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Is training necessary for efficacious use of the Glasgow Feline Composite Measure Pain Scale?

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Authors
Moody, Carly M
Niel, Lee
Pang, Daniel J

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Article

Is training necessary for efficacious use of the Glasgow Feline Composite Measure Pain Scale?

Carly M. Moody, Lee Niel, Daniel J. Pang

Abstract

Objective

The Glasgow Feline Composite Measure Pain Scale (CMPS-F) is a validated cat pain assessment tool for clinical use. No research has examined how training impacts use of this tool. Thus, we examined whether seminar-style training improves the identification of cat pain when using the CMPS-F. Veterinarians ($n = 17$) and non-veterinarian staff ($n = 33$; N = 50) were recruited to participate.

Procedure

Seminars included: i) pre-training use of the CMPS-F to score cat videos with varying degrees of pain; ii) cat pain assessment training; and iii) post-training use of the CMPS-F. Participant CMPS-F ratings were compared to experts' ratings of the same videos. Average CMPS-F scores and analgesic decision ratings were compared pre- and post-training.

Results

Most participants were female non-veterinarian staff who had not heard of the CMPS-F. Participant and expert analgesic decision-making did not differ pre- ($P = 1.0$) and post-training ($P = 0.1$). In addition, analgesic decision-making was similar between participants and experts for all but 3/20 videos.

Conclusion and clinical relevance

Seminar training may not be necessary for efficacious use of the CMPS-F. Further research is needed to explore strategies for improving awareness of cat pain assessment tools and increasing in-clinic use.

Résumé

Une formation est-elle nécessaire pour une utilisation efficace de l'échelle de mesure de la douleur féline composite de Glasgow?

Objectif

L'échelle de mesure de la douleur féline composite de Glasgow (CMPS-F) est un outil validé d'évaluation de la douleur chez le chat à usage clinique. Aucune recherche n'a examiné l'impact de la formation sur l'utilisation de cet outil. Ainsi, nous avons examiné si la formation de type séminaire améliore l'identification de la douleur du chat lors de l'utilisation du CMPS-F. Des vétérinaires ($n = 17$) et du personnel non vétérinaire ($n = 33$; N = 50) ont été recrutés pour participer.

Procédure

Les séminaires comprenaient : i) l'utilisation du CMPS-F avant la formation pour noter des vidéos de chats avec différents degrés de douleur; ii) formation à l'évaluation de la douleur chez le chat; et iii) l'utilisation du CMPS-F après la formation. Les notes CMPS-F des participants ont été comparées aux notes des experts des mêmes vidéos. Les scores CMPS-F moyens et les cotes de décision analgésique ont été comparés avant et après la formation.

Department of Animal Science, University of California Davis, Davis, USA (Moody); Department of Population Medicine, Ontario Veterinary College, University of Guelph, Guelph, Canada (Niel); Department of Veterinary Clinical and Diagnostic Sciences, Faculty of Veterinary Medicine, University of Calgary, Calgary, Canada (Pang); Department of Clinical Sciences, Faculty of Veterinary Medicine, Université de Montréal, Montréal, Canada (Pang).

Address all correspondence to Dr. Carly M. Moody; email: cmoody@ucdavis.edu

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Résultats
La plupart des participants étaient du personnel féminin non vétérinaire qui n'avait jamais entendu parler du CMPS-F. La prise de décision des participants et des experts en matière d'analgésie ne différait pas avant ($P = 1,0$) et après la formation ($P = 0,1$). De plus, la prise de décision analgésique était similaire entre les participants et les experts pour toutes les vidéos sauf 3/20.

Conclusion et pertinence clinique
La formation en séminaire peut ne pas être nécessaire pour une utilisation efficace du CMPS-F. Des recherches supplémentaires sont nécessaires pour explorer des stratégies visant à améliorer la sensibilisation aux outils d'évaluation de la douleur chez les chats et à accroître leur utilisation en clinique.

(Traduit par Dr Serge Messier)

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Introduction

Adequate and consistent pain assessment is imperative for recognizing and treating pain in cats. However, pain assessment in companion cats is particularly challenging due to several factors including, amongst others, the inability to recognize low and moderate levels of pain, limited use of pain assessment tools in veterinary clinics, and lack of training for those assessing cat pain (1–3). Observer pain assessment techniques are commonly used for cat pain assessment, but these methods are subjective, involving an inherent risk of bias influencing evaluations and subsequent decisions on pain management. For example, a veterinarian's attitudes towards companion animal pain, gender, and graduation year impacts analgesic use in veterinary clinics (1,4–7). This is a welfare concern given that unrecognized or underestimated pain cannot be properly managed and may lead to suffering. It is crucial, therefore, that clinical pain assessment in cats be improved. One solution is to increase the acceptance and use of validated pain assessment tools. Limited research has examined current use of cat pain assessment tools in a clinical setting; however, a study conducted in 2013 surveying UK veterinary surgeons suggested it was likely quite low, as 17% (122/720) of questionnaire respondents used a feline assessment tool (2).

For cats, there are 3 validated acute pain scales: the Glasgow Feline Composite Measure Pain Scale (CMPS-F) (8); the UNESP-Botucatu multidimensional composite pain scale for evaluating post-operative pain in cats (UNESP-Botucatu MCPS) (9); and a feline grimace scale (10,11). The CMPS-F and UNESP-Botucatu MCPS were published at the time of data collection for this study. The UNESP-Botucatu MCPS has been validated for assessing ovariohysterectomy pain in cats (9), whereas the CMPS-F has been validated for various acute pain states such as post-operative pain, trauma, and medical conditions (8). In addition, the CMPS-F is a shorter pain scale, making it potentially quicker and easier to apply in a clinical setting.

The CMPS-F examines both spontaneous and evoked behaviors, which is beneficial for providing information on the degree of pain experienced (8). The tool consists of 3 parts and 7 questions, a scale range of 0 to 20, and a derived analgesic intervention level of ≥ 5. A major advantage of the CMPS-F is that it can also be used to guide clinicians with analgesic decision-making. The tool uses a numerical measurement scale to generate a score, to which an analgesic intervention level of 5 is then applied. Cats receiving scores above this level have a greater probability of being in pain (and *vice versa*). This scale provides a good level of sensitivity such that painful cats have a high probability of being correctly classified as requiring an analgesic (8). This is practical and important from a clinical perspective, providing more value as a clinical tool than pain assessment alone.

It remains to be explored if user training has an impact on pain scores when using the CMPS-F tool. Research examining training for pain assessment scoring in laboratory rodents suggests behavior-based pain assessment can be quickly taught (12), and that combining interactive participant discussions about pain assessment techniques with scoring practice may be more effective than practicing scoring alone (13). The objective of the current study, therefore, was to examine whether seminar-style training improved veterinarian and non-veterinarian staff identification of cat pain when using the CMPS-F. We predicted that before training there would be a larger difference between participant and expert scores pre-training compared to post-training.

Materials and methods

The study protocol was reviewed and approved by the University of Guelph's Research Ethics Board (# 18-03-016) and Animal Care Committee (# 3902).

Cat videos and expert CMPS-F scores

Videos of female domestic shelter cats pre- and post-ovariohysterectomy were used in the cat pain assessment training seminars. Ovariohysterectomy surgery was chosen given that it is performed routinely and has the potential to result in pain due to its invasive nature. The cats belonged to 1 of 3 city shelter facilities in the greater Toronto area, Ontario, Canada, and all surgeries and video recordings took place in veterinary hospitals in the same region. All cats were scheduled for surgery, regardless of the current study. The researchers had no influence or involvement with the surgeries, including the anesthesia and pain management provided to the cats. Drugs used were typical for these procedures, and included dexmedetomidine, butorphanol, acepromazine, propofol, ketamine, meloxicam, and buprenorphine. In addition, the clinic veterinarians and veterinary staff carrying out the surgical and post-operative care procedures were unaware of the study goals. A convenience sample of 20 shelter cats elected to be spayed at 1 of 3 veterinary clinics (Clinic 1 = 9 cats, Clinic 2 = 6 cats, and Clinic 3 = 5 cats) with a median age of 1.0 y (range: 0.58 to 3 y) were selected. All cats were housed individually in standard stainless-steel kennels with a towel and/or brown paper covering the kennel floor, litter box, and a purple or green translucent plastic shelter (33 cm long × 40 cm wide × 21.5 cm high; Igloo Hideout; Kaytee Products, Chilton, Wisconsin, USA).

The following CMPS-F protocol was video-recorded by a research assistant and conducted by 1 researcher for consistency (CM; hands-on training received from a veterinary anaesthesiologist, DP):

i) assess undisturbed cat behavior in the kennel;
ii) slowly open kennel door;
iii) remove litter box;
iv) stroke cat from head to tail 3 consecutive times;
v) pick up cat and move to a standing position (if not already standing); and
vi) palpate caudal abdominal midline area (site of surgical incision) (8).

Cat demeanor assessment (score based on visual and hands-on assessment) (14); was scored based on the cat's responses during the pre-surgical videos. Pre-surgical videos were taken at least 1 h after arrival at the clinic. Post-operative video recording commenced 2 h after surgery and every 30 min for 2 (n = 6 cats; 1 clinic) or 3 (n = 26; 2 clinics) 30-minute time points. At the first post-surgical time point, the cat was propped up into a standing position and a sedation scale used no sedation: 0 = stand normally, sedation: 1 = stand but wobbly, 2 = cannot stand on own; revised from Slingsby et al (15). If the cat was still sedated (score = 1 or 2), no video was recorded, and sedation assessment occurred at the next time point for up to 1 to 2 more time points. If the cat was not sedated (score = 0), a post-surgical video was recorded, and sedation was not assessed for the remaining time points. Of the post-operative videos, 2 cats were not video-recorded for 1 post-operative time point due to sedation. The resulting 72 videos were reviewed (CM and DP) and those that were dark and/or of poor quality were removed from the study.

One caveat when using the CMPS-F for clinical cat pain assessment was the potential confounding impact of cat demeanor on pain scores (16,17). For example, when using the CMPS-F, non-painful cats that were shy or aggressive were at risk of being misclassified as painful simply due to being in a clinical setting which may be perceived negatively by some cats (17). Therefore, cat videos with high demeanor scores ($\geq$ 6; shy and aggressive cats) were excluded and those with lower scores ($<$ 6; friendly cats) were included to reduce confounding with pain assessment (17). The 45 remaining videos were edited (increased brightness, clarity, and sharpness) to optimize image quality (Adobe Photoshop v.19; Adobe, San Jose, California, USA), and sound removed to reduce potential bias from background noise. Cat vocalizations were indicated with text appearing at the relevant time in the videos.

The videos were initially scored by a Board-certified veterinary anesthesiologist (DP), an expert in cat pain assessment with experience conducting and publishing studies using a range of pain assessment scales including the CMPS-F (10,17–19). Based on these scores, 20 videos (10 pre-training, 10 post-training) consisting of a broad range of CMPS-F scores and cat demeanor scores were chosen for the seminars. The pre- and post-training periods each included 5 videos with demeanor scores in the lower end of the friendly category (scores 0–3) and 5 videos in the higher end of the friendly category (scores 4–5). The 20 videos were then scored by a second Board-certified veterinary anesthesiologist who was involved in the original development of the CMPS-F but was not involved in the current study. Both experts (DP, AB) scoring the videos were blind to the pre- and post-operative context of the videos. "Expert scores" were created by calculating a mean score from the 2 anesthesiologists. Since the videos in the pre- and post-training phases were different, average expert pain scores were used for comparison with participant scores.

Cat pain assessment training seminars

The target population were veterinarians and non-veterinarian staff members that currently perform pain assessment on companion cats in Ontario, Canada. Ontario veterinary and animal shelter organizations (Ontario Veterinary Medical Association, Ontario Association of Veterinary Technicians, College of Veterinarians of Ontario, the Ontario Shelter Medicine Association, and the Ontario Veterinary College Alumni Association) were asked to share a study advertisement to their member listserv, website, and social media accounts. In addition, advertisements to participate were distributed using Ontario Veterinary College social media accounts. Incentive to participate included 2.5 continuing education credits for registered Ontario veterinarians and Ontario veterinary technicians, as approved by the Ontario Veterinary Medical Association and Ontario Association of Veterinary Technicians, upon completion of the seminar. The advertisement link led to an online consent form; upon consent, respondents could sign up for 1 of 4 seminars.

Four 2.5-hour seminars took place between May 25 and May 27, 2018, each in a different location across the greater Toronto and southwestern Ontario areas. The seminars consisted of 4 parts in the following order: i) introduction and participant questionnaire; ii) pre-training cat pain video assessment; ii) cat pain assessment training; and iv) post-training cat pain video assessment. The seminars used a revised CMPS-F score sheet which included check boxes instead of the numerical scoring system and did not identify the analgesic intervention level. This was intended to encourage participants to focus on the behaviors displayed rather that the numerical score or potential for intervention.

All seminars were conducted by the same researcher (CM) who has extensive knowledge about cat behavior and received hands-on cat pain-assessment training by 2 cat pain experts. First, participants were provided background information about cat pain management (definition of pain, multi-dimensionality of pain, importance of pain assessment, and challenges in cats), then orientated to the revised CMPS-F score sheet. Participants completed a short questionnaire collecting demographic information, frequency of cat pain assessment, and previous use

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of the CMPS-F. For all cat videos played during the seminar, participants were blind to the procedures that the cats had undergone. The 10 pre-training cat videos were then played consecutively; new videos were not played until all participants had finished their assessments. Participants received a 20-minute break, then cat pain assessment training commenced.

Training involved reviewing all aspects of the revised CMPS-F score sheet, including each scale item and associated behavior. Behaviors included in the score sheet were: vocalizations, lip licking, posture, attention to the painful area/wound, ear position, muzzle shape, tail position, response to stroking, response to palpation around the potentially painful area, and demeanor of the cat. Each of the behaviors described in the score sheet was reviewed in detail using operational definitions, pictures, videos, and sound clips. After going through the cat behaviors listed in the scale, we practiced scoring CMPS-F behaviors as a group using pictures and videos, and 1 full cat video using the revised CMPS-F. Participants were free to ask questions and comment throughout the training phase. After the training phase, participants scored 10 new videos of cats in varying degrees of pain using the revised CMPS-F score sheets. During the post-training phase, participants followed the same protocol as the pre-training phase.

Table 1. Categorical demographic information for veterinarians ($n = 17$) and non-veterinarian staff ($n = 33$; N = 50) participating in 1 of 4 cat pain assessment seminars in the greater Toronto area.

Variable	Veterinarian *n* (%)	Non-veterinarian *n* (%)	N
Attended veterinary-related program for position			
Yes	17 (100)	18 (62.0)	35
No	0 (0)	11 (37.9)	11
Total	17	29	46
Year of graduation			
2007–2017	1 (5.9)	6 (27.3)	7
1996–2006	5 (29.4)	5 (22.7)	10
1985–1995	6 (35.3)	1 (4.5)	7
< 1984	1 (5.9)	1 (4.5)	2
Have not graduated	0 (0)	9 (40.9)	9
Prefer not to answer	4 (23.5)	0 (0)	4
Total	17	22	39
Gender			
Female	7 (41.2)	30 (90.9)	37
Male	10 (58.8)	3 (9.1)	13
Total	17	33	50

Data analyses

Since different cat videos were used before and after training, we could not directly compare participant scores before and after training. Instead, we used mixed linear regression modeling to examine the expert by time-point interaction effect, with the hypothesis that expert scores would remain consistent for both sets of videos, and that participant scores would be more similar to expert scores following training. In these models we also assessed whether participant demographic data explained differences in CMPS-F scores among participants. In addition, we created a binary variable using CMPS-F scores (≥ 5 analgesic is needed, yes; scores < 5 no analgesic is needed, no) to compare participant and expert analgesic decision-making before and after training.

Analyses were conducted using SAS Studio v3.71 (SAS Institute, Cary, North Carolina, USA) with $P < 0.05$ considered statistically significant. Responses from the 4 seminars (Seminar 1, $n = 12$; Seminar 2, $n = 7$; Seminar 3, $n = 20$; and Seminar 4, $n = 11$; total participants: N = 50) were combined and descriptive statistics (frequencies, percentages; Tables 1, 2) were generated using participant questionnaire responses.

Mixed linear regression models were used to examine associations between participant cat pain scores, average expert score, participant demographics, and time point (pre-training phase, and post-training phase). Since all veterinarian participants had attended post-secondary education but not all non-veterinarian participants had, non-veterinarian and veterinarian responses were initially analyzed separately for the purposes of the participant cat pain score analyses. However, to allow assessment of differences between veterinarians and non-veterinarians, a secondary analysis combined all participant data, excluding information about post-secondary education. All regression models included the outcome variable participant pain score, with participant ID and time point (pre-training phase, post-training phase) as random effects. Explanatory variables were average expert score, timepoint, gender (female, male), previous experience handling painful cats (yes, no), position (veterinarian, non-veterinarian), and year of graduation (2017 to 2007, 2006 to 1996, ≤ 1995, did not graduate). The non-veterinarian model had the additional explanatory variable post-secondary education (yes, no), and a different position variable (veterinary technician/technologist, veterinary assistant, other).

Models used a stepwise elimination process and included fitting of interaction terms into the model. We also tested for quadratic effects, which have a U-shaped curve, such as expert by expert interactions. Model fit was assessed using residual plots, normality test ($P < 0.05$), and AIC (with a lower value preferred). For all final models, only participant ID was significant as a random effect and thus left in the models. The errors were normally distributed and homoscedastic, and there were no violations of model assumptions. For all pair-wise comparisons, the Tukey-Kramer adjustment was used.

To assess analgesic decision-making, participant and average expert scores were consolidated into a binary outcome with scores ≥ 5 indicating an analgesic is needed (yes), and scores < 5 indicating no analgesic is needed (no). McNemar's test was used to compare the binary expert and participant CMPS-F scores for indicating analgesic decision-making (yes/no), before and after training. The Mantel-Haenszel odds ratio for $2 \times 2 \times k$ tables was computed to provide a summary effect size.

Results

Participants

Overall, data provided by 50 seminar participants were analyzed. Participants were practicing veterinarians ($n = 17$), veterinary technicians/technologists (registered and non-registered; $n = 10$), veterinary assistants ($n = 6$), veterinary students ($n = 6$), and other (e.g., clinic manager; $n = 11$; N = 50). Demographic responses received by participants are outlined in Table 1. Most participants were non-veterinarians (33/50, 66%), female (37/50, 74%), perform cat pain assessment in a small animal clinic (31/45, 69%), handle potentially painful cats (42/50, 84%), and had not heard of the CMPS-F (44/50, 88%). Participant responses indicated that their places of work provided standard analgesia protocols for various procedures (38/40, 95%) and generally did not use a scoring tool for pain assessment (29/40, 72.5%; Table 2).

Cat pain assessment scores

All participants model. A significant quadratic effect was detected between expert and participant CMPS-F scores. The relationship was positive up to a maximum expert score of 9.77, then expert scores declined with increasing participant scores (F_{1596} = 5.8; P = 0.016). Those graduating between 1996 and 2006 gave higher average pain scores by 1.42 (95% CI: 0.78, 2.06; F_{3596} = 7.03; $P < 0.0001$) and by 1.08 (95% CI: 0.45, 1.71; P = 0.004) points than those graduating before 1996 and those that had not graduated, respectively. Male seminar participants gave average CMPS-F pain scores that were 1.4 points (95% CI: 0.14, 1.27; F_{1596} = 6.04; P = 0.014) higher than female participants. We examined the interaction between expert score and time point to test the effect of training, but we did not detect a significant effect ($P > 0.05$).

Veterinarian-only model. Veterinarian CMPS-F scores were different (F_{1214} = 185.6; $P < 0.001$) from expert scores; for every 1-point change in expert score, the average change in the mean participant score was 1.14 points (95% CI: 0.98, 1.31). Veterinarians graduating between 1996 and 2006 reported higher pain scores by an average 2.40 points (95% CI: 0.77, 4.03; F_{2214} = 12.58; $P < 0.041$) and 2.01 points (95% CI: 1.18, 2.83; $P < 0.0001$), compared to those graduating between 2007 and 2017 and before 1996, respectively. We did not detect a significant interaction between expert score and time point.

Non-veterinarian staff model. There was a significant quadratic effect detected between expert and participant CMPS-F scores. The relationship was positive up to a maximum expert score of 10.0, then expert scores declined with increasing participant scores (F_{1377} = 7.79; P = 0.006). Non-veterinarian staff that had not attended post-secondary education for their position reported pain scores that were on average 1.9 points higher (95% CI: 0.31, 3.42; F_{1377} = 5.59; P = 0.0186) than those that had attended post-secondary education. Recent graduates (2007 to 2017) reported higher pain scores on average by 1.0 points (95% CI: 0.23, 1.78; F_{2377} = 3.27; P = 0.012). On average, veterinary students reported higher pain scores by 0.9 points (95% CI: 0.09, 1.76; F_{2377} = 6.87; P = 0.03) and by 1.8 points (95% CI: 0.83, 2.77; P = 0.0003) compared to veterinary technicians and staff that were not technicians or assistants, respectively. Male non-veterinarian staff reported higher pain scores by 1.5 points (95% CI: 0.35, 2.70; F_{1377} = 6.55; P = 0.01) compared to female non-veterinarian staff. We did not detect a significant interaction between expert score and time point.

Analgesic intervention level

Participant and expert scores did not differ in analgesic intervention decision-making when using the CMPS-F tool before (P = 1.0) and after (P = 0.10) training. Regardless of training, the odds of agreement between participants and experts for having similar analgesic decision-making was 2.0 (95% CI: 0.52, 7.71). Overall, experts and participants had similar analgesic decision-making for 17 of the 20 cat videos; however, there were differences for video numbers 1 and 4 before training, and number 19 after training (Figure 1).

Table 2. Summary statistics for pre-training questions describing cat pain assessment information for veterinarians (n = 17) and non-veterinarian staff members (n = 33; N = 50) participating in 1 of 4 cat pain assessment seminars in the greater Toronto area.

Variable	n	Frequency (%)
Location of pain assessment		
Small animal clinic	31	68.9
Animal shelter	6	13.3
Laboratory/Research facility	3	6.7
Other	5	11.1
Total	45	100
Handle potentially painful cats		
Yes	42	84.0
No	8	16.0
Total	50	100
Frequency of pain management in cats		
Daily	26	54.1
Weekly	6	12.5
Monthly	3	6.3
Annually	2	4.2
Never	11	22.9
Total	48	100
Uses standard analgesia protocols for various procedures		
Yes	38	95.0
No	2	5.0
Total	40	100
Uses a standard protocol for pain assessment in cats		
Yes	16	40.0
No	24	60.0
Total	40	100
Uses a scoring tool for pain assessment in cats		
Yes	11	27.5
No	29	72.5
Total	40	100
Participant has heard of the Glasgow Feline Composite Measure Pain Scale		
Yes	26	52.0
No	24	48.0
Total	50	100
Participant has used the Glasgow Feline Composite Measure Pain Scale		
Yes	6	12.0
No	44	88.0
Total	50	100
How confident are you assessing pain in cats? (1 = no confidence, 5 = high confidence)		
1	2	4.1
2	10	20.4
3	20	40.8
4	16	32.7
5	1	2.0
Total	49	100

Discussion

Overall, participants and experts showed similar analgesic decision-making for all but 3 of the 20 cat videos when using

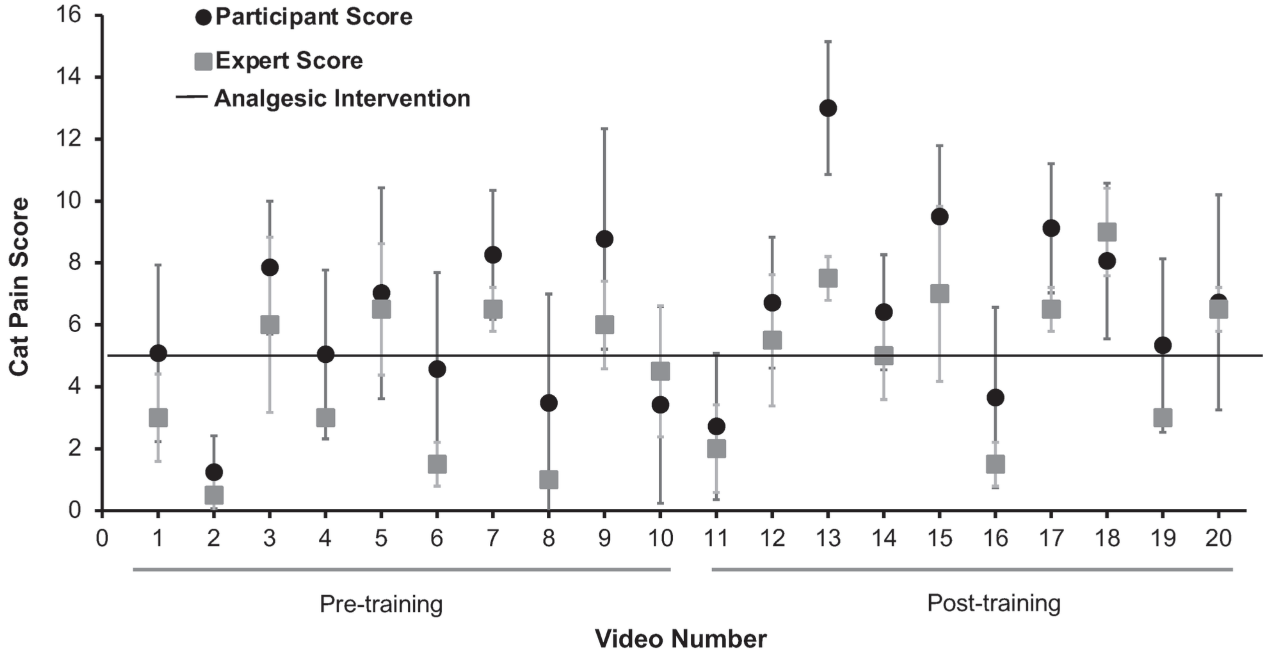

Figure 1. Average (± SD) expert ($n = 2$) and participant ($n = 50$) scores for each video watched during the training ($n = 10$) and post-training ($n = 10$; N = 20) phases during the 4 cat pain assessment seminars in the greater Toronto area.

the CMPS-F tool. The magnitude of the difference between average expert and participant scores for these 3 videos was between 2 to 3 points, with a moderate odds ratio (OR) = 2 (20) of agreement. Although a significant difference was detected between the participant and expert average pain scores, this difference was 1 point (scale range: 0 to 20). We do not consider this clinically relevant given the composite nature of the scale, and that the derived analgesic intervention threshold is intended to serve as a guide for analgesic management. The similarities between average participant and expert scores were likely due to the composite nature of the pain scale, which uses multiple measures of acute pain assessment for overall analgesic decision-making. This type of scale allows for a holistic approach and does not rely on only 1 or 2 items. However, since a deviation of a few points led to differences in analgesic decision-making for 3 videos, these results supported the use of the analgesic intervention threshold for guiding analgesic decisions rather than for definitive judgments (8).

We failed to detect an interaction effect between expert score and timepoint, suggesting that seminar training did not substantially alter the relationship between participant and expert scores. This was a compelling result, as most of our study participants had not previously used or were even aware of the CMPS-F. It is possible that training is not necessary for efficacious use, as the authors of the CMPS-F tool do not report training as a requirement to use this tool (8). In addition, the training seminar may not have been effective for improving participant cat pain assessment when using the CMPS-F to score cat videos. However, it is difficult to assess efficacy of the seminar-style training, given the similarities between the participant and expert scores both before and after training. Although the study results suggested expert and participant scores diverged when average CMPS-F scores were $>$ 10, only 1 video had an average participant score exceeding 10 (Figure 1). Thus, the study results may only be relevant for lower levels of cat pain (scores $<$ 10). A larger sample size incorporating a broader range of CMPS-F scores would provide a more comprehensive assessment of the seminar-style training. In addition, it remains unexplored as to whether scoring videos using the CMPS-F yields the same result as scoring cats in a real-time clinical setting.

The study results indicated that average expert CMPS-F scores tended to be lower than average participant scores in all but 2 videos (pre-training video Number 18; post-training video Number 10). There was a larger difference detected between expert and participant CMPS-F scores when participants rated pain higher. This indicates that when participants scored cat pain higher, experts tended to be more conservative in their ratings. It is possible that the experts may have been less sensitive when examining cats showing higher levels of pain than were non-experts. Underestimation of human pain by professionals in a clinical setting has been identified (21). Alternatively, given that participants were aware they were attending a pain assessment seminar, this may have inflated scores if participants were overly focused on identifying indicators of pain in the videos. It is also important to recognize that the experts have received formal training in pain assessment and have used the CMPS-F tools extensively in clinical practice. Comparatively, the majority of participants had not used the CMPS-F in clinical practice and this was their first time seeing and using the tool.

We inferred that previous education impacted participant cat pain scores. Non-veterinarian staff that had not attended post-secondary education tended to report higher pain scores than those that had attended post-secondary education. In addition, those graduating between 1996 and 2006 tended to score pain higher in the videos, than those graduating before 1996, and those that had not graduated. No other graduate year effects were detected, but sample sizes for some groups were relatively small. It was reported that differences in education and experience levels may influence cat pain assessment (22). In recent years there has been an increase in availability of validated scoring tools for cats (8–11,17). It would be beneficial, therefore, to assess how various types of student training impacts later clinical pain assessment methods used post-graduation. This could provide information on educational strategies for improving cat pain assessment in clinical practice.

Interestingly, male study participants reported higher cat pain scores than did female participants. This was unexpected given that companion animal literature reports that female veterinarians are more likely to provide an analgesic in a clinical setting (1,4,6), suggesting a higher identification of pain by female veterinarians or a greater motivation to provide pain control. However, our sample had gender differences in terms of position, with most of our female participants identifying as non-veterinarians, and most male participants as veterinarians. More research is needed to examine differences in cat pain assessment and analgesic decisions between veterinarians and non-veterinarian staff, as well as the influence of gender on these respective groups.

A potential study limitation was the use of subtitles to indicate when cats were vocalizing. This was done as there was often background noise present in the video clips and we did not want to introduce potential sources of bias or distraction to the scoring procedure. In addition, the study sample included a relatively small number of veterinarians and non-veterinarian staff from 1 region in Ontario, Canada, which is a limitation in terms of generalizability. Future research should examine the use of the CMPS-F in a larger population to better assess the influence of various parameters that may impact the use of the CMPS-F and analgesic decision-making in a clinical setting. Finally, research is needed to explore strategies for improving awareness of cat pain assessment tools and increasing in-clinic use.

Supplementary material

Demographic questionnaire completed by the seminar participants (N = 50) at the beginning of the cat pain assessment training seminars.

Questions and answers

Are you a:
- a) Practicing Veterinarian
- b) Veterinary Technician/Technologist (registered/non-registered)
- c) Veterinary Assistant
- d) Veterinary Student
- e) Other

If you are a non-veterinarian, did you attend a veterinary-related program for your position:
- a) Yes
- b) No

If you attended a veterinary-related program for your position, what year did you graduate?
- a) 2017–2007
- b) 2006–1996
- c) 1995–1985
- d) < 1985
- e) Have not graduated yet
- f) Prefer not to answer
- g) Not applicable

Are you:
- a) Female
- b) Male
- c) Other
- d) Prefer not to answer

Do you handle potentially painful cats?
- a) Yes
- b) No

How often do you assess cats for pain management
- a) Daily
- b) Weekly
- c) Monthly
- d) Annually
- e) Never

Which location(s) do you assess pain in cats? (Choose all that apply)
- a) Small Animal Clinic
- b) Mixed Animal Practice
- c) Animal Shelter
- d) Laboratory/Research Facility
- e) Other

Do any of these locations provide standard analgesia (pain relief) protocols for different procedures? Ex. Spay (ovariohysterectomy/ovariectomy)?
- a) Yes
- b) No
- c) Not applicable

Do any of these locations have a standard protocol (assessment tool) for pain assessment in cats?
- a) Yes
- b) No
- c) Not applicable

In general, on a scale from 1–5, how confident are you assessing pain in cats? (1= no confidence, 5 = high confidence)
- a) 1
- b) 2
- c) 3
- d) 4
- e) 5

Have you heard of the Glasgow Feline Composite Measure Pain Scale?
- a) Yes
- b) No

Have you used the Glasgow Feline Composite Measure Pain Scale before?
- a) Yes
- b) No

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