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A Study Investigating Prevalence of Pain in UK Horse Riders over Thirty-Five Years Old

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Abstract

Horse riding is considered one of the most dangerous sports, more so than skiing, motor racing, and rugby. On average, a rider falls once every two years, and during their career, one in five are seriously injured. Previous research has examined pain in elite dressage, show jumping, and event riders, as well as how overuse injuries and lifestyle can exacerbate pain and affect performance. Persistent pain can be debilitating and determine the end of a career. This study aims to investigate the prevalence of pain in riders over 35 years old, the location and management of pain, and the self-perception of whether pain affected riding. Due to the exploratory nature of the survey undertaken, a primarily quantitative approach was used. 2185 participants completed a questionnaire containing 46 open and closed questions. Pain was experienced by 85.4% (n = 1866) of participants, making riders over 35 years old 5.85 times (O.R.) more likely to experience pain than pain-free. Females were 1.28 times (O.R.) more likely to experience pain than male riders. Participants attributed their pain to old age, arthritis, performing stable duties, and previous injuries, with 42% (n = 784) of participants having to stop riding due to pain. The most common method to treat pain was over-the-counter medication, with female participants being 2.2 times more likely to take medication than males. Participants who had been riding for 20 years or more were 6.54 times (O.R.) more likely to have pain than not, and riders who did not take part in any other physical exercise were 1.4 times (O.R.) more likely to suffer pain. The high frequency of pain in riders over 35 years, particularly lower back pain, could be due to the length of their riding career. While this study reports individual perception of pain and pain management, it is individual perception that is likely to determine the impact of the pain on that individual. Further research is required regarding the perception of pain to better establish the causes of pain and determine appropriate management strategies.

Keywords

Horse riding; equestrian; injury; pain; asymmetry

1. Introduction

In the United Kingdom, 3 million people ride horses regularly [1]. Compared to many other sports, equestrian career longevity can span for decades and it is classed as an early start, late specialization sport [2]. Within the sporting disciplines competition ages range from under 10 to seniors. Some riders regularly compete into their 60's and 70's, even at the Olympics level, suggesting age is not necessarily a limiting factor in equestrian sport. Leisure riding has become increasingly popular with many older riders coming back into the sport later in life [1]. Riding is considered moderately physically demanding and can be highly challenging. It presents a degree of risk as the horse is often an unpredictable creature, capable of moving at 35 mph, and the rider being approximately 3 meters off the ground. During their career, one in five equestrians are seriously injured [3]. On average, a rider will fall from a horse once every two years [4]. This indicates that older athletes who have ridden for many years are likely to have been injured at some point during their riding career. Thirty-seven percent of riders with equestrian-

related injuries requiring hospitalization were over the age of 35 years [5].

In addition to traumatic injury, repetitive movements over a long period of time can cause overuse musculoskeletal injuries and are a common cause of early retirement from sports [6]. Long-term consequences of injury and pain may affect the quality of life and general health [7–10] and may continue to be problematic long after the rider ends their riding career, potentially affecting their everyday lifestyle [11,12].

Injury and pain may also reduce physical performance and sport participation, impacting the success of teams and organizations, as well as individual athletes [7]. Previous injury may lead to asymmetry affecting balance and performance [13–15]. Poor posture and an inactive core may cause pain at some point in the rider's life, and if not actively trained and rehabilitated, repetitive injuries can cause back pain to be more common earlier in life [16].

Previous studies have shown there to be a large proportion of elite competition riders suffering from pain [17,18], with over 35-year-olds reporting the highest levels. There is little research on the prevalence of pain in older non-elite and leisure riders. Further research is needed to establish how pain affects riders as they get older to establish common injuries seen in riding, prevention, treatment, and pain management strategies.

The study aims to investigate the prevalence, location, and severity of pain in riders over the age of 35 years. It also aims to discover factors that affect the pain that riders experience and the pain management techniques used by riders over the age of 35 years.

2. Methods

A survey methodology was selected to answer the aims. The survey tool was a six-part online questionnaire (SurveyMonkey®) that was made available to riders thirty-five years old or over, following full institutional ethical approval. The online questionnaire was accessible for one month, and no incentive was offered to participants. The questionnaire was delivered online to access a geographically diverse population and allow them to respond at their convenience. Volunteer participants were recruited from personal contacts via email, and a number of specialist equestrian social media sites (such as the Horse & Hound forum) were identified, and a link to the questionnaire was posted on these sites. A snowball sampling technique was employed where those receiving an email regarding the questionnaire were asked to send the email to other horse riders that they knew. Due to the anonymity of the questionnaire, completion of the form was considered consent to take part in the study (as explained to them in the participant information sheet preceding the survey).

2.1. Measure

A questionnaire was constructed using the principles put forward by Diem [19] and was adapted from the questionnaire used to investigate pain in elite competitive horse riders [17,18,20]. The questionnaire, containing forty-six questions, was developed containing a mixture of closed-response (e.g. Yes/No and Likert scale) and open-response items [21] and was designed to take no longer than 15 minutes to complete. Section 1 asked respondents to state their riding and competition level. Section 2 asked questions related to a previous injury and self-reported level, location, and cause of pain (adapted from validated questions taken from the short-form McGill Pain Questionnaire [22]). Section 3 was specific to the perceived impact this pain had on their performance. Section 4 asked what factors contributed to increased levels of pain when riding (e.g. saddle, movement of the horse, cold weather, yard work). Information related to the participant's management strategies for dealing with this pain (e.g. over-the-counter pain medication, prescription pain medication, manual therapy such as physical therapy, chiropractic treatment, and other strategies) was also gathered. The final section (5) was modified for equestrian athletes from the Oswestry pain questionnaire [23] to assess the impact their pain has on their general life and wellbeing. Validity evidence for the instrument was provided by reviewing the questionnaire for (1) clarity of wording, (2) use of standard English and spelling, (3) reliance of items, (4) absence of biased words and phrases, (5) formatting of items, and (6) clarity of instructions [24]. Two faculty senior academics experienced in survey design were asked to use these guidelines to review the instrument. Based on the reviewers' comments the instrument was revised and as a pilot study, the questionnaire was distributed to 10 riders before further revisions were made prior to final administration.

2.2. Data Analysis

In total, there were 2803 respondents with 618 discounted due to non-completion of the questionnaire, leaving 2185 to be analyzed. Data from the SurveyMonkey® package were downloaded into a Microsoft Excel® (2010) spreadsheet. Descriptive statistics were used to report frequencies and percentages within the data. The Chi-squared test and odds ratios were utilized to assess the prevalence of pain experienced by riders over the age of 35 years. To analyze relationships between variables, Spearman's test, Kendall's Tua test, and odds ratios were performed. An alpha value was set at $p < 0.05$ (confidence interval 95%) throughout unless otherwise stated. Data were analyzed using SPSS for Windows version 24.

3. Results

3.1. Sex and Age

Of the participants that completed the survey, 98% were female and 2% were male. Female participants were 1.28 times (O.R.) more likely to have experienced pain in the last two years than male participants.

Total participants per age group ranged from 31% of the riders in the 35–40 category to under 1% in the over 70 years category **(Table 1)**. Eighty-three percent of participants reported suffering from chronic pain, with the 61 to 65 years category experiencing the most pain (90%) and the 35 to 40-year-old group, reporting the least pain (79%). Most pain reported was mild or moderate **(Table 2)**.

3.2. Location and Severity of Pain

The most common location of pain experienced was the lower back (51.9% of participants), and the least common location to experience pain was the head (12.7%). Other areas of pain are reported in **Figure 1**. A total of 54% suffered from pain for over 6 years, 16% for four-five years, 21% for two-three years, and 8% for 1 year or less. 7.8% of those reporting pain had experienced severe pain (**Table 2** and **4**), with the most

common location being the hip. 41.2% of those reporting pain had experienced moderate pain, with the most common location being the lower back. 7.8% of those reporting pain had experienced mild pain, with the most common location being the lower back.

3.3. Pain Management Techniques

A total of 51.1% of participants took over-the-counter pain medication, 23.9% of participants were prescribed pain medication, 47.7% had therapy such as physiotherapy, massage, or chiropractic treatment, and 34.2% were on an exercise program to help manage their pain. Female participants were 2.2 times (O.R.) more likely to take over-the-counter medication than males. Half of the participants stated that their pain was medically diagnosed.

A total of 1596 participants managed their pain with medication, 51% (n = 1088) self-medicated taking over-the-counter pain medication, and 47.7% (n = 1016) used therapeutic treatment **(Table 3)**.

3.4. Equestrian Activities and Pain

Only 103 participants reported that no particular activity increased the level of pain they experienced. Participants reported that the weather (including the temperature, n = 903) and sitting for long periods (n = 816) increased the pain they experienced. They also reported some equestrian activities increased pain levels **(Figure 2)**. The most common individual reason was doing stable duties, but collectively ridden activities were reported by 72.8% (1549 of 2128) of participants who reported experiencing pain, as increasing pain levels.

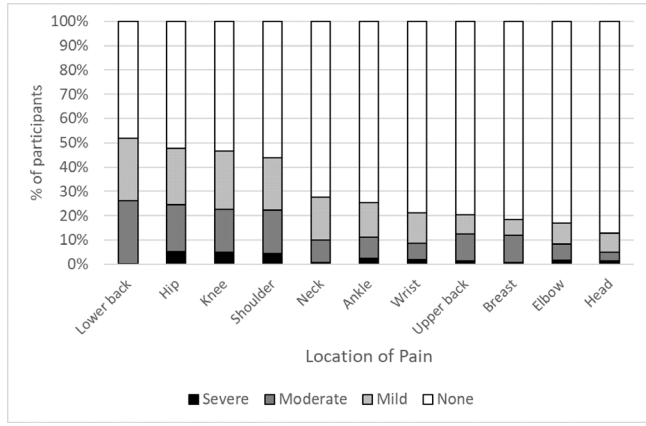

Figure 1: Location and level of pain reported by participants.

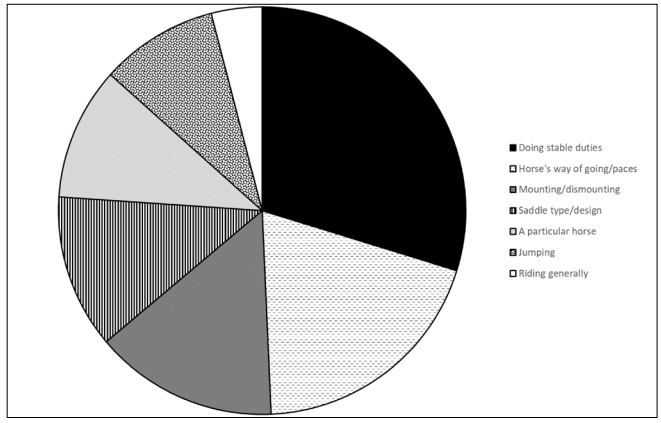

Figure 2: The equestrian activities that increase the pain experienced.

Table 1: Participant demographics and pain reported.

Group	Total number of participants	Participants experiencing pain	Participants experiencing no pain	Odds ratio Pain: No Pain
All respondents	2185	85.4% (1866)	14.6% (319)	5.85
Sex				
Females	2137	85.5% (1828)	14.5% (309)	5.92
Males	43	79.1% (34)	20.9% (9)	3.78
Age (years)				
35-40	688	82.8% (570)	17.2% (118)	4.83
41-45	377	86.7% (327)	13.3% (50)	6.54
46-50	374	89.0% (333)	11.0% (41)	8.12
51-55	363	83.5% (303)	16.5% (60)	5.05
56-60	216	85.2% (184)	14.8% (32)	5.75
61-65	115	92.2% (106)	7.8% (9)	11.78
66-70	36	80.6% (29)	19.4% (7)	4.14
70 and over	16	87.5% (14)	12.5% (2)	7.00

Table 2: Level of pain experienced.

Group	Least pain level experienced	Lower quartile pain level experienced	Median pain level experienced	Upper quartile pain level experienced	Most pain level experienced
All respondents	No pain	Mild	Mild	Moderate	Worst imaginable
Sex					
Females	No pain				Worst imaginable
Males	No pain				
Age (years)					
35-40	No pain	Mild	Mild	Moderate	Worst imaginable
41-45	No pain	Mild	Mild	Moderate	Worst imaginable
46-50	No pain	Mild	Mild	Moderate	Worst imaginable
51-55	No pain	Mild	Mild	Moderate	Severe
56-60	No pain	Mild	Moderate	Moderate	Severe
61-65	No pain	Mild	Mild	Moderate	Severe
66-70	No pain	Mild	Moderate	Moderate	Severe
70 and over	No pain	Mild	Mild	Moderate	Worst imaginable

Table 3: The techniques the 2128 participants who experienced pain reported using to manage the pain.

	Total	Over counter medication	Therapeutic treatment	Exercise	Prescription medication	Nothing
Over counter medication	51.1% (1088)	-	29.2% (621)	20.3% (431)	8.3% (177)	15.7% (334)
Therapeutic treatment	47.7% (1016)	29.2% (621)	-	24.3% (517)	14.6% (310)	4.1% (88)
Exercise	34.2% (728)	20.6% (439)	24.3% (517)	-	9.4% (199)	2.3% (50)
Prescription medication	23.9% (508)	8.3% (177)	14.6% (310)	9.4% (199)	-	5.4% (115)
Nothing	5.6% (120)	-	-	-	-	-

Table 4: A comparison of how pain and pain levels change before, during, and after riding.

		No pain	Pain	Mild	Moderate	Severe
Before riding		188	1289	812	450	27
Before riding compared to during riding	Decreased	-	30.5% (393)	26.5% (215)	36.7% (165)	48.1% (13)
	Stayed the Same	67.0% (126)	56.7% (731)	56.7% (460)	57.1% (257)	51.9% (14)
	Increased	33.0% (62)	12.7% (164)	16.7% (136)	6.2% (28)	-
During riding vs. after riding	Decreased	4.3% (8)	4.5% (58)	3.9% (32)	5.8% (26)	0
	Stayed the same	55.9% (105)	51.8% (668)	47.2% (383)	59.1% (266)	70.4% (19)
	Increased	38.8% (73)	42.7% (550)	48.6% (395)	34.9% (157)	29.6% (8)
Before riding vs. after riding	Decreased	-	14.3% (184)	10.1% (82)	20.9% (94)	29.6% (8)
	Stayed the same	37.8% (71)	48.8% (629)	43.0% (349)	58.0% (261)	70.4% (19)
	Increased	62.2% (117)	36.7% (473)	46.7% (379)	20.9% (94)	-

3.5. Riding History and Pain

Of the participants, 83% stated that they have been riding for over 20 years, 10% had ridden for 10 to 20 years, 3% had ridden for 6 to 10 years, 3% had ridden for 1 to 5 years, and less than 1% had ridden for 1 year or less. The data showed that pain had been experienced by 86.7% of participants who had ridden for over 20 years, 81.5% of those with 11 to 20 years of riding experience, 73.3% of those with 6 to 10 years of riding experience, 76.2% of those with 1 to 5 years of riding experience, and 75% of those with less than 1 year of riding experience **(Table 5)**.

3.6. Level of Riding and Riding Discipline

Nearly half of the participants (49%) considered themselves as amateur competitive riders, 43% stated that they were leisure or recreational riders, and 8% stated that they were professional riders. The results indicated that the proportion of participants reporting pain was similarly high across levels of competitive participation **(Table 6)**, although those competing for leisure purposes reported slightly less pain.

3.7. Pain Affecting Equestrian Activities

Factors of pain that affected performance included the following: 30% of participants stated that pain causes fatigue, 41% said that it limits movement, and 46% stated that it decreases the range of movement. Additionally, 41% of participants stated that pain causes asymmetry, with 17% stating that it causes asymmetry in the horse **(Figure 3)**. A total of 42% of participants reported that pain or injury had stopped them from riding at some point. Time off riding due to pain ranged from a few days to 15 years and even prevented some from returning to riding permanently.

3.8. Other Sporting Activities

About 36% of participants stated that they exercised or participated in a sport other than riding for two to three hours per week, while 22% reported doing so for less than one hour per week, 12% for four to five hours per week, 9% for six or more hours per week, and 21% did not participate in any other sports or exercise. The odds ratio for participants who did not participate in any exercise other than riding was 1.4 times (O.R.) more likely to suffer from pain than participants that did.

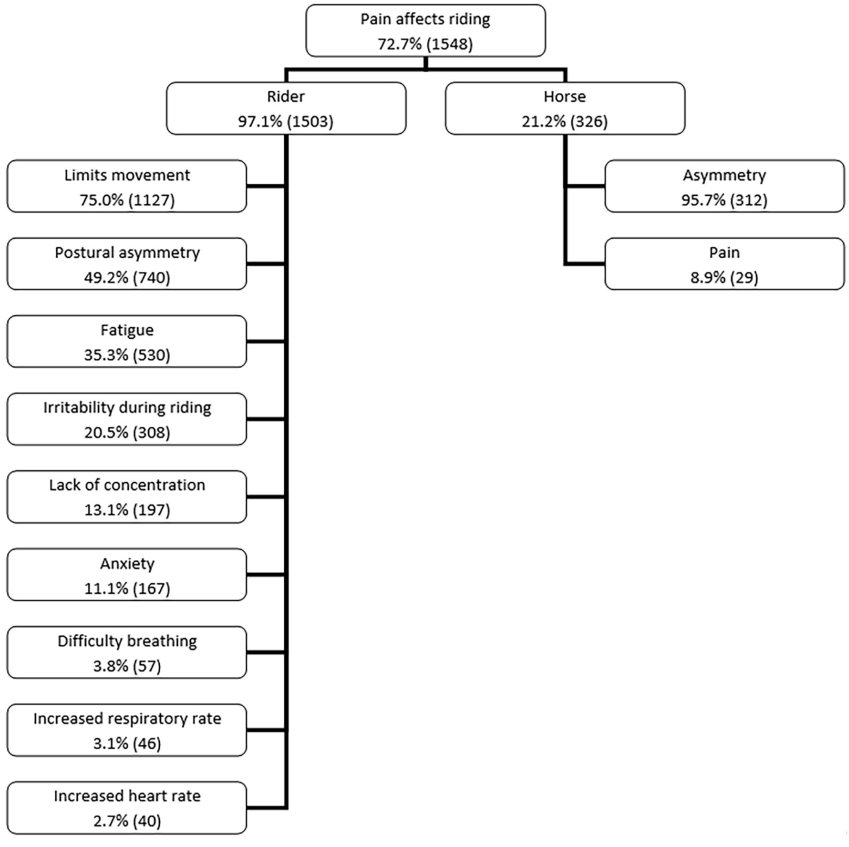

Figure 3: How the participants (2128) who reported pain believed it affected their riding.

Table 5: Comparison between the length of time riding and pain experienced.

Years horse riding	Total number of participants	Participants experiencing pain	Participants experiencing no pain	Odds ratio Pain: No Pain
Less than 1	8	75.0% (6)	25.0% (2)	3.00
1–5	63	76.2% (48)	23.8% (15)	3.20
6–10	75	73.3% (55)	26.7% (20)	2.75
11–20	222	81.5% (181)	18.5% (41)	4.41
More than 20	1817	86.7% (1576)	13.3% (241)	6.54

Table 6: The pain experienced across participants in different equestrian sporting disciplines (with at least 100 participants) and across different levels of competitive participation.

		All	Leisure	Amateur	Professional
All disciplines	Pain	3222	1087	1809	325
	No Pain	525	199	287	45
	Odds ratio (Pain: No Pain)	6.14	5.46	6.30	7.22
Dressage	Pain	1266	371	782	112
	No Pain	196	69	109	17
	Odds ratio (Pain: No Pain)	6.46	5.38	7.17	6.59
Showjumping	Pain	738	207	450	81
	No Pain	130	41	76	12
	Odds ratio (Pain: No Pain)	5.68	5.05	5.92	6.75
Eventing	Pain	429	70	296	63
	No Pain	78	20	50	7
	Odds ratio (Pain: No Pain)	5.50	3.50	5.92	9.00
Hunting	Pain	317	107	162	48
	No Pain	48	12	39	6
	Odds ratio (Pain: No Pain)	6.60	8.92	4.15	8.00
Showing	Pain	151	35	105	11
	No Pain	17	6	10	1
	Odds ratio (Pain: No Pain)	8.88	5.83	10.50	11.00
Non-competitive	Pain	295	277	8	10
	No Pain	54	50	2	2
	Odds ratio (Pain: No Pain)	5.46	5.54	4.00	5.00

*Please note that only those reporting levels were included in this table, however, a participant may take part in more than one discipline.

4. Discussion

Pain is a private and personal experience that each person responds to in a unique way. The feeling of pain alerts the body that something biologically harmful is happening. Pain is subjective and can be substantially influenced by individual susceptibility as well as personality [25]. It is the most common symptomatic reason why medical consultation is sought out [26].

In this study, 83% of riders reported that they experience some level of chronic pain. Results showed that most riders rated their pain between mild and moderate, with over half of all participants having experienced pain for over 6 years. Results also showed a positive correlation between pain and age, as aging is associated with an increased amount of chronic pain [26]. Expectations and perceptions of pain continue to develop from an early age throughout life [27]. Previous experiences and how they are perceived can lead to a pre-empted feeling of pain and a disparity between the severity of pain and the individual appraisal of the pain [28]. Individual perceptions of pain could have affected data and further research is required to determine more accurate results.

Although most pains were considered to be mild to moderate in nature, 72.8% of participants stated that equine activities (riding, grooming, and stable duties) made their pain worse. This could be a result of repetitive asymmetric movements performed over many years when riding or working with horses. These activities have been reported as common causes of chronic long-term pain [3,4]. Indeed, an increase in years of riding increased the levels of pain reported. Participants who had been riding for less than 3 years were 3 times more likely to have no pain than pain. Those who had been riding for over twenty years were 6.54 times more likely to have pain,

suggesting that riding and working with horses is a causal effect of pain.

Females were 1.28 times more likely to experience pain than males as females are more prone to experience pain [29], or at least more prone to reporting pain or injury [30]. One theory seen in American Football is that women players are more honest than men when it comes to self-diagnosis and reporting [31]. Only a third of males stated that their pain was medically diagnosed. This could be due to men in society being conditioned to conceal their pain [32]. In a study by Young [33], male athletes discussed why they hid pain and the normality of not revealing pain to their team. Masculinity is associated with strength and bravery possibly leading men to take greater gambles, to prove their courage in such a way that they become willing to subject their bodies to pain and injury [33].

4.1. Pain and Age

Pain was experienced in 85.4% of riders, with lower back pain (LBP) being the most common location and seen to be higher in riders over 35 compared to other rider populations : elite dressage 76% [17]; general horse riders 72% [13]; and elite eventers 52% [20]. Within the general population, Jordan *et al.* [34], identified that the age group that presented the highest numbers of GP with LBP was the 45-64 year age group, 536 per 10,000 of GP consultations.

Qualitative data from open questions showed that a small number of riders attributed the cause of their pain to aging factors. Open-ended questions gave an insight into what caused rider pain. Common answers were old age and arthritis. Research supports the relationship found between age and pain being caused by age-related degenerative changes [35]. Aging can cause deterioration of the spine, intervertebral discs, and muscles, leading to pain and stiffness [36]. Lumbar disc degeneration (LDD) in particular could be a possible risk factor for back pain in adults, with odds ratios varying from 1.3 to 3.2 [37]. Radiography and magnetic resonance imaging (MRI) can diagnose such problems [36,38]. Over half of the population in this study had received a diagnosis for their pain. However, Kraft, *et al.*, [13] found no conclusive MRI evidence to suggest that riders' LBP was caused by disk degeneration, spondylolysis, spondylolisthesis, or pathologic changes to the paraspinal muscles of the lumbar spine. This suggests that the back pain in some riders may be functional, attributed to muscular dis-balance [13,39,40].

Hip and knee pain was reported by those over 35 years at higher rates than in younger rider populations [18]. Severe pain was reported in the hips. The relationship between hip rotation and low back pain (LBP) is well documented [41,42]. Based on these studies, it appears that people with LBP may have (1) less hip rotation range of motion, either active or passive, and (2) more asymmetry in hip rotation mobility. The relationship between hip rotation motion and LBP is important because external forces can be sequentially transmitted from distal body segments to more proximal ones during movement. Movement at the hip could, therefore, influence movement and loading at the lumbar spine. When performed repeatedly, such hip movement as seen when riding could result in excessive loading on tissues in the low back region [43], and eventually LBP. Gender differences in the pattern of hip and lumbopelvic rotation in people with low back pain [44] might also explain the higher levels reported in female riders and require further research.

4.2. Treatments and Management of Pain

Despite half of the female participants and a third of males having their pain medically diagnosed, the most common method of pain management was the use of over-the-counter medication (61%), although this is slightly lower than what was seen in elite riders (elite event riders 93% self-medication [20], 74% of elite dressage riders [18]). Keogh and Herdenfeldt, [45] suggested that females use emotion-focused coping to manage their pain, whereas men are more likely to use sensory-focused coping strategies. Using drugs to treat oneself without the help of a doctor, known as self-medication, is a fast-developing phenomenon [46]. Riders use painkillers to alleviate pain, allowing them to resume normal activities [47,48]. However, painkillers may restrict the ability to know when the body has reached its limit, increasing the likelihood of injury. Painkillers can be harmful and cause long-term damage to skeletal mechanisms [49]. It is well documented that regular consumption of Non-steroidal anti-inflammatory drugs (NSAIDs) can cause damage to the gastrointestinal tract. When consumed in quantity, Riordan *et al.* [50] found that these drugs can cause headaches, dizziness, and visual disturbances. This could affect the proprioceptive process required to make split-second decisions when riding, potentially resulting in injury due to the high-risk nature of the sport [51]. Continual overuse of NSAIDs can also cause depression, electrolyte disturbance, and even respiratory issues [50]. However, stopping long-term usage of some NSAIDs can increase the risk of a heart attack [52]. Research in 2015 by Bennin and Rother stated that 43% of pharmacists considered the information provided on over-the-counter painkillers to be insufficient, suggesting that some riders may not be fully aware of the health implications of using NSAIDs [53].

Physical therapy was used by 57% of participants to treat or manage pain. Physical therapy is commonly used on athletes in a range of sports, effectively reducing pain and helping to restore the full range of movement [54]. Physical therapy loosens muscles and joints to aid movement and decrease pain [55]. Loosening muscles effectively reduces pain, stress hormones, and symptoms associated with low back pain [56]. Physical therapy can increase serotonin and dopamine levels, and improve trunk flexion and performance [56]. Pilates was used by 40% of participants to manage pain. Mind-body programs using imagery and progressive muscle relaxation improve severe pain and short-term function in people suffering from lower back pain [57–59]. Pilates has been shown to enhance muscular endurance and can improve flexibility and balance [60]. Training programs including Pilates have been shown to improve function and reduce lower back pain, more effectively than core strengthening programs [61]. Pilates reduces the risk of injury by improving balance and trunk stability [62]. Seventy-four percent of participants who took part in other sports or physical activity were 1.4 times (Odds Ratio) less likely to have pain, suggesting that riding

is the possible cause of the pain or other activities reduce the pain. More research is needed to understand this further.

4.3. Causes: Decrease/Limited Movement, Fatigue, Asymmetry

Consequences of reported pain on rider performance are consistent with findings reported in other rider pain studies [17,18] such as decreased or limited range of movement, fatigue, and asymmetrical riding position. These reduced functions are not only problematic for the riders' control and communication with the horse but could impact the welfare of the horse involved. According to the ISES 10 principles of training, the rider must only apply one signal or aid at a time, and each signal has one clear meaning to the horse [63]. These cues should be applied in timing with equine limb biomechanics. Riders must be able to maintain a symmetrical riding position and be able to coordinate movements of the body segments in order that the application of aids is not unclear, ambiguous, or simultaneous [64,65], which can lead to confusion, stress, and conflict behavior that ultimately impact equine welfare [66].

5. Limitations

A quarter of the participants who started the questionnaire did not answer all the questions or did not complete it, limiting the potential of an accurate representation of the overall population. While this study reports individual perception of pain and pain management, it is the individual perception that is likely to determine the impact of the pain on that individual. This self-reported perception of pain limits the reliability of the results.

6. Conclusion

This study demonstrates the prevalence of pain in riders over 35 years of age. Many participants attributed their pain to old age. The high frequency of pain in older riders could be due to the length of their riding career. The most common sites for pain were the lower back and hips, possibly due to the physical demands of riding. Stable duties and riding put strain on the musculoskeletal system by twisting and lifting, which many of the riders felt to be responsible for their source of pain. Riders stated that the weather, sitting, and the horse's way of going made their pain worse. Most riders had been suffering from pain for over 6 years and said that pain affected performance in terms of causing fatigue, limiting movement, decreasing the range of movement, and causing postural asymmetry. These were common symptoms of lower back pain caused by the demands of riding and performing stable duties. Physical limitations can be detrimental to human welfare due to riding being a high-risk sport. Riders used multiple treatments to prevent and manage pain. Self-medicating was the most common pain management technique. However, the effectiveness of the pain prevention and management techniques is debatable due to the high number of participants that still experienced pain.

This exploratory study achieved its aims. Results show that the attitude of riders to their personal health and welfare should be of concern to the equestrian industry. Future studies should contain both quantitative and qualitative methods to get more in-depth knowledge on the chosen subject. Further research on causes of pain, injury diagnosis, treatment of injury, and prevention of pain is needed to improve awareness of rider welfare. Research on pain in male riders and their perception of pain is required to increase understanding of the topic and establish causes of pain and effective management strategies.

Authors' Contributions

V.L. and Z.N. planned and designed the study. Z.N. collected the data and carried out the study. L.D. conducted the statistical analysis. V.L. wrote the manuscript and L.C. reviewed it. All authors read and approved the manuscript.

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Data Availability

The data supporting the findings of this study are available upon request from the corresponding author.

Funding

No funding was received for this research project.

Conflicts of Interest

The authors declare that there are no conflicts of interest.

Ethical Approval

This study received ethical approval from Hartpury University Ethics Committee. The study complied with the guidelines of the Declaration of Helsinki.

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