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A survey of sow management at farrowing

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Abstract

Farrowing is an important period in pig production, with sow health and piglet mortality representing a welfare issue and an economic loss. Sow health and welfare is critical for piglet survival and good management can improve welfare and productivity. This study investigated the management of sows around farrowing and attitudes of UK pig farmers towards sow pain and difficulty farrowing. Farmers were asked how often they provided night checks, used farrowing induction and administered pharmaceutical products during and after farrowing. Farmers and veterinarians were asked if they used or prescribed anti-inflammatories for farrowing-related health issues. Farmers were asked if pain at farrowing was a problem for gilts and sows and what percentage they considered to have difficulty farrowing. Convenience sampling using a number of distribution methods was used. Sixty-one farmers and 52 veterinarians responded. Of the farmer respondents, 10 worked on outdoor and 51 on indoor farms. Night checks were reported as frequently provided and farrowing induction was rare. Many respondents reported using oxytocin substitutes at least sometimes during (74%) or after (54%) farrowing. Azaperone was reported to be used at least sometimes by 45% of respondents during and 33% after farrowing. Farmers indicated that pain at farrowing was more often a problem for gilts than sows and 5% of gilts and 4% of sows were considered to have farrowing difficulty. The high level of supervision around farrowing, with the use of night checks is encouraging and could improve welfare. Frequent use of oxytocin substitutes, which promote farrowing and milk let down may negatively impact sow and piglet welfare and could be masking poor mothers that don't perform well without intervention. This study provides interesting information regarding the management of sows around farrowing, which could inform future research and education to improve sow and piglet welfare in the periparturient period.

Keywords: Animal welfare; farrowing; pain; pig; sow management; survey.

Introduction

In the UK, pre-weaning piglet mortality represents a significant loss to the pig industry and is a welfare issue, with an average live born mortality of 12.3 % indoors and 14.0 % outdoors and an average of 0.72 and 0.44 piglets per litter being born dead (BPEX 2014). Management practices, which rely on supervision by farm staff in the early post-parturient period, can significantly improve piglet survival (for literature reviews see: Baxter *et al* 2013; Kirkden *et al* 2013a). Farrowing supervision can be facilitated through the use of farrowing induction, causing sows to farrow at a convenient time, when farm staff can be available to supervise. Alternatively, farmers can check on sows at night during farrowing times to deal with any issues that could occur outside of the normal working day.

A number of pharmaceutical products are available to use around farrowing. These include oxytocin and carbetocin (a synthetic analogue of oxytocin), which can be used to increase the frequency and intensity of uterine contractions, to aid the progress of farrowing and initiate milk ejection, to aid in the treatment of mastitis-metritis-agalactia (MMA) or post-partum dysgalactia syndrome (PPDS) (VMD 2011). Azaperone is a sedative that can be used during farrowing to treat aggression towards piglets (savaging), excitation and to enable obstetric assistance. Non-steroidal anti-inflammatory drugs (NSAIDs) are licenced to treat conditions involving pain and inflammation in pigs, which could be experienced around farrowing (Mainau & Manteca 2011). These products can be useful tools in the periparturient period, but the inappropriate use of these products has the potential to be detrimental to sow welfare. All these products are classified as POM-V, which means they should be prescribed to an animal or group of animals by a veterinary surgeon following a clinical assessment (NOAH 2014). However, repeated veterinary visits for individual pigs is not economically sustainable, so once a condition has been diagnosed and a method of treatment prescribed,

63 further cases, which are recorded by the farmer and checked by the veterinarian on quarterly
64 visits, can be treated by farm staff.

65 A survey study was recently conducted, focusing on pain and the use of pain relief in
66 breeding pigs (Ison & Rutherford 2014). The aim of the current study was to investigate
67 aspects of management that could have implications for welfare (including pain) and
68 productivity around farrowing and lactation. In addition to the already published parts of the
69 questionnaire (Ison & Rutherford 2014), in the present study farmers were asked questions
70 regarding the management of sows around farrowing, including their thoughts on pain and
71 difficulty farrowing and farmers and veterinarians were asked about the use of anti-
72 inflammatories to treat post-farrowing conditions involving inflammation and pain.
73 Farrowing is a critical time for the welfare of the sow and her piglets, but also the farmer as
74 good performance at this stage of production provides the basis for all other stages of the
75 system. Information gained from this survey could help inform future research and education
76 regarding sow management around farrowing to improve welfare at this critical time.

77 **Methodology**

78 ***Questionnaire design***

79 A questionnaire entitled: 'Pain and the use of pain relief in pigs' was designed using
80 Snap software (Snap surveys, UK) and distributed to UK farmers and veterinarians between
81 September 2012 and June 2013. Questionnaires were sent to farmers and veterinarians (both
82 on-line and on paper). Details of the design and distribution have been described previously
83 (Ison & Rutherford 2014). Questionnaires included a section on the respondents work, for
84 veterinarians, this included questions about their veterinary practice and for farmers, about
85 the farm on which they worked. Anti-inflammatory drugs were listed by active ingredient,
86 asking respondents to tick which ones they used on farm (for farmer respondents) or used or

prescribed (for veterinarians). All respondents were asked to tick how often (‘almost always’, ‘frequently’, ‘sometimes’, ‘rarely’ or ‘never’) they used or prescribed these drugs for lameness. Veterinarians were given the option to tick if they have never advised on the condition and farmers if they had never seen the condition on their farm. Respondents were asked to score eight conditions for the pain they thought pigs experienced and to indicate their agreement with statements about pain and the use of pain relief in pigs. All these results are presented in the previous publication (Ison & Rutherford 2014).

In addition, the questionnaire sent to farmers included a section on farrowing procedures. Firstly, farmers were asked the average number of total born and still born piglets, and the percentage live born mortality (if known). They were then asked how often (almost always, frequently, sometimes, rarely or never) they induced farrowing in gilts and sows and how often they provided night-time checks for gilts and sows around farrowing. They were also asked how often they used pharmaceutical products (oxytocin, carbetocin, azaperone and anti-inflammatories) both during and after farrowing. Finally, they were asked how often they thought pain at farrowing was a problem for gilts and sows (almost always, frequently, sometimes, rarely or never) and what percentage of gilts and sows they thought had difficulty farrowing. The questionnaire to both farmers and veterinarians, also asked respondents to indicate how often then provided anti-inflammatories to treat post-farrowing conditions: mastitis-metritis-agalactia (MMA) and post-farrowing lethargy, where sows are off their feed. In summary, this paper presents the results of the section of the questionnaire given to farmers focusing on farrowing procedures, and the frequency of which anti-inflammatory drugs were used (or prescribed) to treat MMA and post-farrowing lethargy by farmers and veterinarians.

Questionnaire distribution

Before the questionnaire was sent out on a larger scale, it was piloted on five veterinarians and five farmers who worked at University pig units. A convenience sampling technique was used to reach as many farmers and veterinarians as possible. One hundred and twenty-nine veterinarians were sent an email containing a link to the online version of the questionnaire and an invitation to participate in the study, followed by a one week reminder (contact information provided by Zoetis). In addition, paper copies of the questionnaire, along with pre-paid envelopes were sent to 10 veterinary practices. The veterinary practices were identified through an internet search where the practice website indicated that they worked with pigs and contact information was available. The twenty-nine members of the Scottish professional pig managers group were also sent an email invitation to participate in the study, also with one week reminders. Paper copies of the farmer questionnaire were also inserted into the December 2012 issue of *Pig World* magazine, with 4200 subscribers, 3000 of which were pig farmers, including farm owners, managers and employed stockpersons. Some additional paper copies were distributed to pig farmers at BPEX meetings and a small number were offered to pig farmers during veterinary visits to farms by one veterinary practice. In addition, pig farmers visiting the SRUC building at the Royal Highland Show were invited to fill in a questionnaire.

Data Analysis

Data from on-line responses were exported into Excel and postal responses were entered manually. Data analyses were conducted using Genstat (14th Edition; VSN International Ltd., Hemel Hempstead, UK). Differences in the frequency of farrowing induction, night-time checks and pain at farrowing between gilts and sows, along with differences between the use of oxytocin and carbetocin and the frequency of treatment with anti-inflammatories for MMA and post-farrowing lethargy between farmers and veterinarians were all analysed using chi-square tests. Differences in the percentage of gilts and sows

having difficulty farrowing were analysed using a Mann-Whitney U tests. In all statistical tests, no replies were treated as missing values.

Results

Respondents and farms represented

Sixty-one farmers with breeding sow herds and 52 veterinarians filled in questionnaires. The number of veterinarians working with pigs in the UK, taken from our database was 129, so the estimated response rate is approximately 40%. It is estimated that the farmer questionnaire reached approximately 3000 farmers with the distribution methods used, leading to an approximate response rate of 2%. Of the veterinarian respondents, 20 worked in a mixed practice, 17 in a large animal practice, nine in a pig only practice, two for a pig production company, one in a small animal practice, and two were classified as 'other'. The veterinary respondents worked with pigs between 1% and 100% of their time (mean = 60.2 ± 41.3%) and had between one and 45 years of pig experience (mean = 18.6 ± 12.4 years). Of the farmer respondents, 37 were farm owners, 17 were farm managers, one was an employed stockperson, four were classified as 'other' and two did not say. Farmer respondents spent between 5 and 100% of their time working directly with pigs (mean = 66.2 ± 30.8 %), of this time, between 1 and 100% of their time was with breeding pigs (mean = 51.7 ± 29.61%) and had between 3 to 62 years of pig farming experience (mean = 30.8 ± 12.5 years).

Fifty of the farmer respondents worked on breeder-grower-finisher farms, eight on breeder-weaner, two on breeder-grower farms and one did not say, but did have breeding sows. Table 1 shows the breakdown of accommodation types for farrowing and lactating sows and numbers of sows on the farms on which the farmer respondents worked. The numbers of sows represented were 55 % (20875) indoor housed and 45 % (16813) outdoor

housed, with a mean (± STD) breeding herd size of 635 ± 1482 (indoor mean = 409 ± 617; outdoor mean = 1868 ± 3395). This is similar in distribution to the whole UK breeding herd (now thought to be over 40 % outdoor farrowing: BPEX 2014). The farm sizes represented by respondents included 45 farms with more than 100 breeding pigs, seven with 25 to 99, five with five to 24, one had less than five breeding pigs and three did not say. Production information on the farms represented is shown in Table 2, along with UK averages. The total born figures were similar to the UK average for outdoor, but slightly below average for indoor housed sows. Still births per litter were similar for indoor and above average for outdoor housed sows. Both indoor and outdoor farms had below average live-born mortality.

Insert Table 1 here

Insert Table 2 here

Farrowing induction and night-time checks

Table 3 presents the percentage and frequency of respondents who reported to induce farrowing or provided night-time checks at farrowing for gilts and sows, with respondents that work with indoor and outdoor housed sows shown separately. No significant differences were found between gilts and sows for how often farmers reported to induce farrowing (χ^2 = 4.13, P = 0.53) or provided night-time checks at farrowing (χ^2 = 1.88, P = 0.95).

Insert Table 3 here

Use of pharmaceutical products during and after farrowing

Table 4 shows how often farmers reported to use pharmaceutical products both during and after farrowing. Oxytocin and carbetocin have similar indications for use, so the overall frequency of the combined reported use of these drugs was calculated (Table 4). This showed that 74 % of respondents reported using these drugs at least sometimes during farrowing and

183 54 % afterwards. Oxytocin was reported to be used more often than carbetocin both during
184 (χ^2 = 12.67, P = 0.013) and after (χ^2 = 16.78, P = 0.002) farrowing. Azaperone was reported
185 to be used at least sometimes by 45 % of respondents during farrowing and by 33 % after
186 farrowing.

187 *Insert Table 4 here*

188 The reported use of anti-inflammatory drugs to treat MMA and post-farrowing
189 lethargy by farmers and veterinarians is shown in Figure 1. Post-farrowing lethargy was
190 indicated as being treated at least sometimes by 87.7 % of veterinarians and 47.6 % of
191 farmers, and MMA was reported to be almost always treated by 72.5 % of veterinarians and
192 30.4 % of farmers. MMA was reported to be more frequently treated with anti-
193 inflammatories than post-farrowing lethargy (χ^2 = 26.00, P < 0.001) and veterinarians
194 reported to using or prescribing these drugs more often than farmers reported using these
195 drugs for both conditions (Post-farrowing lethargy: χ^2 = 19.80, P = 0.001 (sample sizes = 42
196 farmers, 49 veterinarians); MMA: χ^2 = 21.61, P < 0.001 (n = 46 farmers, 51 veterinarians)).

197 *Insert Figure 1 here*

198 ***Pain and difficulty farrowing***

199 Figure 2 shows how often farmers thought pain at farrowing was a problem for gilts
200 and sows. Respondents indicated that they thought pain at farrowing was more often a
201 problem for gilts than for sows (χ^2 = 11.04, P = 0.012) and that a similar percentage (± SEM)
202 of gilts (5.29 ± 1.15%, minimum: 0, maximum: 50, median: 2) and sows (3.73 ± 0.54%,
203 minimum: 0, maximum: 16, median: 2) were reported to have difficulty farrowing (U = 1144,
204 P = 0.69).

205 *Insert Figure 2 here*

Discussion

This survey study aimed to provide information regarding the use of practices with the potential to impact on sow and piglet welfare and productivity and presents data regarding the management of sows around farrowing in the UK. The information on the farms represented indicates how representative the data are of the UK as a whole and shows that the results should be treated with some caution given the response rate and sampling method. The average herd size for the farms represented in this study was 635, which is larger than the UK as a whole, as in 2012, average pig herd size (for farms with more than five sows) was 153 breeding pigs (DEFRA 2014). In June 2013, the total UK herd was 421,000 breeding pigs, on 6,000 pig holdings, with 370,000 of these breeding pigs on 800 holdings with breeding herds of over 100 pigs (DEFRA 2014). Thus the results of this study represents larger pig farms, with approximately 9% (37,493 breeding pigs) of the total UK herd and 5.6% of the largest farms (>100 breeding pigs) are represented. There is the possibility of respondent bias, due to the use of convenience sampling, with a range of different distribution methods. Therefore, those more interested in management methods and pain in pigs being more likely to respond. This could be the case as live born mortality is below average and a previous study has shown lower piglet mortality on farms where farmers had a more positive attitude to animal welfare (Jääskeläinen *et al* 2014). It is also possible that many of the respondents were not directly involved in day-to-day husbandry tasks. This is demonstrated by the range of time spent working directly with pigs, with some farmer respondents only spending 5% of their time with pigs and the majority of the respondents were farm owners, who may not be directly responsible for decisions regarding sow management at farrowing. This could account for the lack of reply from some respondents to certain questions.

Farrowing induction and night-time checks

The majority of farmer respondents indicated that night-time checks were provided during farrowing periods for both gilts and sows and more so for indoor compared with outdoor farrowing animals. This is an encouraging result as farrowing supervision can produce significant benefits, such as increased piglet survival, because it allows for the implementation of proactive management techniques (for reviews see: Kirkden *et al* 2013a; Vanderhaeghe *et al* 2013). Another tool which can be used to facilitate farrowing supervision is the induction of farrowing by administering prostaglandins or prostaglandins along with oxytocin or carbetocin to synchronise sows to farrow during working hours. By enabling supervision, farrowing induction can increase piglet survival, but there can be risks including an increase in low viability piglets if sows are induced too early and an increased risk of farrowing difficulty (dystocia) and PPDS (Kirkden *et al* 2013b; Papadopoulos *et al* 2010). In this study, few respondents reported that they induced farrowing in gilts and sows, indicating that this practice is not considered beneficial in the farms on which the respondents work. Further information on the nature of supervision given, including the frequency and duration of day- and night-time checks and a larger sample size, would be useful information to indicate any improvements in productivity with the use of supervision.

Use of pharmaceutical products

The current study showed that oxytocin and carbetocin were widely used, with 74 % of farmers reporting the use of these drugs at least sometimes during and 54 % after farrowing. Oxytocin was reported to be used more often than carbetocin, which is not surprising given that oxytocin has been available for longer (since 1994 compared with 2004) (VMD 2011) and is cheaper than carbetocin. However, carbetocin has a longer duration of effect, and is considered safer than oxytocin as it has no effect on the frequency of stillbirths when administered in order to induce parturition (Kirkden *et al* 2013b). In addition, in comparison to oxytocin, the administration of carbetocin showed a tendency to reduce

255 stillbirth and significantly reduced farrowing duration when administered to sows with
256 inadequate contractions during parturition (Hühn *et al* 2004), so could be a better option. A
257 survey of French pig producers showed that farrowing intervention including frequent
258 manual assistance, use of pharmaceuticals and cross-fostering techniques positively
259 correlated with sow productivity (Martel *et al* 2008). However, the use of oxytocin
260 substitutes could also be a cause for concern. Extensive research into the use of oxytocin in
261 sows demonstrates that inappropriate use of this drug can be detrimental, with a surge in
262 uterine pressure having negative impacts on the piglets, increasing the risk of still-birth
263 (Mota-Rojas *et al* 2002, 2005, 2006, 2007; Alonso-Spilsbury *et al* 2004; González-Lozano *et*
264 *al* 2010 Baxter *et al* 2013), as well as being potentially more painful for the sow. In a survey
265 study of injectable medication given to periparturient sows by pork producers in the United
266 States, oxytocin was estimated to be given to 13.8 % of farrowing sows and was used on
267 82.8 % of the 301 farms surveyed (Straw *et al* 2000). This study also showed that only 38.9
268 % of the sows treated received the correct dose (Straw *et al* 2000). An interesting follow up
269 to this study would be to investigate why these pharmaceutical drugs are being administered
270 and whether they are they being used correctly.

271 Another surprising result from this study was that 45 % of respondents reported using
272 azaperone at least sometimes during and over 33 % after farrowing, which indicated that this
273 drug is perceived as a useful management tool in certain cases. Azaperone has been shown to
274 be effective when administered as a single dose post-farrowing, by promoting piglet survival
275 (Miquet & Viana 2010) and increasing piglet weight gain resulting in a larger weaning
276 weight, especially for primiparous sows (Miquet & Viana 2010; Ruediger & Schulze 2012).
277 When administered to primiparous sows housed in conventional crates or outdoor huts at the
278 point of placental expulsion, azaperone reduced piglet mortality in the outdoor system, more
279 specifically, death by crushing and savaging were reduced, resulting in more weaned piglets

(Miquet & Viana 2010). Litter weaning weights were significantly higher in farrowing crates and outdoor huts (Miquet & Viana 2010) and a second study showed higher daily weight gain and weaning weight for piglets from sows given azaperone post-farrowing, which was most obvious for primiparous sows but no difference in mortality or piglet serum immunoglobulin-G concentrations were found (Ruediger & Schulze 2012). However, azaperone, as with oxytocin has the potential for misuse if given at an incorrect dose or time in relation to farrowing and an ethical appraisal of the use of sedative drugs to improve productivity is warranted (Baxter *et al* 2013). Therefore, the reasons for the high reported use of oxytocin substitutes and azaperone warrants further investigation, including what proportion of sows receive these drugs and their use on farms producing the next generation of breeding sows. It would be preferable to select breeding animals that demonstrate good farrowing progress and maternal behaviour without the need for intervention with the use of pharmaceutical products.

There is growing societal concern over the use of farrowing crates in pig production, with an increasing need for alternative indoor systems (Baxter *et al* 2012). Nine of the 51 indoor farms represented in this survey had some form of alternative to the conventional farrowing crate. Alongside the need for alternative farrowing systems is the need for a sow that can perform well in such systems, where maternal care is of greater importance (Arey 1997; Baxter *et al* 2012). Good maternal care in sows is characterised by passivity; lying in a lateral position, with the udder exposed, allowing piglets' access to milk and warmth (Jarvis *et al* 1999). It has been suggested that restricting sows in a farrowing crate could mask the impact of poor maternal care (Baxter *et al* 2008). The frequent use of the sedative azaperone shown in this study could also be 'masking' poor mothers and pain, by increasing passivity and thereby reducing negative maternal responses. In addition, by increasing passivity, the risk of sows developing decubital shoulder ulcers could also be increased (Herskin *et al*

2010). Likewise, the even more frequent use of oxytocin and carbetocin could be masking poor farrowing progression and nursing behaviour and increasing pain, as the increase in frequency and intensity uterine contractions is reported to be painful in women during labour (Lowe 2002). The increasing uptake of alternative crate-free farrowing systems relies on achieving production figures comparable to the farrowing crate and good maternal behaviour plays a crucial role in achieving this (Baxter *et al* 2011, 2012). Sows able to perform well, with little intervention would be beneficial in crate-free systems. Additional data on the management practices of farms with loose-housed farrowing systems and research on techniques that could improve productivity in these systems would be an important area of future research.

Anti-inflammatories were reported to be widely used by farmers and used or prescribed by veterinarians for the post-farrowing condition MMA (or PPDS) and for post-farrowing lethargy, where sows are off their feed. This is encouraging, but not surprising as farmers and veterinarians showed high agreement that pigs recover better with the use of pain relief (Ison & Rutherford 2014). Thirty per-cent of farmers and 73 % of veterinarians almost always used anti-inflammatories to treat MMA. This was similar to anti-inflammatory use reported by Finnish veterinarians in 2003, where around 70 % always treated farrowing fever (Raekallio *et al* 2003), although practices may have changed since this survey was conducted. Veterinarians reported using or prescribing anti-inflammatories more often than farmers used them for both MMA and post-farrowing lethargy, possibly as they are more likely to see the most severe cases; whereas farmers are more likely to see a range of severity and are involved in the routine administration of these drugs (Ison & Rutherford 2014). However, it could also be that farmers are not following veterinary instruction on the use of NSAIDs or are not aware of the benefits of using these drugs. Given that only a third of farmers considered that they were discussing pain and pain relief options with their veterinarian,

whereas two thirds of veterinarians thought they were discussing pain and pain relief options with pig farmers (Ison & Rutherford 2014), there could be barriers to the increased use of these drugs by farmers. Post-farrowing administration of non-steroidal anti-inflammatory drugs compared with a placebo is beneficial to sow welfare and sow and piglet productivity (Mainau *et al* 2012; Viitasaari *et al* 2013, 2014; Homedes *et al* 2014; Tenbergen *et al* 2014), especially at farms with a high incidence of PPDS (or MMA) (Sabaté *et al* 2012). Better communication between farmers and veterinarians regarding the use and benefits of using anti-inflammatory drugs to treat pain could be needed (Cipolla & Zecconi 2015). In addition, further research investigating the welfare and production benefits of using these drugs to treat post-farrowing conditions involving inflammation and pain is warranted.

Pain and difficulty farrowing

Farmer respondents indicated that pain at farrowing was more often a problem for gilts than for sows, with the majority indicating 'sometimes' for gilts and 'rarely' for sows. This fits with the general perception that primiparous dams experience more pain during labour compared with multiparous ones (Mainau & Manteca 2011). When asked to score (on a scale from 0 to 10) the painfulness of a variety of conditions, a normal farrowing was given the lowest score (3.8) by farmers, however, a difficult farrowing requiring manual assistance was scored 6.7, with only a broken leg and infectious mastitis scoring higher (Ison & Rutherford 2014). When asked what percentage of gilts and sows respondents considered to have difficulty farrowing, the numbers were fairly low, with no significant difference between gilts and sows. The fact that farmers' perceptions of pain at farrowing differed between gilts and sows, but that the percentage of each considered to have difficulty farrowing did not is interesting and indicates that pain and farrowing difficulty mean different things to the farmer. A study investigating ease of farrowing in sows showed a subjective score of farrowing ease given by the farmer correlated with objective behavioural measures,

indicating that farmers are familiar with their animals and have a good sense of how difficult a farrowing is (Mainau *et al* 2010). A useful topic for a future survey study would be to discover what features farmers consider when deciding the level of farrowing difficulty. In addition, future research into pain and pain management around farrowing should focus on cases of difficult farrowing, which farmers consider highly painful and investigating the reasons why farmers reported that pain at farrowing was more of a problem for gilts than for sows.

Conclusions and Animal Welfare Implications

Although data presented in this survey study are based on a limited number of respondents and with the use of convenience sampling that may have introduced sampling bias, this study has revealed some interesting information about the current management of periparturient sows in the UK. The high frequency of night-time checks reported to be given to gilts and sows during farrowing times is encouraging as supervision can improve welfare. However, the frequent reported use of oxytocin substitutes and the sedative azaperone could be a cause for concern. These products could be masking poor mothers and could be detrimental to sow and piglet welfare, currently and in the future where the uptake of higher welfare systems is likely to be implemented. Individuals that may not perform well without intervention may not be suitable for free-farrowing systems, where poor mothers could have a greater impact on piglet mortality. It is also encouraging that farmers are considering farrowing as a painful and sometimes difficult process, as it demonstrates a concern for their welfare, which is also indicated by the use, for example, of anti-inflammatories to treat post-farrowing conditions. This survey study provides important information regarding the management of farrowing sows, which could inform future experimental research and training in order to improve management practices to increase welfare and productivity.

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Figure 1

How often (almost always, frequently, sometimes, rarely, never) anti-inflammatory drugs were used and/or prescribed by farmers (in grey) and veterinarians (in white) for A) Mastitis-metritis-agalactia and B) Post-farrowing lethargy in sows/gilts. Veterinarians reported to using or prescribing these drugs more often than farmers reported using these drugs for Post-farrowing lethargy: $\chi^2 = 19.80$, $P = 0.001$ and mastitis-metritis-agalactia MMA: $\chi^2 = 21.61$, $P < 0.001$

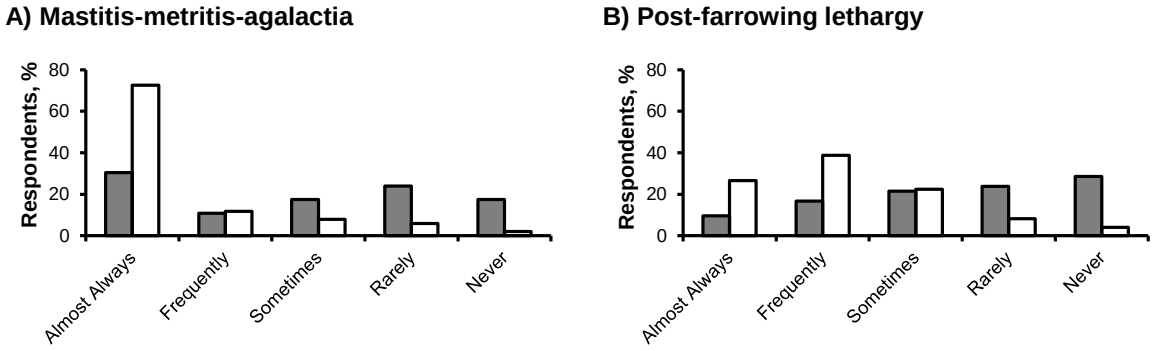

Figure 2

The percentage of farmer respondents who thought that pain at farrowing is a problem for gilts (in grey) and sows (in white) either frequently, sometimes, rarely, never or did not reply, with farmers indicating that they thought pain at farrowing was more often a problem for gilts than for sows ($\chi^2 = 11.04$, $P = 0.012$)

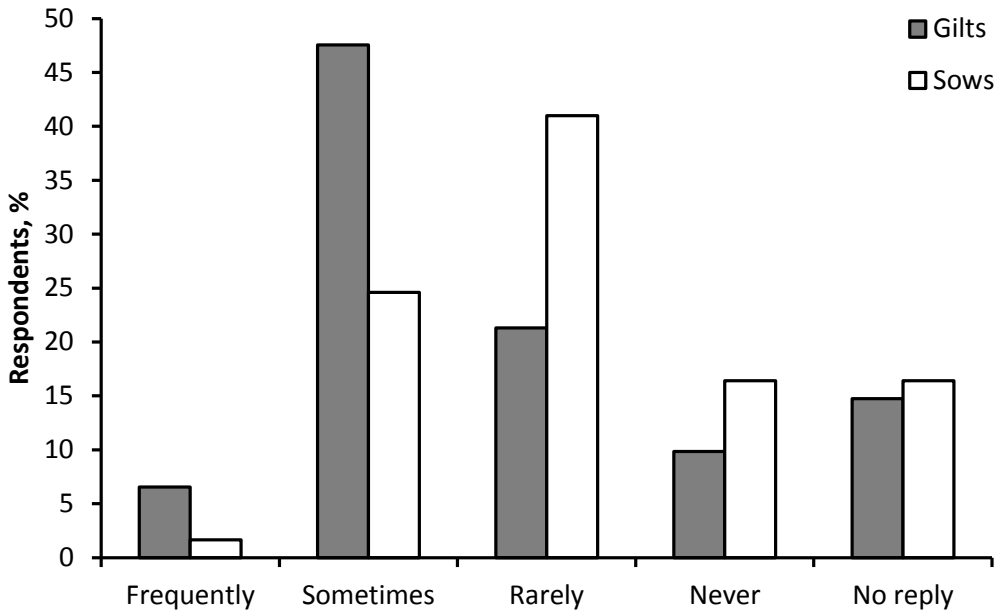

Table 1

Types of accommodation for farrowing and lactating sows on farms represented by survey respondents

Accommodation type	Indoor	Outdoor	
Conventional crates only	42		
Conventional and swing-side crates	3		
Conventional crates and loose pens	2		
Loose pens only	4		
Outdoor huts and indoor loose pens		2	
Outdoor huts only		8	**Total**
Total	51	10	61
Total breeding pigs	20875	16813	37688

Table 2

Production information on farms represented by survey respondents (mean ± SEM), and equivalent UK average figures

Production information	Indoor	UK average Indoor*	Outdoor	UK average Outdoor*
Total born	12.95 ± 0.20	13.16	11.53 ± 0.18	11.58
Stillborn	0.78 ± 0.06	0.72	0.84 ± 0.21	0.44
Live born mortality, %	10.36 ± 0.53	12.33	10.00 ± 1.40	14.00

*****(BPEX 2014)

Table 3

The percentage (and frequency) of farmer respondents who reported how often (almost always, frequently, sometimes, rarely or never) farrowing induction and night-time checks at farrowing were provided for gilts and sows on indoor or outdoor farms.

Frequency	Induce farrowing				Night-time checks at farrowing			
	Indoor		Outdoor		Indoor		Outdoor	
	Gilts	Sows	Gilts	Sows	Gilts	Sows	Gilts	Sows
Almost always	8.0 (4)	14.3 (7)	0.0 (0)	0.0 (0)	48.0 (24)	46.9 (23)	20.0 (2)	11.1 (1)
Frequently	2.0 (1)	6.1 (3)	0.0 (0)	0.0 (0)	16.0 (8)	12.2 (6)	0.0 (0)	11.1 (1)
Sometimes	10.0 (5)	14.3 (7)	0.0 (0)	0.0 (0)	22.0 (11)	24.5 (12)	10.0 (1)	11.1 (1)
Rarely	20.0 (10)	16.3 (8)	10.0 (1)	0.0 (0)	4.0 (2)	4.1 (2)	30.0 (3)	33.3 (3)
Never	60.0 (30)	49.0 (24)	90.0 (9)	100 (9)	10.0 (5)	12.2 (6)	40.0 (4)	33.3 (3)
No reply	1	2	0	1	1	2	0	1
Gilts vs. sows	Effect size (χ^2)		*P* value		Effect size (χ^2)		*P* value	
	4.13		0.53		1.88		0.95	

Table 4

The percentage (and frequency) of farmer respondents who reported how often (almost always, frequently, sometimes, rarely or never) oxytocin, carbetocin, azaperone and anti-inflammatories were used during and after farrowing

	Drug	Almost always	Frequently	Sometimes	Rarely	Never	No reply
During	Oxytocin	1.9 (1)	18.5 (10)	50.0 (27)	9.3 (5)	20.4 (11)	7
	Carbetocin	2.2 (1)	20.0 (9)	22.2 (10)	4.4 (2)	51.1 (23)	16
	Oxytocin and/or carbetocin	3.5 (2)	25.9 (15)	44.8 (26)	10.3 (6)	15.5 (9)	3
	Azaperone	0.0 (0)	3.6 (2)	41.8 (23)	34.5 (19)	20.0 (11)	6
	Anti-inflammatory	0.0 (0)	2.2 (1)	28.9 (13)	24.4 (11)	44.4 (20)	16
After	Oxytocin	0.0 (0)	13.0 (6)	41.3 (19)	15.2 (7)	30.4 (14)	15
	Carbetocin	2.4 (1)	2.4 (1)	11.9 (5)	19.0 (8)	64.3 (27)	19
	Oxytocin and/or carbetocin	2.0 (1)	14.0 (7)	38.0 (19)	20.0 (10)	26.0 (13)	11
	Azaperone	0.0 (0)	2.2 (1)	30.4 (14)	30.4 (14)	37.0 (17)	15
	Anti-inflammatory	0.0 (0)	4.4 (2)	42.2 (19)	24.4 (11)	28.9 (13)	16