Krishi Netra
ISSN : 3048-5207

Management Of Transition Period In Dairy Cattle For Better Productivity

P Shobha[1], G Triveni[2], And C Vijay Kumar[3*]

[1,3] Assistant Professor, Department of VAHEE, College of veterinary Science, Proddutur, Kadapa Dist., AP.

[2] Professor, Department of VAHEE, College of veterinary Science, Proddutur, Kadapa Dist., AP.

Corresponding Author : vijayvety2@gmail.com

Manuscript No: KN-V2-12/008

Abstract:

Dairy cows during the final stages of parturitionundergo many metabolic, physiological, immunological changesto meet the nutrient demand of the foetus. Proper nutrition andmanagement before and after calving onlycan prevent from the production loss after parturition. Addressing the issues during this period reflects the future milkyield, fertility, health conditions of the cow. Studies indicate that atleast one third of the cows crossing this stage are suffering from at least one clinical condition (either metabolic or infectious). It is important to educate farmer and all the stakeholders regarding this aspect of dairy cows life so that the farmer can get a sustainable income from cattle rearing and avoid low productivity which in turn promote selling of cattle for slaughter. This article explores different aspects of dairy cows life that happen during the transition period and measures that can be taken by the farmers to mitigate the production loss during this period.

Introduction:

In dairy cattle, the period between 3 weeks before and 3 weeks after parturition is called as transition period, which is one of the most critical physiological stages since most of the metabolic and infectious diseases occur during this period (Ingvartsen and Moyes, 2013). During this period, cows are in a state of negative energy balance that occurs because the demand for nutrients for baby growth in the womb and disparity between the nutrients required and supplied to meet the milk production after calving (Mezzettiet al., 2021). Further consequences are lowered milk production, immune supression and compromised reproductive performance during the early lacation period (Ravi Kanth Reddy et al., 2016). The poor transition from pregnant to lactation stage often results in the loss of 4.54-9.07 kg of peak milk yield (Overton and Waldron, 2004). During transition period impaired glucose homeostasis resulted in negative energy balance which leads to lower blood glucose levels and the mobilization of body reserves to provide additional energy, leading to elevated blood concentrations of NEFA and β-hydroxybutyric acid (BHBA) (Ingvartsen and Moyes, 2013).

The metabolic disorders include ketosis, milk fever,fatty liver syndrome, metritis, retained foetal membranes (RFM),mastitisand displaced abomasum. Incidence rates of metabolic diseases were unacceptably high, with rates in well-managed herds remaining similar to those published decades ago (Emma et al,2021).In early lactation, calcium requirement increases by more than 65% and energy demands increase by about 300% to support lactogenesis. At the same time, voluntary feed intake decreases to a level that is not sufficient to cover the nutrient requirements of the cow (Caixeta&Omontese 2021).

Nutritional Strategies to Support Metabolic Adaptations

Carbohydrate nutrition in prepartum diet: It is generally understood that dry cows should be fed with diets higher in Non Fibre Carbohydrate (NFC) prior to calving to promote development of ruminal papillae to ensure adequate absorption of VFA during ruminal fermentation. It also assist in Ruminal microbial adaptation toprovide increased amounts of propionate for hepatic gluconeogenesis and microbial protein to support the requirements for maintenance, pregnancy and mammogenesis (Anderson et al. 1999)

Direct supplementation with glucogenicprecursors : Decreased concentrations of NEFA and BHBA in plasma have been consistently demonstrated in response to propylene glycol administered as an oral drench

Krishi Netra
ISSN : 3048-5207

(Zarrinet al., 2017) and also increased milk yield during earlylactation when administered for two days from parturition. Propionate supplements complexed to Calcium or trace minerals potentially could be used to supply substrate for hepatic gluconeogenesis. Controlledrelease Monensin provided during the transition period and early lactation decreased the incidence of subclinical ketosis in dairy cows by 50% (Holger, 2020). Added fat in transition diets: It has been proposed that dietary fat may help to decrease concentrations of NEFA and help to prevent theoccurrence of ketosis (Overton and Waldron, 2004). Dietary long-chain fatty acids are absorbed into thelymphatic system and provide energy for peripheral tissues and the mammary gland which increase energy availability and decrease mobilization of body fat and decrease NEFA concentrations. Controlled Energy Intake During the Dry Period:in the early post partum period if the animal is fed with controlled energy diet it will assist in lowering the blood NEFA,BHB and liver triglycerols(Mann et al., 2015). Strategies for Prevention of Hypocalcemia: Prepartal diets with a negative/Lower dietary cation-anion difference (DCAD) [[Na+K] − [Cl +S]] have shown to reduce subclinical and clinical hypocalcemia in cows (Joshi et al., 2019).Prepartum feeding of Zeolite A prevented milk fever and subclinical hypocalcemia (Vincenzo et al., 2020).

Feed additives to manage transition stress: Peripartum cows require greater amounts of methionine not only at the tissue and cell level for methylationreactions but also for milk protein synthesis after calving. Active dry Saccharomyces cerevisiae(ADSC) supplementation to dairy cows was demonstrated to alleviate SARA caused by abrupt dietary changes from high forage to high grain diets during peripartum, and can potentially improve rumen function (AlZahalet al.,2014).If the diet Supplemented with 14 g Niacin (N2) / day / cow resulted in a significantly lower ß-hydroxybutyrate (BHBA) and nonesterified fatty acids (NEFA) concentrations and elevated glucose concentration in plasma of Holstein cows in early lactation (Karkoodi and Tamizrad, 2009). The incidence of dystocia decreased by 50% in multiparous cows given a combined folic acid (320 mg) and vitamin B12 (10 mg) supplement during prepartum period. Cows produced more milk without increasing dry matter intake on supplementation of folic acid and Vitamin B12 during transition period (Duplessiset al., 2012).

In addition to the nutritional interventions management aspects that affect the health of cow like herd size, stocking density, Body condition Score {As a rule of thumb, the BCS at dry-off (~12 months after calving) would be similar to the BCS at calving}, Environmental stress, Starvation, Bedding management, floor hygiene, Type of Farming system, Existing health issues.

References:

AlZahal, O., L. Dionissopoulos, A. H. Laarman, N. Walker and B. W. McBride. 2014. Active dry Saccharomyces cerevisiaecan alleviate the effect of subacuteruminal acidosis in lactating dairy cows J. Dairy Sci. 97 :7751–7763

Anderson, J.B., J. Sehested and K.L. Ingvartsen. 1999. Effect of dry cow feeding strategy on rumen pH,concentration of volatile fatty acids and rumen epithelium development. ActaAgric Scand. Sect. AAnimal Science 49: 149 - 156

Caixeta, L. S., &Omontese, B. O. (2021). Monitoring and improving the metabolic health of dairy cows during the transition period. Animals, 11(2), 352.

Duplessis, M., R. Gervais, H. Lapierre and C. L. Girard. 2021, Combined biotin, folic acid and Vitamin B12supplementation given during transition period to dairy cows: Part II. Effects on energy balance andfatty acid composition of colostrums and milk. J. Dairy Sci., 105 :7097-71110

Krishi Netra
ISSN : 3048-5207

Emma A. Redfern, Liam A. Sinclair, Philip A. Robinson. Dairy cow health and management in the transition period: The need to understand the human dimension, Research in Veterinary Science,Volume 137, 2021, Pages 94-101.

Holger M. 2020. Transition Period of the Dairy Cow Revisited: I. Homeorhesis and Its Changes by Selection and Management. Journal of Agricultural Science. 12 (3): 1-24.

Ingvartsen, K. L and K. Moyes, 2013.Nutrition, immune function and health of dairy cattle.Animals, 7:112–22.
Joshi, P.M., D. C. Patel and P. D. Patel, 2019.Effect of Chelated Mineral Mixture on Blood Biochemistry, Hormone and Mineral Status in Repeat Breeder Buffaloes in Tribal Areas of Dahod District in Gujarat, India. Ind. J. Vet. Sci. and Biotech.,15 (1): 40-44.

Karkoodi, K. and K. Tamizrad, 2009.Effect of niacin supplementation on performance and blood parameters of Holstein cows. South African Journal of Animal Science, 39 (4) : 349

Mann, S.; Leal Yepes, F.A.; Overton, T.R.; Wakshlag, J.J.; Lock, A.L.; Ryan, C.M.; Nydam, D.V. Dry period plane of energy: E_ects on feed intake, energy balance, milk production, and composition in transition dairy cows. J. Dairy Sci. 2015, 98, 3366–3382.

Mezzetti, M., Cattaneo, L., Passamonti, M.M., Lopreiato, V., Minuti, A., Trevisi, E. The Transition PeriodUpdated: A Review of the New Insights into the Adaptation of Dairy Cows to the New Lactation. DairySci., 2021, 2, 617–636.

Overton, T. R. and Waldron, M. R., 2004. Nutritional Management of Transition Dairy Cows: Strategies toOptimize Metabolic Health. J. Dairy Sci. 87:(E. Suppl.):E105–E119

Ravi Kanth Reddy, P., JakkuluRaju, Nagarjuna Reddy, A., PanduRanga Reddy, P., IqbalHyder. Transition period and its successful management in dairy cows. Ind. J. of Natural Sci. 2016, 7 (38), 11691 – 11699

Vincenzo L, Matteo M, Luca C, Giulia F, Andrea M and Erminio T. 2020, Role of nutraceuticals during thetransition period of dairy cows: a review. Journal of Animal Science and Biotechnology. 11 (96): 1-18.

Zarrin, M., Grossen-Rosti, L., Bruckmaier, R.M. and Gross, J.J., 2017. Elevation of blood β-hydroxybutyrate concentration affects glucose metabolism in dairy cows before and after parturition. J. Dairy Sci., 100(3): 2323-2333.