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Welfare indicators of stall-housed gestating sows

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Introduction: It is important to study the welfare status of sows during their stay in the gestation stalls as relative space availability decreases with advancement of gestation.

Objective: To assess the welfare status of sows housed in stalls in terms of injury levels, salivary cortisol concentration and behaviors during the initial, mid and late stages of gestation.

Materials and methods: The study was conducted at the University of Minnesota, SROC, Waseca. Twenty-five sows (parity 1-5, body weight 157-249 kg) were randomly selected at the time of weaning and housed in gestation stalls (length 200cm x width 60 cm x height 97cm, fully slatted floor). Data were collected on days 5, 56 and 108 of gestation. Video data on behavior were collected using a time-lapse VCR for 24 hours at each stage and analyzed using 'The Observer'. The cortisol concentrations were assessed using radioimmunoassay. Injuries on different body parts of sows were scored and added to get the total injury score (TIS). Mean and SE, median and range were used to describe the data collected. ANOVA for repeated measures and Tukey's pair-wise comparisons were performed for comparing cortisol concentration, body weight, proportion of time spent on behavior and duration of behavior at different stages of gestation. A Friedman's chi-square test followed by non-parametric multiple comparison were employed for comparing frequency of behavior and injury scores. The correlations between body weight and behavior were assessed using Spearman and Pearson correlations. A P value of ≤ 0.05 was considered significant in analyses.

Results: Cortisol concentration was the lowest on day 56. The proportion of time spent lying was higher at day 108. Sows spent the highest proportion of time for non-social physical interactions/exploration on day 56. The time taken for sitting to lying was higher on day 108 than on day 56. Time taken for other postural changes did not vary with the stage of gestation. The frequencies of overall postural change and of standing to lying, sitting to lying, lying to standing, and lying to sitting were higher on day 5 than on other days. The TIS was the highest on day 108. The body weight had negative correlations with proportions of time spent on non-social physical interactions/ exploration and standing and positive correlations with proportion of time spent lying.

Discussion: In addition to the space limitation, weaning, feed restriction and change in accommodation could have contributed the stress and higher cortisol concentration at initial gestation while at late gestation the increase in body size and consequent reduction in available space for postural changes was the major stress factor. The stress at late gestation was further aggravated by the physiological and hormonal changes preparatory to farrowing. The sows might have adjusted to the changed situation as their stay continued as evident from the reduction in cortisol concentration on day 56 of gestation. However, feed restriction continued. The increase in time spent lying towards late gestation could be due to the increase in body weight with advancement of pregnancy. The longer time taken for sitting to lying on days 5 and 108 is indicative that sows were less compromised on day 56. Exploratory behavior was more on day 56 of gestation compared to other stages suggesting that sows were less compromised at this stage. Udder injuries contributed to the higher median TIS on day 108. The reduction in frequency of overall postural change observed on day 108 could be due to reduction in space availability.

Conclusion: In addition to the space limitation, weaning, feed restriction and change in accommodation contributed the stress at initial gestation while at late gestation the increase in body size and consequent reduction in available space was the major stress factor.