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Risk factors of postpartum uterine infection and its subsequent effect on fertility of crossbred dairy cows in Bangladesh

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ABSTRACT

Postpartum uterine infection is extremely important in dairy cattle. It is both common and detrimental to reproductive performance. The present study was conducted to investigate the factors responsible for postpartum uterine infection and its subsequent effect on fertility of crossbred dairy cows in Chatmohar Upazila, Pabna District. A total of 317 cows were selected and registered and then follow up them in postpartum period. Reproductive histories and data of the studied cows were assessed by direct interviewing and from record book of the owners and nearby government veterinary hospital. Totally 33 cows were found uterine infected (10.41%) in postpartum period. The case of pyometra was substantially higher in present study in contrast to others. The incidence of uterine infection puerperal metritis, pyometra and endometritis were 1.89%, 5.99% and 2.52% respectively. Dairy cattle calving season and parity reflected greatly on the incidence of uterine infection. Potentially significant ($p<0.05$) and higher incidence of uterine infection were associated with poor management system where minimum complications were found with good management practice (3.20%) compared to poor management farms. The dairy cows suffering from endometritis significantly showed prolonged days to first estrus interval, days open and number of services per conception and calving interval values (68.5±0.05 days; 115.4±0.4 days , 4.75±0.50, and 398±6 respectively) than normal healthy cows. Further researches in the near future must be directed for prevention of uterine infection, as most of effective treatments don't prevent the negative impacts of such disease upon dairy, reproduction and culling percentage within dairy herd.

Key words: Risk factors, uterine infection, fertility, cross breed cows

INTRODUCTION

Postpartum uterine infection is extremely important in dairy cattle. It is both common and detrimental to reproductive performance. The major diseases of the postpartum period are puerperal metritis, pyometra and endometritis. There is a relationship between uterine infection and fertility of dairy cows. In general, cows with severe uterine contamination are slow to ovulate in the postpartum period. This combination allows a purulent exudate to develop and accumulate in the uterine lumen. In general, cows with pyometra are effectively treated with a luteolytic agent. Accordingly, Shamsuddin et al., (1988) studied the occurrence reproductive diseases in large government dairy farm and identified Puerperal metritis (10.4%), Pyometra (8.2%) and Endometritis (27.4%) as major reproductive diseases in Bangladesh.

The decreased fertility is caused by negative effects in the uterus and in the ovary. Uterine diseases cause lesions in the endometrium [2], disrupt endometrial function [3], and impair embryo development [4, 5]. These complications are responsible for slower uterine involution, reduced reproductive rate, prolonged inter conception and calving interval, cost of medication, drop in milk production, reduced calf drop, and early depreciation of potentially useful cows [6, 7, 8]. Uterine diseases decrease luteinizing hormone, first dominant follicle size and growth, and follicular ability to secrete estradiol, therefore affecting ovulatory capacity [9, 10, 11]. After postpartum ovulation resumes, cows that developed uterine disease present prolonged luteal phases [12, 13], which can decrease time to insemination and conception rates. Cows with uterine infection in the early postpartum period generally have lower conception rates at subsequent breedings. This effect would likely have been more severe if the herds had not been participating in a routine herd health program in which uterine infections and other postpartum reproductive problems were detected and treated early. However, very limited studies have been conducted to determine the risk factors of postpartum uterine infection and its consequence on fertility of crossbred dairy cows in Bangladesh.

Accordingly, the objective of this study was to determine risk factors of postpartum uterine infection and its consequence on fertility of crossbred dairy cows in Bangladesh

MATERIALS AND METHODS

Site profile and geographical information

The present study was conducted for a period of twelve month from January 2015 to December 2015 in Chatmohar Upazila, pabna District. Pabna District area 2371.50 sq km, located in between 23°48' and 24°21' north latitudes and in between 89°00' and

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89°44' east longitudes. It is bounded by Natore and Sirajgang districts on the north, Padma river, Rajbari and Khustia districts on the south, Manikganj and Sirajganj districts and Jamuna river on the east, Padma River, Natore and Kushtia districts on the west. Chatmohar Upazila (Pabna District) area 305.63 sq km, located in between 24°06' and 24°21' north latitudes and in between 89°12' and 89°24' east longitudes. It is bounded by Gurudaspur and Taras upazilas on the north, Atgharia upazila on the south, Faridpur (Pabna) and Bhangura upazilas on the east, Baraigram and Gurudaspur upazilas on the west [14].

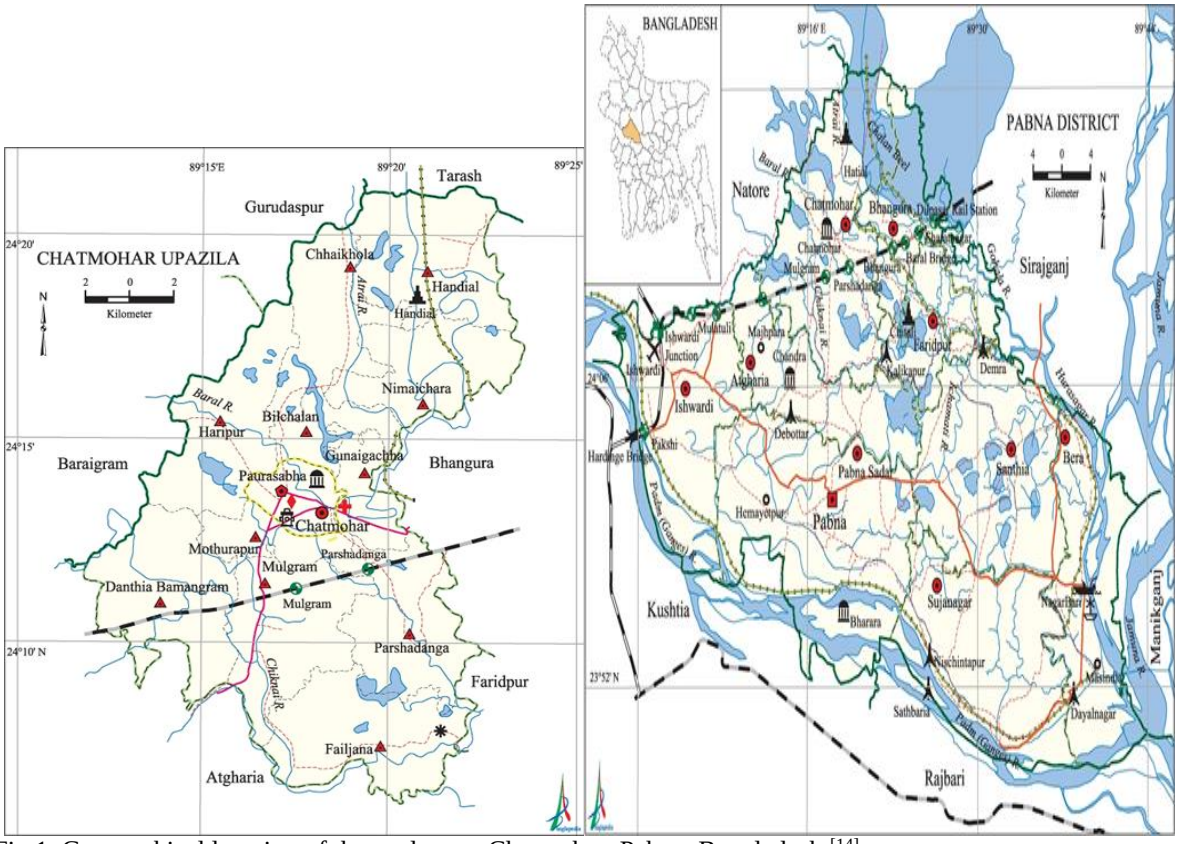

Fig.1. Geographical location of the study area Chatmohar, Pabna, Bangladesh [14]

Study population

The population of the present study was crossbred dairy cows in respective dairy farm. A observational survey method was applied in dairy farms up to their parturition period. Reproductive histories of the studied cows were assessed by direct interviewing and from record book of the owners and near by government veterinary hospital. At the beginning of the study, 317 cows were selected and registered and then follow up them in pre and postpartum period.

Study methodology

All study animals were selected and identified by individual tag number/ID. Then all necessary information: breed, age, parity, date of service, date of calving , Estrous after last calving, conception rate, service per conception, milk production rate, managemental system, body condition score, reproductive complications before and after postpartum period. A regular visit of the farms was carried out to collect data on the major postpartum reproductive problems of dairy cows. Finally, parturient cows were grouped in to those giving birth without any problem and those giving birth with problems according to the following definitions.

Puerperal Metritis: It is characterized by systemic disease within 10-15 days usually with fever, a foetid, watery, reddish-colored uterine discharge, and uterine flaccidity [15, 16].

Endometritis: An inflammation of the uterine wall characterized by reddish brown, white or whitish to yellow mucopurulent, with fetid vaginal discharge along with thickness of uterine wall at transrectal palpation [15, 16,17].

Pyometra: The condition in which progressive accumulation of pus in the uterus and there is persistence of functional corpus luteum[18].

Dystocia: A condition in which difficulty in birth during parturition and the cow required assistance [16, 18, 19].

RFM: A lack of Seperation of the placenta with in the first 24 h after calving [16, 17, 18, 19].

Procedure of Body condition score system

Body condition was scored in order to assess the bony prominence and deposition of subcutaneous fat and animals were grouped in to 0, 1, 2, 3, 4 and 5 body condition scores according to Richard (1993) [20].

Data management and statistical analysis

Regular collected informative data was entered to a Microsoft Excel sheet 2007 and analyzed using a software SPSS ® version 12. The different risk factors (that is, parity, body condition score, season, dystocia , Retained fetal membrane) that were considered during the study period were analyzed using the Chi square technique. The analysis was considered $p<.05$ for establishing significance.

Table 1: Incidence of uterine infection with associated risk factors in cross breed dairy cows

Variables	No. of cows examined	Uterine infection			Sub total (% of incidence)	chi square	P value
		Puerperal Metritis	Pyometra	Endometritis			
Placental expulsion	317						
Normal expelled	284						
RFM	33	6(1.89%)	19(5.99 %)	8(2.52%)	33(10.41 %)		
Effect of Season							
Summer	174	11(6.32 %)	15(8.62 %)	4(2.29%)	30(17.24 %)	6.89	0.032
Rainy	98	2(2.04%)	2(2.04%)	0(0.00%)	4(4.08%)		
Winter	55	3(5.45%)	2(3.63%)	1(1.81%)	6(10.90%)		
Parity							
1	82	2(2.43%)	6(7.31%)	1(1.21%)	9(10.97%)		
2	71	1(1.40%)	4(5.63%)	2(2.81%)			
3	61	1(1.63%)	3(4.91%)	0(0.00%)	7(9.85%)	9.04	0.107
4	45	1(2.22%)	1(2.22%)	0(0.00%)	4(6.55%)		
5	33	0(0.00%)	1(3.03%)	1(3.03%)	2(4.44%)		
>5	25	2(8.00%)	5(20.00 %)	0(0.00%)	2(6.06%)		
					7(28.00%)		
BCS							
<3	105	1(0.95%)	2(1.90%)	1(0.95%)	4(3.80%)		
3.0-4.0	117	6(5.12%)	15(12.82 %)	2(1.70%)	23(19.65 %)	10.23	0.005
>4.0	95	2(4.21%)	4(4.21%)	0(0.00%)	12(12.63 %)		
Management							
Good	125	1(0.80%)	2(1.60%)	1(0.80%)	4(3.20%)		
Medium	99	3(3.03%)	7(7.075)	2(2.02%)	12(12.12 %)	10.97	0.004
Poor	93	5(5.37%)	10(10.75 %)	2(2.15%)	17(18.27 %)		

RESULTS AND DISCUSSION

Among the studied 317 crossbred dairy cows of Chatmohor upazilla (Sub district), 33 cows were found uterine infected (10.41%) in postpartum period (Table 1). The expulsion of placenta had significant effect on post partum uterine infection.

The case of pyometra was substantially higher in present study in contrast to others. The incidence of uterine infection puerperal metritis, pyometra and endometritis were 1.89%, 5.99% and 2.52% respectively (Table 1). Dairy cattle calving season reflected greatly on the incidence of uterine infection. In the summer calving season the highest incidence uterine infection was found (13.79%) compared with different calving seasons and it was might be due to warm temperature in environment during that season. This result was in agreement with Gaafar et al. [21], where they reported that the incidence of the uterine infection increased during summer and spring calving seasons.

Table 2: Consequence of Uterine Infection on Reproductive Performance in Cross Breed Dairy Cows

Uterine status of the cows	Calving to first estrus interval (days)	Days open (days)	Service per conception (N)	Calving intervals(days)
	Mean±SE	Mean±SE	Mean±SE	Mean±SE
Metritis	56.3±.03	110.5±0.5	2.50±0.50	385±5
Endrometritis	68.5±0.5	115.4±0.4	4.75±0.50	398±6
Pyometra	49.4±0.4	105.6±0.6	3.65±0.75	390±4
Healthy	43.2±0.2	86.2±0.2	1.85±0.10	316±6

It was clearly that the incidence ratio of uterine infection was increased in old dairy cows which had parity numbers over 5 and it was about 28.00% (Table 1). Similar type of result was found by those of Deyab, Gabr et al., Gaafar et al. [21-23].The cows which had body condition score within 3.0-4.0 also showed higher incidence of uterine infection(19.65%) significantly compared to other scale. The results were similar to the findings of Dawod et al. [24] and Gaafar et al. [21].The incidence of the uterine infection increased with increasing of the fat tissue deposition and cow's body weight [21]. In fatty cows the steroid sex hormones trapped via excessive fat deposition, as these hormones are known to be fat soluble hormones. Potentially significant ($p<0.05$) and higher incidence of uterine infection were associated with poor management system where minimum complications were found with good management practice (3.20%) compared to poor management farms (Table 1). Management system reported to be plays consistently critical role in occurring uterine infection. The result was in agreement with the findings of Uddin et al. [25]

From Table 2, it was evident that the reproductive performance possessed significant difference among different uterine status in cross bred dairy cows of studied areas. The dairy cows suffering from endometritis significantly showed higher level of days to first estrus interval, days open and number of services per conception and calving interval values (68.5±0.05 days; 115.4±0.4 days , 4.75±0.50, and 398±6 respectively) than normal healthy cows (43.20±0.2 days; 86.2±0.2 days, 1.85 and 316±6 respectively). Good reproductive efficiency is an important factor for production economy in a dairy herd. Uterine infections are the most common cattle diseases that can be a significant cause of poor reproduction [26-27]. Uterine diseases have been associated with increased service per conception, extended days open, increased culling and economic losses [28-30].

CONCLUSION

Uterine infection had great negative impacts upon high yielding Holstein cows productive and reproductive performance even after efficient treatment, as it could be decreased the milk yield. Also, it increased days to first estrus, days open and number of services per conception. Moreover, concern must be given to the dairy females, which calving during summer seasons, as these seasons have high prevalence of puerperal metritis. Dairy producers must be focusing their efforts to detect puerperal metritis within the first ten days of the postpartum period. Since most of such cases appeared during this period by a rate of 89.98%. Attention should be taken to reappearance of the puerperal metritis during successive lactation seasons in the dairy females whom had a history of puerperal metritis as this disease had tended to be recurrent. Further researches in the near future must be directed to prevention of uterine infection, as most of effective treatments don't prevent the negative impacts of such disease upon dairy, reproduction and culling percentage within dairy herd.

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