

Improving sow and piglet welfare from prepartum to weaning

Discusses housing conditions that can be used to improve welfare of both sows and piglets

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Introduction

Providing housing conditions for sows and piglets requires the consideration of many welfare factors. Piglets can be at risk of mortality (e.g. from crushing) by housing environments. High piglet mortality was responsible for the introduction of farrowing crates in the 1960s in an effort to reduce crushing by the sow (Barnett, 2001). However, by confining sows to farrowing crates, the welfare of the sow became compromised as her movement was limited. Current issues affecting the welfare of sows include the size and length of physical confinement, the ability to perform nesting behaviours and exposure to stressors (Barnett, 2001). Additionally, these factors can directly and indirectly affect piglet welfare. Therefore, a complex dilemma exists between providing comfort for the sow and ensuring survival of the piglets. This relationship can be influenced by several factors that play a role during the prepartum period through to the time of weaning. This paper will review recent studies comparing confinement of sows in different housing systems, and the impact on sow and piglet welfare of different floor coverings and exposure to heat prior to farrowing.

Discussion

The risk of piglet death due to physical crushing by the sow tends to be highest during the first three days postpartum (Barnett, 2001). A study by Condous *et al.* (2016) investigated whether a shorter duration of confinement during this risk period decreased rates of piglet mortality. A total of 180 multiparous sows were randomly divided into five groups. Farrowing crates were used as a control to confine the sow until weaning of the piglets. Sows in the four treatment groups were housed in swing-sided pens that were either closed or open during parturition, then opened again at day 3 or 7 of lactation. It was shown that increased length of confinement led to more stillbirths and increased farrowing duration. More piglets were overlain when the pen was open at farrowing compared to closed. Additionally, overlay increased further when the pen was re-opened at day 3 of lactation compared to day 7.

Condous *et al.* (2016) concluded that confinement of sows during farrowing and until day 3 or 7 of lactation had a better outcome for piglet survival. This study was limited as the sows were previously in group housing and had not experienced reduced confinement. Therefore, placing sows in confinement may have caused additional stress and, therefore, contributed to more stillbirths. Furthermore, no nesting material was provided, which may have limited the sows' natural behaviours around gestation. Studies have shown that given access to nesting material and space, sows tend to perform nesting behaviours 24 hours prepartum (Barnett, 2001).

In addition to its effects on sow behaviour, nesting material such as straw has also been shown to improve the sow's physical comfort (Tuytens, 2005). However, in the pig industry, straw has been associated with negative factors including cost, labour and hygiene (Tuytens, 2005). Ruff *et al.* (2017) studied the effects of using rubber mats as alternative flooring and observed the impact on sow lameness and piglet mortality. A total of 213 multiparous sows in late gestation were divided into four groups based on assessment of lameness prior to enrolment and allocation to a rubber mat floor or a slotted metal floor. The study found that sows spent more time standing when on rubber mats, irrespective of lameness assessment. It was also noted that sows housed on rubber mats had increased redness on their belly and legs. More piglets were born alive on rubber mats; however, overlaying by sows was increased and body weight of piglets was decreased. It was suggested that the rubber mats reduce air circulation and retain heat. Piglets need an ambient temperature above 25-30°C to maintain body temperature, while lactating sows require environmental temperatures

around 18-20°C (Muns *et al.*, 2016). Therefore, the warmth of the mats may encourage piglets to lie in areas that put them at risk of crushing, and could induce heat stress in the sow, therefore decreasing milk production. The increased areas of redness on the sows may also be explained by the retained heat in the mats, or may be due to direct abrasion. Ruff *et al.* (2017) acknowledged that sow comfort and piglet welfare must be considered together when determining alternative flooring material and therefore, more research is needed before an alternative can be recommended.

The effect of temperature on farrowing sows was investigated more directly in a study by Muns *et al.* (2016). A total of 20 second-parity sows were divided into two groups, where room temperature was either maintained at 20°C or raised gradually to 25°C for four days and then lowered back down to 20°C before parturition. Sow behaviour and body weight was fairly consistent between the groups, however, higher temperatures led to increased respiratory rates and temperatures of sows, and increased time spent lying laterally. These sows also had increased farrowing duration and decreased feed intake postpartum, which likely impacted milk production. Piglet body weight was consistent at parturition, however, those with mothers exposed to heat were smaller after 21 days postpartum.

The physical signs in both the sows and piglets suggest that the sows were unable to compensate for the increased heat, and therefore experienced heat stress. Muns *et al.* (2016) concluded the study by stating that heat stress in sows has negative implications on both sow and piglet welfare and should therefore be avoided in commercial piggeries. This study was limited as sows were housed in crates, which restricted their ability to perform thermoregulatory behaviours such as changing positions.

Conclusion

The studies above have demonstrated the important implications of multiple housing factors on the welfare of sows and piglets. Adopting a confinement strategy during farrowing and early lactation, and maintaining constant temperatures within housing systems prepartum can improve piglet survival, while also providing improved welfare, particularly in terms of comfort, for the sows. Additional research is required to determine the best flooring material that promotes sow and piglet welfare, while also being feasible for the industry to adopt.

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