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Article

Prevalence of Low Back Pain in Portuguese Equestrian Riders

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Abstract: Low back pain is prevalent in equestrian athletes, but prevalence and associated factors are unknown in the Portuguese equestrian population. A questionnaire regarding low back pain and possible associated factors was answered by 347 respondents. Estimated 12-month prevalence was 67.1%. The probability of suffering from low back pain was higher in individuals with higher weekly riding workload, that reported equestrianism as their main occupation and that performed daily stable duties. The Roland Morris disability questionnaire was applied to the respondents that stated having experienced low back pain in the past 12 months, resulting in an average score of 5.39 ± 4.42 . 63.1% of respondents stated that low back pain impaired their performance. Individuals that stated equestrianism was their main occupation showed a significant higher risk (OR = 1.759) of exhibiting a score ≥ 4 , as measure of dysfunctionality. Age and high body mass index were also associated to a dysfunctional score. Further research is needed to fully understand the impacts of low back pain in Portuguese equestrian athletes.

Keywords: equestrian; low back pain; 12-month prevalence; workload; Roland Morris disability score; body mass index; age

1. Introduction

Equestrian sports science is an emerging field [1], and often based on experimental learning and tradition, instead of being centered on scientific knowledge [2]. Additionally, it has been predominately focused on the horse, while the analysis of the rider has expanded only in the last two decades [2]. To truly understand the various demands, dangers, and opportunities riders face, it is essential to use scientific, evidence-based investigation methods [3]. Compared to other sports, the career of equestrian athletes can be very long, with children starting highly competitive pony divisions at the age of 5 and 6 [4] and riders competing at an Olympic level in their 60's and 70's [5]. As such, according to Long Term Athlete Development, equestrianism is categorized as an "early start-late specialization" sport [6]. Furthermore, horse riding is a hazardous activity, considered more dangerous than sports such as motorcycle riding, skiing, football or rugby [7]. The appropriate position of the rider on the horse is "upright, balanced, elastic, solid and interactive", the shoulder, hip and heel should be in alignment [3], the pelvis in a neutral position, keeping a controlled upright trunk and adapting to the horse's movements [6]. Riders with a center of balance coordinated with their horses are most likely to achieve optimal performances, but also reduce the risk of falling of the horse and possible injury [3]. The horse-rider relationship requires a clear communication, and the rider must maintain balance and posture, to be able to administer predictable cues (called aids) to communicate with the horse [6]. Equestrian sports entail substantial and repetitive compressive mechanical forces primarily absorbed by the vertical axis of the rider's body, notably the lumbo-pelvic-hip complex [4,8,9]. The repetitive nature of training imposes significant demands on the musculoskeletal system, leading to muscle tightness [8,10]. Ultimately, the coordination dynamics, closely linked to the rider's postural control, heavily rely on the coordination and neuromuscular

awareness of the core muscles [11] and back musculature [7]. Previously published studies have determined that riders face the risk of acute injury because of the sport [6], with falling off the horse being the primary cause [7,12] but are also susceptible to overuse or chronic injuries due to the repetitive nature of training programs [6,7]. Injuries and pain can diminish balance, physical performance, and sports participation, impacting athletes' success [5]. Long-term consequences can affect quality of life and overall health, and poor posture may lead to pain at some stage in the rider's career [5]. Furthermore, horses are trained to recognize subtle cues; a rider overcompensating due to pain can cause training difficulties [4] and discomfort for their equine partner. Despite injuries and pain, equestrian athletes often continue to train and compete due to various factors, such as pressure from sponsors and owners [7]. The repetitive movement patterns inherent to this sport can cause overuse injuries, creating a risk of spinal instability and leading to back pain [6,7].

Low back pain (LBP) can be defined as pain and/or discomfort localized below the costal margin and above the inferior gluteal folds [9]. Physical activity is both a preventive and a possible risk factor for LBP [9]. In 2020, low back pain (LBP) afflicted 619 million individuals worldwide, with projections suggesting an increase of up to 843 million cases by 2050, mainly due to population growth and ageing [13]. LBP is the most common chronic injury in equestrian athletes [7,8], and its incidence is higher in equestrian athletes than in other athletes or the general population [9,10]. The main risk factors reported for LBP in equestrian athletes are the sport itself [8], the level of expertise in the sport, consequences of an acute trauma and its poor recovery [1], asymmetry [8,10], the type of saddle [9,14], poor postural control [11] and lack of balance, stability, and alignment at the pelvic level [10,11]. Equestrian athletes with LBP tend to have affected performance (due to distraction caused by the pain), have a higher risk of falling due to earlier onset of fatigue [7,8], reduced ability to maintain the correct riding position and reduced ability to synchronize with the horse's movements [7].

The purpose of this observational cross-sectional study is to investigate, for the first time, the prevalence of LBP in Portuguese equestrian athletes and to gain insight into the primary factors or possible causes leading to LBP in this population.

2. Materials and Methods

An online questionnaire was designed using LimeSurvey (<https://www.limesurvey.org/pt>). Participants were equestrian athletes over 18 years old, federated in the Portuguese Equestrian Federation in 2022 and/or 2023. Participation was anonymous and voluntary, and consent was given prior to the opening of the questionnaire. The questionnaire was disseminated using social media (Facebook, Instagram and WhatsApp), and asking those answering the questionnaire to share the link to other horse riders, and on their social media pages (a so-called snowball sampling technique). Prior to publication, the questionnaire was submitted to a small sample of subjects and evaluated by an expert panel for validation. According to data reported by the Portuguese Equestrian Federation, in 2021, there were 8,076 registered practitioners, of which about 3,500 were senior-level. The questionnaire was available online for two and a half months (from 10/04 to 29/06/2023) when the minimum number of valid responses was obtained (347). The sample size was calculated with a confidence level of 95% and a confidence interval of 5%, using Raosoft® sample size calculator [15]. The questionnaire comprised 50 questions divided into 7 sections, taking approximately 10 minutes to complete. The first section covered demographic data (age, sex, height, and weight), while the second delved into equestrian sports practices (years of practice, weekly practice hours, and federated discipline). The third section addressed other sporting activities and routines, while the fourth focused on injuries and lower back pain. Low back pain was defined as pain, discomfort, or numbness in the lower back area, and an accompanying illustration was provided to aid participants. The fifth section queried pain experienced during daily equestrian practices, while the sixth explored related routines and characteristics. The seventh and final section contained the Roland Morris disability questionnaire [16,17]. This tool comprises a 24-item set that patients are asked to endorse (score 1) or leave blank (score 0), and results in a total score (Roland Morris Disability Score, RMDS) between 0 and 24, where higher values correspond to higher levels of pain-related disability [18]. A threshold value of 4 was considered, to classify patients with LBP as functional or dysfunctional [18].

Sections five and seven were exclusively presented to respondents who reported experiencing LBP in the past 12 months. For further analysis, Body Mass Index (BMI) was calculated dividing the person's weight, in kilograms, by their height, in meters squared; individual BMI were classified into the categories Underweight, Normal Weight, Overweight and Obese [19].

Statistical treatment of data was performed using SPSS version 27.0 [20]. The normality of the distribution for each continuous variable (age, height, body mass, body mass index, RMDS) was examined using the Kolgomorov-Smirnov and Shapiro–Wilk normality tests. Variables revealed a non-normal distribution and hence, non-parametric tests (Mann-Whitney U, Kruskal-Wallis, Spearman's correlations, Chi-square contingency coefficient) and Generalized Linear Models were used for both categorical and continuous variables. To investigate factors associated with the RMDS in individuals with LBP in the past 12 months, several Generalized Linear Models were computed, and adjustment to data was compared using Akaike Information Criteria (AIC) values. The model that best suited the data included BMI category, Equestrianism as main occupation (Yes/No) and Daily performance of stable duties (Yes/No) as predictors, and Age as a covariate.

3. Results

3.1. Demographics and Anthropometric Data

Table 1 presents demographic and anthropometric data. From 347 respondents, 40.1% were enrolled as show jumping riders, 22.8% as dressage riders, and 21.9% as general riders (including equestrians not involved in national competitions, rider instructors, and other officials). The remaining disciplines had minor representation within the sample. Female and male respondents represented 58.8% and 41.2%, respectively. Male respondents were older, taller, and heavier than females, and their BMI was higher, even though the average BMI fell in the Normal Weight category for both sexes.

Table 1. Demographic and anthropometric data of respondents, according to sex.

Discipline ¹	Dressage	Jumping	Eventing	General	Endurance	Horseball	Working Equitation	Total	
n (%)	79 (22.8)	139 (40.1)	30 (8.6)	76 (21.9)	14 (4.0)	5 (1.4)	4 (1.2)	347 (100)	
Female	n (%)	44 (21.6)	86 (42.2)	7 (3.4)	51 (25.0)	9 (4.4)	5 (2.5)	204 (100)	
Male	n (%)	35 (24.5)	53 (37.1)	23 (16.1)	25 (17.5)	5 (3.5)	0 (0)	143 (100)	
Age (years)	Female	23.7	30.9	24.7	26.7	24.9	22.0	22.5	24.8
	Male	28.4	40.1	36.8	32.9	32.6	---	28.0	33.0
Height (cm)	Female	165	168	165	163	163	167	164	165
	Male	177	178	176	178	173	---	178	177
Weight (kg)	Female	59.7	59.4	61.2	60.5	59.0	60.8	57.5	60.2
	Male	74.1	79.9	77.0	78.0	72.0	---	81.0	76.5
BMI	Female	21.9	21.0	22.6	22.7	22.2	21.7	21.3	22.2
	Male	23.7	25.3	24.7	24.6	23.9	---	25.6	24.4

1 – According to the last National Federation inscription.

Overall anthropometric data and years of practice (means \pm standard deviations) are presented in Table 2, as well as the results of a Mann-Whitney U test that compared group that stated that equestrianism was their main occupation, with the group that stated it was not. No significant differences were found for anthropometric data, but years of equestrian practice were significantly higher in the group that stated their main occupation was equestrianism.

Table 2. Anthropometric data and years of practice (mean \pm S.D.), and comparison between respondent status (main occupation: yes/no) (p value for Mann-Whitney U test).

	Total (n = 347)	Equestrianism as main occupation		p value
		Yes (n = 160)	No (n = 187)	
Age (years)	28.20 \pm 11.13	28.36 \pm 10.29	28.07 \pm 11.83	0.498
Height (cm)	169.71 \pm 8.93	170.46 \pm 8.91	169.07 \pm 8.91	0.052
Weight (kg)	66.94 \pm 12.74	67.79 \pm 12.15	66.20 \pm 13.21	0.166
BMI	23.12 \pm 3.28	23.23 \pm 3.10	23.03 \pm 3.44	0.461
Years of practice	16.92 \pm 10.55	18.09 \pm 9.68	15.91 \pm 11.16	0.004

3.2. Prevalence of Low Back Pain in the Past 12 Months

Overall prevalence of low back pain was 61.7%, with women showing a higher prevalence than men (64.2% vs. 58.0%). A significant association between low back pain and riding discipline could not be found ($p = 0.590$ for the likelihood-ratio Chi-Square test). Values are presented in Supplementary Material Table S1. Prevalence was apparently higher in younger riders (18 to 25 and 26 to 35 years old), comparatively lower in the 36 to 45 years old group, and again higher in the 46 to 55 years old group. Women between 26 and 35 years old showed the higher prevalence of low back pain in the past 12 months (74.4%) (Table 3).

Table 3. Prevalence of LBP in the past 12 months (general, according to sex and age).

	Prevalence (95% CI) (n = 347)	Women (95% CI) (n = 204)	Men (95% CI) (n = 143)
Total (n = 347)	61.7% (56.5%; 66.6%)	64.2% (57.4%; 70.5%)	58.0% (49.9%; 65.9%)
Age groups:			
18 – 25 y.o. (n = 194)	65.0% (58.0%; 71.3%)	63.8% (55.6%; 71.3%)	67.9% (54.5%; 78.9%)
26 – 35 y.o. (n = 79)	64.6% (53.6%; 74.2%)	74.4% (59.8%; 85.1%)	52.8% (37.0%; 68.0%)
36 – 45 y.o. (n = 45)	46.7% (32.9%; 60.9%)	36.4% (15.2%; 64.6%)	50.0% (34.1%; 65.9%)
46 – 55 y.o. (n = 19)	68.4% (46.0%; 84.6%)	71.4% (35.9%; 91.8%)	66.7% (39.1%; 86.2%)
56 – 65 y.o. (n = 5)	20.0% (3.6%; 62.5%)	33.3% (6.2%; 79.2%)	0.0% (0.0%; 65.8%)
66 – 75 y.o. (n = 5)	40.0% (11.8%; 76.9%)	-----	40.0% (11.8%; 76.9%)

3.3. Factors Associated with Presence of Low Back Pain in the Past 12 Months

The unadjusted odds ratio and 95% confidence intervals were calculated for each variable (Table 4). There was no difference in the prevalence of LBP in the past 12 months between male and female groups. The prevalence of LBP in the past 12 months was higher in the group that rode 7 or more hours per week; it was also higher in the group that considered equestrianism its primary occupation, compared to those that considered it a hobby, and the group that was daily involved in grooming chores, as opposed to the group that didn't perform stable duties, or did it seldom. There was no difference in the prevalence of LBP in the past 12 months between riders that practice other sports and those who don't, as well as between riders that do warm-up exercise before riding and those who don't.

Table 4. Odds Ratio for factors associated with LBP in the past 12 months.

n = 347	Low Back Pain in the past 12 months		Odds ratio	95% confidence interval	p value
	Yes	No			
Female/Male	131/83	73/60	1.297	0.837–2.011	0.245
Rides 7h or more per week/ up to 6h per week	105/109	50/83	1.599	1.028–2.487	0.045
Main occupation/Hobby	108/106	52/81	1.587	1.023–2.463	0.039
Daily stable duties (Yes/No)	141/73	72/61	1.636	1.051-2.548	0.029

Other sports (Yes/No)	114/100	80/53	0.755	0.487-1.171	0.210
Warm-up before riding (Yes/No)	40/174	17/116	1.569	0.849-2.899	0.151

As expected, the rate of individuals that rode 7 or more hours per week was higher in the group where equestrianism is the main occupation, compared to the group that considers it a hobby (see Supplementary Material Table S2). The results of Mann-Whitney U tests showed no significant differences between groups with and without LBP in the past 12 months regarding age, BMI and years of equestrian practice. Values are shown in Supplementary Material Table S3.

3.4. Factors Associated with the Roland Morris Disability Score (RMDS) in Individuals Who Experienced LBP in the Past 12 Months

From the 214 respondents that stated having felt LBP in the past 12 months and responded to the Roland Morris disability questionnaire, a RMDS of 5.39 ± 4.42 was calculated (mean \pm standard deviation). Mann-Whitney U tests and Kruskal-Wallis tests found no significant differences in RMDS due to sex, age class, BMI category or between riders that stated equestrianism was their main occupation and those that did not.

From the 214 riders who felt LBP in the past 12 months, 135 (63.1%) considered it impaired their performance, 91 (42.5%) felt LBP aggravated while riding, 58 (27.1%) and 56 (26.2%) felt LBP aggravated while cleaning/grooming, and lungeing horses, respectively, and 118 (55.1%) felt LBP aggravated while "mucking out" (removing manure and dirty bedding from horse stalls).

Positive significant correlations (Spearman's rho) were found between RMDS, age and BMI (table 5). Correlation between RMDS and years of practice was non-significant.

Table 5. Correlations between RMDS, age, BMI and years of practice.

	Age	BMI	Years of practice	RMDS
Age	1	0.284**	0.644**	0.141*
BMI		1	0.294**	0.146*
Years of practice			1	0.077
RMDS				1

* - $p < 0.05$; ** - $p < 0.01$.

The unadjusted odds ratio and 95% confidence intervals were calculated for each variable (Table 6). There was no difference in the Dysfunctional/Functional classification between male and female groups, a weekly riding load over 7h, or up to 6h, performing stable duties daily, practice of other sports and warm-up exercise before riding. Nonetheless, individuals that stated equestrianism as their main occupation show a significant higher risk (OR = 1.759) of a RMDS ≥ 4 (Dysfunctional) than those that stated horseback riding was a hobby.

Table 6. Odds Ratio for factors associated with Dysfunctional/Functional RMDS.

n = 214	Roland Morris Disability Score (RMDS)		Odds ratio	95% confidence interval	p value
	Dysfunctional (RMDS > 4)	Functional (RMDS ≤ 4)			
Male/Female	46/60	37/71	1.471	0.847–2.557	0.171
Rides 7h or more per week/ up to 6h per week	56/50	49/59	1.349	0.788–2.309	0.276
Main occupation/Hobby	61/45	47/61	1.759	1.024–3.023	0.041
Daily stable duties (Yes/No)	76/30	65/43	1.676	0.946–2.969	0.077
Other sports (Yes/No)	54/52	60/48	0.831	0.485–1.422	0.499
Warm-up before riding (Yes/No)	20/86	20/88	1.023	0.515–2.035	0.948

The results of Mann-Whitney U tests showed no significant differences between Dysfunctional and Functional groups for BMI ($p = 0.075$) and years of equestrian practice ($p = 0.241$). However, it showed significant differences in age of both groups ($p = 0.022$).

A Generalized Linear Model (GenLM), considering RMDS as the dependent variable, BMI class, Equestrianism as main occupation and Daily performance of stable duties as predictors, and Age as a covariate, outperformed the null (intercept) model, according to an Omnibus test ($p = 0.001$). The effect of Equestrianism as main occupation was non-significant ($p = 0.142$), the effect of Daily stable duties was marginally non-significant ($p = 0.058$), BMI class was significant ($p = 0.043$), as well as the effect of the covariate Age ($p = 0.023$). Estimated marginal means (EMM) for RMDS, with Age fixed at mean value (27.19 years) are shown in Table 7 and reveal higher RMDS values for the Overweight and Obese BMI categories, for equestrianism as main occupation and for daily performing of stable duties.

Table 7. Estimated marginal means (EMM) for Roland-Morris Disability Score (RMDS), with Age fixed at 27.19 years.

Predictor	Groups	EMM for RMDS
Overall estimated mean (n = 214)		6.30
BMI class	Underweight (n = 14)	4.82
	Normal weight (n = 154)	4.83
	Overweight (n = 41)	6.16
	Obese (n = 5)	9.38
Equestrianism	Main occupation (n= 108)	6.74
	Hobby (n = 106)	5.85
Daily stable duties	Yes (n = 141)	6.92
	No (n = 73)	5.68

4. Discussion

4.1. Demographics and Anthropometrical Data

In this study, the distribution of female and male equestrian athletes (58.8% and 41.2%, respectively) was apparently more balanced than in similar studies in other countries [5,9,21]. However, in the last available report of the Portuguese Equestrian Federation [22], even though there is an overall predominance of female athletes (67.3%), there is a tendency to a reduced difference among sexes in the senior categories (riders over 20 years of age, with female athletes representing 53.7%).

Accordingly, reported data [22] show that 17.2% of Portuguese equestrian athletes are 36 years old or older, while 21.3% of respondents were 35 or older in our sample. The sample in this study is representative of Portuguese equestrian athletes. Athletes in disciplines that engage skill (such as equestrian sports, sailing, and shooting) have longer lifespans compared to other athletes, particularly those involved in power disciplines (like boxing, weightlifting, and wrestling) [23]. Previous studies have shown that equestrian sport does not fit a traditional Long Term Athlete Development (LTAD) model, best adapting to an 'early start-late specialization' paradigm and characteristic longevity of the competitive career, even at the elite level competitions, such as Olympic Games [24]. Competitive and general longevity of equestrian careers simultaneously potentiate the development of skills and expertise, but represent an additional risk for progressive spine degeneration, resulting from repetitive trauma and physical stress on the spine [25].

Apart from the general need to avoid excessive weight due to health concerns and physical performance, equestrian athletes feel additional pressure to maintain a controlled weight due to two different factors: the impact of a larger body frame in equestrian performance, namely in disciplines that convey an aesthetical, subjective judgment, such as Dressage [26]; and issues associated with their equine counterpart's welfare and performance [27]. These issues can probably contribute to

justify that, despite their expanded age span (18 to 72 years old) and the fact that, to nearly half of the respondents, equestrianism was not their primary occupation, most respondents (74.1%) corresponded to normal weight or underweight categories.

4.2. Prevalence of Low Back Pain in the Past 12 Months and Associated Factors

Low back pain is highly prevalent and the leading cause of life-long disability in the adult population [28]. The previously reported prevalence of LBP in the global adult population ranged from 1.4 to 20.0% [29] and a 12-month prevalence of 38% [30]. However, the reported prevalence of LBP in athletes is higher, with a mean point prevalence of 42%, ranging from 18% to 80%, and rising to 51% when a 12-month prevalence is considered [31]. The 12-month prevalence of LBP in equestrian athletes has reported values ranging from 88% to 100% [31], indicating a strong association of LBP with this sport. In this study, a 12-month prevalence of 67.1% was estimated. This value, considerably lower than those reported in previous studies [31], may reflect that half of the respondents stated that equestrianism was not their main occupation (non-professionals). A similar value was found in a case-control study on sport-specific and functional back pain features in horse riders, including 16 professional and 16 amateur riders [1]. A cross-sectional study in equestrian athletes reported a value of 74.2% for 12-months LBP [9]. Prevalence of 12-month LBP in equestrian athletes seems to be generally high, although reported values are variable. In this study, a significant correlation between low back pain and riding discipline could not be found, a result consistent with previous studies [32,33], even though a cross-sectional study in the Italian equestrian athletes population reported a higher prevalence in show jumping athletes, when compared to athletes in other equestrian disciplines [9].

In global population, risk factors for low back pain include comorbid conditions such as psychological disorders and multiple medical problems, as well as obesity, smoking, lack of exercise, increasing age, and lifestyle factors [28]. In athletes, strong evidence for higher body weight and moderate evidence for high BMI as risk factors of LBP have been reported, as well as insufficient evidence to indicate age and sex as risk factors [34]. Another study refers a history of a previous episode of LBP, high training volume, periods of load increase and years of exposure to the sport as risk factors [31].

In this study, the 12-month prevalence of LBP was higher in female riders, even though sex, practicing other sports, or warming up before riding had no statistical significance in the occurrence of LBP. Previous studies have also found no connection between sex [1,9,32], practicing other physical activity [9], and LBP in equestrians, even though other authors [5,11] have established that participating in other sporting activities and physical fitness can help equestrian athletes to prevent spinal injury. Age, BMI, and years of equestrian practice were not significantly different between groups with and without LBP in the past 12 months. Regarding the age of equestrian athletes, previous studies report contradictory results, from a higher risk in younger ages [9] to a higher frequency of LBP in older riders [5]. Other authors also failed to find a connection between BMI [8,9,33], length of previous riding experience [8,9], and occurrence of LBP in equestrians.

On the other hand, the probability of suffering from LBP was higher when the weekly riding workload was 7 hours or more when equestrianism was the respondent's main occupation or when they performed daily stable duties. These results seem to point to an association between the workload and parallel chores involved in professional equestrian life and 12-month LBP prevalence, in line with the results found in previous studies that reported a weekly riding period superior to 5-6 hours [9] and riding professionally [1] as risk factors for LBP in equestrian athletes. Stable duties like "mucking out", "preparing the bedding", and sweeping involve a bent and twisted back position most of the time, creating harmful stress loads of the posture [35] and can contribute to an increased risk of musculoskeletal problems [36]. In previous studies, riders stated that stable duties were responsible for their pain [5]. To the authors' knowledge, there is only one study regarding the injury of equestrians in Portugal. Although this study comprised all injuries, and not exclusively LBP, it reports a significant association between the occurrence of injury and the number of days of training per week, years of experience, height, and weight of the rider, and practice of another sport [37].

4.3. Roland Morris Disability Score and Associated Factors

The Roland Morris disability questionnaire is a tool that enables a discriminating outcome measure in LBP [17] and has previously been used in measuring the impact of LBP on everyday functioning [38] and validated for the Portuguese population [16]. Previous studies regarding RMDS in equestrian athletes with LBP yet to be found, thus limiting the comparability of results in this study and advising caution in their interpretation. Nonetheless, RMDS in elite athletes from different sports report lower average scores in individuals with apparently similar characteristics [39].

Stratford and Riddle [18] defined a threshold value of 4 as a reasonably accurate value to discriminate patients according to their functionality in everyday living. Again, previous validation of this threshold in discrimination of functionality in athletes and in equestrians would be advisable, as functionality goals in these populations are probably very different from those regarding LBP patients in the general population. Considering these premises, this study's results indicate a higher risk of an RMDS ≥ 4 (Dysfunctional) in individuals who consider equestrianism their main occupation and in those who perform stable daily duties. It should also be noted that the average RMDS in respondents experiencing LBP in the past 12 months is higher than this threshold, which points to a relevant impact of LBP on the respondents' quality of life, ability to perform their occupational duties, and competitive performance. More than half (63.1%) of respondents stated that LBP impaired their performance, and a considerable number of riders reported that LBP aggravated while riding or performing other chores.

In this study, positive correlations between RMDS, age, and BMI and the results of the GenLM point to the negative impact of pain perception as riders age or in those with higher BMI. Considering the sportive longevity of equestrian athletes [24], it would be beneficial to conduct further research regarding the causes of LBP, as well as strategies that could help its prevention or mitigation, such as specially designed training programs, as the benefits of specific exercise in preventing and improving LBP in athletes have been established in other sports [40]. The importance of BMI as a predictor for LBP has been previously reported in the general population [41,42]. As previously stated, [26,27] performative pressure and equine welfare issues add to the relevance of appropriate weight management of equestrian athletes. Moreover, there is evidence of an association between an erroneous body image and eating disorders in young equestrian athletes, probably as a consequence of those pressures [43]. Appropriate nutritional counseling, and physical training adapted to the equestrian challenges can create positive repercussions on LBP, but simultaneously on the general health and wellbeing of athletes, their performance, and equine welfare.

5. Conclusions

For the first time, this study presents the prevalence of low back pain (LBP) in an apparently representative sample of Portuguese equestrian athletes. A 12-month prevalence of 67.1% was estimated. The probability of suffering from LBP was higher in individuals with higher weekly riding workloads, who reported equestrianism as their main occupation, and who performed daily stable duties. To measure the impact of LBP on the daily functioning of equestrian athletes, we used the Roland Morris disability questionnaire and calculated an average score of 5.39 ± 4.42 (mean \pm standard deviation). Among the riders who experienced LBP in the past 12 months, 63.1% considered it impaired their performance, 42.5% felt LBP aggravated while riding, and 55.1% felt LBP aggravated while removing manure and bedding from horse stalls. We considered a score equal to or higher than 4 to discriminate against individuals whose LBP impaired their functionality. Individuals who stated equestrianism was their main occupation show a significantly higher risk (OR = 1.759) of exhibiting a Dysfunctional score. Our results also point to the negative impact of pain perception as riders age or in those with higher BMI. However, interpretation of these results must be cautious, as no previous studies regarding the Roland Morris disability score in equestrian athletes with LBP or validating the threshold of 4 in discrimination of functionality have been found. Further investigation should be conducted on the pain measurement of LBP in equestrian athletes and the effects of appropriate nutritional counseling and specific physical training on their performance and well-being.

Supplementary Material: The following supporting information can be downloaded at the website of this paper posted on Preprints.org.

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