

## Level of agreement in the recognition of pain among equine practitioners in Chile

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### Abstract

Pain is a relevant component of animal welfare, and its appropriate recognition is essential for the establishment of effective analgesic therapy. The aim of this study was to determine the level of agreement in the recognition of pain in equines among veterinarians (equine practitioners). The effects of gender and age on pain recognition were also studied. The equine practitioners were asked to use a simple descriptive scale to score 25 digital color photographs of horses experiencing different painful conditions. The kappa coefficient for multiple raters was used to determine the degree of agreement. Descriptive statistics was used to estimate the severity of the pain, and the Kruskal-Wallis non-parametric test was used to determine the effect of the rater's gender and age. Thirty-four equine practitioners replied to the questionnaire. A poor level of agreement between equine practitioners was found (global kappa = 0.2871, CI 95% = 0.2032-0.3702); the agreement was stronger for those painful conditions with higher scores (maximum pain). No significant differences ( $P > 0.05$ ) were found for pain scoring in relation to the practitioner's age and gender. This study is the first in Chile to explore the level of agreement in the recognition of pain in equines. It emphasizes the poor level of agreement between equine practitioners in the recognition of pain, which could compromise the establishment of appropriate analgesic treatments and result in poor animal welfare. Further studies are required to determine and promote understanding of the factors affecting veterinarians' attitudes towards the recognition and management of pain in equine species.

**Keywords:** Agreement; Animal welfare; Equine; Pain; Veterinarians.

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### Introduction

The management of pain associated with injury or illness in animals is a fundamental objective of veterinary medicine (Waran *et al.*, 2010). For animal welfare and veterinary practice, the recognition and alleviation of pain are increasingly important issues (Rutherford, 2002). However, the assessment and management of pain in different animal species remains inadequate (Hewson *et al.*, 2007), with a significant disparity in both the recognition of pain by veterinarians and the methods

used to alleviate it (Capner *et al.*, 1999; Lascelles *et al.*, 1999; Price *et al.*, 2002; Hewson *et al.*, 2007; Waran *et al.*, 2010). In equines, the recognition and treatment of pain has received little attention (Taylor *et al.*, 2002; Waran *et al.*, 2010), which could contribute to the persistent lack of consensus among veterinarians regarding the assessment and management of pain in this species (Price *et al.*, 2002; Waran *et al.*, 2010). In this sense, the considerable lack of professional agreement, e.g., about the presence or absence of pain after castration (Flecknell *et al.*, 2001; Jones, 2001), together with the variability in the administration of analgesics (Price *et al.*, 2005), suggest that pain behavior is not well recognized in horses (Price *et al.*, 2002; Waran *et al.*, 2010).

The scoring of pain is an important indicator when determining the level of well-being of animals (Anil *et al.*, 2002). In this sense, the greater the pain that an individual experiences, the poorer its welfare (Broom, 1991) and the more prolonged is the recovery time after trauma or surgery (Sellon, 2006a). Therefore, an appropriate assessment of pain is fundamental for the establishment of an effective analgesic treatment. Attitudes towards the assessment and management of pain in animals, together with assigned pain scores, vary greatly within the veterinary profession and can be influenced by a number of factors, such as age, gender, year of graduation, and the level of empathy (Dohoo and Dohoo, 1996; Capner *et al.*, 1999; Lascelles *et al.*, 1999; Raekallio *et al.*, 2003; Norring *et al.*, 2014). This lack of agreement regarding the recognition and management of pain is likely to impact negatively upon animal welfare (Waran *et al.*, 2010).

The recognition of pain in horses by equine practitioners has not been described in Chile. Thus, the aims of this study were to determine the degree of agreement between veterinarians dedicated to equine practice in their recognition of pain, to estimate the severity of pain assigned to different clinical conditions, and to assess the potential effects of demographic variables, such as age and gender on the recognition of pain.

## Materials and methods

To assess the recognition of pain in equines by veterinarians (equine practitioners), a questionnaire evaluating pain perception, which was based on previously published studies (Kielland *et al.*, 2010; Ellingsen *et al.*, 2010), was designed through a web server (Google Drive®). The questionnaire consisted of 25 digital color photographs that showed equines with different conditions that were assumed to involve varying intensities of pain (Table 1). Below each photograph, a brief description of the clinical condition was included (e.g., articular capsule wound) (Fig. 1). The descriptions were standardized and did not include highly detailed information about the various conditions presented so that the immediate response could be captured and focusing on the details of the conditions could be avoided (Kielland *et al.*, 2010).

The questionnaire, confidential and previously approved by the bioethics committee of FAVET (N° 06-2015), was e-mailed to equine practitioners through the Equine Veterinarian Association of Chile (ACHVE). Equine practitioners were invited to participate in this research; its purpose and the estimated time required to complete the questionnaire were explained, and the anonymity of the information was emphasized. A reminder was emailed 3 weeks after the initial email.

**Table 1.** Distribution of equine practitioners (n=34) according to the pain score assigned, the variance, the median and the range of the estimated severity of pain associated with 25 painful conditions (illustrated in photographs) in equines, scored by equine practitioners using a simple descriptive scale (SDS) from 1 (no pain) to 5 (maximum pain).

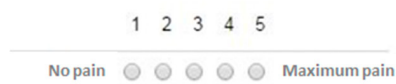
Number of equine practitioners								
Simple descriptive scale								
Painful Conditions	1	2	3	4	5	Variance	Median	Range SDS
Hackamore burn wound	12	19	3	0	0	0,38	2	1-3
Fetlock rope burn wound	1	7	19	7	0	0,54	3	1-4
Poor trimming and shoeing	7	8	11	5	3	1,49	3	1-5
Facial photosensitivity	2	7	12	10	3	1,09	3	1-5
Cannon and pastern rope burn wound	0	1	13	16	4	0,52	4	2-5
Articular capsule wound	0	0	0	26	8	0,18	4	4-5
Insect bite hypersensitivity	14	16	4	0	0	0,45	2	1-3
Donkey bite in a foal	0	0	0	9	25	0,20	5	4-5
Mastitis	0	2	11	19	2	0,48	4	2-5
Open tibia fracture	0	0	0	4	30	0,10	5	4-5
Pectoral fence laceration	0	2	12	16	4	0,59	4	2-5
Castration	0	12	14	8	0	0,59	3	2-4
Saddle sore	0	7	20	7	0	0,42	3	2-4
Subsolar abscess	0	0	1	20	13	0,29	4	3-5
Fracture and necrosis trauma	0	0	4	21	9	0,37	4	3-5
Septic arthritis in foal	0	0	0	14	20	0,24	5	4-5
Skin lesions on withers	0	0	4	21	9	0,37	4	3-5
Dermatophilosis	25	9	0	0	0	0,20	1	1-2
Chemical burn	0	8	13	12	1	0,69	3	2-5
Evisceration	0	0	0	9	25	0,20	5	4-5
Tooth eruption	8	21	5	0	0	0,38	2	1-3
Necrotizing fasciitis	1	0	7	11	15	0,91	4	1-5
Hoof overgrowth	4	8	15	7	0	0,86	3	1-4
Laminitis with hoof loss	0	0	0	4	30	0,10	5	4-5
Pectoral burn wound	2	18	13	1	0	0,42	2	1-4

The equine practitioners were asked to assign the pain level that they felt the animal experienced under each condition using a simple descriptive scale (SDS) beneath each photograph (Fig. 1). This scale used 5 verbal expressions to describe different pain intensity levels; each expression was assigned a value from 1 to 5 as follows: no pain (1), mild pain (2), moderate pain (3), severe pain (4), and maximum pain (5) (Fig. 1). Each respondent was also asked to accept an informed consent and indicate demographic information, such as age and gender. The responses were automatically registered in Excel (Microsoft Office®) on the web-server.

The frequency distribution of the pain severity perceived and declared by the equine practitioners for each photograph was determined, and summary statistics of the values registered for the SDS (variance, median and range) for each painful condition were performed. The degree of agreement between the equine practitioners for each of the categories of pain used in the SDS was determined through

**Clinical condition n° 6: Articular capsule wound.****Clinical condition n° 6**

1= No pain, 2= Mild pain, 3 = Moderate pain, 4= Severe pain, 5= Maximum pain.



**Figure 1.** Photograph used in the questionnaire for evaluating pain perception using a simple descriptive scale (SDS). To qualify the intensity of pain the respondents clicked on the number that represented the pain level they perceived as described in the SDS: 1 = No pain, 2 = Mild pain, 3 = Moderate pain, 4 = Severe pain, 5 = Maximum pain.

the kappa coefficient for multiple raters (Haley y Osberg, 1989; Fleiss *et al.*, 2003). The interpretation of the results obtained from the kappa coefficient was based on the values proposed by Fleiss *et al.* (2003), where positive kappa values < 0.40 indicate poor agreement; 0.40 to 0.75 indicate fair to good agreement; and values > 0.75 are considered to indicate excellent agreement.

The effects of the age and gender of the equine practitioners on the recognition of pain within each condition were determined by the Kruskal-Wallis non-parametric test. The analyses were performed using INFOSTAT software for the non-parametric ANOVA and Epidat 4.1 for the kappa coefficient for multiple raters. The latter utilizes the *jackknife* procedure to estimate confidence intervals at the 95% level. A  $P < 0.05$  was considered significant.

## Results and discussion

A total of 34 equine practitioners associated with the ACHVE answered the pain perception questionnaire, which corresponds to a response rate of 49% of the population of approximately 70 equine practitioners currently associated. The response rate is comparable to the 50.1% reported in Canada by Hewson *et al.* (2007) and is superior to the response rates in other countries for similar studies, which ranged from 23% in New Zealand (Waran *et al.*, 2010) to 25.5% in the United Kingdom (Price *et al.*, 2002). If we consider the main activities of the veterinarians in Chile, where those dedicated exclusively to equine practice represented only 3.1% ( $n = 19$ ) of the surveyed population ( $n = 619$ ) (Ibarra *et al.*, 2004), we can consider it as high and adequate response rate.

In relation to the gender of the respondents, 11 (32%) were female and 23 (68%) male. The number of male respondents was double that of the women, which is consistent with the current trends of the profession dedicated to equine practice (Price *et al.*, 2002; Hewson *et al.*, 2007; Waran *et al.*, 2010; Lorena *et al.*, 2013). The age of the equine practitioners ranged between 28 to 77 years, with an average age of 39.7 ( $\pm 2.09$ ) years. The average men's age was 43.2 ( $\pm 2.75$ ) years, compared to 32.3 ( $\pm 1.42$ ) years for the women. Most of the equine practitioners (61.7%) were under 40 years at the time of the survey, similar to the ages reported by Lorena *et al.* (2013) in a similar study.

Pain in animals has been defined as an aversive sensory and emotional experience, representing an awareness by the animal of damage or threat to the integrity of its tissues; it changes the animal's physiology and behavior to reduce or avoid the damage, reduce the likelihood of recurrence, and promote recovery (Molony, 1997). Given the individual and the subjective experience of pain, the veterinarian is forced to make a judgment on whether a horse is experiencing pain, often based on the interpretation of physiological and behavior indicators (Price *et al.*, 2002; Murrell and Johnson, 2006), as well as the veterinarian's own past personal

**Table 2.** Kappa coefficient values for multiple raters (n = 34 equine practitioners).  
The category represents the five possible categories of pain intensity used in the SDS.

Category	kappa	95% confidence interval		Z-value	P-value
No pain	0.3519	0.0316	0.6689	41.6789	0.0000
Mild pain	0.2504	0.1379	0.3621	29.6531	0.0000
Moderate pain	0.1910	0.1063	0.2753	22.6244	0.0000
Severe pain	0.2088	0.1030	0.3140	24.7286	0.0000
Maximum pain	0.4651	0.2859	0.6430	55.0804	0.0000
Global kappa	0.2871	0.2032	0.3702	64.8055	0.0000

experiences (Schaafsma, 2009), which could determine the variability at the time of the evaluation.

The variability in pain scoring assigned by veterinarians for different conditions and procedures has been previously documented in other countries and in a variety of species (Dohoo and Dohoo, 1996; Capner *et al.*, 1999; Williams *et al.*, 2005; Waran *et al.*, 2010). In this study, as in the above-mentioned studies, a wide variation was found in the scores assigned (Table 1), which is reflected in the "poor level of agreement" obtained (global kappa = 0.2871; 95% CI= 0.2032-0.3702; Table 2).

Of the 25 conditions evaluated, 10 (40%) showed highly varied responses, receiving scores that comprised four and five of the categories employed in the SDS (Table 1). In these conditions, only 3 (12%) were assessed with a range of severity from 1 to 5: poor trimming and shoeing, facial photosensitivity and necrotizing fasciitis (Table 1). Unfamiliarity with these conditions or a low incidence of some of them (i.e., facial photosensitivity) could explain the variability in the scores assigned. The differences in the intensity of the perceived pain in our study are consistent with the wide ranges reported in similar studies (Price *et al.*, 2002; Waran *et al.*, 2010) even though those studies evaluated different clinical conditions and used a different rating scale. Some authors have noted that there is a positive correlation between the perception of pain in animals with certain painful conditions and the levels of empathy towards these animals (Ellingsen *et al.*, 2010; Kielland *et al.*, 2010). Empathy is understood to be an "affective response that stems from the apprehension or comprehension of another's emotional state or condition and is similar to what the other person is feeling or would be expected to feel" (Eisenberg, 2000). For example, Norring *et al.* (2014) reported that the empathic skills of veterinarians could affect the pain scores they assigned to painful conditions in cattle, and the differences in the levels of empathy of the veterinarians could then explain the variability of the scoring obtained. However, to our knowledge, no studies have reported the effect of empathy on the perception of pain in equines.

Kielland *et al.* (2009), after evaluating students' attitudes towards pain in cattle, reported that those painful conditions that were illustrated with a picture had a wider range of scores than those described without pictures. Consequently, how painful conditions were presented in this study could explain the wide ranges of response obtained. In relation to the estimation of the severity of pain, based on the median rating, five conditions were ranked by the equine practitioners as the most painful: laminitis with hoof loss, evisceration, septic arthritis in foal, open tibia fracture and bite lesion in foal (Table 1). These conditions showed a narrower range of severity scores assigned and a lower variance, in contrast to the conditions that

were rated as mild to moderate (Table 1). This suggests that equine practitioners achieve greater agreement for those conditions involving a maximum level of pain ( $\kappa = 0.4651$ , 95% CI = 0.2859-0.6430), compared with those involving mild, moderate and severe levels of pain (Table 2); this differs from the results of Waran *et al.* (2010), who found wider ranges of scores for the most painful conditions. On the other hand, Sellon (2006b) noted that most veterinarians readily recognize signs of acute severe abdominal pain, acute laminitis and injury to the appendicular skeleton in horses, while it was more difficult for them to recognize behavioral signs of mild or moderate pain, as in the present study.

Previous studies of attitudes towards the recognition and management of pain in small animals have reported that women and younger individuals assign higher pain scores to clinical and surgical conditions and are more likely to administer analgesics than male and older individuals (Dohoo and Dohoo, 1996; Capner *et al.*, 1999; Williams *et al.*, 2005; Lascelles *et al.*, 1999; Raekallio *et al.*, 2003). In contrast, the results of this study indicate that pain ratings assigned by the equine practitioners within each condition were not influenced by age or gender ( $P > 0.05$ ). The lack of effect based on age and gender on the perception of pain found in this study is consistent with results of previous studies (Price *et al.*, 2002; Waran *et al.*, 2010). Price *et al.* (2002) reported no difference in the pain scores assigned to castration, colic and diseases associated with skeletal muscle, while Waran *et al.* (2010) found that the only procedure influenced by gender was Caslick surgery.

This is the first study assessing the recognition of pain associated with a large number of clinical conditions, most of them not previously evaluated in horses. Therefore, there are certain methodological limitations when trying to compare our results with those of other studies. Castration has been one of the most studied conditions in questionnaires assessing attitudes toward pain in equines (Price *et al.*, 2002; Hewson *et al.*, 2007; Waran *et al.*, 2010). In our study, most equine practitioners rated this condition with moderate pain (41%). However, the responses ranged from mild (35%) to severe pain (24%) (Table 1), results that are similar to those found by Waran *et al.* (2010), who reported that 61%, 22% and 17% of the veterinarians rated castration as a condition of moderate, mild and high pain, respectively. This reflects the persistent professional disagreement that still exists among veterinarians about whether castration is a painful condition. In light of these results, it is likely that there are also discrepancies in the analgesic prescriptions of those who rated it as mild and those who considered it a condition involving severe pain, as found by Price *et al.* (2002), with direct repercussions on the welfare of horses.

## Conclusion

The results of this study indicate, in general, a poor level of agreement in the detection and recognition of pain in horses by equine practitioners in Chile. The perceptions of pain were divergent, except for those conditions involving maximum pain, which showed a good level of agreement. Likewise, the demographic variables studied did not show a determining effect on the recognition of pain. However, because the evaluation of pain severity is fundamental for clinical decision-making (Ashley *et al.*, 2005) and the welfare of patients, it is important to conduct further research on this subject to determine other factors that could influence the attitudes of the veterinarians towards the recognition and management of pain in this species.

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## Conflicts of interest

The authors declare that they have no conflict of interest.

## Author contributions

Daniela Luna Fernández: designed and conducted the research, analyzed the data, and wrote the manuscript.

José Manuel Yáñez López: analyzed the data.

Tamara A. Tadich Gallo: designed and conducted the research, and edited the manuscript.

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