

## Effect of individual cows factor on prevalence of anestrus in heifer and postpartum cows at Rajshahi region of Bangladesh

Md. Jalal Uddin Sarder\*, Md. Hemayatul Islam, Rashida Khaton, Soniya Akter Nishi and Most. Rokeya Sultana

Department of Veterinary and Animal Sciences, University of Rajshahi, Rajshahi-6205, Bangladesh

### Abstract

**Context:** Anestrus cow is big problem in worldwide, share the feed, fodder and water resources and colossal burden to the animal owner.

**Objective:** This study was carried out to evaluate the effect of individual cows factor on prevalence of anestrus in heifer and postpartum cows at Rajshahi region of Bangladesh.

**Materials and Methods:** Data were collected by interviewing the owner of the cows using questionnaires from selected private dairy farms at two districts namely Rajshahi and Natore. Total 294 dairy cows were selected for evaluating the prevalence of anestrus cows due to various risk factors such as age, breed, genetic composition, body weight, body condition score and parity during the period from July 2017 to June 2018. The raw data were then sorted, computed, coded and statistically analyzed with the help of latest version of SPSS statistical software package.

**Results:** The present findings revealed that, the overall prevalence of anestrus arts was 54.4%. The age, breed, genetic composition, body weight, body condition score and parity of cows influenced the prevalence of anestrus in cows. The highest prevalence of anestrus were 60%, 55.00%, 66.66%, 56.81% and 62.33% in <4 year's age, crossbred, Local x Sahiwal genetic composition, poor body condition and heifer group of dairy cows respectively at Rajshahi region, Bangladesh. On the other hand the lowest prevalence of anestrus were recorded 39.39%, 50.00%, 50.00%, 51.21% and 42.10% in >6 years age, indigenous breed, local non descriptive genetic composition, good BCS and 3<sup>rd</sup> parity cows, respectively.

**Conclusion:** The prevalence of anestrus was higher in young, crossbred, Local x Sahiwal, Poor body condition and heifer cows.

**Key words:** Anestrus, individual cow factors, dairy cows and Rajshahi.

### Introduction

Livestock is the back bone of rural economy and about 70 per cent people depend on Agriculture and livestock activity. Among the livestock, cattle are most available and resourceful element. It plays an important role to promote human health and wealth by supplying animal protein in the form of milk and meat. The main goal of dairy farmers is one calf/cow per year. High reproductive efficiency is very much important for achieving maximum return from this animal. Bangladesh, a large number of animals remain barren or unproductive due to reproductive diseases like anestrus. Anoestrus is one of the major causes of economic losses in both the dairy and beef industries "Dziuk and Bellows (1983). The economic success of a dairy farm commonly depends on the success of establishing an optimal calving interval of approximately 1 year (Inchaisri *et al.*, 2010). In order to achieve the optimal calving interval in dairy cows, an anestrus period after calving should not exceed 65 days (Opsomer *et al.*, 2000). Factors associated with an increased calving interval are related to the dairy cow herself (uterovarian abnormalities) (Opsomer *et al.*, 2000) or may reflect serious shortcomings in management (inadequate estrus detection) (Opsomer *et al.*, 2004; Shamsuddin *et al.*, 2006). In developing countries, dairying is an important economic activity that provides supplementary income and high employment of family labor (Shamsuddin *et al.*, 2006a). In general, farmers follow a dominant marketing channel to sell their milk according to their geographic location and proximity to possible purchasers (Ghosh *et al.*, 2002), although in some areas farmers collectively operate their farm through a cooperative system (Ghosh *et al.*, 2002). Prolonged postpartum anestrus is the main constraint of cattle reproduction (Kamal *et al.* 2012), resulting from inefficiencies in nutritional management (Pharo, 1987 ) and poor

estrus detection (Shamsuddin *et al.*, 2006; Shamsuddin 1995), both giving rise to a significantly extended calving interval. Many estrus synchronization techniques can induce a fertile heat as much as 50% of the anestrus cows. Thus, it was typical for many of these synchronization Techniques to result in 45 to 55% of the animals being pregnant by the end of the first week of the breeding period (Mel DeJarnette, 2004). Fricke (2005) stated that hormonal intervention is a good method for improving reproductive management. Anestrus rapidly becomes a significant problem but no work on anestrus problems in cows particularly in Rajshahi area.

Considering the above mentioned facts, the present study was conducted to effect of individual cows factor on prevalence of anestrus in heifer and postpartum cows at Rajshahi region of Bangladesh.

### Materials and methods

The research was conducted 74 private dairy farms at two districts namely Rajshahi and Natore. Total 294 dairy cows were selected for the Identifying the prevalence of anestrus cows due to various risk factors from July 2017 to June 2018. The data has been collected directly from the dairy farms owner by using questionnaires and gynecological examination of cows were made on the basis of history, clinical examination and observation.

Out of 294 dairy cows 160 anestrus cows were observed for anestrus clinical managements. Postpartum anestrus was defined as lack of estrus in a cow that had calved 60 or more days (Opsomer *et al.*, 2004). It was evaluated in age, breed, genetic composition, body condition Score (BCS) and parity of the cows in Rajshahi region.

$$\text{Prevalence of anestrus rate (\%)} = \frac{\text{No. of detected in anestrus cow}}{\text{Total no. of adult cows studied}} \times 100$$

\* Corresponding author: jalalnusa@yahoo.com

### Grouping of selected cows

To achieve the goal, animals were grouped according to following considering factors:

**Status of cattle:** it was divided in two ways anestrus and normal cows.

**Age:** The examined cattle were divided in three groups such as < 4 years (n=96), 4 to <6 years (n=51) and > 6 years (n=13).

**Breed:** Local non descriptive and cross breed.

**Genetic composition:** it was also sub divided into Indigenous (n=7), Local ×Frisian (n=143) and Local ×Sahiwal (n=10).

**Body Condition Score (BCS):** On the basis of body condition score the cattle was divided in poor (n=96), medium (n=96) and good (n=96) BCS groups and

**Parity:** The whole cattle divided in to 5 groups. It was heifer (n=48), 1<sup>st</sup> parity (n=50), 2<sup>nd</sup> parity (n=42), 3<sup>rd</sup> parity (n=16) and ≥4<sup>th</sup> party (n=10).

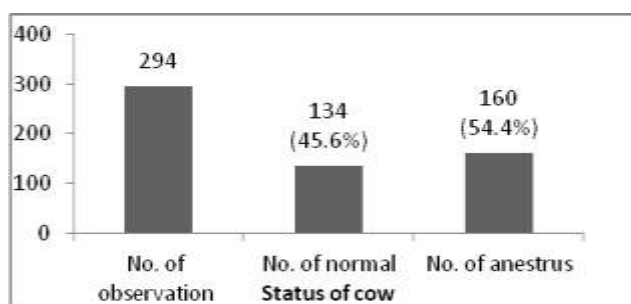
**Statistical analysis:** The Data which was collected, sorted and complied with the help of computer software SPSS. Various statistical tools such as %, mean, standard deviation, incidence & chi-square test and the significant difference among therapeutic treatment means were identified by least significant difference (LSD) test.

### Results and Discussion

The purpose of this study was to investigate the overall prevalence of anestrus and its associated risk factors of dairy cows in Rajshahi, Bangladesh. Considering the general health parameters of the animals such as respiration rate, pulse rate and body temperature, the investigated cows can be regarded as healthy.

#### Prevalence of anestrus

Statistical analyses revealed that 54.4% (160/294) of cows were anestrus at ≥60 days postpartum (Figure 1). Of the cows reported to be anestrus (n = 160), 45.6% (134/294) were subestrus as evidenced by true anestrus as defined by not having a CL in 2 examinations 10 days apart. Kamal *et al.*, (2014) observed less prevalence (18%) of anestrus in cows in Bangladesh. This is comparable with an earlier report in Bangladesh (Pharo, 1987), although a higher prevalence (35%) of anestrus was reported in previous study (Zdunczyk *et al.*, 2002).



**Figure 1.** Average percentage of normal and anestrus cows at study area

#### Cow-level risk factors

The cow level risk factors such as age were associated with prevalence of anestrus is expressed under the Table 1. The highest percentage (60%) of anestrus was observed in less than

4 years of age cows. The highest, lowest rate and other rate of anestrus were 60%, 50.49% and 39.39% correspondences with age group < 4 years, 4 to < 6 years and >6 years at Rajshahi. The age had significant ( $P < 0.05$ ) effect on the prevalence of anestrus in dairy cows at Rajshahi, Bangladesh.

**Table 1.** Effect of age on prevalence of anestrus in cow.

Age group	No. of Observation	No. of normal cow	No. of anestrus cow	% of anestrus cow
< 4 years	160	64	96	60.00% <sup>a</sup>
4 to <6 years	101	50	51	50.49% <sup>b</sup>
> 6 years	33	20	13	39.39% <sup>c</sup>
Total	294	134	160	54.42%

The values are a, b and c with different superscript letters in same column differs significantly with each other ( $p < 0.05$ ).

The prevalence of this forms of anestrus in different herds is dependent on various factors (Mwaanga & Janowski, 2000) but major causes of anestrus are subestrus and true anestrus (Zdunczyk *et al.*, 2002).

**Table 2.** Effect of breed on prevalence of anestrus in cow

Breed	No. of Observation	No. of normal cow	No. of anestrus cow	% of anestrus cow
Indigenous	14	7	7	50.00%
Crossbred	280	127	153	55.00%
Total	294	134	160	54.42%

The prevalence of anestrus association with breed had not significant effect. The highest (55%) prevalence of anestrus was observed in crossbred cows than indigenous cows (50%). This variation due to various factors (Mwaanga & Janowski, 2000) but major causes of anestrus are subestrus and true anestrus (Zdunczyk *et al.*, 2002). Subestrus is more likely because of poor detection system or high incidence of silent estrus (Shamsuddin *et al.*, 2004 and Lyimo *et al.*, 2004). Inaccurate estrus detection is also an important problem in Bangladesh (Shamsuddin *et al.*, 2004 and Shamsuddin, 1985). Visual checks are the most frequently used methods to detect a cow in estrus, often resulting in relatively low on-farm detection rates (Orihuela, 2000). Moreover, the most prevalent ovarian dysfunctions like delayed onset of postpartum ovarian activity and cessation of cyclical ovarian activity after a period of normal ovarian function (Opsomer *et al.*, 2000 and Matiko *et al.*, 2008) contribute significantly to the prevalence of anestrus.

**Table 3.** Effect of genetic composition on prevalence of anestrus in cow.

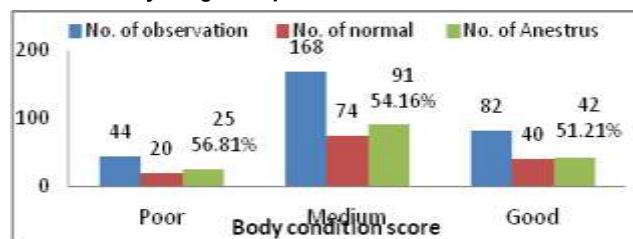
Genotypes	No. of Observation	No. of normal cow	No. of anestrus cow	% of anestrus cow
Local non descriptive	14	7	7	50.00% <sup>bc</sup>
Local ×Frisian	265	122	143	53.96% <sup>b</sup>
Local ×Sahiwal	15	5	10	66.66% <sup>a</sup>
Total	294	134	160	54.42%

The values are a, b and c with different superscript letters in same column differs significantly with each other ( $p < 0.05$ ).

The genetic composition had significant effect on prevalence of anestrus of cows in Rajshahi region, Bangladesh. The highest rate of anestrus was 66.66% in Local × Sahiwal crossbreed cows. On the other hand the lowest percentage was 50% in Local non descriptive cows and other rate of prevalence was

53.96% in Local ×Frisian crossbred cows. The author Kropp *et al.* (1973) stated that dairy genotype had higher anestrus problem than beef breed.

#### Effect of Body weight on prevalence of anestrus in cow



**Figure 2.** Effect of body condition score on prevalence of anestrus in cows

The body condition score had no significant effect on anestrus prevalence. The highest anestrus cow was observed in poor BCS. The lowest and others percentages were in good and medium BCS group of cows. Various researcher observed the prevalence differences due to ovarian cysts and pyometra is minimal (Zdunczyk *et al.*, 2002) and are comparable to the result of the present study cows with poor and excessive BCS were more likely to remain in true anestrus at 60 or more days postpartum than cows with optimal BCS in the present study. Although energy balance was not measured, these data clearly demonstrate that changes in energy status as evidenced by BCS are important factors regulating when cows resume cyclicity after calving (Santos *et al.*, 2009). Under feeding and poor BCS led to high incidence of true anestrus (Opsomer *et al.*, 2000). Cows with excessive BCS undergo increased mobilization of body fat and accumulate more triglycerol in the liver, and revealed a longer postpartum interval to first estrus (Butler *et al.*, 2003).

**Table 4: Effect of parity on prevalence of anestrus in cow.**

Parity	No. of Observation	No. of normal cow	No. of anestrus cow	% of anestrus cow
Heifer	77	29	48	62.33% <sup>a</sup>
1 <sup>st</sup> Parity	82	32	50	60.97% <sup>ab</sup>
2 <sup>nd</sup> Parity	78	36	42	58.94% <sup>b</sup>
3 <sup>rd</sup> Parity	38	22	16	42.10% <sup>d</sup>
≥ 4 <sup>th</sup> Parity	19	9	10	52.63% <sup>c</sup>
Total	294	134	160	54.42%

The values are a, b, ab, c and d with different superscript letters in same column differs significantly with each other ( $p < 0.05$ ).

The prevalence of anestrus on parity of cows is presented in Table 4. It was observed that, heifer had the highest prevalence of anestrus (62.33%) and the lowest in 3<sup>rd</sup> parity (42.10%). Parity had significant ( $P < 0.05$ ) effect on anestrus in dairy cows. Coleman *et al.* (1985) reported a higher conception rate in multiparous cows that in primiparous cows. Moreover, Boyd and Reed (1961) reported increased anestrus rate decrease parity from parity 1<sup>st</sup> to 3<sup>rd</sup> parity, and then increase ≥4<sup>th</sup> parities. Mwaanga and Janowski (2000) partially agreed and had been discovered the highest prevalence at first parity (Kropp *et al.*, 1973) and Britt *et al.* (1993) also observed that primiparous cows have longer intervals to first ovulation than multiparous ones.

#### Conclusion

A high percentage of the cows were identified as being anestrus at 60 or more days postpartum. The higher proportion of

subestrus among cows determined as anestrus indicates that poor estrus detection is a much more serious problem than true anestrus. The prevalence of anestrus cows was recorded 54.42%. The highest prevalence of anestrus were observed in <4 yrs age (60.0%), crossbred (55.0%), Local×Sahiwal (66.66%) genetic composition, poor body condition (56.81%), 1<sup>st</sup> parity (60.97% and heifer (62.33%) cows at Rajshahi region in Bangladesh.

#### References

- Butler WR and Smith RD. Inter-relationship between energy balance and postpartum reproductive function in dairy cattle. *J. Dairy Sci.* **1989**; 72: 767-783.
- Butler WR. Energy balance relationships with follicular development, ovulation and fertility in postpartum dairy cows. *Livest. Prod. Sci.* **2003**; 83: 211-218.
- Dobson H and Alam MGS. Preliminary investigation into the endocrine system of subfertile cattle: location of a common lesion (rate limiting step). *J. Endocrinol.* **1987**; 113: 167-171.
- Dziuk PJ and Bellows RA. Management of reproduction of beef cattle and sheep and pigs. *J Anim Sci* 57. **1983**; (supp 2) 355.
- Kamal MM, Bhuiyan MMU, Parveen N, Momont HW and Shamsuddin M. Risk factors for postpartum anestrus in crossbred cows in Bangladesh. *Turk. J. Vet. Anim. Sci.* **2014**; 38: 151-156.
- Kamal MM, Rahman MM, Momont HW and Shamsuddin M. Underlying disorders of postpartum anoestrus and effectiveness of their treatments in crossbred dairy cows. *Asian J. Anim. Sci.* **2012**; 6: 132-139.
- Lyimo ZC, Nkya R, Schoonman L and Van Eerdenburg FJCM. Postpartum reproductive performance of crossbred dairy cattle on smallholder farms in sub-humid Coastal Tanzania. *Trop Anim Health Prod* **2004**; 36: 269-279.
- Matiko MK, Kanuya NL, Waldmann A, Ropstad E and Reksen O. Environmental constraints on postpartum ovarian activity in Tanzanian Zebu cows. *Theriogenology* **2008**; 69: 896-904.
- Mwaanga E and Janowski T. Anoestrus in dairy cows: causes, prevalence and clinical forms. *Reprod Domest Anim* **2000**; 35:193-200.
- Opsomer G, Grohn YT, Hertl J, Coryn M, Deluyker H and de Kruif A. Risk factors for postpartum ovarian dysfunction in high producing dairy cows in Belgium: a field study. *Theriogenology.* 136-142. **2000**; 53: 841-857.
- Pharo HJ. Analysis of clinical case records from dairy cooperatives in Bangladesh. *Trop Anim Health Prod.* **1987**; 19:136-142.
- Santos JEP, Rutigliano HM and Sa Filho MF. Risk factors for resumption of postpartum estrous cycles and embryonic survival in lactating dairy cows. *Anim. Reprod. Sci.* **2009**; 110: 207-221.
- Sasser RG, Williams RT, Bull RC, Ruder CA, Falk DG. Postpartum productivity performance in crude protein restricted beef cows: return to estrus and conception. *J. Anim. Sci.* **1988**; 66: 3033-3039.
- Shamsuddin M, Bhuiyan MMU, Chanda PK, Alam MGS and Galloway D. Radioimmunoassay of milk progesterone as a tool for fertility control in smallholder dairy farms. *Trop Anim Health Prod* **2006**; 38: 85-92.
- Shamsuddin M, Goodger WJ, Hossein MS, Azizunnesa, Bennett T and Nordlund K.A. survey to identify economic opportunities for smallholder dairy farms in Bangladesh. *Trop Anim Health Prod* **2006a**; 38: 131-140.
- Shamsuddin M. Fertility trend and status of estrus detection in the bovine under farm conditions in Bangladesh. *Bangladesh Vet J* **1995**; 29: 9-16.
- Tomar OS, Sharma PA, Verma GS and Nagpaul Pk. Effect of nutrition of growth reproductive performance and milk production in Karan-Swiss animals world. *Rev Anim Prod.* **1985**; 21: 45-48.