Traditional equestrian events in Italy: results of the official veterinary controls carried out during the period 2017-2023

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SUMMARY

Traditional equestrian events, such as races, jousting and tournaments, where equids (donkeys and horses) are used outside authorised hippodromes, are still widespread in Italy and represent important religious and historical events. However, in the last years, public debate on animal welfare and public safety in these events has increased due to the high risks of injuries both for animals and humans. For these reasons the Italian Ministry of Health issued a specific ordinance for the protection of equids, riders and spectators during these events. According to the ordinance, official veterinarians must participate in all phases of the event and complete a technical report with information concerning the type of the event, the characteristics of the environment, the characteristics of the animals and any fatal or non-fatal incidents involving the animals. The present study reported for the first time information regarding these Italian traditional equestrian events, with a focus on issues related to animal health and welfare (i.e., injuries and death cases). The number of equestrian events reported by the official veterinarians during the study period (September 2017-December 2023) was 572. The predominant event type were races (n=291) followed by jousting events (n=182), tournaments (n=37) and pariglia (n=28). A total of 10,055 equids (horses and donkeys) participated to these traditional events. Concerning injuries, lethal outcomes, or other problematic situations, 47 cases were reported during the reference period, corresponding to 0.5% of all equids (n=10,055) that participated during the traditional events. Forty-six cases involved horses and only one case concerned donkeys. Six cases, all involving horses, resulted in death or euthanasia (6/47; 12.8%), which corresponded to 0.07% of the horses that competed from September 2017 to December 2023. The frequency of incidents by event type was quite similar among races, quintains, pariglia, and tournaments. The ground type that resulted in the most incidents was quarry material (28.6%), followed by pozzolana (13.3%) and tuff (10%). Concerning track length most of the injuries occurred on tracks ranging from 501 to 1000m and on tracks overs 1000m. Although the number of incidents reported during the study period is below 1%, these findings could help risks managers and policymakers to take informed decisions aimed to protect equid welfare during these types of events.

KEY WORDS

Horse; donkey; horse race; injury; death.

INTRODUCTION

In Italy, equine breeding has been a widespread practice since ancient times. The main species raised are horses, donkeys, and their hybrids (mules and hinnies). According to data from the Italian livestock identification system (updated as of December 31, 2023), the population of farmed equines has been steadily increasing since 2017. In fact, the number of donkeys raised has grown from 17,504 in 2017 to 80,818 in 2023 (+362%), while the number of horses has increased from 78,900 to 388,569 (+392%). Overall, the total equine population has risen from 96,404 in 2017 to 469,387 in 2023 (+387%). As of 2023, the Italian regions most active in this practice are Lombardy (13.3%), Lazio (11.5%), and Sicily (10%). Regarding gender, females predominate both in horses (58%) and donkeys (71%), although the purpose of the animals differs between the two species. In fact, according to the European legislation on equine identification, these animals can be classified as animals not intended for slaughter or as food-producing animals [1]. In Italy, 66% of horses are classified as not intended for slaughter and the 41% of donkeys fall into this category [2]. These data indicate a strong inclination towards breeding equines for companionship, sports, or, more generally, for use in public or private events. This trend mirrors that of other societies, both in countries where horse meat is not traditionally consumed, such as the United Kingdom [3] and New Zealand [4], and in countries where there are no taboos regarding its consumption, such as Spain [5] or France [6].

In Italy, as in many countries of the Mediterranean region, popular events involving equines play an important role in local traditions, attracting large public participation and tourists.

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These events range from religious and historical celebrations to sports competitions and folkloric events [7,8]. However, public debate around these events has grown in recent years, particularly regarding the welfare of the animals involved [9]. Equine sports events are indeed considered among the most dangerous sports, with fatal accident rates reported to be higher than those in motor sports [10,11]. According to LAV (Italian Anti-Vivisection League), from 1970 to 2006, there was an average of approximately 1.3 horses euthanized per event [7]. Therefore, issues related to animal welfare (e.g. injuries, death), along with concerns for public safety in contexts where animals are involved, are currently a subject of significant attention and sensitivity not only from the public but also from policymakers [9]. For these reasons, drawing inspiration from the Italian Veterinary Police Regulation [12] and the National Decree of February 2, 2003 [13], concerning provisions on the welfare of companion animals and pet therapy, as well as from specific National guidelines for the protection of equids [14], the Italian Ministry of Health issued a specific ordinance in 2009 replaced in 2011 [15] and subsequently amended, regarding "public or private events involving equines, outside officially authorized facilities and tracks", excluding equine exhibitions, parades, and processions. According to the ordinance, these events can only be authorized after the favourable opinion of the supervisory commission, which includes a veterinarian from the local public health authority and a track technician trained by specific equestrian technical bodies and registered in a specific public list.

The commission must verify the suitability of the track: it should be safe for jockeys, equines, and the public, with a surface designed to cushion the impact of hooves and prevent equines from slipping. The course should be protected by barriers to absorb potential impacts and falls. The organizers are responsible for safeguarding the health and welfare of equines throughout the rehearsals and the event by providing a veterinary ambulance or an appropriate transport vehicle and access to a veterinary facility. The animals must be examined by an equine veterinarian before the start of the event (i.e., pre-event veterinary examination). Animals in poor health, those that cannot be identified, or those under 4 years of age must be excluded. Furthermore, the treatment of equines with doping substances is prohibited. The organizers of the events must adopt a regulation outlining the procedures for controls in order to ensure the compliance of the animals, in accordance with one of the reference standards defined by the equestrian technical bodies [9].

The use of English Thoroughbred horses is prohibited in events that involve speed races. By way of exception, the use of this breed is permitted only on courses with technical characteristics like those of facilities for gallop racetracks officially authorized by the Ministry of Agriculture.

Finally, the competent local public health authority must ensure the presence of an official veterinarian throughout the rehearsals and the entire event. From September 2017, this veterinarian must submit to the Italian National Reference Centre for Animal Welfare (CReNBA), a completed technical report within 7 days from the end of the event, using the form defined by the Italian Ministry of Health. Each technical report should be accompanied by an attachment containing the list of the equines that took part to the event. The list should include the data related to the animals (name, breed, identification - microchip, passport-, year of birth and sex) and the date and the outcomes of the pre-event veterinary examination [15].

The aim of this study was to describe and analyse for the first time the data reported in the technical reports filled out by the competent local public health authority during traditional equine events held in Italy from September 2017 to December 2023, with a focus on event characteristics and on issues related to animal health and welfare (i.e., injuries and death cases).

MATERIALS AND METHODS

Data source

Starting from September 2017, for each event involving equids, the technical report required by the ministerial ordinance was compiled by the official veterinarian and sent to the CReNBA office in PDF format. The technical report was organized into 6 sections: i) organization, ii) event characteristics, iii) characteristics of the environment, iv) characteristics of the involved animals, v) veterinary assistance; vi) injury report (Table 1).

The authors entered all the data from the technical reports and the attach lists into a Microsoft Excel spreadsheet. Missing data or illegible data were classified as «data not provided». Duplicates were removed from the dataset and transcription errors were corrected. A descriptive statistic was carried out calculating sum and percentage for each information provided by the official veterinarians.

For calculating the number of equids involved in the events, each animal was counted as a new individual, even if it participated in multiple events within the same year or within the reference period (from September 2017 to December 2023). This approach was necessary, due to the absence of the attached list with animal identification data for several events, making it impossible to accurately identify and track individual animals.

RESULTS AND DISCUSSION

Between September 2017 and December 2023, CReNBA received technical reports regarding 572 traditional equestrian events (Figure 1). Of the total forms received, 68 (11.9%) lacked the attachment containing the list with the identification of the equines that took part to the events.

During the reference period, the Italian regions most active in these events were Tuscany (146 events, 25.5%), Sardinia (137 events, 24.0%) and Lazio (66 events, 11.5%). Most of the events (430/572; 75.2%) were carried out during the summer months (from June to September).

Although the 2017 data were partial and there was an evident drop in traditional equestrian events in 2020 and 2021 (Figure 1), due to the COVID-19 emergency which officially ended in Italy on the 31st of March 2022, the recorded number of events was inconsistent with the data reported by Fedele et al. [9], who estimated approximately 520 equestrian events in Italy per year. The absence of a national database for the mandatory recording of popular equestrian events makes it difficult to quantify the exact number of these events in Italy [9]. In addition, the ministerial ordinance does not require the submission of the technical report for exhibitions, parades, and processions, thus the number of equestrian events obtained in this study may be underestimated.

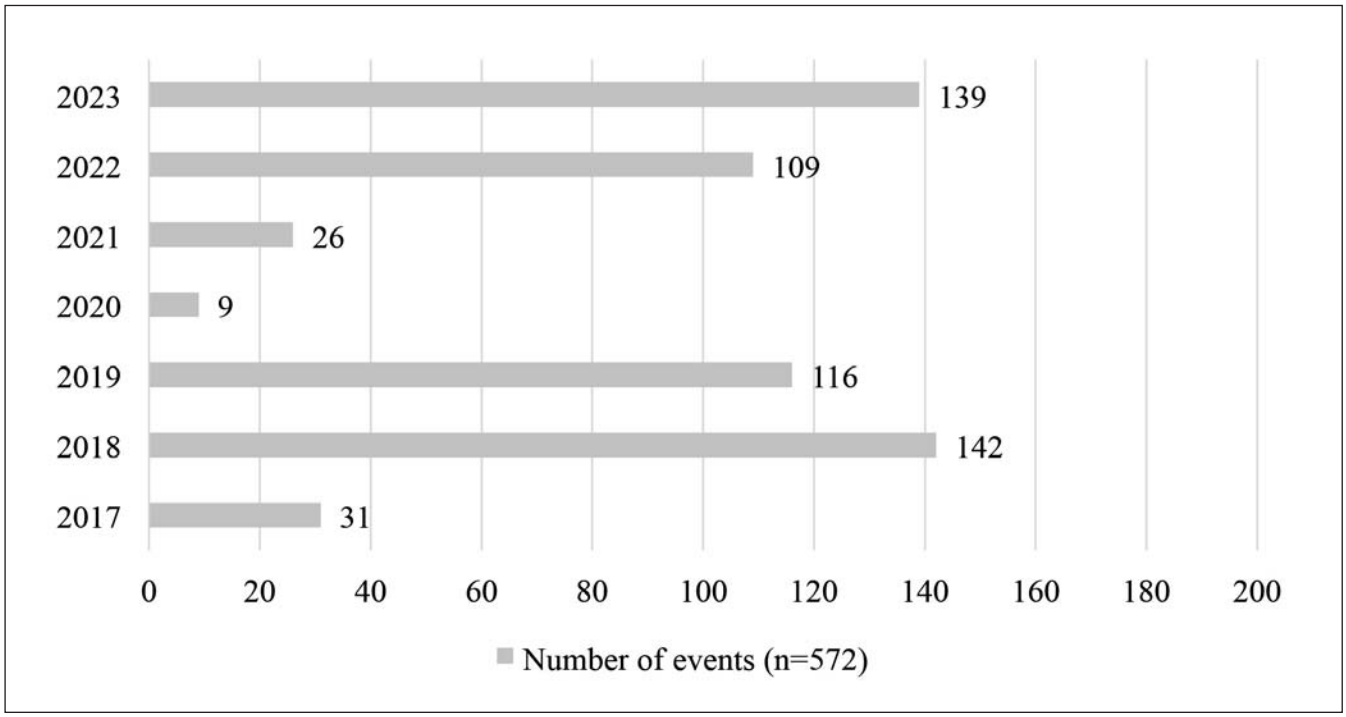

Figure 1 - Number of Italian traditional equestrian events per year.

Out of the total 572 events, 291 were races (50.9%) and 182 were jousting events (31.8%) (Table 2). Seven reports related to parades were also received, although the ministerial ordinance does not require their monitoring. Horses were involved in 413 events (72,2%) and donkeys took part to 148 events (25.9%). No events were organized with only mules or hinnies participating, while 5 events involved multiple equine species simultaneously (Table 2).

As shown in Figure 2A, saddle and bareback riding ware the prevailing riding methods (92.0%). Regarding the type of race start, the received technical reports indicated that *"canapo"* (i.e., the rope used to mark the starting point of the horse race) was the most widely used (29.7%). However, in most of the reports (58.6%) this question was skipped (Figure 2B).

Table 3 presents data regarding the characteristics of the environments where the Italian traditional equestrian events were held from September 2017 to December 2023. The results indicate that the most frequently used venues were sports fields or stadiums, (35.0%), followed by town squares (19.1%). Regarding ground type, sand was used in 279 events (48.8%), grass in 102 events (17.8%), a mix of fill/soil and sand in 68 events (11.9%), and tuff in 30 events (5.2%). Other surface types, such as *pozzolana*, soil only, and quarry material, were used less frequently, for a total of 34 events (5.9%). Two events were carried out on cobblestone, despite the ministerial ordinance considered this type of ground unsuitable for equids.

Sand has been reported to reduce physical impact on athletes, whether they are animals or humans [16]. Therefore, the fact that sand was the most commonly used surface aligns with the primary goal of the ministerial ordinance, which is the protection of the equids involved in these events. On the other hand, as stated by Ryan et al. [17], dirt and turf surfaces are greatly influenced by weather conditions, which can compromise the safety of both the horse and the rider.

Regarding track or overall course length, most of the events were between 101- and 500-meters long (47.2%). The predominant track layout was the ring type (47.6%), followed by the straight type (33.6%) (Table 3).

Safety systems, such as fences and barriers were present in 529 (92.5%) and 498 (87.1%) events, respectively. Shelters for the animals were provided in 323 events (56.5%).

During the study period, a total of 10,055 equids participated in the traditional events reported (Table 4). Specifically, there were 8,442 horses (84.0%) and 1,359 donkeys (13.5%). As already shown in Table 2, no mules or hinnies took part to these events. The data indicate that typically up to 50 animals were involved in each event. In fact, 53.0% of the events (n=303) had no more than 10 participants, and in 40.6% of the events (n=232) the number of participants ranged from 11 to 50. Only 5.4% of the celebrations (n=31) involved more than 50 equids were. For 6 events (1.0%), no data were provided.

Out of the 8,442 horses, 1,126 (13.3%) were stallions, 3,129 (37.1%) were geldings, and 3,197 (37.9%) were mares. Concerning horse age categories, 3,156 subjects (37.4%) were between 4 and 8 years old, 2,416 (28.6%) were in the 8-12 years age group, and 1,880 (22,3%) were over 12 years old. For 990 horses (11.7%), sex and age data were not provided. The Anglo-Arab breed was the most frequently represented horse breed (27.0%), followed by the entry "other breeds" (25.3%) and English Thoroughbred (14.8%). Breed data were missing for 1,718 horses (20.4%).

Among the 1,359 donkeys, mares were the predominant sex (51.8%), followed by stallions (27.7%) and gelding (18.5%). The most common age groups were 8-12 years (36.3%) and 4-8 years old (34.1%), with over-12 years old category also well represented (28.3%). Data on sex and age were missing for 27 donkeys (2.0%). Regarding donkey breed, the most frequent entry was "other breeds" (57.2%), followed by crossbred (31.5%). Breed data were not provided for 225 donkeys (16.6%).

Several technical reports showed missing data regarding sex, age or breed, which precluded a thorough analysis of this in-

Table 1 - Section and type of information requested by the ministerial technical report filled out by the official veterinarian during a traditional equestrian event.

Section of the technical report	Type of information
1) Organization	Name of the event Organizer Legal representative Ground technician Equine veterinarian Composition of the veterinary commission Notes (e.g. opinions of the public entertainment committee, of the ground technician or/and of the equine practitioner)
2) Event characteristics	Municipality and address where the event take place Event date Event start and end times Number of rehearsals Date of each rehearsal Classification of the event: - race (i.e. a test based solely on speed) - jousting/quintain (i.e. a test that involves demonstrating skills with one equine at a time) - tournament/sartiglia (i.e. a test that involves demonstrating skills with multiple equines simultaneously) - other Type of riding or handling: - saddles or bareback riding - driving - led by hand - without a jockey ("*scosso*") How does the horse event start? - one subject at a time or group departure - number of groups, number of horses per group, time interval for the start of the different heat - starting gates or *canapo* (i.e. the rope used to mark the starting point of the horse race) - other - notes
3) Characteristics of the environment	Characteristics of the event venue: - sports ground/stadium - town square - urban or rural district (urban roads or roads outside the urban area) Safety systems - indicate the presence or absence of: - fences marking the track - protective barriers along the track - shelters for the animals Track length in meters Overall course length in meters (if the track is covered multiple times) Ground type: - grass - sand - tuff - other Track layout: - straight track - ring - circuit (e.g., figure-eight racing circuit) - other Clockwise or counter-clockwise race track Notes
4) Characteristics of the involved animals	Horses: - number of stallions between 4 and 8 years old - number of stallions between 8 and 12 years old - number of stallions over 12 years of age - number of mares between 4 and 8 years old - number of mares between 8 and 12 years old - number of mares over 12 years of age - number of geldings between 4 and 8 years old - number of geldings between 8 and 12 years old - number of geldings over 12 years of age

Table 1 - continued.

Section of the technical report	Type of information
	Donkeys: - number of stallions between 4 and 8 years old - number of stallions between 8 and 12 years old - number of stallions over 12 years of age - number of mares between 4 and 8 years old - number of mares between 8 and 12 years old - number of mares over 12 years of age - number of geldings between 4 and 8 years old - number of geldings between 8 and 12 years old - number of geldings over 12 years of age Mules/hinnies: - number of stallions between 4 and 8 years old - number of stallions between 8 and 12 years old - number of stallions over 12 years of age - number of mares between 4 and 8 years old - number of mares between 8 and 12 years old - number of mares over 12 years of age - number of geldings between 4 and 8 years old - number of geldings between 8 and 12 years old - number of geldings over 12 years of age Most represented breeds Equines not admitted to the event: - date of the pre-event veterinary examination - details on the protocol used for the pre-event veterinary examination - number of animals excluded from the event for ongoing health issues - number of animals excluded for being unsuitable for the track - number of animals excluded due to lack of identification - number of animals excluded due to positive doping test - number of animals excluded due to age (less than 4 years old)
5) Veterinary assistance	Indicate the presence or absence of: - facilities or area for health inspections - facilities or area for equids that require veterinary care - veterinary ambulance or appropriate transport vehicles for injured animals (indicate also the number of vehicles and the name of the service team) Doping test: - number of tests conducted - used protocol - supporting documents - date of the tests, name of the person who performed the samples, matrix type, name of the testing laboratory - results of the tests Staff: - number and names of the equine veterinarians - number and names of the official veterinarians - number of the non-veterinary personnel assigned to emergency services - name of the farriers - name and distance of the reference veterinary clinic
6) Injury report	Indicate the number of cases that occurred during the rehearsals and during the event: - number of injured animals - number of animals transported to the veterinary clinic - number of animals deceased - number of euthanized animals Notes: - describe the type of injuries and how they occurred - indicate the name of the veterinarian who certified the injuries - in case of lethal outcomes, describe in detail where and how they occurred - identify and report any other problematic situations and how they were addressed

formation. No reports showing the participation of equids under 4 years of age were received. In fact, the ministerial ordinance prohibits the use of animals under 4 years old. It seems that younger animals are generally more prone to injuries during competitions [3,18]. However, other studies suggest that training and competition at two years of age can extend animal's career [4] and that the risk of accidents tends to increase with the age of the subjects [9]. In a review by Zanichelli et al. [7], the authors conclude that it is difficult to establish a direct causal relationship between age and musculoskeletal injuries. Rather, the increased risk seems to stem from a combination of age-related damage, exercise, and the adaptive capacity of

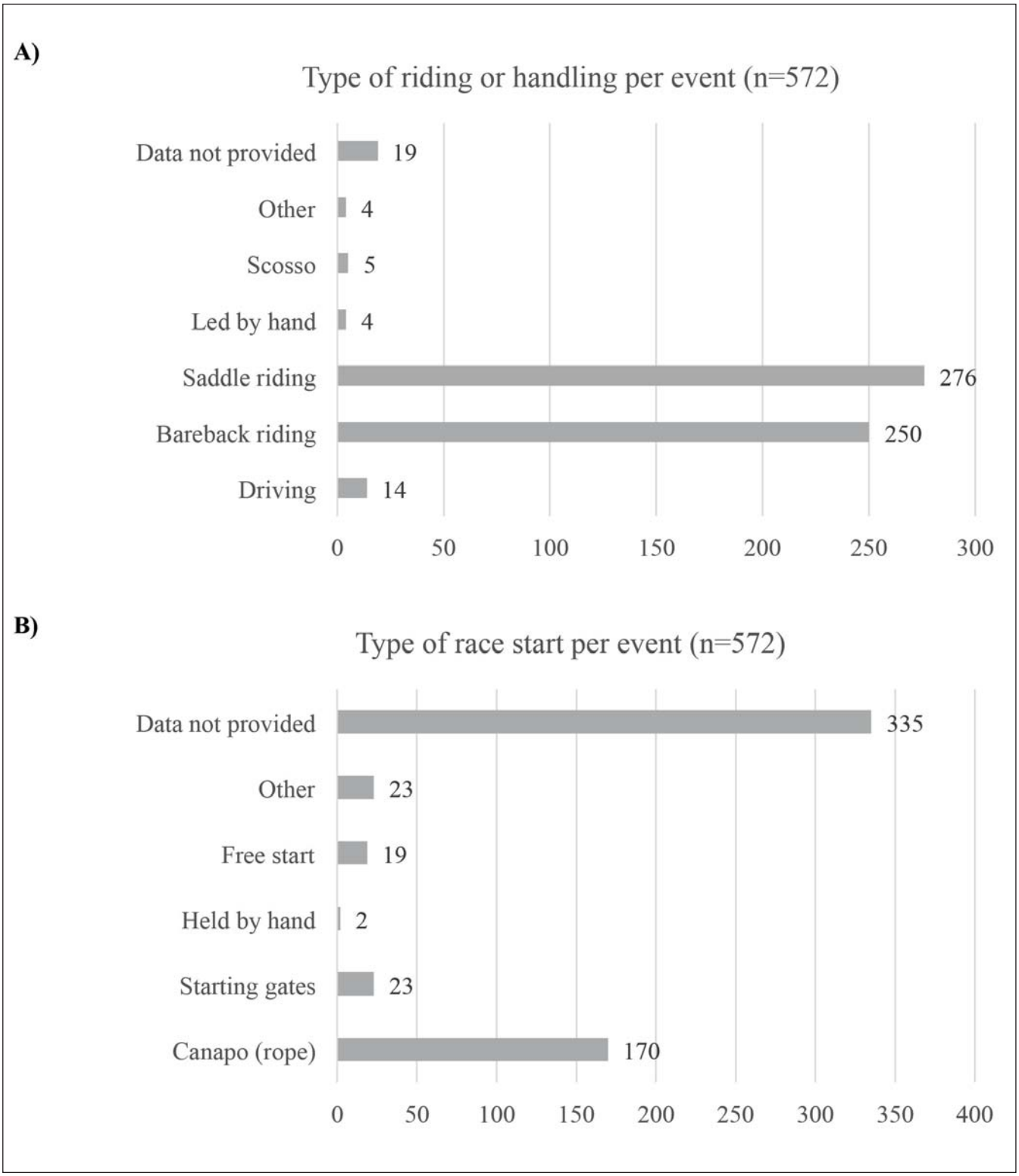

Figure 2 - Type of riding or handling (A) and type of race start (B) for each Italian traditional equestrian event during the period September 2017- December 2023.

certain structures.

Concerning breeds, according to the Ministry of Health's ordinance, the use of English Thoroughbred horses is banned in speed-based competitions, such as races and "*palii*", unless held on official racetracks. This restriction is due to the breed's susceptibility to inherited diseases, which can be exacerbated by physical stress resulting from these events [3]. Additionally, English Thoroughbred horses may induce other participants to increase their speed, driven by the instinct to catch up with each other, potentially leading to injuries [19]. Despite these regulations, English Thoroughbred horses were still used in 18 races conducted on unofficial tracks, highlighting non-compliance with the ordinance.

Since September 2017, a total of 108 equines have been excluded from popular events. As shown in Table 5, the main reasons were related to health issues (43 equids, 39.8%), followed by exclu-

Table 2 - Number of traditional events involving equids categorized by event type and species.

Event type	Horses	Donkeys	Mules/hinnies	Multiple species	Data on species not provided	TOTAL
Race	156	134	0	1	0	**291**
Gymkhana	5	1	0	0	0	**6**
Jousting/quintain	172	9	0	1	0	**182**
*Pariglia**	28	0	0	0	0	**28**
Shooting trial	5	0	0	0	1	**6**
Parade	5	0	0	1	1	**7**
Tournament/sartiglia	34	2	0	1	0	**37**
Data not provided	8	2	0	1	4	**15**
TOTAL	**413**	**148**	**0**	**5**	**6**	**572**

**Pariglia*: Horse racing with riders performing acrobatic moves.

Table 3 - Number and percentage of equestrian events per event venue, ground type, track length and track layout. Reference period September 2017- December 2023.

Event venue	Number of events (%)	Ground type	Number of events (%)
Sports ground/stadium	200 (35.0%)	Grass	102 (17.8%)
Urban or rural district	94 (16.4%)	Sand	279 (48.8%)
Authorized permanent facility*	31 (5.4%)	Soil	12 (2.1%)
Town square	109 (19.1%)	Mix of soil and sand	68 (11.9%)
Meadow/park	39 (6.8%)	Cobblestone	2 (0.4%)
Beach	5 (0.9%)	Tuff	30 (5.2%)
Street	53 (9.3%)	*Pozzolana*	15 (2.6%)
Other	14 (2.4%)	Synthetic materials	2 (0.4%)
Data not provided	27 (4.7%)	Quarry materials	7 (1.2%)
		Other	36 (6.3%)
		Data not provided	19 (3.3%)
Track or overall course length	**Number of events (%)**	**Track layout**	**Number of events (%)**
Up to 100 m	50 (8.7%)	Ring	272 (47.6%)
From 101 to 500 m	270 (47.2%)	Straight track	192 (33.6%)
From 501 to 1,000 m	131 (22.9%)	Circuit	85 (14.9%)
More than 1,001 m	74 (12.9%)	Semicircle	3 (0.5%)
Data not provided	47 (8.2%)	Data not provided	20 (3.5%)

*Authorized from the Ministry of Agriculture

Table 4 - Number of equids involved in Italian traditional equestrian events form September 2017 to December 2023.

Event type	Horses	Donkeys	Mules/hinnies	Multiple species	Data on species not provided	TOTAL
Race	2,781	1,231	0	24	0	**4,036**
Gymkhana	78	6	0	0	0	**84**
Jousting/quintain	3,017	83	0	66	0	**3,166**
Pariglia	1,091	0	0	0	0	**1,091**
Shooting trial	31	0	0	0	N.A.*	**31**
Parade	341	0	0	80	44	**465**
Tournament/sartiglia	1,028	31	0	30	0	**1,089**
Data not provided	75	8	0	6	4	**93**
TOTAL	**8,442**	**1,359**	**0**	**206**	**48**	**10,055**

*For one shooting trail event no data were available (n.a.) both for species and number of equids involved

sions due to the animal's unsuitability for the track (36 equids, 33.3%) and to age (< 4 years old) (28 equids, 25.9%). As previously discussed for age, this result is reassuring when it comes to pre-existing conditions, particularly since the presence of such conditions is a significant risk factor for the occurrence of injuries [7].

The collected data indicated that facilities for health checks were present during 529 events (92.5%) and facilities for equids in need of veterinary care were available in 484 events (84.6%). Veterinary ambulance or appropriate transport vehicles for injured animals were provided in 530 events (92.7%). A designated veterinary clinic was assigned for 473 events (82.7%), while in the 16.8% of the cases this information was not provided. The average distance of these clinics from the event lo-

cation was 75.8 km ± 20.2 km, with a minimum distance of 0 km and a maximum distance of 427 km. Doping tests were carried out during 211 events (211/572; 36.9%), while for 17 events (3.0%) the information was not provided. In particular, doping tests were carried out during 127 races, that is 43.6% of all races that were held (n=291), 68 jousting or quintains (68/182; 37.5%), 1 *pariglia* (1/28; 3.6%), 14 tournaments or sartiglia (14/37; 37.8%) and 1 during a not specified event (1/15; 6.7%). None of the conducted doping tests resulted positive (Table 5). Official veterinarians were present at 561 events (98.1%) and equine veterinarians at 563 events (98.4%). At 373 events (65.2%) not-veterinary personnel assigned to emergency services were also present. Farriers were available during 304 events (53.1%).

Concerning injuries, lethal outcomes, or other problematic situations, 47 cases were reported during the reference period (Figure 3), corresponding to 0.5% of all equids (n=10,055) that participated during the traditional events.

Sixteen of these cases occurred during the rehearsals, and 31 during the public event. These incidents concerned 36 events (36/572; 6.3%), in particular 16 were races, 13 were jousting or quintain events, 3 were *pariglia*, and 4 were tournaments. Forty-six cases involved horses and only one case concerned donkeys. Six cases, all involving horses, resulted in death or euthanasia (6/47; 12.8%), which corresponded to 0.07% (6/8,442) of the horses that competed from September 2017 to December 2023.

Figure 3 shows the number of fatal and non-fatal cases by event type. The frequency of incidents by event type was quite similar among races, quintains, *pariglia*, and tournaments. Specifically, 0.5% of all subjects (n=4,036) that participated in races, 0.5% of all equids (n=3,166) that participated in quintains, 0.3% of all animals (n=1,091) that took part to *pariglia* and 0.6% of all subjects (n=1,089) that participated in tournaments experienced an incident. Not all reports submitted to CReNBA included the sex, age, and breed of the equids involved in these 47 cases, making it impossible to conduct an analysis in this regard.

Table 5 - Number of equines not admitted to the events and reasons of exclusion. Reference period: September 2017-December 2023.

Reasons of exclusions	Number of equids (%)
Due to age (< 4 years old)	28 (25.9%)
Due to ongoing health issues	43 (39.8%)
Due to unsuitability for the track	36 (33.3%)
Due to positive doping test	0 (0.0%)
Due to lack of identification	1 (0.9%)
TOTAL	**108 (100%)**

The ground type that resulted in the most incidents was quarry material (28.6%), followed by *pozzolana* (13.3%) and tuff (10%). Concerning track length most of the injuries occurred on tracks ranging from 501 to 1000m and on tracks overs 1000m.

In a review by Pepe et al. [20] the incidence of injuries during one of the most prominent traditional horse races in Italy (i.e., *Palio di Siena*) decreased from 7.6% in the period 1992-1999 to 3.4% during the years 2000-2008. Over the same periods, the rate of fatalities dropped from 3.8% to 1.7%. These injury rates were higher compared to those reported in seven different studies cited by the authors, where the incidence of injuries or fatalities in animals racing in official racetrack ranged from 0.03% to 0.23%, depending on the breed used, the type of event, or the ground type. Thus, the incidence of severe injuries was lower in official racetrack events compared to the "*Palio*", despite official racetracks studies involved a larger number of equines compared to the 335 horses involved in the "*Palio*" events [20]. In the present study, 47 equids (47/10,055; 0.5%)

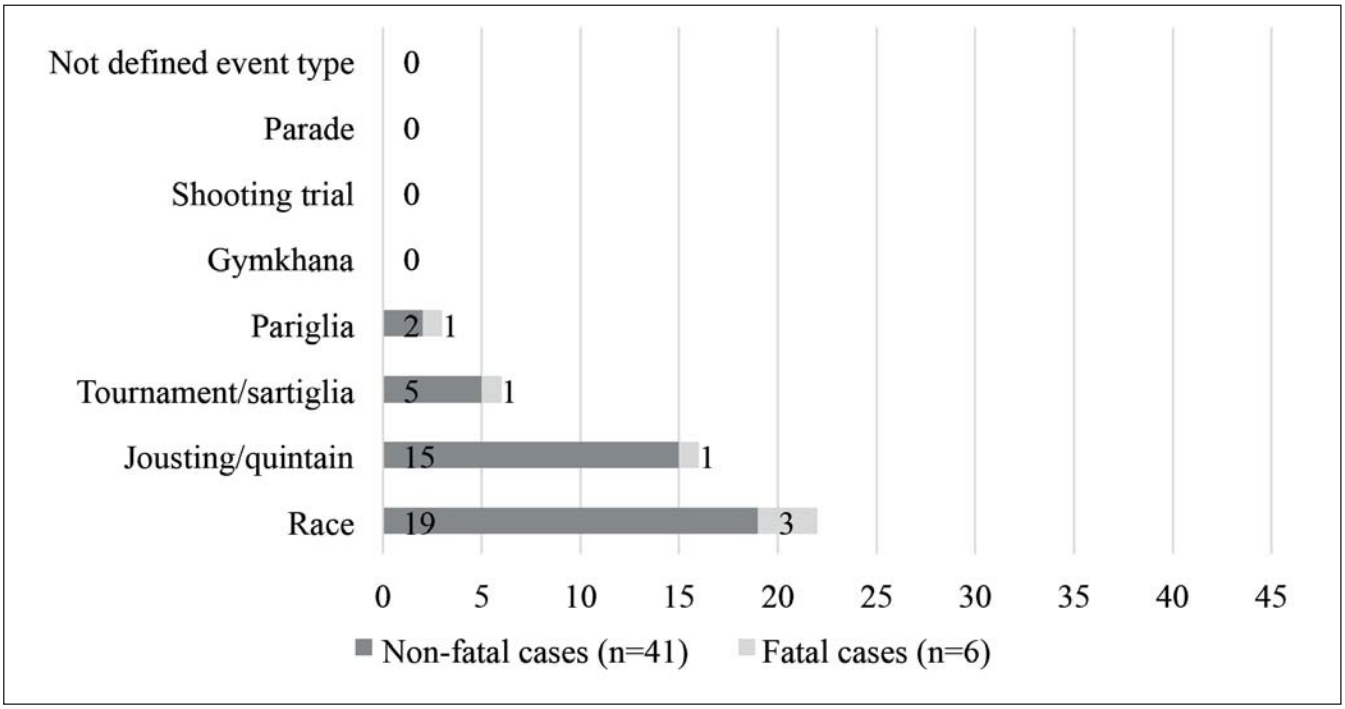

Figure 3 - Number of fatal and non-fatal cases per event type occurred during the period September 2017-December 2023.

Table 6 - Injuries, lethal outcomes or other problematic situations occurred during equestrian popular events in Italy during the period September 2017 and December 2023.

Description of the cases	Number of cases in horses (%)	Number of cases in donkeys (%)
Injury (not otherwise specified)	7 (15.2%)	0 (0.0%)
Wound or cut	7 (15.2%)	0 (0.0%)
Abrasion	6 (13.0%)	0 (0.0%)
Muscle pain	0 (0.0%)	1 (100.0%)
Lameness	14 (30.4%)	0 (0.0%)
Ocular trauma	1 (2.2%)	0 (0.0%)
Back pain	1 (2.2%)	0 (0.0%)
Exhaustion	1 (2.2%)	0 (0.0%)
Fractures	2 (4.3%)	0 (0.0%)
Disorientation	1 (2.2%)	0 (0.0%)
Euthanasia	2 (4.3%)	0 (0.0%)
Death	4 (8.7%)	0 (0.0%)
TOTAL	**46 (100%)**	**1 (100.0%)**

experienced injuries, of which 6 (6/10,055; 0.06%) resulting in death. These results are consistent with the studies carried out on official racetrack and referenced by Pepe et al. [20], although the traditional events differ from those races both in terms of infrastructure, as well as equines and personnel involved. Zanichelli and colleagues [7] reported 0.3% of injuries during race in official racetrack and 0.2%-0.8% of injuries during jousting events and *palio*, respectively.

Regarding the specific type of injuries, in our study, musculoskeletal injuries were found to be the most prevalent (Table 6). Locomotor system damages are health problems that significantly limits the horse's training or participation in competitions. It is also one of the most common reasons for eliminating horses from endurance competitions, where lameness can reach up to 80% [21]. In addition, other authors [22,23] indicate musculoskeletal injuries as the leading cause of fatal accidents during races and the primary reason for early retirement from competitive careers.

In terms of ground surfaces, several authors [24,25,26,27,28] have conducted specific studies on the causal relationship between the type of surface used and injuries. What emerged is that overly soft surfaces could cause damage to soft tissues, muscles, tendons, hooves, joints, and bone tissue [24,25].

In any case, Hernlund [28] emphasized that injuries are difficult to associate with surface properties because their aetiology is multifactorial, and they often occur after long time.

Various authors studied the impact of course length on certain injuries in animals. For instance, shorter courses that require intense efforts from the animals over relatively brief distances appear to be more significantly associated with the onset of exercise-induced pulmonary haemorrhage [29]. On the other hand, other studies have found that pathological conditions such as hyperthermia, dehydration, laminitis, and colic are often linked to competitions involving longer distances, such as endurance riding [30,21]. The results of our study indicated that the incidence of injuries and fatalities was higher in events ranging from 501 to 1,000 meters in length. Specifically, 16 injuries and 4 fatalities were recorded in this distance category, respectively out of a total of 41 accidents and 6 deaths. This high rate contrasts with the small number of participant (18.5%) involved in events of this length.

CONCLUSIONS

The analysis of equestrian events reported during the period September 2017-December 2023, highlights the popularity of such events in Italy, revealing the complexities surrounding the management and safety of the animals involved. The evidence of injury and fatality rates, even if under 1%, underscores the necessity for continuous monitoring of the health and welfare conditions of participating equines, as well as implementing more rigorous prevention practices. Additionally, this study revealed gaps in information, such as incomplete records on the characteristics of participating equines, doping test conductions and more detailed information about injuries and fatalities. The complete filling of these data could be useful for obtaining a more comprehensive risk assessment analysis and provide more reliable data for future well informed decision by policymakers.

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Conflict of Interest Statement

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