Identifying causes and preventing injuries to horses

Identifiering av orsaker och förebygga skador på häst

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Uppsala 2014

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Nr. 575

Student report
Swedish University of Agricultural Sciences
Department of Animal Environment and Health

No. 575

ISSN 1652-280X

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Nyckelord: hästskador, frågeformulär, djurskydd, animal welfare, injuries, horse

Serie: Studentarbete/Sveriges lantbruksuniversitet, Institutionen för husdjurens miljö och hälsa, nr. 575, ISSN 1652-280X

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Content

1. SUMMARY

Today there are approximately 220 000 horses in Sweden and every third person has in some way contact with horses or horse-related sports. During the last ten years the number of horses has increased with approximately 40 %. But according to Agria (a Swedish animal insurance company) there has been a 50.5% increase in number of injuries per 10 000 horse from 1995 to 1999. There is very little earlier work on trying to identify factors that increase the risk of the horse being injured. The aim of this study is to determine the cause of the most commonly occurring injuries to horses and it is hoped to determine whether these types of injuries can be prevented, or at least the frequency of them reduced.

A questionnaire was sent to 268 horse-owners that had visited the animal-hospital in Ultuna. They were divided into two groups, the first 134 had visited the animal-hospital because the horse was injured, and those were the test-group. The other 134 visited the hospital because something else was wrong with their horse, for example colic or castration. This was the control-group. The questionnaire consisted of five different sections (the control-group received a questionnaire where part c was removed);

a) Information about the owner/caretaker of the horse
b) Information about the horse
c) Information about the injury and how it happened
d) Information how the horse is kept outdoors and indoors
e) Information how the horse is exercised and trained

By gathering information about the injury, how the horse is kept and trained and then comparing the two groups, it is hoped to determine whether horse-injuries can be prevented or at least the frequency of them reduced.

It was found that 74 % of horses were injured in paddock and that these 89% of these injuries were on the legs (53% back and 36% front legs). More specifically it was found that 31% of the horses were injured by something in the paddock, 22% kicked by another horse and 17% fastened in fence around the paddock. Although 16% of responders stated that the accident was impossible to prevent, the most commonly reported suggestion to prevent future accidents was to search the paddock for things that the horse can hurt itself on, for example stones or branches, or to improve the fencing.

The only significant difference between the two treatment groups was regarding the time that the horses spent outdoors. Horses in test group that visited the clinic because the horse had a trauma injury were on average kept outdoors 12.5 hours per day compared to 9.6 hours per day for horses in the control group who visited the clinic for reasons unrelated to an accidental injury.

According to this investigation there did not seem not to be any large differences in how the horse owner stabled and trained their horses. As a consequence of this, it is not possible to give any recommendations in these areas to decrease the risk of getting the horse injured. Although accidents keep occuring and horses get injured, so there is still much work to do!

2. SAMMANFATTNING

Idag finns cirka 220 000 hästar i Sverige (SCB, 2005) och var tredje person har på något sätt kontakt med hästar eller hästrelaterade sporter. Under de senaste tio åren har antalet hästar ökat med ungefär 40%. Enligt Agria (svenskt företag som försäkrar djur) har dock antalet olyckor ökat med 50.5 % per 10 000 hästar från 1995 till 1999. Det finns väldigt lite forskning där man försöker analysera och indentifiera faktorer som ökar risken att få hästen skadad. Syftet med den här studien är att försöka kartlägga anledningen till de mest vanliga skadorna hos hästen och förhoppningsvis kunna se om dessa kan förhindras eller åtminstone att antalet skador minskas.

Ett frågeformulär skickades ut till 268 hästägare som hade besökt djursjukhuset i Ultuna. De var indelade i två grupper, de första 134 hade besökt sjukhuset på grund av en skada på hästen, dessa var testgruppen. Resterande 134 hade besökt djursjukhuset på grund av någonting annat som var fel, till exempel kolik eller rutinundersökningar som till exempel kastrering. Dessa var kontrollgruppen. Frågeformuläret bestod av fem stycken (i kontrollgruppens frågeformulär var stycke C borttaget);

a) Information om hästägaren/skötaren
b) Information om hästen
c) Information om skadan och hur den uppkom
d) Information om hur hästen är uppstallad respektive hur den hålls ute
e) Information om hur hästen är motionerad och tränad

Genom att samla information om skadan, vad man har för hästhållning och hur den tränas och sen jämföra dessa grupper kan man förhoppningsvis bedöma om antalet skador på hästarna kan förebyggas eller åtminstone att antalet minskas.

Denna studie visade att 74 % av hästarna skadades när de vistades i hagen och att 89 % av dessa var skador på benen (53 % på bakben och 36 % på framben). Det visade sig att 31 % av hästarna skadades på något föremål i hagen, 22 % hade blivit sparkade av en annan häst och 17 % hade trasslat in sig i stängslet. Trots att 16 % av de tillfrågade menade att olyckan varit omöjlig att förhindra så var de vanligaste angivna förslagen för att förhindra framtida olyckor att söka igenom hagen efter föremål som hästarna kunde skada sig på, till exempel större stenar och grenar, eller genom att förbättra stängslet.

Den enda signifikanta skillnaden mellan de två behandlingsgrupperna var relaterade till hur länge hästarna spenderade tid utomhus. Hästarna i testgruppen som besökte kliniken på grund av en olycksrelaterad skada hölls i genomsnitt utomhus 12,5 tim per dag, jämfört med 9,6 tim per dag för hästarna i kontrollgruppen, vilka besökte kliniken av andra orsaker än olycksrelaterade skador.

Enligt den här studien verkar det inte finnas några större skillnader i hur hästen uppstallas eller tränas. Därför kan man inte ge några rekomendationer hur man undviker skador på sin häst. Olyckor sker dock och hästar blir skadade så det är det mycket arbete kvar att göra!

3. INTROUCTION

Humans have used horses for many thousands of years. The first relibale trace of domesticated horses is from 4000 – 5000 years before Christ, in Asia and Europe (Furugren, 1983; Kiley-Worthington, 1990). But there are engraved pictures seeming to be a horse with a halter, that could be a sign that humans have held horses in captivity as long as 15 000 years (Björnhag, 1989). Today there are approximately 220 000 horses in Sweden, which is an increase with 60000 horses since 1990 (internet 010206, www.agria.se) and every third person has in some way contact with horses or horse-related sports (internet 010206, www.ridsport.se). As the number of horses increases, it is natural that the number of horse-injuries also increases. But, according to Agria's (a Swedish animal insurance company) statistics over horse-injuries, there was a 50.5% increase in the number of injuries per 10 000 horses from 1995 to 1999. A part of this can be explained by horse-owners taking their horses to the animal-hospital more often than before (internet 010206, www.agria.se), but the fact that injuries are actually increasing is alarming. Why are horses injured? Can horse-owners do something to prevent injuries? By trying to find the answer to these questions maybe it is at least possible to reduce the number of horse-injuries.

There is very little earlier work on trying to identify factors that increase the risk of a horse being injured. Neither are there recommendations, based on scientific studies, to horse-owners of what to do to decrease the risk. A good start for horse-owners in trying to understand why accidents happen and horses are injured is to learn about the behaviour of the horse and how it perceives the surroundings. Familiarity with the behavioural repertoire of the horse and its ability to detect objects helps anticipate the horse's reaction in different situations and possibly prevent, or at least reduce, the number of accidents.

The behaviour of wild horses

Although the horse has been domesticated for approximately 7000 years during which time we have selected for characteristics such as rapid learning and co-operation with humans, very little of the natural behaviour of the horse has changed in today's horses compared to their wild counterparts (Kiley-Worthington, 1990). Also Rundgren (1996) says that the basic behaviour is still very similar between domesticated horses, feral horses (horses that live as wild horses but of which the ancestors were domesticated) and Przewalskis horse, which have never been domesticated. Domestication has only influenced the threshold at which different behaviours are triggered. For example, the sexual drive is stronger in domesticated horses than in wild horses and the flight behaviour is stronger in the wild (Rundgren, 1996).

Horses in unmanaged groups in the wild live in harem groups called bands (Tyler, 1972; Wells and Goldsmidth-Rothchilde, 1979). The most common social unit consists of one mature male and several mature females and their offspring less than three years of age (Waran, 2001). The total harem size can vary from two to twenty-one individuals depending on the environmental conditions, such as amount and quality of food and the number of predators (Keeling, 1996). Harems are relatively stable groups and most of the changes are due to births and deaths. Also when young, females join other bands and young stallions leave their birth herd to stay either solitary or join together with other young stallions and form bachelor groups. Thus group composition will change (Waran, 2001).

Horses do not defend territories, but occupy a specific area called a home range (Kiley-Worthington, 1987). A home range can vary in size depending on the availability of the necessary resources for survival e.g. watering holes, suitable grazing areas and protected areas for avoidance of biting insects and thermal extremes (Waran, 2001). Home ranges may sometimes overlap and when flocks are forced to use a common resource, group size seems to be what determines who has first access to the resource (Berger, 1977).

When two horses meet they will relatively quickly determine a dominance-subordinate relationship. Hierarchies or dominance relationships in a herd are the sum of all the pair-wise relationships (Keeling, 1996). In small groups the rank-order is linear, whereas in larger herds more complicated relationships are apparent (Waran, 2001). In a stable social group the rank-order is positively correlated with age, with younger horses occupying a lower position in the order (Waran 2001). Body-size does not seem to influence the rank-position in the group (Keeling 2000). Neither does sex seem to be the determinant when it comes to rank-order. Studies on feral populations have shown that while in most cases the males are dominant , in other, it is the females who are at the top of the hierarchy (Feist and McCullough, 1976; Berger 1977; Houpt and Keiper 1982;).

Dominance relationships in a group are stable, often over many years, and result in a reduction of aggressive behaviour (and so injury) and an increase in group cohesion (Waran, 2001). Expressions of dominance vary from very subtle to violent, depending on the rank of the animals involved. Because of the high risk of injury and the high energy expenditure most dominance related behaviour is subtle (Keeling, 1996).

Effects on social behaviour due to group size and space allowance in stabled horses

In captivity, a horse is unlikely to spend his/her life at the same establishment. Even if the horse is kept at the same place throughout its life, it is unusual that the horse will belong to the same social group for this time. Where horses are kept outside only a few hours per day, they can be seen as part-time members of a group. When the social group is not stable the horses may have to establish/re-establish their social order each time they are turned out. This, as well as limited space and restricted access to food, is one reason for the higher level of aggressive interaction often reported in domestic horses (Waran, 2001). However, Houpt and Wolski (1980) have shown that where the part-time group is the same over a period of more than a year, the hierarchy remains relatively stable. They have also shown that where horses are constantly changing, aggressive interactions and injury are greatest when supplementary food is given. Space is often limited in captivity and where horses are confined, interactions between horses and aggressive behavior are more likely to occur. It has also been shown in other animals that aggressive behaviour increases as space decreases (Keiper, 1988).

How does the horse perceive its surroundings?

As a prey species living on the open plains, the eye is very important to horses, As a result eyes are large and located at either side of the head. The horse has the ability to see separately with each eye and has a much larger monocular visual field than humans. Harman et al. (1999) measured it to 160-170°. The binocular overlap is estimated to be 80°, and was found to be directed down the nose and not straight ahead as was thought originally. Harman et al. (1999) also found that a blind area existed directly in front of the forehead. This probably

explains why a horse must raise its head to detect distant objects and why horses will often shy away from an object that appears to have been in their visual field for some time. However, the horse seems to be extremely good at detecting small movements when an object is in focus. This is very important when most of its social communication relies on its ability to perceive small changes in body posture, for example a slight change in ear-position (Waran 2001). The horse has good night vision, which is important when detecting nocturnal predators and for communication with other horses.

The extent of the hearing capability of the horse is not known, but it is thought that horses hear the same frequency range as humans (Waran 2001). The horse's ears are large and moveable and can rotate independently of each other. Despite this, a horse's ability to locate sound does not appear to be very effective, although one would expect it to be important for a horse to be able to locate predators and the whereabouts of the rest of the herd (Fraser, 1992)

Smell is important to horses for exploring their environment and identifying feeding material (Marinier et al., 1988). Smell is also important for communication. The scent of the horse tells what group it belongs to and what reproductive state it is in (Marinier et al., 1988).

Aims

The aim of this study was to determine the cause of one of the most commonly occurring injuries to horses. By gathering information on the details of how the horse was kept and managed at the time of the injury, it was hoped to determine whether these types of injuries can be prevented, or at least the frequency of them reduced. By comparing horses used for different sports, the intention was to determine whether certain categories of horses have more or less injuries compared to horses that are used in other ways and for other sports. It was also of interest how much of this is due to the sport itself and how much it is due to how the horse is kept.

4. MATERIALS AND METHODS

Collecting data

A questionnaire was sent to 268 horse-owners who had visited the animal-hospital in Ultuna, Uppsala from 1999-06-01 to 2000-10-18. The horse-owners were divided into two groups. The first 134 had visited the animal-hospital because the horse was injured (in this study called test-group **TG)**. The other 134 visited the hospital because something else was wrong with their horse, e.g. colic, or they wished to have the horse castrated (in this report called control-group **CG**). To avoid confusion with horses that were lame for other reasons, e.g. back-problems, only horses with obvious injuries such as wounds were selected. The main proportion of injured horses that come in to the animal-hospital have wounds and therefore not many were missed (John Pringle, personal communication).

The owners of the injured horses were found in a database over patients at the hospital. By using a computer placed at the reception for medical surgery for large animals and the data-program Univet2000, they were located by searching for;

Animal: horse
Time of visit: 99-06-01 – 00-10-18
Diagnose: Traumatic injury (code ha711)

The control-group to these horses was found in the same database, using the same data-program**.** To find a corresponding control horse for each test horse, it was necessary to locate a horse of the same breed and sex that had visited the animal-hospital during the same period of time. This was possible by searching for;

Animal: horse
Animal breed: the specific breed to be found
Sex: mare, stallion or gelding
Time of visit: 99-06-01 – 00-10-18
Treatment: everyone that has paid (code a110)

To satisfy the criteria for a control horse, firstly the breed had to be the same, secondly the age. If no horse of the same age visited the hospital during the same period, a horse that was one year younger or one year older than the test horse was selected. Finally the sex of the horse was selected. If there was more than one horse that matched the test horse, the one that had been visiting the animal-hospital at the latest date was selected.

The file was then located from which it was possible to look up the address, the type of horse and more details about the injury. In those cases where the file could not be found, a different search engine was used. By giving the file-number and the type of animal, which in this case was horse, the owner and the address were presented, but with this method it was not possible to access more detailed information about the injury.

The questionnaire

In the questionnaire, there were questions about how the horse became injured, to enable us to develop a good understanding of the circumstances around the injury. There were also questions about how the horse was kept, managed and trained around the time of the injury. In total there were 38 questions.

To make the questionnaire easier to fill in, it was divided into five different sections with the following headlines:

A) Information about the owner/caretaker of the horse
B) Information about the horse
C) Information about the injury and how it happened
D) Information how the horse was kept outdoors and indoors
E) Information how the horse was exercised and trained

The control-group of owners received the same questionnaire, but the section about injuries was removed, so the questionnaire consisted of 30 questions.

Breed, sex and age of the horse were filled in on the questionnaire before sending it to the owner. This acted as a check for the person as to which horse the questionnaire referred to, in case the owner had many horses. Every questionnaire was also marked with a number so it would be possible to check who had answered and, respectively, not answered and send a reminder if necessary. Two reminders were sent out to the horse-owners.

Statistical analyses

The data was entered into a spreadsheet (Excel) and the results for each question for the two groups (owner of injured and non-injured horses) compared. The analyses were carried out using the statistic software Minitab (version 14). For the questions where average values were compared, a 1-sample-sign test was used, for the remaining questions a Chi-square Test was used.

5. RESULTS

Of the original 268 questionnaires that were sent out, 134 to horse owners in the test-group (TG) and 134 to horse owners in the control-group (CG), a total of 191 were returned, 90 (67%) in TG and 101 (75%) in CG. In some of the questionnaires the horse-owner had not filled in every question, which resulted in a lower response rate for some questions. In other questions several alternatives were filled in by the same horse-owner and therefore there was a seemingly higher response-rate for those questions (see Appendix for response rate for each question).

Among the 191 questionnaires that were returned, 144 included horses that matched each other from the two groups (i.e.72 matched pairs). For example, in question four, where the horse-owners gave the time they had known the horse (where average- and median-values were compared) the 144 matched horses were used. For the most of the remaining calculations, for example in question three, where the horse-owners were asked to describe their knowledge and experience of horses on a scale from 1 (very inexperienced) to 10 (very experienced), comparisons were made on the total number of 191 returned questionnaires. The results section is divided according to the type of analysis.

The injury

Type of injury

Most of the horses had one type of injury and the most common type was a cut wound (almost 37 %). A quite large percentage, 28 %, had stated “other” as the type of injury, which includes for example, a kick from another horse or a transport-accident. No horses had suffered from a large penetrating injury to the body. Only eight of the responders had horses that suffered from two types of injuries at the same time. Cuts and puncture wounds were the most common combination and were represented by four of these horses.

What part was injured

The limbs seem to be the most vulnerable part of horse’s body. 89 % of the horses injured the limbs, especially the hind limbs. 53 % of the horse-owners that answered the question gave the hind limbs as the injured part of the horse’s body and 36 % reported injuries on the front limbs. No horse had injuries to the neck or the hindquarters.

Season when the accident occurred

Approximately 47 % of the accident happened during summer, from June to August. Winter, spring and autumn were equally represented (<20% each).

Place where the horse was injured

The majority (74%) of the horses were injured in the paddock. The second most common place where horses got injured was in the trailer, represented by 10 %. Other places, such as in the stable or on the roads did not exceed 10 %.

How the horse was injured

Among the answers the majority (31%) said that the horse got injured from something in the paddock while similar percentages, approximately 20%, stated that the horse was kicked by

another horse or that the horse was caught in the fence. Unfortunately and very surprisingly 4% of the horses were deliberately injured by an unfamiliar human.

What caused the accident
In order to describe what caused the accident there were nearly as many different answers as there were responders. However a few reasons were stated several times. These were that the group-composition in the paddock changed, the horse was frightened or the owners stated that it was simply bad luck that got the horse injured. These reasons each represented approximately 19 % of the responses.

Suggestions to prevent accidents
The most common answer was that the accident was impossible to prevent which was stated by 16% of the responders. Other suggestions that came up repeatedly were to search the paddock for things that the horse can hurt itself on, for example stones or branches, or improve the fence.

Comparison between test-group and control-group

A) Information about the owner

Distribution of age and gender
There was no difference between the TG and CG in the proportion of males and females that accompanied the horse to the clinic. Approximately 80% were women in both groups. Neither was there any difference in the age of the people taking the horse to the clinic, 80% in both TG and CG was over 25 years old.

The horse-owners generally thought they were experienced
On a scale from 1 to 10, with 10 being the most experienced, the horse-owners were asked to assess their knowledge and experience of horses. The average level was 8.1 in both groups and almost all people ranked themselves as above 6 on the scale (see figure 1).

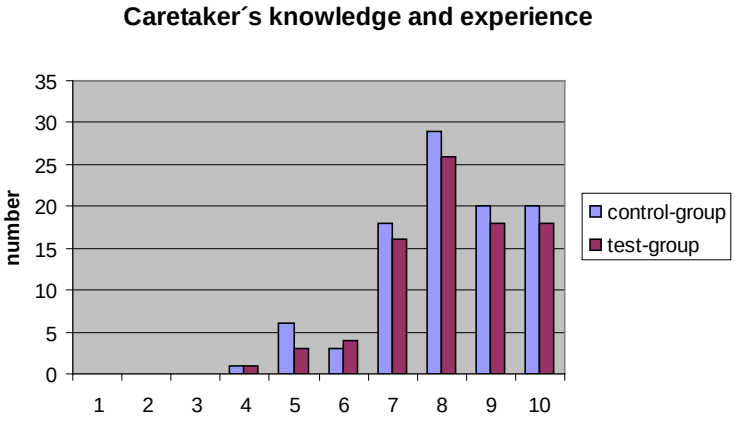

Figure 1. Owner/caretaker's knowledge and experience of horses on a scale from 1(very inexperienced) to 10 (very experienced).

Time the person had known the horse
The time the horse-owners had known the horse ranged from a few weeks up to 15 years in TG and from a few weeks up to 17 years in CG. The mean time the owner/caretaker had known their horse was 4.2 years in CG and 3.4 years in TG but there was no significant difference between the groups (Wilcoxon signed rank test, P=0.7).

B) Information on the horse

The distribution of different types of horses
Since the horses in CG were chosen according to the age and breed distribution of horses in TG, these attributes were the same in the two groups.

As many mares as geldings
No sex was more represented than the other in any of the groups.

Mostly medium-ranked horses
In the answer to question 9 where the person should classify the horse´s rank towards other horses, there was no significant difference between the groups. Most people classified the horse as medium or high-ranked, 88% in TG and 85% in CG.

Rather easy horses
The perceived temperament of the horse while handled and during training did not differ between the groups. On a scale from 1 (very easy-calm and nice) to 5 (very difficult-playful and mean) more than 82% of the respondents in both groups scored their horses within 1 to 3 (table 1). The average value was 2.2 in the test-group and 2.5 in the control-group and this difference was not significant (Wilcoxon sign rank test, P=0.8).

Table 1. The temperament of the horse, classified on scale from 1 (very easy-calm and nice) to 5 (very difficult-playful and mean). TG= Test group. CG= Control group

Temperament	***TG (%)***	CG (%)
1	26	20
2	36	34
3	24	28
4	13	16
5	1	2

C*)* Information about the management of the horse

Situations before visiting the clinic
Approximately 1/5 of the horses in both groups were put in a new situation the last days or weeks before visiting the animal-hospital. The most common type of new situation in the two groups was a new environment, such as a new stable, or put in an enclosed pasture with new horses.

Outdoors housing

There was a significant difference regarding the time that the horses spent outdoors between the two groups. Horses in TG were on average kept outdoors 12.5 hours per day compared to 9.6 hours per day in CG (Wilcoxon signed rank test, P=0.015).

Together with other horses

Most of the horses in both groups were kept together with other horses when they were outside, 91 % in TG and 79 % CG. This was not significantly different (Chi-square test, P=0.15).

Group-composition

Mostly the flock consisted of three to four horses in both groups. Neither were there any significant differences between groups regarding the sex- and age-distribution of the flock. All possible combinations of compositions according to sex were represented and the most common was a combination of mares and geldings in both the test- and the control-group. The most common age-distribution was horses older than four years, and there was no flock that consisted only of horses younger than 1 year in either of the groups in this study.

Stability in the flock

The groups did not differ regarding the stability of the flock, 91 % of the horses in TG and 97 % of the horses in CG lived in stable flocks.

Paddock; size and type of fence

There was no difference regarding the size of the enclosure between the test- and the control-group. The majority of the horses in both groups had access to grass when they were outside, 87 % in TG and 85 % in CG. This difference was not significant (Chi-square test, P=0.64). The type of fence did not differ and the most common fence type was an electric fence in both groups, 76 % in TG and 84 % in CG used electric wire. 20 % of the respondents in TG and 14% in CG used wooden fence and only a small number of horse-owners used pig-netting and railing. Approximately 10 % in both groups used a combination of several types of fences.

Indoors housing

Indoors, the majority of horses in both groups, were kept in a loose box where the horse could see other horses or where they could touch other horses (table 2). Very few horses were tied up, but even these still had the possibility to have visual contact with other horses. Only 1 % of the responders in TG kept the horse alone in the stable in a loose box, but also only 7 % of the horses in TG and 5% in the CG were housed in groups with full social contact when housed indoors. No significant differences were observed (Chi-square test, P=0.48).

Table 2. Type of stabling system. TG= Test group. CG=Control group.

Type of stabling	***TG(%)***	CG (%)
Loose box, alone in the stable	1	0
Loose box, can see other horses	53	53
Loose box, can touch other horses	35	44
Group house	7	5
Tied up, can see other horses	3	1
Other	1	0

Food management

There was no difference in the amount of hay, straw or other roughage given to the horses between the two groups. The average amount in TG was 8.2 kg per day and in CG 8.0 kg per day. When relating these figures to the average-bodyweight of the horses, which was 466 kg in TG and 461 in CG. Neither was there any difference in the amount of grain/concentrate supplement for the horse between the groups, where the average was the same in both groups, 2.4 kg per day.

D) Information about training and handling of the horse

Exercise

There was no difference regarding the number of days per week the horse was exercised, where the average was 4.7 days/week in both groups. The average time the horse was exercised per day was 2.4 h/day in TG and 1.4 h/day in CG, but this difference was not significant (Wilcoxon sign rank test, P=0.69).

Most people have their horse as a hobby

There was no difference between the two groups regarding the proportion of respondents keeping their horse as a hobby and the proportion of respondents keeping their horse for the purpose of earning money. Most of the people had their horse as a hobby, 81% in TG and 74% in CG. The majority used the horse for traditional English riding, but also some western riding and some training on Icelandic horses.

In what discipline and where do people train their horse

Every discipline was represented in both groups and more than 50% of those who had answered the questionnaire in both groups reported traditional English riding as their discipline. Approximately half of the horse-owners in both groups trained their horse mainly in the countryside, but quite many trained in a riding-hall or in a paddock.

Education of the horses

From the answers to the question about where the horse-owners would classify the level of education of the horse on a scale from 1 (early stage) to 10 (late stage), no significant difference was observed (Wilcoxon sign rank test, P=0.45). All categories were represented and the average score in TG was 5.8 and in CG 5.6.

Compete or not

There was no difference between the groups regarding whether they competed or not with their horse, 40% of the people in TG competed with their horse and 48% in CG. Among these, a majority had dressage or show jumping as their discipline.

6. DISCUSSION

The return rate for the questionnaire was generally good in both groups. Although there were few differences between the groups, I will discuss my results and compare them with other investigations. In this discussion, firstly the different types of injuries are presented followed by a discussion on how the test group and the control group differed. This section will end with some words of how to prevent horse related injuries.

The injury

Place where the horse was injured

Outside in the paddock or the enclosure there are many things that horses can hurt themselves on, for example stones or trees. This might be one explanation for why the majority (74 %) of the horses were injured in the paddock. Similar results were shown in the Egenwall et al. study from 2009, where 64 % were injured while at pasture. Half of the injuries happened during summer, when horses in general are spending more time outside compared to the rest of the year, which can be an explanation for the high rate. The second most common place where horses got injured was in the trailer (10 %). This can also be due to the high rate during summer when people travel more with their horses (i.e. season for competition).

How the horse was injured

To the question where the horse-owners were asked to describe the accident, the response rate was only 50 %. The proportion of responders was even lower to the questions where they were asked what they thought caused the accident and what they could do to prevent similar accidents in the future. In these types of questions, where people had to write in their own words, the response rate can be expected to be lower because it takes more time than just to check a box. Anyway there are reasons to believe that a part of those who did not answer actually did not know how the horse got injured or what caused the accident, especially when 3/4 of the accidents happened in the paddock.

What caused the accident

According to Keeling et al. (1999) approximately one quarter of all horse-related accidents are due to the horse being frightened and miscommunication between horse and rider, which is partly supported by this study (19 %). Although no one stated that the human was the cause or in some way affected the horse's reaction, which then caused the injury. Several studies, however, show that the state of mind of the human has an impact on the horse's behaviour. Chamove et al. (2002) suggested that human attitude correlates with the behaviour of the horse. Also Morgan et al. (2000) suggested that the rider's personality correlates with the behaviour of the ridden horse. Maybe if the horse owners were given alternatives in the questionnaire, where their own contribution to the accident was one alternative maybe it would be a different outcome. Most horse owners in this study assessed themselves as rather experienced and maybe don´t think about themselves as a contributory cause to the accident.

Comparison between test-group and control-group

A) Information about the owner

Distribution of age and gender

Every third person in Sweden is in some way connected to riding and mostly woman work with horses. According to the Swedish Equestrian Federation 85% of their members are girls and women (www.ridsport.se/ridsport.htm). This corresponds well with the gender-distribution in both groups in this study (80 % women). It is not surprising that there were no differences according to gender between TG and CG. One wouldn't expect that one sex would have a higher number of injured horses or have other reasons to visit the animal-hospital more often than the other sex. Also figures from the same federation regarding age-distribution shows that 55% of their members are younger than 21 years old (www.ridsport.se/ridsport.htm). Although you wouldn´t expect a child bringing the horse to the animal-hospital.

The horse-owners generally thought they were experienced

Blombergs (2000) investigation of factors causing horse-related accidents where humans are injured, showed that 65% of the respondents classified themselves above average regarding their knowledge and experience. In this study, the majority perceived themselves as above average. This might be due to that in Blomberg (2000), half of the respondents were very young. It is natural that older people have more knowledge and are more experienced than young people. But are people in general really that experienced or do people only think they are experienced? It would be interesting to investigate the estimated value for the horses that were brought to the animal-hospital. Maybe more experienced people have more valuable horses and therefore they are more likely to visit the animal-hospital.

B) Information on the horse

The distribution of different types of horses

Since the horses in CG were chosen according to the age and breed distribution of horses in TG, these attributes were the same in the two groups. Although there are several studies that imply differences in behaviour between breeds. Hausberger et al. (2001) observed differences in friendly attitude where French saddlebreds were more friendly than Angloarabs which also more often developed a stereotypic behaviour, which could influence the risk of getting injured. Lloyd et al. (2007) investigated variations between breed according to horse personalities. The results from that study imply that there are differences in personality due to the breed. Anxiousness and excitability showed the most variation while dominance and protection showed the least variation. It would be interesting to see a study were one compared differences in injuries and/or rate of injury, between different breeds.

One may question whether or not the method I used to gather the data gave a representative picture of the composition of horses and horse-owners in Sweden. Probably not so, because different categories of horse owners are more or less likely to bring their horse to the clinic. Nevertheless this was one way of collecting data and it is possible that there are better ways in reaching a representative distribution of horses that this balanced case control approach. In Rapport 2005:5 from the Swedish Board of Agriculture presented 2005 figures over the

estimated number of horses and the distribution of different types of horses in Sweden. According to Jan Lockvall at Svenska Hästavelsförbundet, the number of matings basically reflects the distribution of different types of horses. The distribution of different types of horses in this study has more similarities to the more recent figures. Notable are though that the warm-blood trotting-horses and the cold-blood horses are less represented in this study and the amount of warm-blood riding-horses represents a larger percentage compared to the numbers of matings from year 2000 (table 3). These differences could be due to the fact that this study only reflects the horse-population around Uppsala, which in that case may differ from the average distribution all over in Sweden. It could also be that it is a certain type of horse-owner who brings their horse to the clinic. Perhaps trotting-horses, both warm-blood horses and cold-blood horses, to a greater extent are taken to the animal-hospitals which are sponsored by ATG (AB Trav och Galopp), so called ATG-clinics. They are often located near to the trotting tracks. Or can it be that trotting-horses actually have less injuries than other groups of horses and that riding-horses are more often involved in an accident?

Table 3. Distribution (%) of different types of horses represented in Sweden based on the estimated number of horses in Sweden in the 2005 report and the numbers of matings in the year 2000, compared with the distribution in this investigation. TG= Test group. CG= Control group

Breed/type of horses	***Share %***			
	In Sweden		***In this study***	
	Report 2005	Matings 2000	TG	CG
Warm blood riding horses	30	25.6	46	43
English thoroughbred	3	12.3	12	15
Warm blood trotting horses	22	31,3	18	19
Cold blood horses	5	10	1	2
Icelandic horses	7	5.6	10	11
Ponies	26	15.2	13	10

As many mares as geldings

No sex was more represented than the other in any of the groups and the distribution is similar as in Blombergs (2000) (see table 4). Whether or not our figures agree with the horse population's distribution according to sex of horses in Sweden, and so whether a certain category or horse is more or less likely to be injured, unfortunately can't be determined due to lack of information on these distributions in Sweden.

Table 4. The distribution (%) of horses according to sex. TG= Test group. CG= Control group.

Sex	***TG %***	***CG %***	Blomberg´s study %
Stallions	15	13	5
Geldings	42	38	47
Mares	43	49	48

Mostly medium-ranked horses

Dominance relationships are generally stable, often lasting for many years. These reduce the level of aggression and so injuries and they contribute to the stability in a group. More than 70% of all aggressions are low cost displacements and the mildest form is when a high ranking animal moves into the space previously occupied by a low ranking horse (Keeling 1996). These visual signals can be difficult for the owner to detect and that might be one

reason why more than 50% of the respondents classed their horse as medium-ranked in both groups – the owners were simply uncertain about the rank of their horse.

Rather easy horses
The results in this study imply that there is no difference in the extent to which the horse suffers an injury depending on its temperament. Reactivity is defined as responsiveness to stimuli, and a highly reactive horse has a lower threshold of responsiveness (Kiley-Worthington, 1990). Although it is reasonable to assume that highly reactive horses are more prone to respond to something and hence get injured, it may also be that these horses notice danger faster and can avoid being hurt.

C) Information about the management of the horse

Situations before visiting the clinic
Horses are prey-animals driven by three major instincts; they are perceptive to danger, they flee from fear and are gregarious. This means, according to Parelli (1999), that the horse reacts first and thinks second. By exposing horses to unfamiliar subjects and sounds it is possible that horses may improve their ability to control fear reactions, i.e. think first and react second. By such training, accidents where horses and humans are injured may be avoided.

Outdoors housing with other horses
There was a significant difference regarding the time that the horses spent outdoors between the two groups. 75% of the accidents happened outdoors, mainly in paddocks. Naturally there are more objects for the horses to hurt themselves from outdoors than indoors, such as stones, trees and fence etc.

Most of the horses in both groups were kept together with other horses when they were outside. This, together with the fact that the most common cause of injury was related to some object in the paddock or being caught in the fence, implies that the risk of a horse being injured is not dependent on whether you keep your horse together with other horses or alone. It was not clear though in this study what the horse was doing that led to it being injured by the object or fence. It could be that it was playing with or reacting during an agonistic interaction with another horse. If it is so, the Hartmann et al. (2009) study indicates that aggression can be reduced when mixing unfamiliar horses, and so the risk of injury be reduced, by pre-exposure in neighbouring boxes before releasing them into the paddock. In my study 22 % stated that the horse was kicked by another horse and 19 % thought that the injury was caused by a change in group composition. Perhaps some of these accidents could be avoided if the horses were pre-exposed to each other. Although in this study the treatment groups did not differ regarding the stability of the flock.

Indoors housing
That horse management affects horse's welfare has been shown in several studies for example Bachmanm et al. (2003). Confinement and lack of social contact have been identified as causes of decreased welfare in the horse. Also insufficient early social experience, or even the absence of it, has been shown to affect later ability to cope with social challenges e.g. Henderson et al. (2007). It is interesting that over 50 % of the respondents in his study had their horse in confinement. Would there be less injuries if more horse owners had the horse in

a group housed system? Söndergaard and Ladewig (2004) also highlighted the positive effects of group housing on horse-human relationship. These are factors that more horse owners should consider when deciding how to manage their horse.

Food management

There was no difference in the amount of hay, straw or other roughage given to the horses between the two groups. The recommended amount of roughage is at least 1.5 kg per 100 kg horse per day (Plank, 1997), which means that the amount given to the horses in this study seem to fulfill that recommendation. Holland et al. (1996) showed in his study that dietary fats influence reactivity in horses. Soy lecithin and corn oil reduce activity and excitability. It would be interesting to learn more about the differences in injuries between horses feed with dietary fats and horses that have been given regular grain/concentrate, but questions about the composition of the feed were not included in this study.

D) Information about training and handling of the horse

In what discipline and where do people train their horse

There were no differences between the groups regarding what discipline the horse was trained or where the horse was trained. Poor welfare or heightened emotional state can lead to undesirable reactions of horses when ridden and Haueberger et al. (2007) suggest that the type of work and/or riding style affects the horse's general state of welfare. For example Normando et al. (2002) suggested that horses ridden in western style developed less stereotypic behaviour compared to horses ridden in the English style.

Preventing injuries

According to this investigation there did not seem to be any large differences in how the horse owner stabled and trained their horses. As a consequence of this, it is not possible to give any recommendations in these areas to decrease the risk of getting the horse injured. Although if there is a certain group of horse-owners who take their horses to the clinic, maybe it would be possible to detect differences by choosing another control-group. It might be useful in the future to compare horses having severe trauma wounds with only healthy horses, or with horses that had been visited by the local veterinarian at home rather than coming into the clinic.

There are a few things that the horse owner can do to decrease the risk of getting the horse injured. The most important, based on the results of this study, is to make the paddock as safe as possible since most injuries occurred in the paddock and the horses that had injuries spent significantly more time in the paddock than horses coming to the clinic for other reasons. Stability in the flock could also contribute to a smaller risk of an injury to the horse. In this study the stability rate was higher in the control-group (97%) and in the in the test-group (91%). Another thing that owners can do is learn more about horse behaviour. Knowing how a horse perceives the surroundings may incease the probability of being able to predict the horse's reaction and hopefully avoid an accident. As Hausberger et al. (2007) says, there is enough knowledge about horse behaviour so that education in ethological observational

methods to increase attention to the horses body posture and attitudes should help people predict a horse's reaction and therefore prevent an accident.

In order to improve the relationship between the horse and its owner to reduce the risk of injury, management will also play a part. Chaya et al. (2006) stated that confinement is a factor involved in the development of stereotypies or changes in behaviour, even when horses are worked regularly. Rivera et al. (2002) suggested the same in reaction to work and she also showed that group living horses are found to be easier to handle and train. This may be due to learning, through social interaction with conspecifics, to be attentive to other´s signals, including the trainers/caretaker. Another positive effect on having group-housed horses is that they can move as much as they want to and get rid of surplus energy and therefore are more calm and relaxed overall. A relaxed horse is less reactive in different situations and therefore less likely to cause accidents.

It is also possible to train the horse in new situations, expose it to sounds and objects so that the horse will learn not to be afraid. In this way it is possible to decrease the risk of the horse getting injured because of it being frightened. Unfortunately there are some pure accidents that are impossible to prevent, but horse owners can arrange that the environment around the horses is as predictable as possible and in that way do their best to decrease the risk of getting themselves and their horse injured.

7. CONCLUSIONS

The aim of this study was to determine the cause of one of the most commonly occurring injuries to horses, that is to say trauma wounds, and the intention was to determine whether certain categories of horses have more or less injuries compared to horses that are used in other ways and for other sports.

This study showed too few significant differences between the groups for many conclusions to be made, but there is still much that can be done. For example, horseowners can focus on making the environment in the paddock as safe as possible, since injured horses were outside more often. They can also keep the horse in the same group as much as possible, since many injuries were caused by the horse being kicked by another horse and stability in the flock will reduce the level of aggression.

Finally, horseowners can learn more about horse behaviour and how it perceives the surroundings. Knowing how the horse acts increases the chances to prevent an accident and training it in new situations and getting it accustomed to different objects so it is less reactive also decreases the risk of an accident. This may be particulary important during transport, since the second most common place where a horse got injured was in the trailor.

8. ACKNOWLEDGEMENTS

I would like to thank my supervisor Linda Keeling for her most valuable support in my final year project. I also want to thank John Pringle for his ideas to improve this project when it first started. Finally I would like to thank everyone at the Department of Animal Environment and Health, Skara for helping me with any kind of practical problems.

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10. APPENDIX

The results in the test-group will be shown in left column and the control-group in the right column thorough the result section.

TG

No reply:44
Reply:90
Response rate:67%

CG

No reply:33
Reply:101
Response rate:75%

A) Information about the owner/caretaker of the horse

Question 1.

Kvinna eller man?
Woman or man?

No reply:47
Reply:87
Response rate:65%

Sex	**Number**	**Rate(%)**
Woman	70	80
Man	17	20

No reply:35
Reply:99
Response rate:74%

Sex	**Number**	**Rate(%)**
Woman	83	84
Man	16	16

Question 2.

Hur gammal är du?
How old are you?

No reply:48
Reply:86
Respons rate:64%

Age (years)	**< 7**	**7–12**	**12–25**	**25<**
Number	0	1	15	70
Rate(%)	0	1	17	81%

No reply:35
Reply:99
Respons rate:74%

Age(years)	**<7**	**7–12**	**12–25**	**25<**
Number	0	2	15	82
Rate(%)	0	2%	15	82

Question 3.

Beskriv din kunskap och erfarenhet av hästar enligt en skala från 1 (mycket liten) till 10 (mycket stor).
Describe your knowledge and experience of horses on a scale from 1 (very inexperienced) to 10 (very experienced).

No reply:48
Reply:86
Response rate:64%
Average-value:8.2
Median:8

Level of experience	Number	Share (%)
1	0	0
2	0	0
3	0	0
4	1	1
5	3	3
6	4	5
7	16	19
8	26	30
9	18	21
10	18	21

No reply:37
Reply:97
Response rate:72%
Average-value:8.1
Median:8

Level of experience	Number	Share (%)
1	0	0
2	0	0
3	0	0
4	0	0
5	7	7
6	3	3
7	18	18
8	29	30
9	20	21
10	20	21

Question 4.

Hur länge har du haft hästen/hur länge har du känt hästen?
For how long have you been the owner of the horse/for how long have you known the horse?

No reply:51
Reply:83
Response rate:62 %
Average-value:3.4 years
Median:2 years

No reply:40
Reply:94
Response rate:70%
Average-value: 4.2 years
Median:3 years

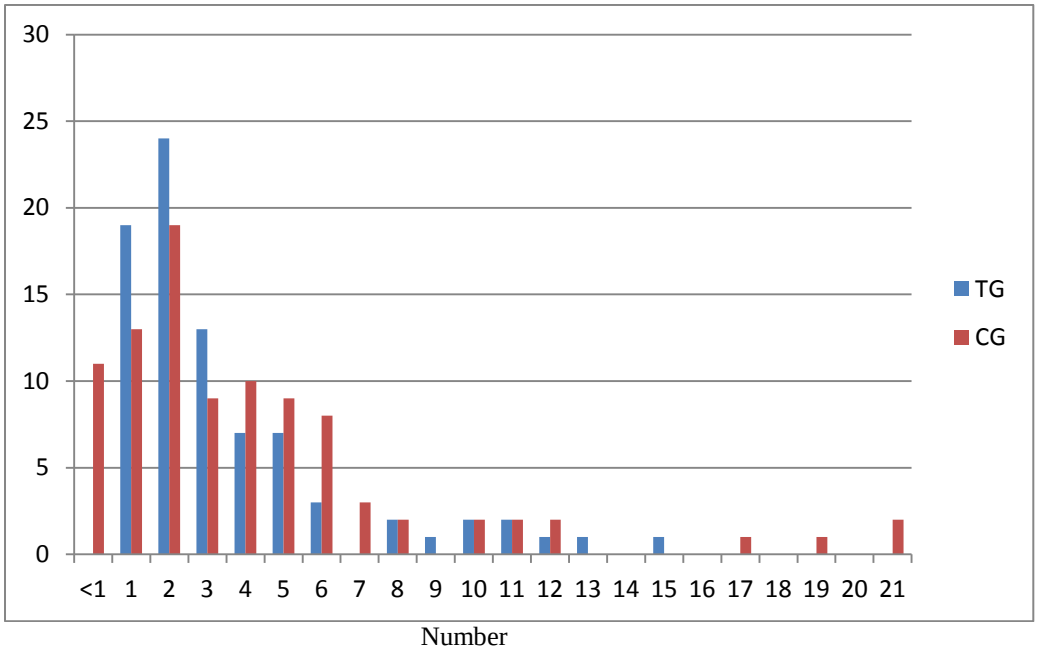

Figure 10.1Age-distributionof the horse. TG= Test group. CG=Control group.

B) Information about the horse

Question 5.

Ras eller typ av häst?
Breed or type of horse?

TG
No reply:44
Reply:90
Response rate: 67%

Breed	**Number**	**Share %**
Warmblood ridinghorse*	41	46
English Thoroughbred	11	12
Warmblood TGottinghorse	16	18
Coldblood horse**	1	1
Icelandic horse	9	10
Pony***	12	13

*Swedish warmblood (29), Arabic thoroughbred (1), Danish and Irelandic imports (3), Crossbred (1), American quarter horse (4), KnabsTGup (1), Hannover horse (1), Holstein horse (1)
**North Swedish (draft) horse
***Shetland pony (3), Gotland pony *(1),* Welsh cob pony (1), New forest pony (2), Connemara pony (1), Achal-tekiner (1), Pony of the America (1), Crossbred (3)

CG
No reply:33
Reply:101
Response rate: 67%

Breed	**Number**	**Share %**
Warm blood riding horse*	44	43
English Thoroughbred	15	15
Warm blood trotting horse	19	19
Coldblood horse**	2	2
Icelandic horse	11	11
Pony***	10	10

* Swedish warmblood (34), Arabic thoroughbred (1), Danish and Irelandic imports (3), Crossbred (2), American quarter (2), knabsTGup (1), Hannover horse (1)
****** North Swedish (draft) horse, Fjord horse
***Shetland pony (2), New forest pony (2), Connemara pony (1), Crossbred (5)

Question 6.

Hästens kön?
Sex of the horse?

No reply:44
Reply:90
Respons rate:67%

Sex	Number	Share %
Stallions	13	15
Geldings	38	42
Mares	39	43

No reply:33
Reply:101
Respons rate:75%

Sex	Number	Share %
Stallions	13	13
Geldings	38	38
Mares	50	49

Question 7.

Hästens ålder?
Age of the horse?

No reply:45
Reply:89
Respons rate:66%
Average-value:7 years
Median:5.5 years

No reply:33
Reply:101
Respons rate:75%
Average-value:7.3 years
Median:7.0 years

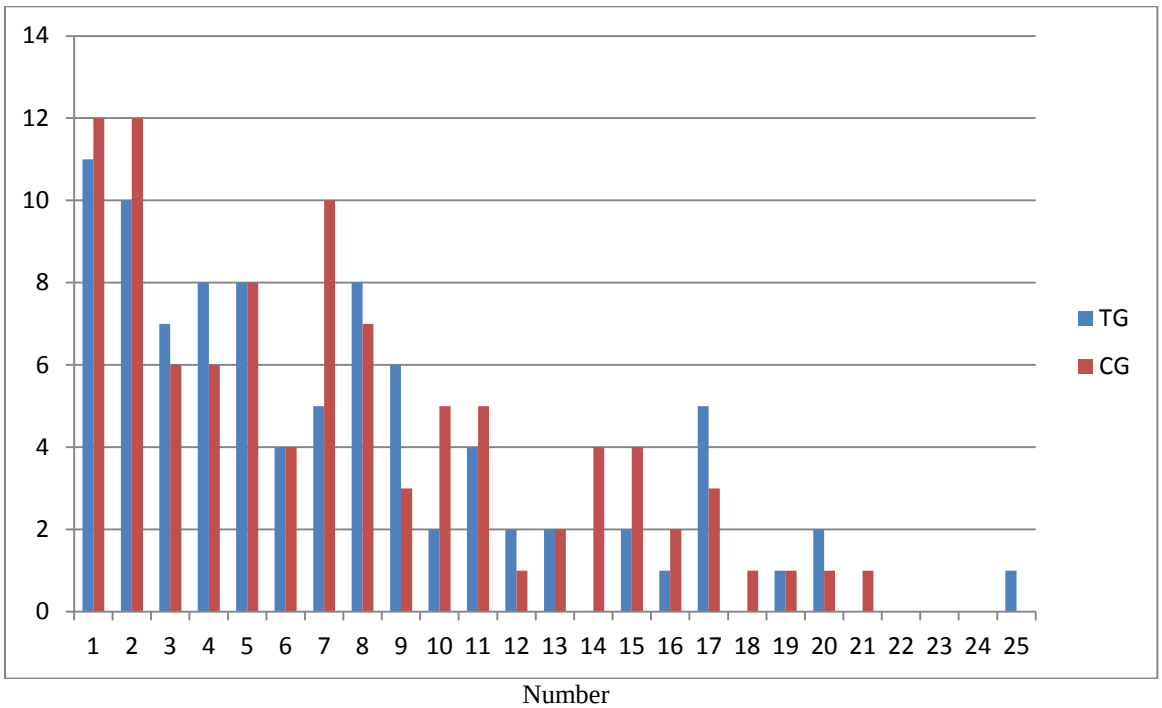

Fig 10.2 Horses age-distribution. Four horses in CG were less yhan one year. TG= Test group. CG= Control group.

Question 8.

Hur mycket väger hästen?
Weight of the horse?

No reply:50
Reply:84
Response rate:63%
Average-value:476 kg
Median:500 kg
Max:800 kg
Min:100 kg

No reply:50
Reply:84
Response rate: 63%
Average-value:461 kg
Median:500 kg
Max:675 kg
Min:100 kg

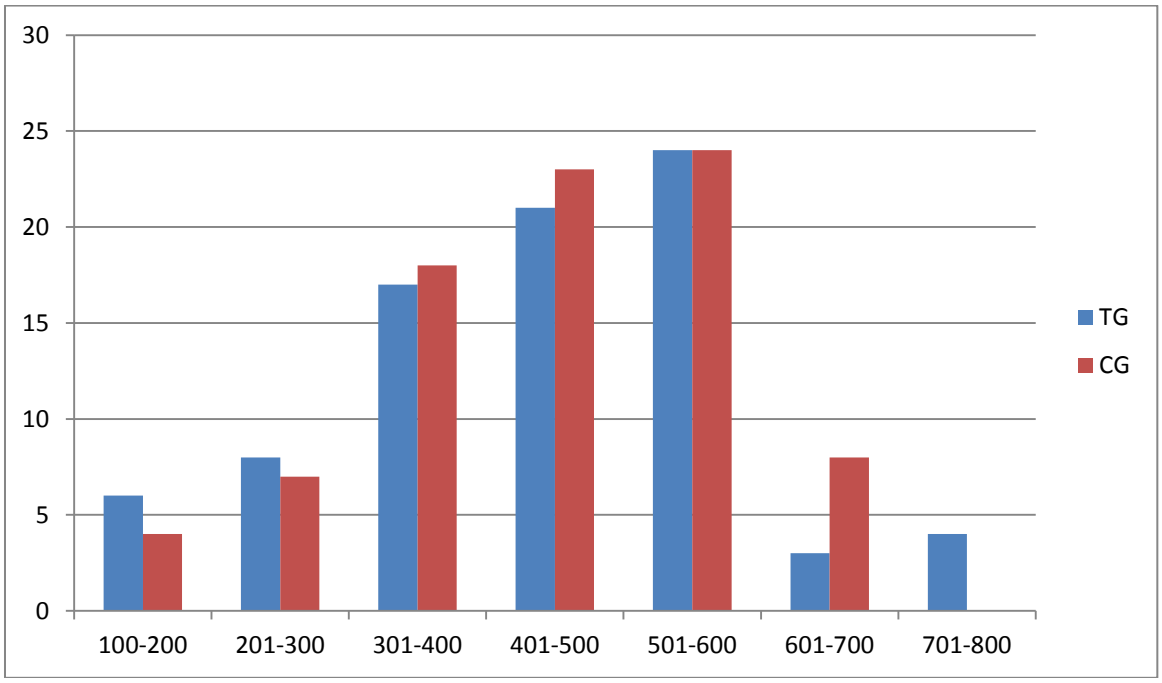

Fig 10.3Horses weight-distribution. TG= Test group. CG= Control group.

Question 9.

Hur är hästen gentemot andra hästar?
How ea the horse behave towards other horses?

No reply:45
Reply:89
Respons rate:66%

No reply:35
Reply:99
Respons rate:74%

Rank	**High rank**	**Middle rank**	**Low rank**
Number	29	50	10

Rank	**High rank**	**Middle rank**	**Low rank**	**Don't know**
Number	32	52	12	3

Question 10.

Hur skulle du klassificera hästens temperament vid hantering och TGäning/motionering på en skala från 1 (mycket lätt – lugn och snäll) till 5 (mycket svår – lekfull och elak)?
How would you classify the horse's temperament when it is managed and TGained/exercised on a scale from 1 (very easy – calm and kind) to 5 (very difficult – playful and mean)?

No reply:45
Reply:89
Response rate:66%
Average-value:2.2
Median:2.0

No reply:34
Reply:100
Response rate: 75%
Average-value:2.5
Median:2.0

	TG		**CG**	
Temperament	**Number**	**Share %**	**Number**	**Share %**
1	23	26	20	20
2	32	36	34	34
3	21	24	28	28
4	12	13	16	16
5	1	1	2	2

C) Information about the injury and how it happened (In this section only the testgroup were asked)

Question 11.

Hästen har varit skadad, vilken typ av skada?
The horse has been injured, what type of injury?

No reply:44
Reply:90
Response rate: 67%

One type of injury:
Reply:82
Share:91%

Type of injury	**Number**	**Share %**
Large peneTGating injury to the body	2	2
PeneTGating injury to the hoof(e.g.nail)	0	0
Cut/ laceration	30	37
Puncture	10	12
Laceration/ abrasion	6	8
Open wound	7	9
Other hoof injury	2	2
Fracture	2	2
Other*	23	28

*for example wound infection, colic, fracture

Two types of injuries:
Reply:8
Share:9%

Types of injuries	**Number**	**Share %**
Cuts and punctures	4	50
Cuts and lacerations	2	25
Punctures and lacerations	1	12.5
Penetrating injury to the body and other	1	12.5

Question 12.

Vilken kroppsdel på hästen blev skadad?
What part of the horse body was injured?

No reply: 45
Reply:89
Respons rate: 66%

Part of the body	**Number**	**Share %**
Head	1	1
Neck	0	0
Breast	8	9
Forelimb	32	36
Stomach/back	1	1
Hind quarters	0	0
Hind limb	47	53

Question 13.

Vilken tid på året inträffade olyckan?
What time of the year did the injury occur?

No reply: 47
Reply:87
Respons rate: 65%

Time of the year	Number	Share %
November - March	13	15
April – May	16	18
June - August	41	47
September - October	17	20

Question 14.

Var inträffade olyckan?
Where did the accident take place?

No reply:46
Reply:88
Respons rate:66%

*in pasture

Place	Number	Share %
In the stable	3	3
In the paddock or in the enclosure	65	74
In the riding hall or arena	0	0
On the roads	5	6
In the forest	1	1
On a competition	1	1
In a trailer	8	10
Other*	3	3
Don’t know	2	2

Question 15.

Om du vet hur hästen blev skadad, beskriv skadetillfället.
If you know how the horse was injured, describe the accident.

No reply:66
Reply:68
Response rate:51%

Scenario	Number	Share %
Hurt from something in the paddock	21	31
Kick by another horse	15	22
Caught in the fence because it was frightened or rolled over too close	11	17
Hurt in a trailer; jumped over bar, head under bar etc.	8	12
Hurt durig the ride; stumble etc	5	7
Hurt by a strange human	3	4
Other*	5	7

*the horse ran away from the paddock to a raod, accident on the way from the stable to the paddock, the horse got lose, the horse was stolen.

Question 16.

Vad tror du orsakade olyckan (t.ex. hade något förändrats i hästens miljö/rutiner, var den tillsammans med nya hästar etc.) försök att beskriva!
What do you think caused the accident (for example were there any changes in the environment/routines, was it together with new horses etc.) try to explain!

No reply:92
Reply:42
Response rate:31%

What caused the accident	**Number**
New horses	8
Frightened	8
Bad luck	6
Other*	20

*the horse was stolen, hurt from something in the paddock, slippery ground, the horse rullade runt to close to the fence, rank-fight, fight between horses, change of environment.

Question 17.

Hur tror du att du i framtiden skulle kunna förhindra att en likadan olycka inträffar igen?
How do you think you could prevent a similar accident in the future?

No reply:89
Reply:45
Response rate:34%

Things to do to prevent accident	**Number**
Impossible to prevent	7
Not send out the horse to other people to pasture	2
Search the paddock for things that the horse can hurt itself on e.g. stones, branches	5
Exclude the part of the paddock that contains things, e.g. stones, that can cause injury to the horse, improve the fence	7
Be together with older, more experiencedand calm horses	2
Do not change group composition	2
Alone in the paddock	3
Other*	17

*less horses in the group, big enclosures and bring horses to the stable in rank order, remove the horse that caused the accident, more supervision of the horse, inga broddar

Question 18.

Har hästen varit skadad förr så att du blivit tvungen att kontakta veterinär?
Has the horse been injured previously so that you had to contact the veterinarian?

No reply:46
Reply:88
Response rate:66%

	Number	**Share %**
Yes	27	31
No	61	69

D) Information about how the horse is kept outdoors and indoors

Question 19.

Hade det skett någon förändring i skötseln av hästen under de senaste dagarna/veckorna före besöket på stordjurskliniken, eller befann sig hästen på annat vis i någon ny eller ovanlig situation?
Where there any changes in the management of the horse during the last days/weeks before the visit to the clinic, or was the horse exposed to a new or unusual situation in some other way?

No reply:46
Reply:88
Respons rate:66%

No reply:38
Reply:96
Respons rate:72%

	TG		**CG**	
	Number	**Share %**	**Number**	**Share %**
Yes	18	20	18	19
No	70	80	78	81

Question 20.

Hur många timmar per dag (i genomsnitt) vistas hästen ute i hagen?
How many hours per day on average is the horse outdoors?

No reply:47
Reply:87
Response rate:65%
Average-value:12.4
Median:9.0

No reply:46
Reply:88
Response rate:66%
Average-value:10.1
Median:8.0

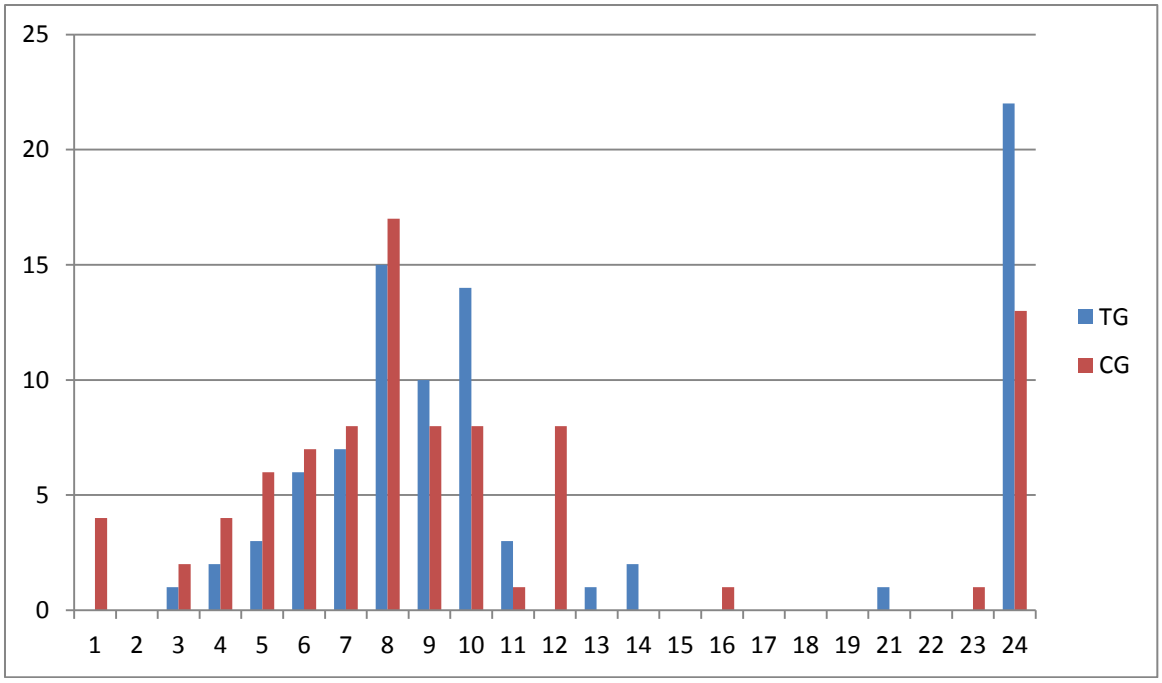

Fig 10.4 Time spent in the paddock/enclosure per day. TG= Test group. CG= Control group.

Question 21.

Hur hålls hästen utomhus?
How is the horse kept outside?

No reply:46
Reply:88
Respons rate:66%

No reply:38
Reply:96
Respons rate:72%

	TG		**CG**	
Type of horsekeeping	**Number**	**Share %**	**Number**	**Share %**
Alone, can not see other horses	0	0	2	2
Alone, can see other horses	5	6	10	11
Alone, can touch other horses	3	3	8	8
Together with other horses	80	91	76	79

Question 22

Hur många hästar består flocken av i hagen?
How many horses are there in the flock/group in the paddock?

No reply:51
Reply:83
Respons rate:62%

No reply:55
Reply:79
Respons rate:59%

	TG		**CG**	
Number of horses in the flock	**Number**	**Share %**	**Number**	**Share %**
2	19	23	24	30
3-4	38	46	28	36
5-10	16	19	22	28
More than 10	10	12	5	6

Question 23.

Hur är könsfördelningen i flocken?
What is the sex-distribution in the flock?

No reply:53
Reply:81
Respons rate:60%

No reply:55
Reply:79
Respons rate:59%

	TG		**CG**	
Sex	**Number**	**Share %**	**Number**	**Share %**
Mares	22	27	18	23
Stallions	3	4	2	2
Geldings	15	19	14	18
Mares and stallions	2	2	34	43
Mares and geldings	33	41	4	5
Geldings and stallions	5	6	6	8
Mares, geldings and stallions	1	1	1	1

Question 24.

Hur är åldersfördelningen i flocken?
How is the age-distribution in the flock?

No reply:53
Reply:81
Respons rate:60%

No reply:56
Reply:78
Respons rate:58%

	TG		**CG**	
Age	**Number**	**Share %**	**Number**	**Share %**
Everybody younger than 1 year	0	0	2	3
Everybody between 1-4 year	14	17	12	15
Everybody older than 4 year	46	57	44	56
Mare/mares and foals	10	12	10	13
Mixed	11	14	10	13

Question 25.

Är flocken stabil, eller tillkommer/försvinner hästar regelbundet (flera gånger i månaden)?
Is the flock stabile or are horses added/removed on an even basis (several times a month)?

No reply:52
Reply:82
Respons rate:61%

No reply:55
Reply:79
Respons rate:59%

	TG		**CG**	
	Number	**Share %**	**Number**	**Share %**
Stabile	77	91	77	97
Not stabile	5	9	2	3

Question 26.

Hur stor är hagen per häst?
How big is the enclosure per horse?

No reply:49
Reply:85
Respons rate:63%

No reply:49
Reply:85
Respons rate:63%

	TG		**CG**	
Size of the enclosure	**Number**	**Share %**	**Number**	**Share %**
Smaller than ½ ha	21	25	22	26
½ - 1 ha	30	35	32	38
1 – 3 ha	24	28	23	27
Larger than 3 ha	10	12	8	9

Question 27.

Har hästen tillgång till gräsbevuxen mark när den är utomhus?
Does the horse have access to grass when it is outdoors?

No reply:48
Reply:86
Respons rate:64%

No reply:42
Reply:92
Respons rate:69%

	TG		**CG**	
	Number	**Share %**	**Number**	**Share %**
Yes	75	87	78	85
No	11	13	14	15

Question 28.

Vad är det för typ av stängsel runt hagen?
What type of fence is there around the enclosure?

No reply:46
Reply:88
Respons rate:66%

No reply:40
Reply:94
Respons rate:70%

	TG		**CG**	
Type of fence	**Number**	**Share %**	**Number**	**Share %**
Wooden fence	18	21	13	14
Electric fence	67	76	79	84
Pig-netting	1	1	0	0
Barb wire	0	0	0	0
Other*	2	2	2	2

*combination of wodden fence and electric fence

Question 29.

Hur står hästen när den är inne i stallet?
How is the horse kept indoors?

No reply:49
Reply:85
Response rate:63%

No reply:40
Reply:94
Response rate:70%

	TG		**CG**	
Type of stabling	**Number**	**Share %**	**Number**	**Share %**
Loose box, alone in the stable	1	1	0	0
Loose box, can see other horses	45	53	47	50
Loose box, can touch other horses	30	35	41	44
Tied up, can see other horses	2	3	1	1
Group housed	6	7	5	5
Other	1	1	0	0

Question 30.

Hur många kilogram hö, halm eller annat grovfoder får hästen per dag?
How many kilograms of hay, straw or other roughage does the horse get per day?

No reply:49
Reply:85
Response rate:63%
Average-value:8.2 kg
Median:8 kg
Min:3 kg
Max:14 kg

14 horses had free access to roughage.

No reply:56
Reply:78
Response rate:58%
Average-value:8.0 kg
Median:8.0 kg
Min:3.0 kg
Max:20 kg

17 had free access to roughage.

Question 31.

Hur många kilogram kraftfoder får hästen per dag?
How many kilograms of grain/concentrate does the horse get per day?

No reply:51
Reply:83
Response rate:62%
Average-value:2.4 kg
Median:2 kg
Min: 0.2 kg
Max:6 kg

No reply:44
Reply:90
Response rate:67%
Average-value:2.4 g
Median:2.0 kg
Min: 0 kg
Max:6 kg

E) Information about how the horse is exercised and trained

Question 32.

Hur många dagar per vecka (i genomsnitt) motioneras hästen?
How many days per week (on average) is the horse exercised?

No reply:60
Reply:74
Response rate:55%
Average-value:4.7
Median:5

No reply:54
Reply:80
Response rate:60%
Average-value:4.7 days
Median:5.0 days

	TG		**CG**	
Number of days	**Number**	**Share %**	**Number**	**Share %**
0	5	7	4	7
1	2	3	1	3
2	2	3	1	3
3	6	8	9	8
4	12	16	14	16
5	13	18	22	18
6	26	34	21	34
7	8	11	8	11

Question 33.

Hur länge (i genomsnitt) arbetas hästen dessa dagar?
For how long time (on average) is the horse exercised these days?

No reply:67
Reply:67
Response rate:50%
Average-value:1.5
Median:1.0
Min:20 min
Max:6 h

No reply:82
Reply:52
Response rate:39%
Average-value:1.0
Median:1.0
Min:15 min
Max:5 h

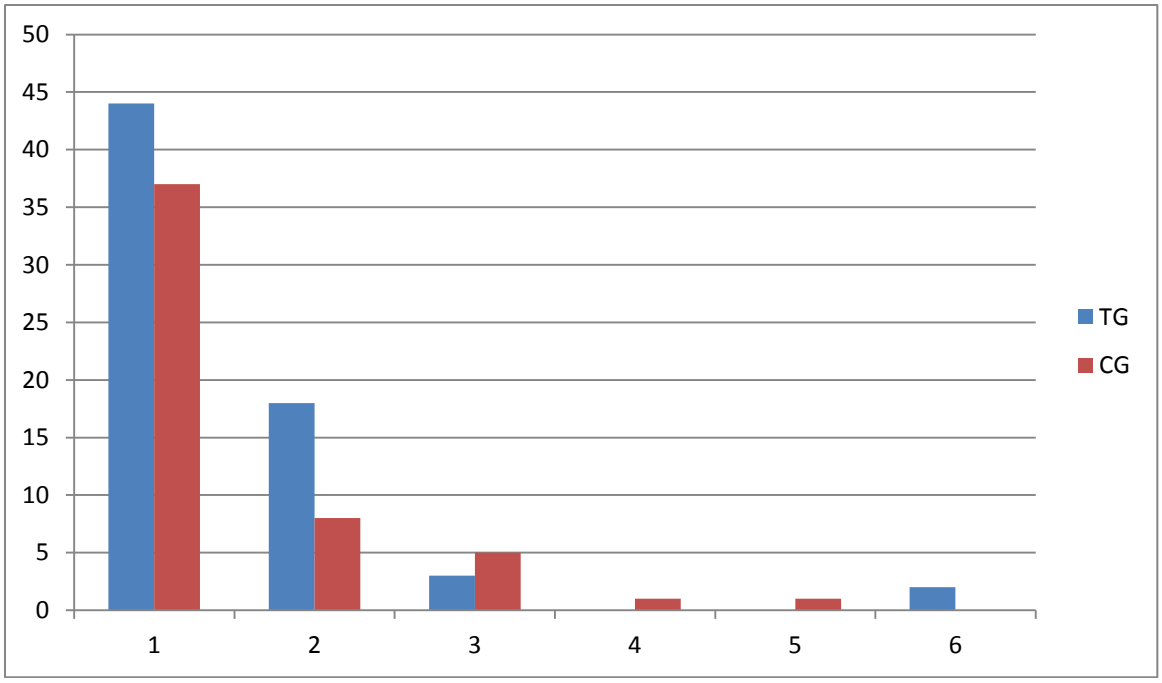

Fig 10.5hours of work per occasion. TG= Test group. CG= Control group.

Question 34.

Används hästen som fritidssysselsättning eller försörjer du dig på den?
Do you have your horse as s hobby or do you have the horse in the purpose of earning money?

No reply:38
Reply:96
Response rate:72%

No reply:21
Reply:113
Response rate:84%

	TG		**CG**	
	Number	**Share %**	**Number**	**Share %**
Hobby	78	81	84	74
To earn money	18	19	29	26

Om hästen används som fritidssysselsättning, vad används den till huvudsakligen?
If you keep your horse as a hobby what do you manly use it for?

	TG		**CG**	
Use	**Number**	**Share %**	**Number**	**Share %**
Riding	45	58	54	63
Driving	5	6	3	4
Riding and driving	7	9	3	4
Breeding	6	8	3	4
Only a juvenile when injured	13	17	3	4
Other	2	2	18	21
TOTAL	**78**	**100**	**84**	**100**

Om du försörjer dig på hästen, vad används den då till?
If you have the horse in the purpose of earning money, then what is it used for?

	TG		**CG**	
Use	**Number**	**Share %**	**Number**	**Share %**
Riding	5	28	9	31
Driving	9	50	11	38
Breeding	1	5	4	14
Other	3	17	5	17
TOTAL	**18**	**100**	**29**	**100**

Question 35.

Tränas hästen i någon av följande grenar? Rangordna i procent efter hur mycket av träningstiden du ägnar åt de olika grenarna.
Do you TGain the horse in some of the following disciplines? Place in order of rank, according to percentage of time you train in the different disciplines.

No reply:56
Reply:78
Response rate:58%

No reply:56
Reply:78
Response rate:58%

	TG		**CG**	
Discipline	**Number**	**Mean-percentage spent per discipline**	**Number**	**Mean-percentage spent per discipline**
Natural horsemanship	13	5	15	6
Western-riding	5	4	3	2
Traditional English riding	44	50	51	57
Trotting	11	11	14	15
Racing	1	1	7	5
Driving	4	2	5	3
Train for Icelandic horse competition	1	1	3	2
Long distance ride	4	3	1	0.3
Other	4	4	8	6
TOTAL	87*****		**107****	

*The total number (87) is higher than the number of responders (78), this is due to that some horses are trained in several disciplines.
**The total number (107) is higher than the number of responders (78), this is due to that some horses are trained in several disciplines.

Question 36.

Var tränar du hästen? Rangordna i procent efter hur mycket av träningstiden du tillbringar på följande ställen.
Where do you train the horse? Place in order of rank, according to percentage of time you train on different places.

No reply:54
Reply:80
Response rate:60%

No reply:47
Reply:87
Response rate:65%

	TG		**CG**	
Location	**Number who train at different place**	**Mean-percentage spent at location**	**Number who train at different places**	**Mean-time spent at location**
Riding hall	35	15	49	22
Paddock or enclosure	33	12	42	15
Racetrack trotting	10	4	8	4
Racetrack gallop	2	1	8	3
In the countryside/forest/roads	60	43	78	50
Other	1	1	3	0.5
TOTAL	141*		**188****	

*The total number (141) is higher than the number of responders (80), this is due to that the majority trained their horses at more than one locations.
** The total number (188) is higher then the number of responders (87), this is due to that the majority trained their horses at more than one location.

Question 37.

Hur långt har hästen kommit i utbildningen på en skala från1 (tidigt stadium) till 10 (långt kommen)?
How would you classify the horse's level of education on a scale from 1 (early stage) to 10 (late stage)?

No reply:59
Reply:75
Response rate:56
Average-value:5.8
Median:6

No reply:46
Reply:88
Response rate:66%
Average-value:5.6
Median:6.0

	TG		**CG**	
Level	**Number**	**Share %**	**Number**	**Share %**
1	6	8	9	10
2	4	5	4	4.5
3	8	11	7	8
4	7	9	7	8
5	5	7	15	17
6	8	11	10	11
7	12	16	13	15
8	13	17	13	15
9	8	11	4	4.5
10	4	5	6	7

Question 38.

Tävlar du med hästen?
Do you compete with your horse?

No reply:49
Reply:85
Response rate:63%

No reply:43
Reply:91
Response rate:68%

	TG		**CG**	
	Number	**Share %**	**Number**	**Share %**
Yes	34	40	44	48
No	51	60	47	52

Among those who competed with their horse, the distribution of disciplines and the average-level of competition (on a scale from 1 (high) to 3 (low) was as follows:

	TG		**CG**	
Discipline	**Number**	**Average-level of competition**	**Number**	**Average-level of competition**
Western riding	4	1,5	1	2
Dressage	11	2.5	19	2,5
Jumping	13	2	22	2
TGotting	7	2	4	1.75
Racing	1	1	5	1.5
Driving	1	2	0	0
Icelandic horse competition	2	3	2	2.5
Three-Day event	1	2	4	2
Long distance ride	4	2.5	0	0
Other	1	3	1	3
TOTAL	**45***		**58****	

*The total number (45) is higher than the number of responders (35) who stated they competed with their horse. This is due to that some respondents competed in several disciplines.

** The total number (58) is higher than the number of responders (44) who stated they competed with their horse. This is due to that some respondents competed in several disciplines.

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