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Impact of Post Partum Due Care on Fertility in Farm Animals

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Abstract: The transition from a pregnant non-lactating state to a non-pregnant lactating state in farm animals is associated with numerous physiological challenges and stressors related to parturition and the onset of lactation. The postpartum period is defined as the time between parturition and completion of uterine involution. The postpartum care of domestic animals starts before giving birth. To avoid reproductive tract infections, animals need to be served and give birth under hygienic conditions, otherwise animals will suffer from prolongation in the interval to next parturition and great economic losses. The current article aims to threw lights on the proper postpatrum hygienic precautions to maintain fertility in farm animals. These precautions are mainly directed towards appropriate balanced nutrition; improved health status and good management. Balanced feeding with vitamins, mineral and traces supplementation must be available to face the increased nutrient demands and the onset of lactation. Application of the suitable proper vaccine program against prevailing local diseases is required to protect these animals, as well as their offspring. Dropping of fetal membranes must be monitored to ensure its separation in the proper time otherwise veterinary medical interference must be taken. The uterus must be checked for the progress and completion of post partum involution either thought rectal palpation or ultrasonography. A plenty of room and clean site of parturition should be available. Bedding should be changed after each parturition with the use only disinfected instruments and disinfect both the operator and animal before and after conducting any obstetrical manipulations. If a birth is difficult, or otherwise abnormal, intra-uterine application of a broad-spectrum antibiotic will help prevent infection. In conclusion, the peripartum period should not be neglected to maintain animal health and fertility and decrease economic losses.

Key words: Post Partum Period · Cow · Mare · Ewe · Lactation · Fertility

INTRODUCTION

Reproductive potential is the key which determine the lifetime performance of farm animals. In bovines, it is necessary to produce a calf every year at normal conditions. The post partum period is the most critical stage in the reproductive cycle of farm animals. Several precautions were reported as essential factors to reduce health and productive problems during the peripartum period, whereas, poor health will result in reduced yield, increased risk of death or culling, lower fertility and increased treatment costs[1].

Events in the post partum period are influenced by prepartum management, especially the nutritional management [2].

Good nutrition program on a farm will provide benefits when accompanied by good management practice which should aim to provide a low stress environment for transition cows. It is well known that negative energy balance (NEB) is a problem arising from high milk energy output and relatively low feed intake [3].

Proper general management of the late pregnant mare is important to ensure that the foal is given every advantage and that the mare's future reproductive career is not affected [4].

The first ovulation and the resumption of uterine physiological status differ in domestic animals. However, every animal species need certain care during the postpartum period according to their gestation length, type of placenta, time of physiological uterine involution

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and interval to first ovulation in order to increase economic return through decreasing inter-parturition interval and infertility problems during such period.

The present article threw lights on the proper postpartum hygienic precautions to maintain favorable fertility in farm animals.

Bovines: After calving, the reproductive tract goes through a period of recovery (involution). This is usually completed in 25 to 35 days. However, this process can be delayed if the uterus becomes infected after calving. This can happen if the cow calves under unhygienic conditions, or if it has an abnormal delivery, such as dystocia, RP or prolapse of the uterus [5].

Nutrition Program: During the early post partum period, the initiation of milk production make cows experiences a substantial increase in energy requirements. This requirement is only partially met by increased feed consumption with the remainder being met by mobilization of body reserves resulting in animals entering NEB [6]. The maintenance of an optimal body condition score (BCS) relative to lactation stage, milk yield, nutrition and health status is perhaps the most important aspect of dairy cow management that facilitates a healthy transition from pregnancy to lactation [7].

Cows with low BCS at calving, or that suffer excess BCS loss early postpartum have less conception rate to first service and pregnancy loss with increased calving to conception interval [8,9]. This can partly be attributed to impaired oocyte competence associated with a low BCS [10].

Fertility in cows that are over conditioned at calving is compromised as they have reduced dry matter intake (DMI) just prior to calving, take longer to increase DMI postpartum, tend to have greater fat mobilization and therefore a more severe NEB early postpartum. The better the nutrition from calving to breeding, the better the calf crop the next year [9].

Multiple potential mechanisms exist whereby energy status during the postpartum period could reduce fertility in dairy cows. NEB decreases dominant follicle growth and estradiol production, possibly because of decreases in circulating insulin, insulin like growth factor-1(IGF-1) and luteinizing hormone (LH) pulses [11]. A longer time from calving until energy balance nadir has been associated with an increased interval to first postpartum ovulation [12]. In addition, the magnitude of BCS loss after calving can increase the percentage of cows that are not cycling at the end of the voluntary waiting period. Thus, early postpartum NEB may decrease reproductive efficiency by increasing the percentage of an-ovular cows [13].

Cows have a lower feed intake in the early postpartum period were reported to suffer from periparturient health disorders, such as retained placenta (RP), fat cow syndrome and milk fever. Several cytokines, including tumor-necrosis factor, interleukin 1 and interleukin 8, released as a component of the immune response to inflammatory conditions such as mastitis and endometritis, may reduce feed intake [14].

During early lactation, metabolic disorders, caused by a mismatch between macromineral requirements and availability in the diet such as clinical hypocalcaemia (Milk fever), hypomagnesaemia and ketosis can exacerbate the degree of immunocompromisation [15].

Friesian cows supplemented with protected fat, ionophores or selenium during the last month of gestation gave more favorable results as monitored by ease of calving, calf vitality and birth weight, dropping of fetal membranes and incidence of calving associated problems. Also, these cows showed rapid uterine involution, early first observed post-partum heat, high incidence of conception, low number of services per conception and high pregnancy rate during the first 6 months postpartum as compared with non supplemented cows [16].

Health Aspect: After calving, the reproductive tract of the cow goes through a period of recovery (Involution), this is usually completed in 25 to 35 days. However, this process can be elongated if the uterus becomes infected after calving. This could happen if the cow calves under unhygienic conditions, or if it has an abnormal delivery, such as dystocia, retained placenta or prolapse of the uterus [7] Cows that suffer from metabolic disorders in the peri parturient period are more likely to have increased incidence of mastitis, lameness and endometritis during the post partum period [2] and all of which contribute to reduced reproductive efficiency. This may be overcome by adopting a sequential feeding system whereby a glucogenic diet is offered early postpartum to enhance follicle development and resumption of ovarian cycles [17].

Uterine contamination at parturition or in the following days should be avoided to decrease the incidence of endometrial inflammation and purulent vaginal mucus [18].

Lactating cows are predisposed to a reduction of its immune competence and consequently are more susceptible to disease, especially invading pathogens causing mastitis [19].

From the common problems that needed care after parturition of bovine is placental retention. Two to 30% of cows retain their fetal membranes for 12 to 24 hours after a normal delivery. Fetal membranes should be handled as early as possible to avoid metritis, since membranes retained for more than 2 or 3 days decompose in the uterus [1]. The livestock should be free of brucella through vaccination or eradication as incidence of retained afterbirth is often high in *Brucella*-infected herds [16]. Ration must be supplied with selenium because selenium deficiency also increase incidence of retained afterbirth [1]. Cows with endometritis required significantly more services per conception had lower conception to first service rate and longer calving interval and more animals were culled for infertility. Cows with retained afterbirth have poor appetite which adversely reduces milk, meat yields and fertility especially if metritis developed. Animals that develop post partum uterine infection, mammary infections or metabolic diseases like ketosis or milk fever must be promptly put under veterinary intervention [3].

Management Practice: Animals kept at open system and exposed to heat stress showed exacerbate effects of NEB with reduced appetite and higher BCS loss early postpartum compared to non heat stressed cows [20].

Small Ruminants: The involuting uterus has been considered to be a temporary barrier to delay fertility during the early postpartum period in sheep. Nevertheless, there is no consistent effect of the many environmental factors on the rate of uterine involution [21]. In contrast, the resumption of postpartum ovarian cyclicity in sheep has been shown to be influenced by diet and can be advanced by hormonal administration [22, 23].

Nutrition Program: After birth, the sheep divert nutrients from their food for milk production resulting in weight loss and reduction of organic resistance, adversely affecting their reproductive performance in the next breeding season [24]. Energy is the main nutrient limiting sheep production, especially in the first eight weeks of lactation when the demands are greater. Therefore, the energy deficiency can result in an impaired quality of food consumed or of low quality [25].

Pambu-Gollah *et al*. [26] and Antunovic *et al*. [27] recorded decreased blood glucose concentrations in lactating ewes as a result of constant energy loss with the milk lactose synthesis and Antunovic *et al*. [27] pointed out that ewes fed on unsatisfactory energy supply, especially during early lactation showed low concentrations of glucose and thyroid hormones, leptin and insulin in blood serum. Moreover, Tokuda *et al*. [28] and Purohit [29] added that leptin is sensitive to energy balance and is reduced during periods of NEB in ewes.

Kaneko *et al*. [30] attributed decreases in concentrations of blood total protein and albumins over the lactation to a rapid extraction of immuno globulin from the plasma during the last few months of pregnancy when colostrums' is being formed in the mammary gland. Moreover, they recorded changes in the concentrations of electrolytes in the blood of ewes, particularly in lactating ewes. These differences were associated with increased requirements for intensive growth of fetus in high pregnancy and due to increased synthesis of milk in lactation.

Health Aspect: In ewes and does encounter dystocia, care should be taken to handle retained fetal membranes without delay since placenta of sheep and goats completed its expulsion with 3-6 hours [31, 32] and the expelled placenta and time parturient discharges must be properly cleaned [33]. The involuting uterus has thus been considered to be a temporary barrier to delay fertility during the early postpartum period in sheep. The resumption of postpartum ovarian cyclicity in sheep has been shown to be influenced by diet and can be advanced by hormonal administration [23]. Mastitis prevention scheme must be used during lactation to minimize the incidence of the disease for effective treatment of cases of the disease during lactation, to decrease the bacterial populations in the flock and to limit risk of infection of other animals. Placenta had not expelled within 25 hours after birth, needs to be treated by veterinarian [29, 31].

Management Practice: One month before lambing is a good time to shear ewes. With the fleece out of the way, lambing is easier for the shepherd, the barn is roomier and warmer, nursing is easier for the lambs and the ewes require smaller lambing pens. If the ewes are not shorn before lambing, crutch the vulva and udder areas and watch out for breaks in the wool from nutritional deficiencies late in gestation [29, 34].

Equine: Due to the demand to produce one foal per mare per year, the optimum management of the postpartum period is of paramount importance to economical stud farming [35].

Nutrition Program: Nutrition is particularly important, especially in the lactating mare as she has higher requirements than any other horse, even one in heavy work. The grain fed immediately post partum should be laxative and easily digestible. Drenching some oil to parturient mares is of value. The diet of animals must be increased slowly. In the mare a bran mesh is good [33].

After parturition, the mare continues to provide all the nutrients for the foal via milk and in addition the foal now requires higher levels of nutrients. Supplying nutrients via milk is less efficient than via the placenta and so the mare's requirements increase rapidly. At peak lactation a mare may produce up to 3% of her body weight as milk (8-12 litres / day for a pony or 10-18 litres / day for thoroughbreds). As with the pregnant mare, protein and energy are important, under-feeding of either will cause milk production to drop and result in an ill thrifty foal [36]. In general the nutrient requirements of the mare are determined by her level of milk production and the length of her lactation, *i.e.* the shape of the lactation curve. The lactation curve is in turn determined by the demands of the foal, i.e. its size, appetite, activity, whether creep feed is being fed and when weaning occurs. In addition there is considerable variation between mares, some mares do their foals very well by producing a lot of milk and so have higher nutritional demands [30].

Health Aspect: After normal parturition, mares must be given an injection of Tetanus toxoid or Tetanus antitoxin immediately after foaling and if a mare has not been dewormed for the last 2 months it should be dewormed in a few days of foaling [33]. After 3 hours veterinarian interference is needed to remove retained fetal membranes in mares encounter dystocia [37].

Oxytocin or prostaglandins are sometimes used in post-foaling mares to promote uterine contractions and thereby eliminate fluid and debris and decrease the size of the uterus in an attempt to enhance foal heat conception rates [38].

A simple, common strategy to optimize post partum conception rates in mares with uncomplicated foaling is to have the mare examined by ultrasound on days 7 and 9 post foaling. Mares that ovulate on or before day 9 are not bred, but are administered prostaglandins 5 days after ovulation to bring them back into heat (i.e. short-cycled). Mares that still have a large follicle 9 days post-foaling are bred using standard techniques [36].

In general, owners are encouraged to breed mares during the foal heat period. However, mares that experienced foaling or postpartum complications (i.e. dystocia, retained placenta, prolonged discharge, etc) may have a decreased foal heat pregnancy rate or an increased embryonic loss rate. Consequently, it may be advisable to breed such mares on the second postpartum estrus (30 day heat) or a later heat period Proper general management of the pregnant mare is important for the future reproductive career. The mare should be in fit condition throughout pregnancy; this will ensure easy foaling and good physical condition for the next pregnancy [4].

As with all adult horses the lactating mare with a young foal at foot is susceptible to large and small strongyles, bots, tapeworm, lung- worm and pinworm. However, foals are particularly susceptible to ascarids and threadworms and so wormers which also act against these are advised, especially if a problem is sus-pected. The mare's worming should also fit in with the worming of other stock on the stud and a system of clean grazing and dung removal practiced [36]. No specific vaccination of mares is required during early lactation, providing the mare has been adequately vaccinated in late pregnancy.

Management Practice: An internal examination of the mare is often carried out within three days of foaling to identify any problems and check uterine involution. Ideally, mares should not be covered until at least 10 days after foaling. Avoid pulling of placenta from the umbilical cord to avoid uterine prolapse and if the dam standup without dropping of the placenta, excessive manipulation should be avoided and the mare left to cleanse spontaneously. Adverse events that center around foaling and uterine involution are likely to contribute to acute and chronic endometritis, susceptibility to uterine infection and persistent post mating endometritis [36, 37]. Mares should be turned out about three days after foaling. Exercise is important in helping the uterus to recovery, especially in the first few days after foaling and is associated with better conception rates [36].

CONCLUSION

In farm animals, most of infertility disorders originate during the peripartum period, especially following exposure to harsh socioeconomic environmental conditions. Proper nutrition, good veterinary intervention sound management should be maintain to guarantee favorable animal health, fertility and decreased economic losses.

REFERENCES

1. Gordon, P., 2013. Preparation, management and monitoring of calving cows. http:// www.vetsonline.com/publications/veterinary-times/archives/n-43-20/preparation-management-and-monitoring-of-calving-cows.html
2. Roche, J.F., 2006. The effect of nutritional management of the dairy cow on reproductive efficiency. Anim. Reprod. Sci., 96: 282-296.
3. Drackley, J.K., H.M. Dann, G.N. Douglas, N.A.J. Guretzky, N.B. Litherland, J.P. Underwood and J.J. Loor, 2005. Review article: Physiological and pathological adaptations in dairy cows that may increase susceptibility to periparturient diseases and disorders. Ital. J. Anim. Sci., 4: 323-344.
4. Morel, M.C.G., 2008. Equine reproduction physiology, breeding and stud management. 3rd ed. Wallingford, UK: CABI Publishing.
5. Drost, M., 2007. Complications during gestation in the cow. Theriogenology, 68: 487-491.
6. Grummer, R.R., 2007. Strategies to improve fertility of high yielding dairy farms: Management of the dry period. Theriogenology, 68S: S281-S288
7. Khan, H.M., T.K. Mohanty, M.B. Hakat, A.K. Gupta and G. Mondal, 2015. Effect of vitamin E and mineral supplementation during peri-partum period on BCS, body weight and calf performance in Murrah buffaloes. Buffalo Bull., 34: 79-85.
8. Berry, D.P., J.M. Lee, K.A. Macdonald, K. Stafford, L. Matthews and J.R. Roche, 2007. Associations among body condition score, body weight, somatic cell count and clinical mastitis in seasonally calving dairy cattle. J. Dairy Sci., 90: 637-648.
9. Roche, J.R., N.C. Friggens, J.K. Kay, M.W. Fisher, K.J. Stafford and D.P. Berry, 2009. Invited review: body condition score and its association with dairy cow productivity, health and welfare. J. Dairy Sci., 92: 5769-5801.
10. Snijders, S.E.M., P. Dillon, D. O'Callaghan and M.P. Boland, 2000. Effect of genetic merit, milk yield, body condition and lactation number on in vitro oocyte development in dairy cows. Theriogenology, 53: 981-989.
11. Canfield, R.W. and W.R. Butler, 1990. Energy balance and pulsatile LH secretion in early postpartum dairy cows. Domest. Anim. Endocrinol., 7: 323-330.
12. Gumen, A., R.R. Rastani, R.R. Grummer and M.C. Wiltbank, 2005. Reduced dry periods and varying prepartum diets alter postpartum ovulation and reproductive measures. J. Dairy Sci., 88: 2401-2411.
13. Santos, J.E.P., H.M. Rutigliano and M.F.S. Filho, 2009. Risk factors for resumption of postpartum estrous cycles and embryonic survival in lactating dairy cows. Anim. Reprod. Sci., 110: 207-221.
14. Ingvartsen, K.L. and J.B. Andersen, 2000. Integration of metabolism and intake regulation: a review focusing on periparturient animals. J. Dairy Sci., 83: 1573-1597.
15. Mulligan, F.J. and M.L. Doherty, 2008. Production diseases of the transition cow. Vet. J., 176: 3-9.
16. Ahmed, W.M., K.I. El-Ekhnawy, W.S. El-Nattat, H.M. Desouky, K.A. Abd El-Razik and H.H. El-Khadrawy, 2004. Investigations on calving associated problems ina Friesian herd in Egypt with special reference To some prophylactic trials. Egypt. J. Bas. Appl. Physiol., 3: 65-78.
17. Garnsworthy, P.C., A.A. Fouladi-Nashta, G.E. Mann, K.D. Sinclair and R. Webb, 2009. Effect of dietary-induced changes in plasma insulin concentrations during the early post partum period on pregnancy rate in dairy cows. Reproduction, 137: 759-768.
18. Sheldon, I.M., S.B. Price, J. Cronin, R.O. Gilbert and J.E. Gadsby, 2009. Mechanisms of infertility associated with clinical and subclinical endometritis in high producing dairy cattle. Reprod. Domest. Anim., 44: 1-9.
19. Sordillo, L.M. and S.L. Aitken, 2009. Impact of oxidative stress on the health and immune function of dairy cattle. Vet Immunol Immunopathol., 128: 104-9
20. Shehab-El-Deen, M.A.M.M., J.L.M.R. Leroy, M.S. Fadel, S.Y.A. Saleh, D. Maes and A. Van Soom, 2010. Biochemical changes in the follicular fluid of the dominant follicle of high producing dairy cows exposed to heat stress early post-partum. Anim. Reprod. Sci., 117: 189-200
21. Ababneh, M.M. and T. Degefa, 2005. Ultrasonic assessment of puerperal uterine involution in balady goats. J. Vet. Med. Series A, 52: 244-248.
22. Mitchell, L.M., M.J. Ranilla, G. Quintans, M.E. King, F.E. Gebbie and J.J. Robinson, 2003. Effect of diet and GnRH administration on post-partum ovarian cyclicity in autumn-lambing ewes. Animal Reproduction Science, 76: 67-79.

23. Hayder, M. and A. Ali, 2008. Factors affecting the postpartum uterine involution and luteal function of sheep in the subtropics. Small Ruminant Research, 79: 174-178.
24. Oliveira Filho, B.D., M.L. Gambarini and G.H. Toniollo, 1997. Efeitos da suplementação nutricional pré e pós-parto e da condição corporal ao parto sobre a reprodução de ovinos nos trópicos. Revista Brasileira de Reprodução Animal., 21: 112-113.
25. Andriguetto, J.M., L. Perly, I. Minardi, A. Gemael, J.S. Flemming and G.A. Souza, 2002. Nutrição animal: As bases e os fundamentos da nutrição animal-Os alimentos. v.1. São Paulo: Nobel, pp: 425.
26. Pambu-Gollah, R., P.B. Cronje and N.H. Casey, 2006. An evolution of the use of blood metabolite concentrations as indicators of nutritional status in free-ranging indigenous goats. South Afr. J. Anim. Sci., 30: 115-120.
27. Antunovic, Z., J. Novoselec, H. Sauerwein, M. Speranda, M. Vegara and V. Pavic, 2011. Blood metabolic profile and some of hormones concentration in ewes during different physiological status. Bulg. J. Agric. Sci., 17: 687-695.
28. Tokuda, T., C. Delavaud and Y. Chilliard, 2002. Effects of dietary energy levels on plasma leptin in sheep. Anim. Sci. J., 73: 471-478.
29. Purohit, G.N., 2006. Parturition related disorders in sheep and goats, pp: 227-231. In: National Seminar on Innovations and Recent Advances in Reproduction for Augmenting Small Ruminant Production. CSWRI, Jaipur, Rajasthan, India Compendium.
30. Kaneko, J.J., J.W. Harvey and M.L. Bruss, 2008. Clinical biochemistry of domestic animals. 6th ed. Elsevier Academic Press, London, UK.
31. Petridis, I.G. and G.C. Fthenakis, 2014. Administration of antibiotics to ewes at the beginning of dry- period. J. Dairy Res., 81: 9-15.
32. Braun, W., 2007. Parturition and dystocia in the goat. In Youngquist RS, Threlfall WR eds. Current Therapy in Large Animal Theriogenology 2nd edition. Missourri Saunders Elsevier, pp: 555-558.
33. Purohit, G.N., 2010. Intra-partum conditions and their management in mare. Journal of Livestock Science, 2: 20-37.
34. Filho, E.S., M.S. Farias, P.H. de Souza and S.C. Silva, 2015. Effect of nutrition supplementation on post-parturition in sheep from the Tocantins region of Maranhão state, Brazil. Intern.l J. Inform. Res. Review, 2: 508-510
35. Sharma, S. , M.C. Davies Morel and G.S. Dhaliwal, 2010. Factors affecting the incidence of postpartum oestrus, ovarian activity and reproductive performance in Thoroughbred mares bred at foal heat under Indian subtropical conditions. Theriogenology, 74: 90-99.
36. Duggan, V.E., G.R. Holyoak, C.G. Mac Allister and A.W. Confer, 2007. Influence of induction of parturition on the neonatal acute phase response in foals. Theriogenology, 67: 372-381.
37. Threlfall, WR, 2007. Parturition and Dystocia. In: Youngquist RS, Threlfall WR eds. Current Therapy in Large Animal Theriogenology 2nd edition. Missourri Saunders Elsevier, pp: 118-130.
38. Davies Morel, M.C.G., 2005. Breeding horses. Copyright © 2005 by Blackwell Publishing Ltd.