

Pain Management of Cow Before and After Cesarean Surgery

Sura Shakir Hammoud¹, Sumaya Loay Mohamed Shams Al-Dean² Mohammed Adil Jebur³

¹Technical Medical Institute, Department of Nursing Technology

²Technical Medical Institute, Department of Community health Technology

³Technical Medical College, Alfarahidi University

KEYWORDS

Caw, Cesarean Section, Pain Management, Post-Operative

ABSTRACT

Background: On-farm pain reduction treatments are used depending on whether or not they are feasible and how important they are to the producer. The Iraqi beef industry lacks understanding on the various methods of pain treatment. The aim is to management the pain in cows of caesarean section operation. Method: This article provides an overview of agricultural pain techniques as well as producer pain mitigation strategies. A questionnaire covering calving and processing was given to one hundred cow-calf producers in the southern region of Iraq. Interviews on farms were semi-structured, and 25 people who had filled out the questionnaire were chosen to participate. Results: Between fifty and one hundred percent of respondents utilized cesarean pain relief. Reports. In most cases, pain medication was not offered. 66% of them employed branding, while just 7% focused on pain alleviation. The perception of pain by producers is influenced by factors such as common sense, relatability to cattle, visual evidence of suffering, and the age of the animal. The reason for reducing pain was impacted by factors such as the age of the animal, the benefits of operation, costs and logistics, market needs, and personal conscience. The management adhered to the norms of Iraq. Conclusion: The findings of this research might potentially provide future efforts in policy making, research, and extension with a route to follow in order to expand the adoption of pain reduction techniques.

1. Introduction

The management of calving and the processing of calves are two of the most common types of traumatic events that may take place in cow-calf operations(1). These are also two of the most common types of traumatic events that may take place. Both of these occurrences have the potential to put people in harm's way(2). Calves have a greater risk of suffering an injury as a result of these procedures due to their smaller size. During the process of calving, a number of potentially unfavorable situations, including as dystocia and cesarean sections, may take place. These may be necessary in some instances(2)(3). These processes are frequently required in certain circumstances(4)(5). The term "dystocia" refers to a difficult calving that happens as a result of prolonged labor during parturition or the utilization of vigorous obstetric help during delivery(6). Both of these factors can contribute to the development of the condition. Both of these elements have the potential to play a role in the development of the illness(7). As a direct result of the illness that has been identified, the mother cow and the calf that she just gave birth to are both enduring horrific levels of pain(8). Cesarean sections are difficult for the cow because they are surgical procedures; however, veterinarians are trained to alleviate the discomfort caused by cesarean sections using veterinary medications(9). Although cesarean sections are difficult for the cow, veterinarians are trained to alleviate the discomfort caused by cesarean sections(10). Because they are surgical procedures, caesarean sections cause considerable discomfort for the cow. The cow has considerable discomfort throughout the cesarean section procedure because these procedures are medical in nature and need incisions(11). Processing refers to a variety of unpleasant management procedures that are performed on calves. These procedures are generally known as "processing(11)." Castration, dehorning, and branding are some of the processes that fall under this category(12). Calves are used in each and every one of these treatments(13). The word "processing" is one that comes to mind while attempting to describe each of these distinct procedures(14). Because of the processing that they go through, young calves are put through a painful experience. This is because of the nature of the work that is done on them. Even though a great number of studies have been conducted in order to learn how consumers feel about the treatment of animals, very little attention has been paid to how cattle producers feel about pain in cattle and the use of pain mitigation measures in cattle(15). This is despite the fact that a great number of studies have been carried out in order to learn how consumers feel about the treatment of animals(16). This is in spite of the fact that a great number of research have been conducted in order to determine how customers feel

about the way animals are treated in various industries(17). This stands in stark contrast to the various studies that have been conducted to establish how customers feel about the way animals are treated in the food industry(18). These studies have been carried out to determine how customers feel about the way animals are treated in the food industry. In spite of the vast number of studies that have been carried out on painful procedures involving cattle, the existing pain-associated treatment techniques and the application of pain reduction strategies in Iraq remain unknown as of the present day(19). This is the case despite the fact that these studies have been carried out. This study's objectives were to investigate the relationship between those practices and the demographics of the producers and the operations; characterize the existing animal care and health management techniques connected with cattle discomfort on southern Iraqi cow–calf operations; and investigate the relationship between those practices and the demographics of the producers(20). The utilization of primary and secondary sources of information was intended to be the means by which these two goals would be achieved(21). Another component of cow-and-calf farming that was going to be explored in this study was the way in which farmers interpret the amount of suffering that their animals go through. As part of this investigation, we were also going to look into the factors that cause cow and calf farmers to either accept or reject the use of pain reduction measures.

2. Material and methods

Study design

Quantitative part

This study is a component of the southern Iraqi cattle surveillance project, which will last for one year and involve the collection of biological samples from herds every other year in addition to the administration of two to three questionnaires each year. The duration of the project is expected to be one year. It is anticipated that the project would take a whole year to complete. Because southern Iraqi cattle farmers worked closely with the local veterinarians, they were able to enroll their cows and calves in the southern program. This was made possible as a direct result of the collaboration between the two parties. A minimum herd size of 150 cows, the maintenance of production records, and the producer's desire to engage were the prerequisites for eligibility for participation in the program. In order to be eligible for participation in the program, the prerequisites for eligibility were a minimum herd size of 150 cows. The participants were chosen with the goal of encouraging reflection in mind when the selection was made. In recognition of the significant contribution that they made; an honorarium equal to one year's salary was given to each of the producers. As part of this research initiative, a total of one hundred fifty cattle producers from the southern area of Iraq were handed questionnaires to complete out.

Form of study

management and calf processing were developed with the help of an expert group that comprised researchers, veterinarians, and producers. This group worked together to generate the materials. The group was in charge of formulating the guidelines that were established. Each of the provinces that make up the southern area of Iraq was represented on the panel by one of its members. A glossary was included to ensure that all of the technical terminology could be comprehended by the audience. As part of a pilot study, the questionnaire was distributed to cow-calf farmers. The goal of the study was to identify any questions that lacked clarity. Respondents were sent with the final questionnaire, which included of questions in total and focused on the years 2019 and 2020. There were some surveys that were mailed out to participants, and there were also some questionnaires that were made accessible online for participants to fill out whenever it was most convenient for them. The management procedures for calves were the topic of one of the questions on the questionnaire. This section included questions about the utilization of pain mitigation practices during and after dystocia and caesarian section, as well as inquiries into whether or not cesarean sections had been performed during the allotted time period, and if so, who had been the surgeon. Additionally, this section included questions about the utilization of pain mitigation practices during and after dystocia and caesarian section. A

supplementary section centered on post-calving management procedures was included. This section included questions about the proper way to handle cattle during different age ranges, such as 1–9 months; the timing and method of castration and dehorning; the timing and use of pain mitigation during the age ranges that were previously mentioned; the frequency and method of branding; the use of pain mitigation for branding; and alternative forms of identification, such as wattling and ear splitting. Wattling is a method for identifying cattle that requires removing the skin from the brisket and then leaving the flaps of skin hanging loose. This procedure is performed by removing the skin from the brisket. On the other hand, "ear splitting" refers to the process of cutting notches in the ear for the purpose of identifying the person who had the treatment. In the final section of the survey, respondents were asked a series of questions, including whether or not they would be willing to participate in an on-farm interview, whether or not they agreed that procedures are painful if pain mitigation is not administered, whether or not they were familiar with the animal care guidelines specified in the, and whether or not they agreed with the guidelines.

Statistical analysis

In order to carry out the analysis of the data, the newest version of GraphPad Prism (version 9) was applied. A descriptive analysis was carried out so that we could explore the pattern that each variable followed in terms of its occurrence. Because data on an individual level were not available, the proportions of the entire population of bull calves that were castrated by method and age were estimated using the responses of those respondents who reported a complete distribution of castration methods that totaled one hundred percent. These proportions were estimated using the responses of those respondents who reported a complete distribution of castration methods that totaled one hundred percent. This was done in order to make up for the lack of individual-level data that was accessible, which was accounted for by doing this.

Results

The characteristics of the population used for the sample are outlined in (**Figure 1**), and demographic information on the operation can be found in (**Table 1**). The person in charge of making the most important decisions for the enterprise was on average 55 ± 9 years old and had on average 32 ± 14 years of experience in livestock management. The age of the person who makes the majority of the decisions regarding the business.

Management of calves

A total of 46 percent of respondents, or 42 out of 92, reported making frequent use of a pain reduction treatment for dystocia. This is the majority of those who do so. (Table 2) outlines the many methods of pain relief that are considered to be effective during dystocia and can be utilized by a patient. The heifer calving season and the cow calving season were substantially connected, which was shown to be one of the characteristics in the univariable analysis that was associated with the utilization of pain mitigation for dystocia. Another characteristic that was associated with the utilization of pain mitigation for dystocia was the duration of the heifer calving season.

Table 1: demographic and responders in study.

Demographic category	Respondents	
	No.	Percent
method		
before	68	69
other	30	32
Site of surgery		
Small (100 to 300)	59	67
Large (≥ 300)	44	47
Type of surgery		
Original bred	8	8
Economical <u>berd</u>	70	64
both	33	27
other cattle surgery	34	28
nutrition	12	14

As a consequence of this, separate models were assessed for each variable, and the outcomes of these assessments were compared making use of the Akaike information criterion. Herds that calved their heifers in the winter were 3.8 times more likely to report the usage of pain mitigation for dystocia than herds that calved their heifers in the spring. Herds that calved their heifers in the summer were 1.8 times more likely to report the usage of pain mitigation for dystocia. Additionally, the chance of a large herd claiming the usage of pain mitigation for dystocia was six times greater than the likelihood of a small herd making such a claim. This was the case because large herds are more likely to have access to pain medication. Only one of the ninety-four individuals who took part in the survey provided the response that C-sections were carried out by qualified staff members. Unhappily, 56 percent of those who responded that a C-section was performed in 2020 did not know what treatment the veterinarian administered to the cow between the ages of 70 and 87. According to the replies of all of the survey participants, who were aware of what was administered to the cow prior to the C-section, pain medication was frequently provided (Table 2).

Table 2: pain mitigation of cow operations.

Method of pain mitigation	Respondents	
	No.	Percent ¹ (95% CI)
Dystocia		
Epidural	20	16 (8 to 24)
NSAID ³ administered to cow at time of dystocia	35	36 (25 to 46)
NSAID administered to cow >24 h after dystocia	11	10 (4 to 20)
NSAID administered to calf at time of dystocia	27	32 (21 to 41)
NSAID administered to calf >24 h after dystocia	10	12 (6 to 19)
None	51	64 (54 to 70)
Any pain mitigation given	45	56 (38 to 59)
C-section ⁴		
Epidural	35	82 (67 to 88)
Local anesthetic	31	81 (63 to 90)
NSAID administered to cow at time of C-section	27	66 (51 to 82)
NSAID administered to cow >24 h after C-section	5	10 (2 to 4)
Sedation	7	7 (3 to 21)
<1 wk	5,749	53 (29 to 77)
Any pain mitigation given	42	100 (95 to 100)

Castration was planned to be done on most of the bull calves before they reached the age of three months. Only 12% of respondents stated that they utilized any kind of pain medication during the castration process. The injection of a nonsteroidal anti-inflammatory medication was the method that was used to ease discomfort during the process of castration the majority of the time. This was done in order to maximize patient compliance. The reported percentage of polled calves had a median value of 95 percent, and practically all of the respondents said that polling was performed on their calf crop (that is, genetically devoid of horns). Before calves reached the age of three months, it was anticipated that the majority of those with horns would have their horns removed (also known as "dehorning").

Cattle identification practices	Respondents	
	No.	Percent (95% CI)
Method of branding		
Hot iron brand	51	56 (43 to 65)
Freeze brand	6	6 (3 to 13)
Did not brand in 2014 but plan to in the future	12	11 (6 to 21)
Pain mitigation strategy at branding		
NSAID ⁴ at branding	4	6 (1 to 17)
None of the above	49	98 (97 to 100)
Alternative methods of identification⁵		
Brisket tag	10	58 (36 to 91)
Tattoo	9	39 (16 to 68)
Ear splitting	3	6 (0 to 21)

The number of respondents who had their calves dehorned and reported using pain mitigation was less than seventeen percent. The injection of a nonsteroidal anti-inflammatory drug (NSAID) was the method that was utilized to reduce discomfort associated with dehorning more frequently than any other technique. More than half of all of the calves that were reported to have been branded were thought to have been branded. The vast majority of respondents stated that they utilized pain reduction strategies throughout the branding process. The many techniques for identifying cattle are broken down here. Only a small portion of the herd appears to have been branded with either a hot iron or a freeze brand, judging on the comments of some of the people who participated in the poll.

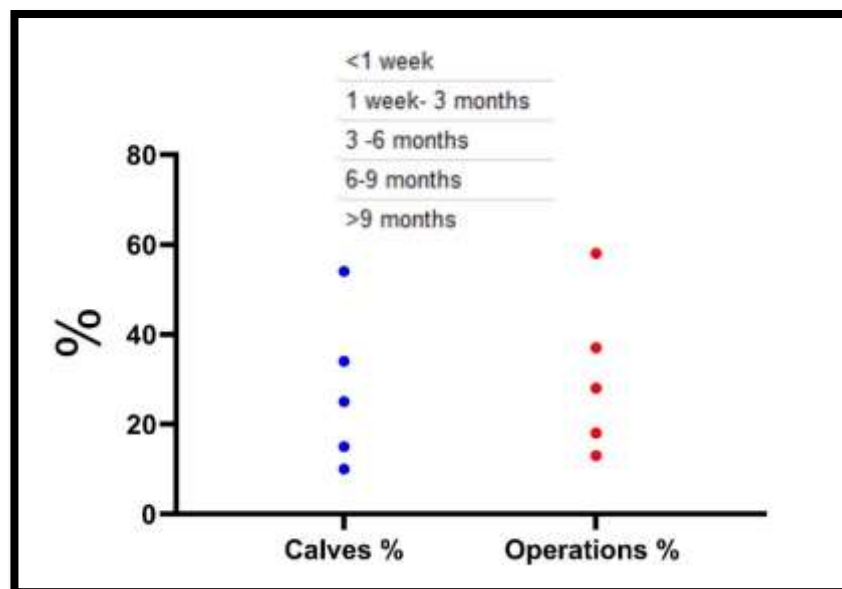


Figure 1: percent of pain with age.

Discussion

In the current study, pain mitigation for dystocia (52%) and C-section (96%) was greater than a decade earlier in an assessment of analgesics in beef cattle by Iraqi veterinarians. A 2020 study of Alberta cow-calf operations indicated decreased calf (15%) and cow (17%) pain mitigation after dystocia(1). This may reflect a recent surge in pain reduction or a selection bias, as Iraq participants had a veterinary

office and may be more advanced(2). In this investigation, 61 and 45% of operations castrated and dehorned before 1 week of life, which was fewer than a recent survey of western Iraqi cow–calf farmers and a 2020 Alberta cow–calf survey(22). This is the first research to assess calf treatment by age(3). The western Iraqi poll didn't determine processing age, but said it was between 2 and 28 days. This study found higher castration and dehorning pain relief than an Iraqi producer survey(5). Pain management or selection bias may be involved. Most have these operations as children and only need pain treatment after 9 months. This study's proportion of branded calves (54%) was greater than a 2019-2020 Iraqi slaughterhouse audit(6). Some producers only branded replacement animals, which may explain the variation because on-farm cattle weren't audited(7). 54% of firms hot-iron branded their cattle, compared to 73% in the southern Iraqi poll. This may be due to varied national requirements for traceability; Iraq requires every cow to have an RFID tag, making branding unnecessary(8). Farmers in Iraq may utilize a traditional branded register until livestock cross state lines. Large herds reported better dystocia and calf processing pain relief. Large herds may have better veterinarian-patient connections, more protocols, or more personnel. Winter-calving herds are more likely to reduce calf discomfort(10). These enterprises may have had more thorough management to ensure calf survival in colder conditions or calved earlier in the year(11). Many farmers claimed winter calving was done in a warm barn, reducing discomfort during delivery(11). Castration, dehorning, and branding all painful, according to a poll of Iraqi beef producers. This study didn't examine producer discomfort or calving management. Prior research showed that farmers could visually discern if their cattle were comfortable and that normal behavior after a strong stimulus suggested the discomfort had subsided(12). Producers say surgical castration is more painful than band castration on young animals. Respondents agreed that aging needed pain alleviation(13). Older animal processors didn't engage in interviews, thus their pain-reduction suggestions couldn't be researched. Genetic selection helped farmers minimize calving issues, a research found(16). Veterinarians were trusted for cow health and welfare information. This study discovered barriers. Lack of vet interaction may be why many farmers don't have access to pain medications. Iraqi vets might not know what's available. Pain injections were worse than processing, say several manufacturers(17). A topical anesthetic applied to the spermatic cord and scrotal neck before castration reduced calf pain. Unsure if this refers to intravenous, intramuscular, or subcutaneous NSAIDs(18). Oral analgesics and the newest study were unknown to many producers. Some farmers feared dystocia painkillers might hinder suckling(19). After a hard pull, calves administered NSAIDs exhibited increased vigor, suckle reflex, and milk consumption(20). Future growth should fill knowledge shortages. Cost and logistics impede animal welfare measures. Studies indicate a balance between animal production and wellbeing(21). The producer's overall operation advantage is the barrier. Farmers don't restrict cow welfare since it hurts performance and profitability, claimed study participants. This study explored pain-management motives. Some farmers may accept pain reduction if it increased calf weight(23). Current Iraqi farmer practices have not been shown to promote long-term calving weight gain. Improving calf vitality in the first 8 weeks of life may enhance long-term performance(24). Using an NSAID before castrating calves at 10 to 12 months old lowers respiratory infection in the feedlot, but this wouldn't affect cow–calf operations because researchers rarely castrated calves that old(25). Manufacturers lacked time to provide pain medications before operation. For efficient analgesia, provide items before calf processing, say previous research(26). This calls for pain relief investigations. Younger castration and dehorning is less painful, according to study(27). If juvenile castration was unpleasant, some producers may change their management strategies. Castration beyond 1 week is rarely studied. Burdizzo castration of >1-week-old dairy calves is painful, based on behavior. Few research subjects had Burdizzo castration, therefore it's questionable if the findings can be applied. Future study is needed on early castration(28). Future extension programs should incorporate producer viewpoints on pain barriers and motivators. Underdeveloped brand pain remedies. Neither a cooling gel nor an NSAID injection reduced branding-related discomfort. Some manufacturers claimed branding was important, thus pain reduction should be studied(29). It has faults. Misread questionnaires and interviews may have introduced prejudice. To avoid bias, a producer-expert panel, a glossary, and target producers piloted the questionnaire(30). Interview questions and clarifying remarks reduced interview bias. Social desirability bias may have influenced participants'

replies(31). Participants' answers were anonymized to prevent bias. Selection bias may have underrepresented small herds or less-engaged farmers. This study's and preceding polls' respondents didn't answer every question(31,32).

Conclusion

The majority of responders said that calving and the processing of calves were unpleasant, but just a handful claimed they used pain medication. Processing of young calves without the use of any pain medication is permitted in Iraq. The belief that younger animals were less sensitive to pain, availability issues, financial and time restrictions, and consumer desire were the primary factors contributing to the absence of pain mitigation. Because it's possible that younger calves would experience less pain, further study is required to validate the requirements. Castration, dehorning, and branding are all painful procedures that should be the subject of future research, as well as the health, performance, and financial rewards associated with these procedures. In the future, extension measures will involve providing access to information and analgesics for veterinarians and producers, educating producers on the pain associated with calving and processing, and improving communication between veterinarians and producers on welfare issues.

Reference

- [1] Newman KD. Bovine cesarean section in the field. *Vet Clin North Am Food Anim Pract.* 2008;24(2):273–93.
- [2] Lin H. Pain management for farm animals. *Farm Anim Anesth cattle, small ruminants, camelids, pigs.* 2022;207–46.
- [3] Hewson CJ, Dohoo IR, Lemke KA, Barkema HW. Canadian veterinarians' use of analgesics in cattle, pigs, and horses in 2004 and 2005. *Can Vet J.* 2007;48(2):155.
- [4] Alwan AM, Afzaljavan F, Tavakol Afshari J, Homaei Shandiz F, Barati Bagherabad M, Vahednia E, et al. The impact of CYP19A1 variants and haplotypes on breast cancer risk, clinicopathological features and prognosis. *Mol Genet genomic Med.* 2021;9(7):e1705.
- [5] Hiew MWH, Baird AN, Constable PD. Clinical signs and outcomes of beef cattle undergoing cesarean section because of dystocia. *J Am Vet Med Assoc.* 2018;252(7):864–72.
- [6] Ferrari D, Lundgren S, Holmberg J, Edner A, Ekstrand C, Nyman G, et al. Concentration of carprofen in the milk of lactating bitches after cesarean section and during inflammatory conditions. *Theriogenology.* 2022;181:59–68.
- [7] Tschoner T, Sauter-Louis C, Peinhofer V, Feist M. Attitudes of Bavarian bovine veterinarians towards pain and pain management in cattle. *Vet Rec.* 2020;187(10):e90–e90.
- [8] Mauffré V, Cardot T, Belbis G, Plassard V, Constant F, Bernard S, et al. Meloxicam administration in the management of postoperative pain and inflammation associated with caesarean section in beef heifers: Evaluation of reproductive parameters. *Theriogenology.* 2021;175:148–54.
- [9] Alwan AM, Afshari JT. In Vivo Growth Inhibition of Human Caucasian Prostate Adenocarcinoma in Nude Mice Induced by Amygdalin with Metabolic Enzyme Combinations. *Biomed Res Int.* 2022;2022.
- [10] Schwartzkopf-Genswein KS, Fierheller EE, Caulkett NA, Janzen ED, Pajor EA, González LA, et al. Achieving pain control for routine management procedures in North American beef cattle. *Anim Front.* 2012;2(3):52–8.
- [11] Loar A. Maximizing Genetic Return on a Valuable, Terminally Injured Cow. 2014;
- [12] NEWMAN KD. The cesarean section (C-section) is probably one of. *Curr Vet Ther Food Anim Pract.* 2008;372.
- [13] Wood S, Barrett D, Yarnall M, Kerby M, Cutler K, Macfarlane P. Clinical forum: how effectively are we managing pain in cattle? *Livestock.* 2014;19(4):202–8.

- [14] Mohammed Alwan A, Tavakol Afshari J, Afzaljavan F. Significance of the Estrogen Hormone and Single Nucleotide Polymorphisms in the Progression of Breast Cancer among Female. Arch Razi Inst [Internet]. 2022;77(3):943–58. Available from: https://archrazi.areeo.ac.ir/article_126343.html
- [15] Ahmed AM, Jalil AT. Investigating the Protective Role of Rhodanese Enzyme Against Cyanide, the Cytotoxic by-product of Amygdalin, in HDF and L929 Cell Lines. Lett Drug Des Discov [Internet]. 2022;19. Available from: <https://www.eurekaselect.com/article/124333>
- [16] Newby NC, Leslie KE, Dingwell HDP, Kelton DF, Weary DM, Neuder L, et al. The effects of periparturient administration of flunixin meglumine on the health and production of dairy cattle. J Dairy Sci. 2017;100(1):582–7.
- [17] Aubry P. Routine surgical procedures in dairy cattle under field conditions: abomasal surgery, dehorning, and tail docking. Vet Clin Food Anim Pract. 2005;21(1):55–72.
- [18] Adcock SJJ, Tucker CB. Painful procedures: when and what should we be measuring in cattle? In: Advances in cattle welfare. Elsevier; 2018. p. 157–98.
- [19] Smith JS, Schleining J, Plummer P. Pain management in small ruminants and camelids: applications and strategies. Vet Clin Food Anim Pract. 2021;37(1):17–31.
- [20] Soens MA, He J, Bateman BT. Anesthesia considerations and post-operative pain management in pregnant women with chronic opioid use. In: Seminars in Perinatology. Elsevier; 2019. p. 149–61.
- [21] Shah Z, Tunio AN, Ahmad S, Ahmad I, Ali J, Khan SB. Cesarean sections through flank incision in exotic cattle breed. Meat Sci Vet Public Heal. 2017;2(1):1–4.
- [22] Kumar D, Purohit GN. Cesarean section in cattle: A review. Agric Rev. 2022;43(2):154–61.
- [23] Dev S, Sultana I, Dey T. Management of incomplete cervical dilation in a Jersey crossbreed cow. Bangladesh J Vet Anim Sci. 2016;4(1).
- [24] Hussein H, Abd Ellah MR. Effects of dystocia, fetotomy and caesarian sections on the liver enzymes activities and concentrations of some serum biochemical parameters in dairy cattle. Anim Reprod Sci. 2008;105(3–4):384–91.
- [25] Hiew WHM. Prediction of parturition and dystocia in holstein-friesian cattle, and cesarean section in dystocic beef cattle. 2014;
- [26] Muir WW, Hubbell JAE. Handbook of veterinary anesthesia. Elsevier Health Sciences; 2014.
- [27] Dobson H, Tebble JE, Smith RF, Ward WR. Is stress really all that important? Theriogenology. 2001;55(1):65–73.
- [28] Alexander D. Bovine caesarean section 1. On-farm operations. In Pract. 2013;35(10):574–88.
- [29] Anderson DE, Muir WW. Pain management in cattle. Vet Clin Food Anim Pract. 2005;21(3):623–35.
- [30] Anderson DE, Edmondson MA. Prevention and management of surgical pain in cattle. Vet Clin Food Anim Pract. 2013;29(1):157–84.
- [31] Moggy MA, Pajor EA, Thurston WE, Parker S, Greter AM, Schwartzkopf-Genswein KS, et al. Management practices associated with pain in cattle on western Canadian cow–calf operations: A mixed methods study. J Anim Sci. 2017;95(2):958–69.
- [32] Newman KD, Anderson DE. Cesarean section in cows. Vet Clin Food Anim Pract. 2005;21(1):73–100.