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Effects of prepartum grouping strategy on health, reproductive, and productive parameters of dairy cows.

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Objectives were to evaluate the effect of an 'All-in-All-Out' (AIAO) prepartum grouping strategy on health, reproductive, and productive parameters of Jersey cows. Cows (254±7 d of gestation) were paired by gestation length and assigned randomly to AIAO or control treatments. In the AIAO (n=259) treatment groups of 44 cows were moved into a pen where they remained for 5 wk, whereas in the control treatment (n=308) approximately 10 cows were moved into a pen weekly to maintain stocking density (44cows/48headlocks). Pens were identical in size and design and each of the pens received each treatment a total of 3 times, totaling 6 replicates. Cows were examined at enrollment, calving (d0), d28, and d56 for lameness and BCS, on d 1, 4, 7, 10, and 14 for retained fetal membranes (RFM) and metritis. Cows were observed daily for displacement of abomasum (DA) and mastitis until d60. Blood samples were collected from all cows on d -21, -14, -7, 0, 7, 14, and 21 for determination of non-esterified fatty acid (NEFA) concentration and weekly from d-14 to d 14 from a subgroup of cows (n=34/treatment) to determine concentration of glucose. Cows were classified according to NEFA concentration as above or below 0.10 mmol/L on week 3 and as above or below 0.18 mmol/L on the week preceding calving, because, based on the data from the current study, these were the criteria that predicted occurrence of displacement of abomasum with the best sensitivity and specificity. Blood was sampled weekly from d-14 to d 14 from a subgroup of cows (n=34/treatment) to determine neutrophil phagocytosis (PHAGO), oxidative burst (OXID), and expression of CD18 and L-selectin and for hematology. Cows were examined by ultrasound for detection of corpus luteum (CL) on d 39 and 56. Cows were observed daily for estrus starting on d 50 and pregnancy exam was conducted 38 and 66 d after AI. Milk production and components were measured monthly and energy corrected milk yield was calculated for the first 3 tests. Data were analyzed by MIXED procedure and the fixed effect was treatment (AIAO vs control) and the random effect was treatment within pen and replicate. Treatment had no effect on incidence of lameness on d0 (P=0.75), 28 (P=0.45), and 56 (P=0.35). Similarly, treatment had no effect on incidence of RFM (P=0.84), metritis (P=0.35), acute metritis (P=0.54), DA (P=0.92), and mastitis (P=0.47). Treatment did not affect BCS on d -21 (P=0.67), 0 (P=0.64), 28 (P=0.59), and 56 (P=0.90). Glucose concentration was not affected by treatment (P=0.28) or by the interaction between treatment and day (P=0.11). Treatment (P=0.17) and the interaction between treatment and day (P=0.11) did not affect NEFA concentration. Percentage of cows with NEFA > 0.10 mmol/l on week 3 before calving (P=0.19) and percentage of cows with NEFA > 0.18 mmol/l on week 1 before calving (P=0.99) were not affected by treatment.

Among the subgroup of cows evaluated for immune parameters no differences between treatments were observed in percentage of male calves (P=0.81) and twins (P=0.57) or incidence of retained fetal membranes (P=0.71) and metritis (P=0.43). Percentage of neutrophil positive for OXID (P=0.91) and intensity of OXID (P=0.94) were not different between treatments. Similarly, no differences were observed regarding percentage of neutrophil positive for PHAGO (P=0.98), intensity of PHAGO (P=0.91) and percentage of neutrophil expressing CD18 (P=0.17) or L-Selectin (P=0.83). Number of leukocytes (P=0.64), neutrophils (P=0.33), and lymphocytes (P=0.80) were not different between treatments. Percentages of cows with a CL on d 39 (P=0.17) and 56 (P=0.96), cows inseminated in estrus (P=0.52) and cows pregnant after first AI (P=0.47) were not affected by treatment. Finally, treatment had no effect on milk (P=0.82) or energy corrected milk (P=0.66) and on linear somatic cell score (P=0.28). In conclusion, AIAO grouping strategy did not reduce incidence of peripartum diseases and did not improve, reproductive and productive performance.

KEYWORDS
prepartum cow
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performance