurred at home or on a farm.[2] Equestrian-related injuries may be as likely to occur during routine activities like boarding, cleaning, ground work, and noncompetitive riding as during formally organized activities. We advocate safety helmet use with noncompetitive as well as competitive equestrian activities.

Head coverings are part of customary equestrian attire; however, many riders and health care professionals are unaware that not all helmets meet impact and retention standards of the American Standard Testing Materials (ASTM). Semi-rigid hats are perceived by many riders as providing adequate protection, but riders need to recognize the differences between safety-approved helmets and protective hats. Safety helmets undergo rigorous testing and must be able to withstand a triple gravity (3G) impact before receiving the Safety Equipment Institute (SEI) approval. All helmets approved by the SEI display a safety approval label inside the helmet shell. These helmets also include a sturdy chin harness that secures the helmet in place. When shopping for protective headgear, buyers should check for these features to ensure adequate protection.

We suggest that the prevalence of safety-approved helmet use tends to be associated with risk perception of specific horse-related activities. Hunt seat riding, a form of English-style riding, may be viewed by equestrians as a dangerous activity because it involves jumping obstacles on rugged terrain. A study by Nelson et al. (1994) found that 57.5% of English-style riders wore helmets on their most recent ride, compared to only 11.8% of Western-style riders who did so.[6] The authors suggest that the difference in helmet use by the two riding styles probably reflects appearance and tradition. While this is likely to be true, we believe that perception of risk may also play a part in the decision to wear a helmet. Both styles involve the same risks. For example, Western-style riding incorporates quick turns, uneven terrain, and speeds similar to those of hunt seat activities. Additionally, other types of equestrian activities may be even more risky than hunt seat riding. For example, rodeo riders are routinely thrown from agitated horses. Rodeo events that have long been part of the culture in the western states are rapidly gaining popularity among youth in Kentucky. Rodeo riders wear the characteristic cowboy hats, which are constructed of straw, felt, or wool that offer no protection from impact. Trail riders are exposed to

potential injury because they encounter unfamiliar terrain and in addition, risk being hit by tree branches. Ground work with horses, including grooming and feeding, offers exposure to the entire bulk of the animal and may result in being kicked, bitten, or crushed by the horse. Any exposure to horses should be perceived as an injury risk and met with appropriate action to prevent injury.

PREVIOUS RESEARCH

While protective riding hats have been available for nearly forty years, safety-approved equestrian helmets were just introduced in 1989. Helmet safety accreditation dates back to the establishment of the NEISS data base in 1979. NEISS allowed researchers access to population-based data on the prevalence rates for horse-related injuries. Much of the literature is based on that NEISS data or retrospective reviews of hospital patient charts. These data are descriptive in nature and outline only the epidemiologic characteristics of the injury. Bixby-Hammett and Brooks (1990) discuss the prevalence of different types of injury and report that an upper extremity is the most common location of injury, and the two most prevalent injuries are soft tissue damage and bone fractures.[4] Although injury to the face and head occurs less frequently (20%) than injury to the upper extremity (24%-61%) or lower extremity (36%-40%),[4] it holds the greatest potential for serious permanent disability. Barber (1973) found that nearly 2% of head traumas resulting from equestrian incidents were followed by post traumatic epileptic seizures.[12] Neurologic and central nervous system (CNS) injuries may require intensive physical therapy and long term medical care. Equestrian safety helmets are designed to absorb the energy that produces trauma, reducing severity of injury.

Only two studies reported the prevalence of helmet ownership, usage patterns, and attitudes toward equestrian helmets.[6,11] Nelson et al. (1994) examined cross-sectional survey data of horseback riders and found that reasons for the lack of helmet usage included that they were unnecessary (43.8%) or uncomfortable (29.9%).[6] Surprisingly, 62% reported one or more complaints about the helmets.[6] Although 43% of the sample thought helmets were unnecessary, nearly the same percentage had reported their helmets had

prevented injury. Thus, it is clear that helmets are a source of discomfort for many riders, and some respondents are still unaware of the efficacy of helmets in preventing injury. Condie et al. (1993) support this assertion with their findings that inadequate helmet design is the prevailing reason for non-use and helmets are seen as inappropriate for certain riding styles.[11] This finding suggests that many riders may continue to underestimate the necessity of helmets as a protective factor for injury and/or accord style and tradition a higher priority. Moreover, attitudes about helmet comfort may predispose those riders to increased risk since they are less likely to wear helmets as a measure of injury prevention.

The weakness of the epidemiological studies as a source of surveillance data is that no International Classification of Diseases code (ICD) exists for injuries related specifically to horses. This precludes accessibility from public health records and reduces researchers' ability to effectively pinpoint the prevalence and severity of horse-related injuries. Even with limited data, it is evident that horseback riding can be a dangerous sport. Data show that even the most expert riders are subject to injury, dispelling the myth that only children and novices suffer increased risk of injury.[8,13]

Nelson and Bixby-Hammett (1992) reviewed five emergency department studies and determined that most injuries to riders occurred in the 10 to 19 year age group.[5] A possible explanation for this finding is that young riders may be inexperienced and ride without adult supervision. These factors may place them at risk for horse-related injury and safety-approved helmets should be considered essential as an injury prevention measure.

PRELIMINARY STUDY

The Commonwealth of Kentucky is renowned for its horse industry. Children on Kentucky farms, as in other states, often have access to horses and learn to ride without benefit of instruction from a trained equestrian. Safety rules and attitudes toward animal handling are learned from parents and peers. Low prevalence of safety-approved equestrian helmet use may stem from the perception of helmets as unnecessary or unfashionable. The purpose of this study

was to gain a fuller understanding of the attitudes and behaviors of children and youth toward helmets and riding behavior.

The data are drawn from surveys administered during the Spring of 1995 to 4-H horse project members from 8 Kentucky counties. The 25-question survey was developed as an exploratory instrument to provide data related to children's and youths' helmet use, attitudes toward helmets, and riding characteristics. Respondents' ages ranged from 8 to 19 with a mean of 13 years. The riding experience varied between less than one year and 15 years, with 6.5 being the median years of riding experience. The majority began riding about age 5. The sample consisted of 66 children and youth, most of whom lived on farms (71%), and reported owning their own horse (86%). The response rate was 100%, that is, every participant in the eight 4-H Clubs completed a usable questionnaire. The survey instrument was tested for face-validity by a panel of farm based equestrians which included teenagers and adults.

Table 1 presents helmet use by riding activity. The highest prevalence of helmet use (61.1%) was found among those who engage in equestrian jumping. Nelson et al. (1994) found a similar rate of helmet use in English-style riding, which includes hunting and

TABLE 1. Percentage of Riders Who Wear Helmets by Type of Riding Activity*

Type of Activity	Number of Riders Who Wear Helmets	Percent
Hunt seat**	17	43.6
Jumping	22	61.1
Western**	10	23.9
Saddle seat**	8	40.0
Trail	22	37.9
Working with Horses	9	15.5
Other**	14	42.4

Note: *Includes persons who listed more than one type of riding
**Question restricted to showing horses in competition

jumping. In their study, 57% of English-style riders owned an SEI approved helmet and 57.5% wore a helmet on their last ride.[6] Since 4-H policy mandates safety helmets in hunt style competition, it is not surprising that we found helmet usage rate to be highest for this type of riding. Similarly, respondents working with horses in such activities as conducting ground training or grooming reported the lowest prevalence of helmet use (15.5%). Several activities, including cross country trail riding and saddle seat riding, showed patterns of helmet use at around 40.0%. Although Nelson et al. (1994) restricted their question on helmet use to the respondent's most recent ride, they report that among western riders, only 11.8% wore helmets.[6] This rate is markedly lower than that shown by our data; however, we asked how often respondents wore safety helmets, and thus, results are not comparable.

We expected high rates of helmet use for hunt seat style competition riding because 4-H policy mandates helmet use for this riding style. Current requirements for 4-H horseback riding competition in Kentucky specify horse and rider attire, but helmet use policy for riders other than hunt seat style is at the discretion of each local 4-H board. We believe that the policy variation regarding mandated helmet use by 4-H members may be responsible for the low rates found in our study. Although competitive riding may not necessarily have a higher risk for injury among equestrian activities, mandating safety helmet use in all competitive equestrian events would serve to promote familiarity with helmets and thus pave the way for attitude changes with respect to both competitive and noncompetitive riding.

This study suggests an association between helmet use and types of riding activities. The choice of whether or not to use a helmet may be a result of the perceived risk for the type of riding activity, or tradition and style, rather than actual exposure to the animal. For example, jumping had the highest prevalence of helmet use, while other activities, like feeding and grooming, reflected minimum helmet use. Bixby-Hammett (1987) found that cross-country trail riding, often thought to be a rather innocuous activity, had the highest percentage of equestrian injuries relative to various riding activities.[8] Thus, further epidemiologic research is needed to explicate

the relationship between risk perception of each riding activity and helmet use behavior.

ATTITUDES AND BEHAVIORS

The results of this study underscore the disparity between attitudes and behavior with regard to helmet use. Eighty-two percent (82%) of the respondents reported that they had been advised to wear a helmet, and over 86% expressed the opinion that helmets should be used to prevent injury. Moreover, 53% knew someone who was hurt in an equestrian activity, presumably due to failure to wear a helmet. When asked if they had worn a helmet at least one time in the past, 60% of our respondents answered in the affirmative. However, it would appear that the rate of consistent helmet use is lower. When asked about helmet use in specific riding styles, 44% of hunt seat, 61% of jumping, 24% of western, 40% of saddle seat, and 38% of trail riders reported that they consistently used a helmet.

Most of our respondents live on farms and the great majority own their own horses. Compared with riders who use private riding stables, farm children are more likely to have an increased exposure to horse-related injury because complete care of the horse is often the responsibility of the rider. When working with unmounted horses, our respondents seldom (15.5%) wear helmets, thus increasing their risk from injury due to unexpected movement of the animal. Barone and Rogers (1989) determined that 20% of their subjects sustained head and face trauma by being kicked by horses which they were not riding.[14] Also, Bixby-Hammett (1987) reported that in a 5 year study, 12.5% of 160 equestrian injuries were not related to riding.[8] Clearly safety-approved helmets should be worn by anyone with any exposure to horses, regardless of the setting.

We suggest that neither the site, the riding environment, nor the type of riding activity is the sole decisive factor in helmet use behavior. Rather, the characteristics of helmets must be considered when examining the relationship between helmet use and riding activities. Table 2 shows the respondents' favorite characteristic of equestrian helmets. Over 86% identified the prophylactic function of helmets in preventing injuries, greatly surpassing the next high-

est characteristics, lightweight and comfortable. Thus, young persons are clearly able to identify the preventive safety function of helmets.

To find an explanation for the lack of helmet use, one could examine the negative characteristics of helmets as identified by the respondents (see Table 3). Sixty percent (60%) of the sample named poor ventilation features of helmets. Between 19% and 22% mentioned poor appearance, lack of fit, and discomfort as negative characteristics of riding helmets. Helmets were redesigned in 1993, with new models incorporating improved ventilation ports and lighter-weight materials.[11] Goretex® liners are available to dissipate perspiration and promote cooling. Comments from focus group interviews, conducted after completion of the survey and a demonstration of safety helmets, revealed that children and youth were unaware of these new comfort features.

A notable finding is that only 3% of the youth surveyed reported that helmets are "easy to forget to put on" when riding. This per-

TABLE 2. Percentage of Named Positive Characteristics of Riding Helmets

Helmet Characteristics	Percent
Safety	86.2
Light Weight	5.9
Comfort	5.9
Attractiveness	2.0

TABLE 3. Percentage of Named Negative Characteristics of Riding Helmets*

Helmet Characteristics	Percent
Poorly Ventilated	60.6
Unattractive	19.7
Poor Fitting	21.2
Uncomfortable	22.3
Easy to Forget	3.0

Note: *Includes those who listed more than one answer

centage illustrates that the lack of helmet use is not a function of the incidental nature of forgetting to wear a helmet, but is a conscious choice. This choice is influenced by the physical factors that are part of helmet use. Perspiration and heat, which are often trapped by ill-fitting and poorly ventilated helmets, can render a helmet very uncomfortable and constitute a plausible explanation for not using them.

In focus group discussions, attitudes toward helmets were strongly influenced by peer pressure. Hunt seat riders more readily accepted the safety helmets, stating they have worn them for several years. Training helmets were met with some resistance by all participants due to the helmets' color and size. "I look like a motorcycle cop," one participant stated. Western helmets were met with the most resistance. "They look 'dorky,' like my head belongs to an alien." "Nobody else wears one, you don't see real cowboys wearing these things [safety helmets]." "It doesn't go with my outfit. Why don't they make them so they look better?" These comments point to the need for manufacturers to increase their attention to the appearance needs of riders. Even more important is the urgent need for role models who wear safety helmets. Focus group analysis found that perception of children and youth is that if adults do not wear them, helmets must be meant for inexperienced riders or just for children. Neither of these perceptions has a positive impact on the popularity of safety helmets.

DISCUSSION

Approximately 6,000 children and youth in Kentucky participate in 4-H horse programs. Although no horseback rider is exempt from injury risk, targeting a special population, children and youth, provides an avenue for changing the perception of safety helmet use. Encouragement for participants to use safety-approved equestrian helmets, through financial incentives to purchase helmets, role modeling by leaders who wear helmets, and adoption of policy, would foster positive images of safety helmets as standard attire for anyone engaged in horse-related activities. Findings from this study support the assumption that children and youth are able to identify the importance of safety helmets but have preconceived negative

perceptions of this personal protective equipment. To foster a change in these negative perceptions, helmet manufacturers should market their recently redesigned helmets with emphasis on comfort and style.

Safety-approved equestrian headgear is initially more expensive than cosmetic head coverings or protective hats, yet has the potential to save thousands of dollars in medical expenses, prevent serious injury, and reduce the number of disabilities and deaths caused by injury. The cost of even an uncomplicated emergency room visit far outweighs the average cost of a safety-approved equestrian helmet (about $50.00). Changing children's and youths' negative perceptions of riding helmets rests with building a positive image of peer and role model acceptability, similar to the efforts that have vaulted the use of bicycle helmets, and increasing exposure to redesigned safety helmets. Until perceptions are changed, use of equestrian helmets will remain low, and unnecessary injuries will continue.

REFERENCES

1. Cogbill TH, Busch HM, Stiers GR. Farm accidents in children. Pediatrics 1985; 76(4):562-6.

2. Centers for Disease Control. Injuries associated with horseback riding, United States, 1987-1988. MMWR 1990; 39:329-32.

3. Bond GR, Christoph RA, Rodgers BM. Pediatric equestrian injuries: assessing the impact of helmet use. Pediatrics 1995; 95(4):487-9.

4. Bixby-Hammett DM, Brooks WH. Common Injuries in horseback riding. Sports Med 1990; 9(1):36-47.

5. Nelson DE, Bixby-Hammett DM. Equestrian injuries in children and young adults. Am J Dis Child 1992; 146:611-4.

6. Nelson DE, Rivara FP, Condie C. Helmets and horseback riders. Am J Prev Med 1994; 10(1):15-9.

7. Traumatic farm injury surveillance in Kentucky, No. 4, Summer, 1994. [newsletter] Kentucky Department for Health Services, Division of Epidemiology.

8. Bixby-Hammett DM. Accidents in equestrian sports. Am Fam Physician 1987; 36(3):209-14.

9. Firth JL. Equestrian injuries. In: Schneider RC, Kennedy JC, Plant ML (Editors). Sports injuries: mechanism, prevention and treatment. Baltimore, MD: Williams and Wilkins, 1985; 431-9.

10. Consumer Product Safety Commission. Injuries associated with selected sports and recreational equipment treated in hospital emergency departments–calendar year 1994. Consumer Product Safety Review 1996; 1(1): 5.

11. Condie C, Rivara FP, Bergman AB. Strategies of a successful campaign to promote the use of equestrian helmets. Public Health Rep 1993;108(1):121-6.

12. Barber HM. Horse play: survey of accidents with horses. BMJ 1973;3:532.

13. Bixby-Hammett DM. Pediatric equestrian injuries. Pediatrics 1992;89(6): 1173-6.

14. Barone GW, Rodgers BM. Pediatric equestrian injuries: a 14 year review. J Trauma 1989; 29(2):245-7.