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The incidence of Reproductive Disorders in Dairy Cows under Smallholder Farms

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Abstract

The objective of this study was to know the incidence of reproductive disorders in smallholder dairy farms. The study was conducted in 12 small dairy farms in Enrekang Regency, Indonesia. A total of 80 dairy Holstein Friesian cattle consisted of 51 dairy cows and 29 dairy heifers were used in the present study. All dairy cattle at each farm were housed in tie-stall barns. Reproductive examination was conducted to determine the incidence of reproductive disorders both vaginoscopy and palpation per rectum. The incidence of reproductive disorders was 30.0%; 31.0% in dairy heifers and 29.4% in dairy cows. Uterine infection was the most reproductive disorder suffered to the dairy cattle (12.5%), followed by inactive ovaries and cyst (10% and 5%, respectively). The dairy cattle suffered from reproductive disorders increased the likelihood to mate (artificial insemination; AI) greater than three times as well as to become pregnant. In the population of dairy cattle, 48% AI was conducted greater than three times. The pregnancy rate for the dairy cattle suffered from reproductive disorders was only 20%, with interval from calving to conception was 550 days in average. It can be concluded that high incidence of reproductive disorders in smallholder dairy farms. The occurrence of reproductive disorders decreased the reproductive performance of the dairy cattle in smallholder farms.

Keywords: Dairy cattle, reproductive disorder, smallholder farm, reproductive performance.

INTRODUCTION

Reproductive disorders in dairy cattle are one of the great problems facing by the producers for their milk production. Occurrences of reproductive disorders in dairy cattle reduce the reproductive efficiency, extending the interval from calving to conception resulted prolonged calving interval, increase the number of services per pregnancy and finally reduce milk production. Low reproductive efficiency as a consequence of prolonged the calving interval resulted in greater economic loss (Inchaisri *et al.*, 2010). Furthermore, metabolic and reproductive disorders that occurred in early lactation have an impact on the performance of the cow in lactation (Klerx and Smolders, 1997). Likewise, Gemma *et al.* (2017) stated that housing

system especially indoor systems can restrict natural behaviors of the dairy cattle and reduce health such as increase the incidences of lameness and mastitis.

Efforts to improve the reproductive performance in dairy cattle, one of them are to overcome the incidences of reproductive disorder. These efforts have long been conducted in the large dairy farms. While in smallholder farms, the existence of reproductive disorders is not a serious concern. This may be due to that the impact of reproductive disorders in a smallholder farm does not showing significant different in economic loss.

The nature of reproductive disorders in dairy cattle cannot be separated by size of the herds. In other words, large dairy herds with better management and greater milk production also experience reproductive disorders as well as smallholder dairy farms. Most popular study has shown that increase milk productions in large farm are also suffered from reproductive disorder (Lucy, 2001). Milk production, different calving months, and diseases such as retained placenta, metritis and ovarian cysts reduced likelihood to conceive. However, in smallholder dairy farms, whereas milk productions are much lower than in modern dairy farms, it is a little information regarding the incidence of reproductive disorders. Therefore, the objective of this study was to know the incidence of reproductive disorders in smallholder dairy farms.

MATERIALS AND METHODS

Dairy Cattle and Herd Management

The study was conducted in 12 small dairy farms in Enrekang Regency, Indonesia. All dairy farms were using tie stall management with rubber mattresses over the concrete throughout the year for handling the dairy cattle. A total of 80 dairy Holstein Friesian cattle aged between two to ten years old consisted of 51 dairy cows and 29 dairy heifers were used in the present study. The dairy cows were usually milked twice a day; in the morning and in the afternoon. Basically, the feed for the cattle consisted of elephant grass and the others natural grasses as well as rice bran and sometimes supplemented with minerals and vitamins.

Reproductive Examination

Clinical reproductive examination was conducted to determine the incidence of reproductive disorders both palpation per rectum and vaginoscopy. Palpation per rectum was conducted following procedures of Yusuf *et al* (2017) to examine the condition of both ovaries, uterine horns, and cervix. Likewise, vaginoscopy examination (Vaginoscope: 35 cm long, 2 mm thick, and 4 cm external diameter; L.C.C. Co. Ltd., Shunan Shi, Yamaguchi, Japan) was performed to observe the condition of outer part of the cervix and vagina. The dairy cows or heifers were categorized as suffered from reproductive disorders when the reproductive organ(s) such as ovary, uterine horn(s), or cervix had abnormality. Otherwise, were categorized as normal. During clinical examinations, the cattle that suffered from one or more reproductive disorders were noted and treated based on the type of reproductive disorder.

Data Collection

The following data were collected during clinical reproductive examination: pregnancy status both cows and heifers and abnormalities of reproductive organs. Additional data were also

noted such as body condition score (BCS) as described by Edmonson *et al.* (1989), interval from calving to conception (CC), services per conception (S/C), and calving interval (CI).

Data Analyzes

All collected data were presented as mean and standard deviation (SD), tabulated and analyzed using Microsoft Excel program and software SPSS 16.0 for windows. Pregnancy statuses were compared between dairy cows and dairy heifers using Chi-square test. Services per conception (S/C) were compared using t-test.

RESULTS AND DISCUSSION

Reproductive Performance of Dairy Cattle Under Smallholder Farms

A total of 80 dairy cattle both dairy heifers and dairy cows in 12 dairy smallholder farms was reproductively examined during the study period. First examination was conducted of diagnosis of pregnancy that is shown in Figure 1 (Yahya, 2017). At the time of clinical reproductive examination, the proportion of dairy cows in pregnant had significantly ($P < 0.05$) higher than in dairy heifers (51.0 vs. 20.7%). This result was out of our prediction. We predicted that the proportion of dairy heifers become pregnant should be higher than in dairy cows. This due to that all dairy heifers used in the present study was showing their first estrus before clinical examination and had been artificially inseminated in the next estrus. The reason why the heifers had lower pregnancy rate than in cows are not well understood. However, uterine infections in dairy heifers were the causes of this problem. The occurrence of uterine infection in dairy heifers most probably was caused by AI that were not applied properly and sanitary enough.

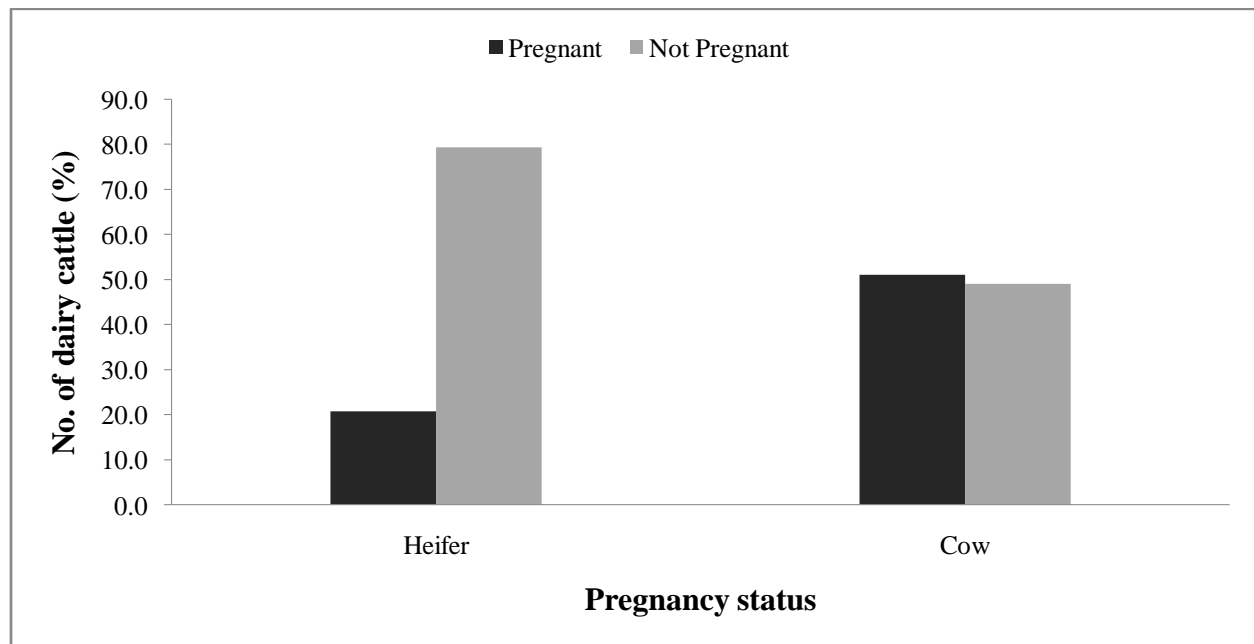


Figure 1. Pregnancy statuses of dairy cattle in smallholder farms

Table 1 shows that body condition scores between dairy heifers and cows in the present study did not showing significant different (3.02 ± 0.24 vs. 2.88 ± 0.32 ; $P = 0.1916$). However, the average scores of the dairy heifers had 0.14 greater than in dairy cows. This might be indicated

that some of the dairy cows had in lactation, which requires more energy expenditure resulting in reducing body condition.

The reproductive performance of the dairy cows under smallholder farms that involved in the current study as shown in Table 1 seemed to be poor. The average interval from calving to conception was 217 days; ranged from 69 to 396 days. However, some dairy cows become pregnant within 150 days (25.5%) (Figure 2). The remaining dairy cows become pregnant greater than 150 days postpartum, consequently, prolonged the calving interval.

Table 1. Body condition score and reproductive performance of dairy cattle under smallholder farms

Parameter	Heifer	Cow	P-value
Body condition score	3.02 ± 0.24	2.88 ± 0.32	0.1916
(Interval; min – max)	2.75 – 3.50	2.25 – 3.50	-
Interval from calving to conception (days ± SD)	-	217.4 ± 93.8	-
(Interval; min – max)	-	(69 – 396)	-
Services per conception (S/C) (± SD)	1.6 ± 1.2	3.4 ± 3.0	0.0024
(Interval; min – max)	(1 – 7)	(1 – 15)	-
Calving interval (days ± SD)	-	522.6 ± 120.3	-
(Interval; min – max)	-	(366 – 867)	-

SD = Standard deviation

The other reproductive parameter measured in the present study was number of services per conception (S/C). This study also noted that S/C in dairy heifers was significantly better than in dairy cows (1.6 vs. 3.4; P=0.0024) (Table 1). The reason for this difference might be caused by the occurrence of reproductive disorders. The dairy cattle suffered from reproductive disorders increased the likelihood to mate (artificial insemination; AI) greater than three times as well as to become pregnant. In the population of dairy cattle, 48% AI was conducted greater than three times. This indicated that some dairy heifers or cows suffered from repeat breeding syndrome. The pregnancy rate for the dairy cattle suffered from reproductive disorders was only 20%, with interval from calving to conception was 550 days in average.

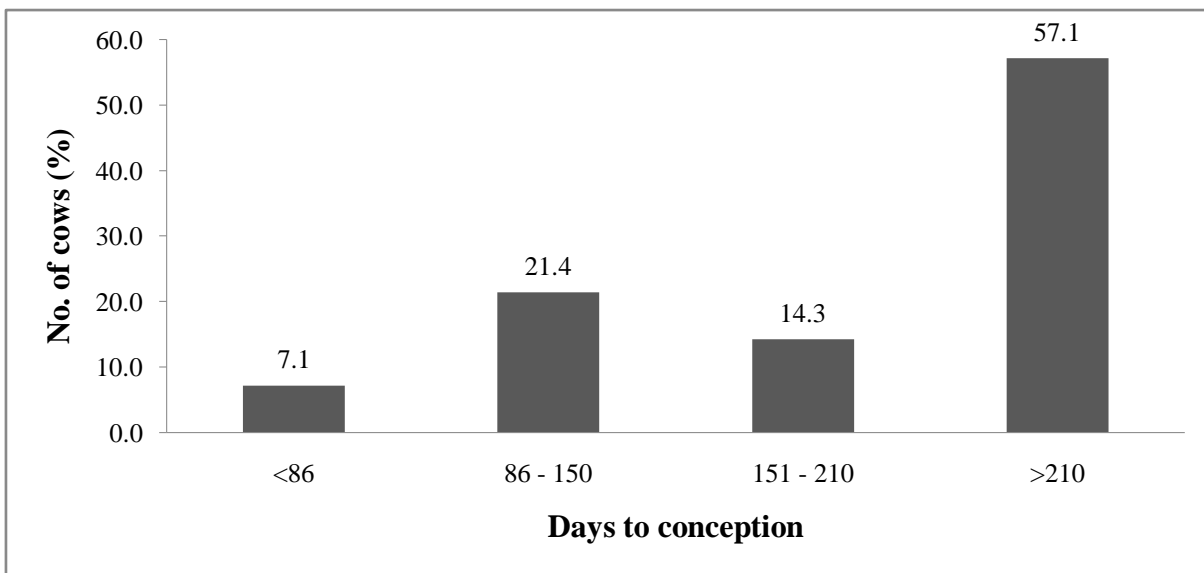


Figure 2. Days to conception of dairy cows in smallholder farms

The Incidence of Reproductive Disorders in Dairy Cattle Under Smallholder Farms

Table 2 shows the incidence of reproductive disorders in dairy cattle. The incidences of reproductive disorders in dairy cows and heifers were 31.0% and 29.4%, respectively; did not differ significantly ($P>0.05$). Uterine infection was the most reproductive disorder suffered to the dairy cattle (12.5%), followed by inactive ovaries and cyst (10% and 5%, respectively). While the incidence of urovagina that occurred in the dairy heifers was only 2.5% and none in dairy cows. It is noteworthy that the incidences of uterine infection and urovagina in dairy heifers were greater than in dairy cows. We presumed that the incidence of uterine infection in dairy heifers mainly caused by AI that were not applied properly and sanitary enough. For instance, forcing and unclean insemination gun resulting in uterine damage and dirty, subsequently the microorganism easier to develop well in the uterine.

Table 2. Type and incidence of reproductive disorder in dairy cattle under smallholder farms

Type of reproductive disorder	Dairy cow	Dairy heifer	Average
Inactive ovary (%)	13.8	7.8	10.0
Cyst (%)	6.9	3.9	5.0
Uterine infection (%)	10.3	13.7	12.5
Urovagina (%)	0.0	3.9	2.5
Total	31.0	29.4	30.0

Future Prospect for Improvement of Reproductive Performance in Dairy Cattle Under Smallholder Farms

High incidence of reproductive disorders in dairy cattle under smallholder farms was noted in the present study. Consequently of the occurrence of these reproductive disorders is reducing reproductive performance of both dairy heifers and dairy cows. This in line with the study of López-Gatiuset *al* (1996), stated that pregnancy attrition rates increased in cows with previous reproductive disorders. Prolonged interval between calving and conception as well as calving interval are the two major consequences facing by the farmers. Subsequently, milk production is also limited. Causes of this problem were not fully understood. Management factor including reproductive management are predicted to be the main causes of this problem. Therefore, to achieve high reproductive performance and to reduce the incidence of reproductive disorders in dairy cattle under smallholder farms, it is necessary to find the risk factors affecting this condition. Management approach including reproductive management is the first priority to overcome such situation. Application of better management practices, including housing system at the farms would to reduce the incidence of metabolic disease (Saborío-Montero *et al*, 2017). This intended to have cattle comfort throughout the year while minimizing stress that can reduce the reproductive performance. Nowadays, the housing systems are designed to accommodate cows based on body size and, in some cases, stage of lactation (Bewley *et al*, 2017). The second approach is to classify individually the dairy cattle that suffered from reproductive disorder.

In order to treat the dairy cattle that suffered from reproductive disorders, it is necessary to find the type of reproductive disorders and finally treated with certain treatment. This due to that not all cows had poor reproductive performance and suffered from reproductive disorders; it is therefore, to improve their reproductive performance, attention must be paid to the only the cows that had poor reproductive performance and those suffered from reproductive disorders.

CONCLUSION

In conclusion, high incidence of reproductive disorders in smallholder dairy farms was noted in the current study. Both dairy cows and heifers had high incidences of reproductive disorders (31.0% vs. 29.4%; $P>0.05$). The occurrence of reproductive disorders decreased the reproductive performance of the dairy cattle in smallholder farms.

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