The association between jockey experience and race-day jockey falls in flat racing in Australia

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To investigate risk factors for falls to less-experienced thoroughbred flat racing jockeys.
• Incidence rates and risk factors for falls by thoroughbred racing jockeys have previously been reported.

• Inexperience of the jockey and riding less accomplished horses have been implicated as contributing factors to increased fall rates, justifying further investigation into the interplay of these factors.

• Apprentice flat racing jockeys had a fall rate that was 50 percent higher than that of their more experienced counterparts.

• Fall rates differed by race grade:
  – 67% higher than full-licensed jockeys in maiden races
  – 51% higher in class races
  – 21% higher in open and restricted races
Data sources

- Collected race-day data for period 2002/03 to 2008/09 racing seasons.

- Incident information on falls obtained from stewards’ reports.

- Race field information provided by Racing Information Services Australia (RISA).

- These data were merged with the incident falls data by 1:1 matching on race date, race course, race number, jockey name and horse name.
Methods

- Apprentice jockeys who commenced their race riding career between 1 August 2002 to 31 July 2009.

- Jockey experience was classified by the number of career rides.
Main study factors

- Jockey licence, age and sex
- Horse age and sex
- Previous race rides at a race meeting
- Race grade
- Previous starts by the horse
- Track rating
- Club level
- Field size
- Race distance
- Prize money

- Rail position
- Weather conditions
- Race number
- Race season
Methods

Cox proportional hazards regression methods to model the probability (hazard) of falls as a function of time and covariates.

The unit of “time” = each race ride

Jockey was considered to have survived to the next point in “time” (the next ride) if he/she had not had a fall during the last race ride.

The gap-time modelling approach was employed to take account of recurrent events, with standard errors adjusted to take account of clustering on jockey.
Early-career jockeys

<table>
<thead>
<tr>
<th>Category</th>
<th>Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>No. jockeys</td>
<td>514</td>
</tr>
<tr>
<td>Falls</td>
<td>1,311</td>
</tr>
<tr>
<td>Injuries</td>
<td>303</td>
</tr>
<tr>
<td>No. of rides</td>
<td>254,449</td>
</tr>
<tr>
<td>Flat races analysed</td>
<td>95,164</td>
</tr>
<tr>
<td>Race meetings analysed</td>
<td>15,785</td>
</tr>
</tbody>
</table>
Early-career jockeys

Jockeys with fewer career rides were generally:

- younger in age
- had been riding for a lesser amount of time
- had a lower winning strike rate
- had lower exposure

The horses they rode were:

- older in age
- had a greater number of previous race starts

The races in which these jockeys rode were:

- lower in grade
- had less prize money at stake
- had fewer starters
- were shorter in distance
Early-career jockeys

Career rides of early-career jockeys (n=514) who commenced race riding between 2002/03 to 2008/09 racing seasons.

<table>
<thead>
<tr>
<th>Study factor</th>
<th>Falls</th>
<th>Rides</th>
<th>Falls per 100 rides</th>
<th>Hazard ratio (95% CI)*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Career rides</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&lt; 50 rides</td>
<td>158</td>
<td>19,917</td>
<td>0.79</td>
<td>1.00</td>
</tr>
<tr>
<td>50 – 249 rides</td>
<td>395</td>
<td>57,280</td>
<td>0.69</td>
<td>0.74 (0.51, 1.07)</td>
</tr>
<tr>
<td>250 – 499 rides</td>
<td>253</td>
<td>47,693</td>
<td>0.53</td>
<td>0.48 (0.32, 0.73)‡</td>
</tr>
<tr>
<td>500 – 999 rides</td>
<td>260</td>
<td>57,629</td>
<td>0.45</td>
<td>0.41 (0.26, 0.63) §</td>
</tr>
<tr>
<td>1000 – 1999 rides</td>
<td>188</td>
<td>51,495</td>
<td>0.37</td>
<td>0.26 (0.16, 0.42) §</td>
</tr>
<tr>
<td>≥ 2000 rides</td>
<td>57</td>
<td>20,435</td>
<td>0.28</td>
<td>0.16 (0.09, 0.28) §</td>
</tr>
</tbody>
</table>

* HR (95% CI) = hazard ratio (95% confidence interval); † p<0.05, ‡ p<0.01, § p<0.001

p<0.001 for trend
Fall incidence rates by number of career rides for early-career jockeys who commenced race riding during the study period.
Significant predictors of falls were:

- older jockey age at commencement of career ($p=0.001$)
- fewer previous rides this meeting ($p<0.001$)
- fewer previous starts by the horse ($p<0.001$)
- younger horse age ($p<0.001$)
- lower race grade ($p<0.001$)
- less prize money at stake ($p<0.001$)
- shorter race distance ($p<0.001$)
- drier track rating ($p<0.001$)

The hazard ratios for race grade, previous horse starts and race distance differed significantly across category of jockey experience.
During the first 50 rides, the gradients of risk were less pronounced because the most inexperienced jockeys were generally at higher risk regardless of study factor.

Adjusted for all other covariates in multivariable analysis, none of the interactions (race grade \( p=0.071 \), previous starts by horse \( p=0.059 \), race distance \( p=0.089 \)) remained statistically significant because they were not independent of each other.
Race grade

Interaction effect p=0.010
Interaction effect p=0.049
Race distance

Interaction effect p=0.037
Study strengths, limitations, conclusions & recommendations
National study of falls and injuries of licenced jockeys in Australia.

Comprehensive analysis of incidence of falls, location outcomes, and predictors of falls.

Very high ascertainment, with 96% of stewards’ reports for the period being obtained.

Large size of dataset permitted close investigation of risk factors within strata of other factors.

Confined nature of the study period that reduced heterogeneity due to changes in regulations and practices.

Objective nature of most of the measurements.
Limitations

• Stewards’ reports were not standardized and have not been validated

• Observational descriptions of incidents involving multiple observers in differing jurisdictions

• Cross-sectional design allows inferences about associations, but not about causation

• No coverage of falls in track work, which in a Victorian study accounted for 31% of falls.¹

• Apprentice jockey experience was inversely and strongly associated with increased rates of falls.

• Risk factors that preferentially contribute to falls by inexperienced jockeys include indicators of less accomplished horses and race conditions.

• Consideration should be given to restricting apprentice jockeys with little race riding experience from riding horses that have not yet won a race (maiden) or that have had few previous race starts.
• Several Principal Racing Authorities of Australia already have policies or local rules in place
  – restrict apprentice jockeys from riding 2-year-old or unraced horses until the apprentice has ridden in a prescribed number of official races or barrier trials or has otherwise satisfied the stipendiary stewards.

• The evidence presented here shows that it is particularly the level of horse accomplishment rather than age that is most important.
Apprentices with little race-riding experience could be identified by:

(1) Number of race-rides successfully ridden (e.g. first 50, first 250).

OR

(2) The year of the race-riding career (where year 1 commences from the 1\textsuperscript{st} race ride NOT from the apprenticeship start date):

<table>
<thead>
<tr>
<th>Year</th>
<th>No. apprentices</th>
<th>Average no. rides</th>
<th>Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>1\textsuperscript{st} year</td>
<td>514</td>
<td>117</td>
<td>1 – 801</td>
</tr>
<tr>
<td>2\textsuperscript{nd} year</td>
<td>316</td>
<td>200</td>
<td>1 - 1078</td>
</tr>
<tr>
<td>3\textsuperscript{rd} year</td>
<td>230</td>
<td>230</td>
<td>3 - 1036</td>
</tr>
<tr>
<td>4\textsuperscript{th} year</td>
<td>167</td>
<td>213</td>
<td>1 - 931</td>
</tr>
</tbody>
</table>
Strategies for improving industry practice

- Imposition of restrictions on early-career jockeys from riding in situations that have been confirmed to impose high risk.
  - May require apprentices to be better prepared when they commence riding less accomplished or more difficult horses.

- Investigate methods of providing better training and conditioning for jockeys.

- Establishment of minimum standards of performance for jockey licensing.

- More thorough education of horses in race-day conditions prior to them commencing a racing career.

- Objective medical data to monitor safety standards.
Recommendations for future research

• Fall and injury incidence rates and risk factors in track-work riding.

• Investigation of other potential risk factors:
  – Information on training, years of experience, and riding record
  – Racetrack data, penetrometer readings at the time of the race, and more detailed data on weather conditions
  – Extraneous factors such as crowd size and noise level

• A large-scale study of physiological and fitness attributes of jockeys including investigation of the association of falls with other factors such as mental alertness, adequacy of warm-up and familiarity with the track.
Australian Racing Board and all Principal Racing Authorities

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