THE INCIDENCE OF REPRODUCTIVE DISORDERS IN A DAIRY HERD: A CASE STUDY IN SINJAI REGENCY

(Tingkat Kejadian Gangguan Reproduksi pada Ternak Sapi Perah: Studi Kasus Di Kabupaten Sinjai)

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ABSTRAK

Penelitian ini bertujuan untuk mengetahui tingkat gangguan reproduksi pada induk ternak sapi perah. Sebanyak 44 ekor ternak sapi perah Holstein Friesian digunakan dalam penelitian ini. Palpasi rektal dilakukan untuk mengetahui konsistensi uterus termasuk didalamnya kontraksi, elastitas, tonisitas, simetritas tanduk uterus, dan cairan uterus, diikuti dengan palpasi ovarium. Ternak yang tidak bunting pada saat palpasi rektal dilanjutkan dengan pemeriksaan secara vaginoskopi. Data yang diperoleh pada penelitian ini dianalisa secara deskriptif berdasarkan persentase dan rata-rata. Uji T digunakan untuk menganalisa jarak antara melahirkan dan inseminasi buatan (IB) pertama antara ternak yang bersiklus normal dan ternak yang mempunyai gangguan reproduksi. Hasil penelitian ini menunjukkan bahwa tingkat gangguan reproduksi pada ternak sapi perah sangat tinggi; 38,6%. Ovarium tidak aktif, kista, dan endometritis merupakan gangguan reproduksi yang paling mempengaruhi ternak sapi perah. Gangguan reproduksi ini menurunkan penampilan reproduksi dengan memperpanjang jarak antara melahirkan dan IB pertama serta jarak antara melahirkan dan kembali bunting. Kondisi tubuh yang rendah disinyalir merupakan faktor utama penyebab masalah ini.

Kata kunci: Sapi perah, Gangguan reproduksi, Penampilan reproduksi

ABSTRACT

The objective of this study was to ascertain the incidence of reproductive disorders in a dairy herd. A total of 44 Holstein Friesian cows in a dairy herd were enrolled in the present study. Trans-rectal palpation of the uterine was performed to determine the consistency of uterine including contraction, elasticity, tonicity, symmetry of uterine horns, and the presence of any fluid in the uterus followed by the presence of any palpable ovarian structures. Cows that did not become pregnant during clinical examination were examined vaginoscopically. Data obtained in the present study were analyzed descriptively based on percentages and means. T-test was used to analyze the interval from calving to first artificial insemination (AI) between cyclic cows and cows with reproductive disorders. The results of this study showed that incidence of

reproductive disorders was very high; 38.6%. Inactive ovaries, cyst, and endometritis were the most reproductive disorders suffering the dairy cows. These reproductive disorders subsequently reduced reproductive performance by prolonged interval from calving to first AI as well as interval from calving to pregnancy. Lower BCS of the cows were invented as the most prominent causes of this issue.

Key words: Dairy cows, Reproductive disorders, Reproductive performance.

INTRODUCTION

Fertility of dairy cows is the most essential thing in the dairy industry in order to maintain continuously of milk production. High fertility level of the cows in a herd results in high milk production in a time manner, otherwise, reduces milk yield as well as profits from the cows to the producer. To be a good fertility management, 95% cows in the herd after calving must be served by keeping the average calving to first service interval to less than 70 days, more than 55% overall heat detection rate, and 50% or more of pregnancy rate (Esslemont and Kossaibati, 2000). Requirements to achieve this target or high reproductive efficiency in the dairy herd are a disease-free transition period, high submission rates to AI, and high conception rate per service (Roche *et al*., 2000). However, many current dairy herds have a difficulty to breed the cows and to have calves in an optimum time for various reasons. To have a calf every twelve or thirteen months, timely resumption of uterine and ovarian functions postpartum is essential (Gautam *et al*., 2009). One of the most significant causes of declining fertility in cattle is the complex of diseases that includes retained placenta, puerperal metritis, endometritis, pyometra and other non-specific infections of the uterus (Noakes *et al*., 2001). Abnormal resumption of postpartum ovarian cycles and ovarian disorders reduce reproductive performance in dairy cows (Nakao and Yusuf, 2008; Yusuf *et al*., 2010).

Several studies have indicated the incidences of reproductive disorders in the dairy cows at different location, environment, management, production, etc and its effect on subsequent reproductive performance (LeBlanc *et al*., 2002; Gilbert *et al*., 2005; Gautam *et al*., 2009; Yusuf *et al*., 2011). Therefore, the objective of the present study was to ascertain the incidence of reproductive disorders in a dairy herd.

MATERIALS AND METHODS

Animals and herd management

A total of 44 Holstein Friesian cows in a dairy herd in Sinjai Regency were enrolled in the present study. Cows in the herd were housed in tie-stall barns. Out of 44 cows, 14 cows (32%) were lactating during clinical examination and milked once daily in the morning time at approximately from 6:00 to 7:00 am before regular cleaning. Feedstuffs consisted of elephant grass or rice straw, concentrate, and mineral supplements. The parity of the cows ranged from one to two. Cows detected in estrus were artificially inseminated (AI) by inseminator / technician approximately 2 – 6 hours

later using frozen/thawed semen from proven Holstein Friesian sires. The voluntary waiting period (VWP) of the herd was determined 40 days after calving.

Clinical examination and case definition

Clinical examination was implemented by the authors with the help of local technician and/or management staffs of the herd. All cows were subjected to trans-rectal palpation for pregnancy status and/or the genitalia to asses uterine conditions and ovarian structures. Trans-rectal palpation of the uterine was performed to determine the consistency of uterine including contraction, elasticity, tonicity, symmetry of uterine horns, and the presence of any fluid in the uterus (Gautam *et al*., 2010). The presence of any palpable ovarian structures, ovarian cysts was defined as one or more follicle-like structures >25 mm in diameter without a concurrent corpus luteum (CL). Ovaries without palpable structures (i.e. ovarian follicles > 10 mm in diameter and/or a functional CL) were considered inactive (Yusuf *et al*., 2010).

Cows that did not become pregnant during clinical examination were examined vaginoscopically. For vaginoscopy, the cows were restrained in a feeding stanchion, the tail was held to one side, the vulva washed with clean water, wiped with a clean paper towel, sprayed with 2% polyvinyl pyrrol-iodine, and wiped with cotton soaked in 70% alcohol (Gautam *et al*., 2010). A glass vaginoscope (35 cm long, 4 mm thick, and 4 cm external diameter; L.C.C. Co. Ltd., Shunan-Shi, yamaguchi, Japan) was inserted into the vagina up to the level of the external cervical os. The contents of the anterior vagina, if any, viewed using a torch light, and a portion was aspirated with a 25-mL or 50-mL syringe fitted to an AI gun sheath and transferred into a Petri dish (Gautam *et al*., 2010). The discharge was considered normal, if it was clear or slightly cloudy without any pus flakes and no foul smell. However, mucopurulent or purulent discharge was considered abnormal, consistent with endometritis (Yusuf *et al*., 2010). Cases having vaginal contents with the presence of urine or urine mixed mucus (characterized by at least any two of yellowish in color, watery in consistency, uremic in smell, and/or pH >7.4) were defined as urovagina (Gautam *et al*., 2010).

Data collection

The following data were recorded for each cow: parity, days in milk at first AI, postpartum reproductive disorders (retention of fetal membranes, endometritis, pyometra, urovagina, ovarian cysts, and inactive ovary. Body condition scores (BCS) were conducted for each cow based on the notation of Edmondson *et al*. (1989). The score was from 1 (severe under-condition) to 5 (over-condition) with 0.25 increments.

Statistical analyses

All calculations were carried out using the statistical package SPSS 16.0 for Windows (SPSS Inc., Chicago, IL, USA). Differences in percentages of BCS, pregnancy status, cyclic, and reproductive disorders and it types were analyzed using descriptive statistic. Intervals from calving to first AI and from calving to pregnancy were presented as mean ± standard deviation (SD). T-test was used to analyze the interval from calving to first AI between cyclic cows and cows with reproductive disorders.

RESULTS

Body condition score (BCS)

A total of 44 cows were examined during the study period. The percentages of cows at different BCS are shown in Figure 1. Approximately a half of the cows in the herd have had lower BCS (≤2.50). The other cows were having moderate BCS or greater (≥2.75).

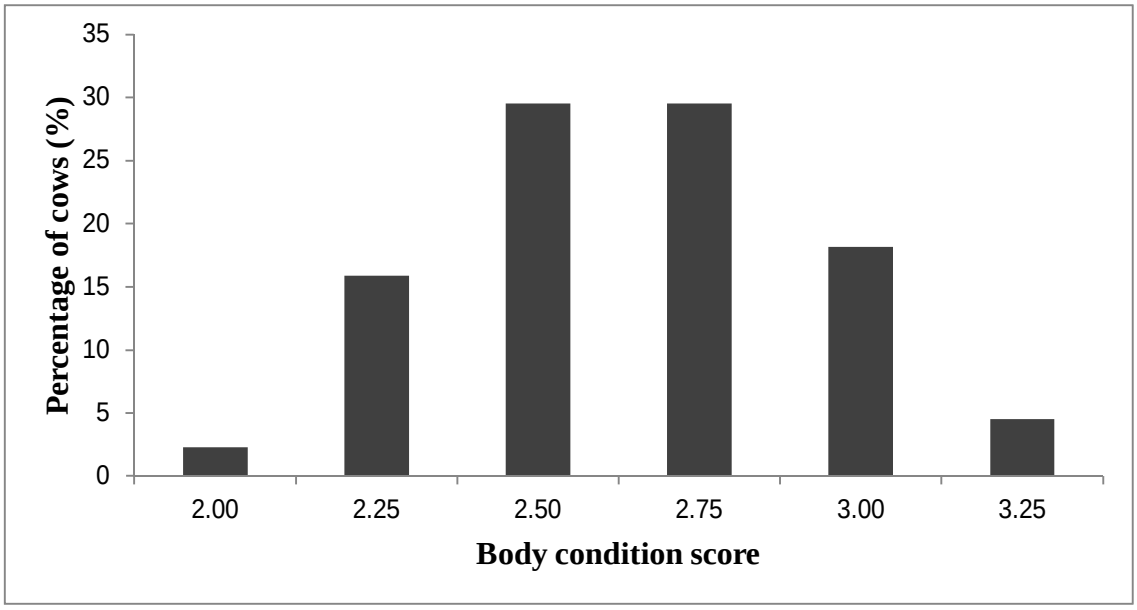

Figure 1. Percentages of cows at different BCS (n=44)

Incidence of reproductive disorders

Proportion of cows at different pregnancy status and the incidence of reproductive disorders are shown in Table 1. The percentage of cows pregnant at the time of clinical examination was only 37.3%, while the other cows did not become pregnant after repeated inseminations. Out of 32 cows that did not pregnant, there was only 15 cows cyclic normally, indicated by normal uterine horns and ovarian functions. A group of cows in the herd with at least suffering from one reproductive disorder was 38.6%.

Types of reproductive disorders

Among the 44 cows examined, 17 cows (38.6%) were suffering from various reproductive disorders (Table 1). Types of those reproductive disorders in detail are shown in Table 2. Inactive ovaries was the major cases of ovarian function, followed either follicular cyst or luteal cyst. During the vaginoscopy examination, there was 24% (four cows) suffering from endometritis. One cow with luteal cyst was concurrently with uterine infection; endometritis and pyometra.

Table 1. Proportion of cows at different pregnancy status and the incidence of reproductive disorders in a dairy herd

Variable	No. of cows	Percentage (%)
No. of cows examined	44	100
Pregnant	12	37.3
Not-pregnant		
Cyclic	15	34.1
Reproductive disorders	17	38.6

Table 2. Types of reproductive disorders in a dairy herd

Reproductive organ	Finding	No. of cows	Percentage (%)
Uterine	Normal	13	76
	Endometritis	2	12
	Endometritis + pyometra	1	6
	Endometritis + urovagina	1	6
Ovarian	Inactive	13	76
	Follicular cyst	3	18
	Luteal cyst	1	6

Days in milk at first AI and interval from calving to pregnancy

Days in milk at first AI between cows with normal cyclicity (n=15) and cows with reproductive disorders (n=17) were 532.8 ± 65.1 days and 581.2 ± 26.9 days, respectively; P>0.05. For pregnant cows (n=12), the interval between calving to pregnancy was 509.5 ± 196.1 days.

DISCUSSION

The present study was conducted in a dairy herd in West Sinjai, Sinjai Regency South Sulawesi Province. The study confirmed that this area has been pointed out for development of dairy cows due to the altitude (500 to 1000 above sea level) and climate that are assumed suitable for dairy industry. The results of this study showed that distribution of cows by BCS in the herd ranging from 2.00 to 3.25. Unfortunately, approximately a half of the cows in the herd had very poor BCS, leading to reduce both milk production and reproductive performance. Our previous study (Yusuf *et al*., 2012) documented that high incidence of repeat breeding in this area, suggested low reproductive efficiency.

The incidence of reproductive disorders in the present study was found very high. Cows were mainly suffering from inactive ovaries, followed by endometritis and

ovarian cysts. Although inactive ovaries are not solely caused by low BCS, however, the herd where the study was taking place the cows seemed to be under-nutrition. Therefore, the challenge to improve reproductive performance of lactating dairy cattle involves an understanding of the biochemical and physiological principles controlling reproductive and lactational processes that are then integrated into nutritional management, production medicine, and reproductive management systems to optimize fertility of the herd (Thatcher *et al*., 2006). Lower BCS is an indicative of lower nutritional management such as insufficient dry matter intake (DMI) or severe negative energy balance (NEB). Maintaining feed intake during the periparturient transition period is a key to reducing NEB and avoiding metabolic problems that are deleterious to performance. NEB causes various reproductive disorders in lactating dairy cows. NEB is strongly associated with the length of the postpartum anovulatory period through attenuation of LH pulse frequency and low levels of blood glucose, insulin and IGF-I that collectively limit estrogen production by dominant follicles (Butler, 2003). This condition recognized as detrimental effect for both milk production and the interval to first ovulation (Butler and Smith, 1989), which subsequently prolonged reproductive disorders in the cow.

Inactive ovaries are the condition of abnormal resumption of postpartum ovarian cycles or delayed first ovulation. Delayed first ovulation adversely affected subsequent conception rate (Nakao and Yusuf, 2008). Cows with delayed first ovulation show lower BCS and body weight, and higher plasma NEFA concentrations than those with normal first ovulation postpartum (Shrestha *et al*., 2005). Furthermore, delayed resumption of ovarian cycles postpartum is caused by a shortage of energy intake during an early lactation period, which is often associated with a variety of peri-parturient diseases including metabolic disorders (Nakao and Yusuf, 2008).

In the present study, no attempt was made to measure all reproductive parameters. Nevertheless, we were able to collect the important reproductive parameters such as the interval from calving to pregnancy for pregnant cows, and the interval from calving to first AI to the cows with or without reproductive disorders for cows that did not become pregnant after repeated inseminations. However, both this reproductive parameters showed poor reproductive performance. Calving interval for pregnant cows supposed to be 789.5 ± 196.1 days or greater for the cows with reproductive disorders.

Abnormal resumption of postpartum ovarian cycles significantly extended the interval from calving to first AI (Yusuf *et al*., 2011). The reason for the delay in the interval to first ovulation in cows with abnormal resumption can be explained partially by the greater negative energy balance during early lactation period in the modern dairy cows (Lucy, 2001; Wiltbank *et al*., 2006), which reduces postpartum LH pulsatility (Lucy, 2001) and decreases circulating estradiol (Wiltbank *et al*., 2006). Similarly, persistent luteal activity during both the first and subsequent cycles before insemination was associated with reduced fertility and a higher incidence of late embryo mortality (Lamming and Darwash, 1998; Shrestha *et al*., 2004). Risk factors for abnormal estrous cycles include puerperal problems, negative energy balance, and uterine disease (Lopez *et al*., 2004). Therefore, it is necessary to build short term and long term strategies in order to improve the fertility in dairy cows. In the short term, a greater understanding of the interactions between nutrition and fertility to better manage the issue. To improve reproductive functions, while maintaining productivity, nutritional strategies are

needed that provide regulatory signals to stimulate reproductive processes without compromising the partitioning of energy into milk production (Chagas *et al*., 2007). These nutritional strategies will likely vary with cow genotype, dairy production system (e.g. pasture vs. TMR), management system, and their interactions. The development of these strategies must consider the processes that optimize the probability of a successful pregnancy, including early postpartum immune function, uterine health, ovarian function, behavioral estrus, ovulation, and sustaining oviductal and uterine environments to maintain pregnancy and embryonic viability. The complexity of the subfertility syndrome associated with lactation means that developing a solution requires scientific integration of disciplines including animal management, nutrition, immunology, molecular biology, and physiology (Chagas *et al*., 2007).

CONCLUSIONS

The incidence of reproductive disorders confirmed in the present study was very high; 38.6%. Inactive ovaries, cyst, and endometritis were the most reproductive disorders suffering the dairy cows. These reproductive disorders subsequently reduced reproductive performance by prolonged interval from calving to first AI as well as interval from calving to pregnancy. Lower BCS of the cows were invented as the most prominent causes of this problem.

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