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Occurrence of reproductive disorders in post parturient cows with special emphasis on vaginal culture in some selected upazilas of Bangladesh

S.K. Debnath[a], C. Mattra[b], S.M.L. Kabir[c,]*, J.U. Ahmed[a]

[a]*Department of Surgery and Obstetrics, Faculty of Veterinary Science, Bangladesh Agricultural University, Mymensingh-2202, Bangladesh.*

[b]*CP Bangladesh Co., Ltd., House # 28, Alaol Avenue, Sector # 6, Uttara, Dhaka-1230, Bangladesh.*

[c]*Department of Microbiology and Hygiene, Faculty of Veterinary Science, Bangladesh Agricultural University, Mymensingh-2202, Bangladesh.*

*Corresponding author; Department of Microbiology and Hygiene, Faculty of Veterinary Science, Bangladesh Agricultural University, Mymensingh-2202, Bangladesh.

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ABSTRACT

The present investigation was undertaken to determine the clinical trends of reproductive diseases and disorders of cows at three upazilas in the Mymensingh district with particular emphasis on vaginal culture during the period from April 2011 to March 2012. Records of reproductive cases were collected from official stock book from veterinary hospitals of 3 upazilas namely Fulbaria, Mymensingh sadar and Fulpur of Bangladesh. Microbiological investigation of vaginal swab samples (n = 20) collected from the selective cows which were suffering from various reproductive disorders were also performed. A total of 7679 clinical cases were collected and among them 68 reproductive disorders in post parturient cows were identified. The overall occurrence of reproductive disorders in post parturient cows was 0.87%. The occurrence of reproductive disorders was higher in crossbred cows (1.27%) than that of indigenous cows (0.69%). The proportion of individual reproductive disorders in post parturient cows recorded were retained placenta (44.1%), pyometra (16.8%), endometritis (11.8%), metritis (10.3%), uterine prolapse (8.9%), vaginal prolapse (5.9%) and vaginitis (2.9%). A total of 20 vaginal swab samples were

also collected from the selective cows which were suffering from various reproductive disorders for microbiological investigations. In microbiological investigations, various microorganisms were identified from vaginal culture such as *Escherichia coli*, *Streptococcus* spp, *Bacillus* spp and *Staphylococcus* spp. Among various bacterial agents *Escherichia coli* was higher (100%) and *Staphylococcus* spp was lower (10%). However, the frequency percentages of *Streptococcus* spp and *Bacillus* spp were 60% and 30% respectively. It was concluded that presence of microorganisms in uterine cavity may cause massive reproductive losses in the farming system in Bangladesh.

1. Introduction

The efficiency of today's dairy has increased due to the growing number of cows per herd and the production of milk per cow. However, increased milk production has resulted in a reduction of conception rates causing a loss of income for the dairy producer since the dairy industry relies heavily on milk production, which is caused by good conception rates. Many reproductive disorders like dystocia, metritis, endometritis, and retained placenta affect conception rates and can lead to metabolic diseases like rumen acidosis, milk fever and displaced abomasum. Recurrent metabolic diseases can eventually lead to culling of the cow. Many of these metabolic disorders can be the cause of poor nutrition and management during the close-up period and after parturition.

Various diseases and disorders can limit developing healthy productive livestock in Bangladesh. To determine the prevalence of diseases of dairy cows in Bangladesh, a survey on different diseases of cattle in an organized dairy farm was conducted elsewhere (Dewan and Rahman 1986). It has been reported that reproductive disorders are responsible for remarkable economic losses to the dairy farmers in Bangladesh (Mia and Islam, 1967; Talukder et al., 2005). The occurrence of different reproductive disorders in cows has been reported in Bangladesh by several authors (Shamsuddin et al., 1988; Das et al., 1995; Shamsuddin et al., 1995; Talukder et al., 2005; Sarder et al., 2010).

Nevertheless, the diseases and disorders of livestock are treated by the veterinarians trained on medicine, surgery and reproduction. Although, the usual prevalence of diseases or disorders related to medicine is higher than that of surgery and reproduction related counterparts, the reproduction-related diseases or disorders cause most economic losses to farmers. The economic dairy farming greatly depends on the yearly calf production from each healthy dam with normal reproductive physiology. Unlike many diseases related to medicine, occurrence of most of the reproduction related problems cannot be controlled or prevented by vaccination. Further, the resources and facilities available in the field veterinary services are not without question to diagnose and treat reproduction related diseases or disorders in Bangladesh. It is now an established fact that one of the causes of genital diseases is microorganisms. Among the genital diseases infertility due to infectious diseases is considered to be one of the most important problems in dairy herd.

Post parturient is a period of high risk for mother and offspring in all species, and cattle are no exception. As well as the risks of physical damage during the birth process or failure to release the placenta after parturition, there is often an upsurge of microbial infections in the cow. Some animals acquire infections of the uterus or mammary gland during late gestation, which may lead to premature parturition, or compromise fetal or calf health. However, the greatest impact on health and productivity is associated with microbial contamination of the uterine lumen after parturition. Amongst the mammals, *Bos taurus*, and particularly dairy cattle farmed in intensive systems, commonly acquire microbial contamination of the uterus. Indeed, 80–100% of animals have bacteria in their uterine lumen within the first 2 weeks after calving. Although immune responses progressively eliminate the microbes, up to 40% of animals still have a bacterial infection 3 weeks after calving. Of course bacterial contamination does not always imply disease. Therefore, the present study was undertaken with a view

to highlight the occurrence of reproductive disorders and consequences of uterine diseases in post parturient period.

2. Materials and methods

2.1. Study area and animals

The study was conducted in three upazilas namely Fulbaria, Phulpur and Mymensingh sader under the district of Mymensingh, which are located at the north side and 124 kms away from Dhaka city. The averages annual rainfall varied from 1429 to 4338 mm. Smallholder farmers maintains the majority of the animals adjunct to crop agriculture as having significant dependence on livestock with little or no outside labour and with returns that provide subsistence but little for saving, capital investment or for the purchase of external agriculture inputs. They are of sole source of draught power of the subsidence farming system of the country. The owner of the animals reported that these animals live on mainly rice straw; little grazing and wheat/pulse bran was used for concentrate. Cattle populations in selected three upazilas in Mymensingh district of Bangladesh are presented in Table 1.

Table 1
Cattle population in selected three upazilas in Mymensingh district of Bangladesh.

Serial No.	Upazila	Number of cattle		Total cattle
		Indigenous	Crossbred	
1	Fulbaria	122368	65684	188052
2	Phulpur	136474	63736	200210
3	Mymensingh Sadar	86006	31617	117623

2.2. Data Collection Procedure

The investigator personally visited all the selected upazila hospitals, extracted the information on reproductive disorders of post parturient cows from the data sheet designed by the hospital authority. Therefore, records of reproductive cases were collected from official stock book during April 2011 to March 2012 from Veterinary Hospitals of 3 upazilas namely Fulbaria, Mymensingh sadar and Fulpur. Out of 7679 clinical cases, a total of 68 reproductive disorders of post parturient cows were screened out from datasheet of official stock book.

Furthermore, a total of 20 vaginal swabs were collected from the selective cows which were suffering from various reproductive disorders. The animals were controlled firstly; the genitalia and neighboring parts were washed thoroughly with soap water. The vulva of the animals was then wiped clean and disinfectant with a swab of cotton wool soaked in alcohol. The clean and sterilized cotton plug applicator was then inserted in the vagina. The apparatus employed in collecting samples was pattern after the one design by Lindy and Hatfield (1952).

2.3. Microbiological investigation of vaginal swab samples

A total of twenty vaginal swab samples were collected aseptically and transferred to sterile nutrient broths in sterile screw capped test tubes. Thereafter, all swab samples were transported in an isolated container packed in ice and brought to the Microbiology Laboratory of Bangladesh Agricultural University, Mymensingh for subsequent studies.

2.4. Media and reagents employed

2.4.1. Solid media

The media used for bacteriological analysis were nutrient agar (NA), MacConkey agar (MA), blood agar (BA), eosin-methylene-blue agar (EMB), Salmonella-Shigella agar (SSA), and staphylococcal mannitol salt agar. The commercial media were prepared according to the direction of the manufacturer (Hi-Media, India).

2.4.2. Liquid media (broth)

The following liquid media were used for the bacteriological analysis**:** Nutrient broth (NB), MacConkey broth (MB), peptone broth, methyl-red and voges-proskauer broth (MR-VP broth), selenite broth (SSB), Koser's citrate

medium, semisolid motility indole urea (MIU). All of the liquid media used for the bacteriological analysis were purchased from Hi-Media, India.

2.4.3. Reagents

The reagents used during the study were 0.1% peptone water, phosphate buffer saline (PBS), phenol red, reagents for Gram's staining like methylene blue, Gram's iodine, 3% hydrogen peroxide, oxidase reagent (tetramethyl phenylenedimine dihydrochloride), mineral oil, normal physiological saline solution and other common laboratory chemicals and reagents. All of the reagents used during the study were purchased from Hi-Media, India.

2.5. Cultural and biochemical examination of bacterial isolates obtained from samples

The cultural examination of swab samples for bacteriological analysis was done according to the standard method as per instruction of Cowan (1985). The examination followed detailed study of colony characteristics including the morphological and biochemical properties. In order to find out different types of microorganisms, different kinds of bacterial colonies were isolated in pure culture.

2.6. Gram's staining

Gram's Method of staining was followed during the experiment for the morphological study of bacteria to provide basic information about the presumptive bacterial identification as per recommendation of Cowan (1985).

3. Results

A total of 68 reproductive cases of post parturient cows were recorded from different veterinary hospitals over a period of one year (April/2011 to March/2012) in 3 upazilas of the Mymensingh district. Table-2 shows the proportions of reproductive disorders recorded in 3 upazilas.

Table 2
Proportions of reproductive disorders of post parturient cows recorded in 3 upazillas during a year.

Sl. No.	Upazila	Total clinical cases	Reproductive disorders	Percentage (%)
01	Fulbaria	2580	24	0.93
02	Phulpur	2810	31	1.10
03	Mymensingh sadar	2289	13	0.57
Total		7679	68	0.87

The recorded proportion of reproductive disorder of post parturient **c**ows out of the hospital cases was 0.87%. Among the 3 upazilas the proportion of reproductive disorder was highest in Phulpur (1.10%) followed by Fulbaria (0.93%) and lowest in Mymensingh sadar (0.57%).

Table 3
Occurrences of reproductive disorders of post parturient cows in crossbred and indigenous cattle in three upazilas.

SL No.	Name of upazila	Clinical cases in indigenous cattle			Clinical cases in crossbred cattle		
		Total clinical cases	Reproductive disorders	Percent ages (%)	Total clinical cases	Reproductive disorders	Percentages (%)
01	Fulbaria	1617	12	0.74	963	12	1.25
02	Phulpur	1760	15	0.85	1050	16	1.52
03	Mymensingh Sadar	1617	06	0.48	672	7	1.04
Total		4994	33	0.69 (avg)	2685	35	1.27 (avg)

Table 3 shows that the occurrences of post-partum reproductive disorders in all upazilas was higher in crossbred (1.27%) than that of indigenous cattle (0.69%). The occurrences of parturient disorders in both indigenous and crossbred cattle was higher in Phulpur (0.85% and 1.52% respectively) and lower in Mymensingh Sadar (0.48% and 1.04% respectively). Table 3 shows that in indigenous cattle 0.74%, 0.48% and 0.85% post-partum reproductive cases were recorded in Fulbaria, Mymensingh Sadar and Phulpur, respectively. In crossbred cows, the reproductive disorders were 1.25%, 1.04% and 1.52% in Fulbaria, Sadar and Phulpur, respectively.

Table 4
Occurrence of reproductive disorders of post parturient cows.

Diseases	No. of cows	Percentages (%)
(i) Retained placenta	30	44.12
(ii) Pyometra	11	16.18
(iii) Endometritis	08	11.76
(iv) Metritis	07	10.29
(v) Uterine prolapse	06	8.82
(vi) Vaginal prolapse	04	5.85
(vii) Vaginitis	02	2.94
Total	68	

Table 4 represents that the highest & lowest occurrence of reproductive disorders of post parturient cows were retained placenta (44.18%) and vaginitis (2.94%). Other reproductive disorders of post parturient cows such as pyometra (16.18%), endometritis (11.76%), metritis (1.29%), uterine prolapse (8.82%), vaginal prolapse (5.85%) and vaginitis (2.94%) were also recorded.

Colony characteristics of *E. coli*, *Streptococcus*, *Bacillus* & *Staphylococcus* are presented in Table 5.

Table 5
Colony characteristics of the isolated bacteria.

Organism	Colony characteristics
E. coli	Smooth circular colonies with dark centres and metallic sheen on EMB agar containing gram negative pleomorphic rods.
Streptococcus pyogenes	Small, white, hard drew drop like colonies with hemolysis in blood agar were situated.
Bacillus spp	Small, convex, round colonies on blood agar were found.
Staphylococcus aureus	Distinctly white colour and lemon yellow colour in blood agar were studied separately.

Table 6
Frequency percentage of bacterial isolates obtained from 20 vaginal swab samples.

Sl. No.	Name of isolates	Number of isolates	Percentages (%)
1.	*Escherichia coli*	20	100
2.	*Streptococcus* spp	12	60
3.	*Bacillus* spp	06	30
4.	*Staphylococcus* spp	02	10

Table 6 demonstrates the frequency percentage of bacterial isolates obtained from 20 vaginal swab samples. In this study, *Escherichia coli* occupied the highest percentage of occurrence (100%). *Streptococcus* spp obtained the second position (60%), *Bacillus* spp & *Staphylococcus* spp occupied the third (30%) and fourth (10%) position respectively.

4. Discussion

This particular study indicated clinical reproductive problems such as retained placenta, pyometra, endometritis, metritis, uterine prolapse and vaginal prolapse which are considered the major factors responsible for the economic losses of smallholder dairy cows in the Mymensingh district.

The variation in the prevalence of reproductive problems among the different region may be due to effects of the differences in management (production) systems and environmental conditions including poor sanitation, nutritional status, contamination during calving, the indiscriminate use of broad spectrum antibiotics and corticosteroids for the treatment of reproductive disorders or the insemination of animals with contaminated semen that may lead to microbial infections of the uterine environment, which greatly affect the occurrence of reproductive health problems. Cattle rearing system and environment might be different in each region.

The higher prevalence of reproductive disorders in crossbred (1.27%) in comparison to indigenous cattle (0.69%) was observed. The higher occurrences rate of reproductive problems was in crossbred cattle than indigenous zebu cattle which may be due to the fact that European breeds are less adapted to tropical conditions of high temperature and humidity, disease and low feed quality than zebu cattle (Mukasa-Mugerwa, 1989) making them more susceptible than indigenous zebu cattle. Beside this, crossbreds require more elaborated management, feeding and better health care than the indigenous zebu to get better reproductive performance (Tekleye et al., 1991). More crossbreds were brought to the hospital than local cows because crossbreds are more valuable animals. The occurrence of retained fetal membrane (12.8%) in recent study is in line with those reported by Mukherjee et al. (1993) (15.6%). Satya pal (2003) observed 27.7% cases of retained placenta in Karan Fries cows and Saini et al. (1988) stated 17.5% of retained placenta in different crossbreed cows of Holstein Friesian, Brown Swiss, and Jersey with Hariana.

The important of microorganism as one of the causes of infertility has been recognized (Nuun 1970, Deka et al., 1979, Sirohi et al., 1989; Kwon et al., 2012). These infectious agents affect fertility by altering the uterine environment. Microbes may produce a marked change in P^H of uterine and vaginal secretions, inflammation, and denudation of uterine mucosa. In the present study 20 reproductive disorder of post parturient cows were found to be positive for bacterial isolation. This finding is in close agreement with several other reports on isolation of bacteria from genital tracts (Deka et al., 1979).

In the present study predominant bacteria isolated from post parturient cows having reproductive disorders were *E. Coli*, *Staphylococcus* spp, *Streptococcus* spp and *Bacillus* spp. Similar report of isolation of bacteria from the genital tracts of cows were also recorded by Deka et al. (1979).

5. Conclusion

The economic importance of reproductive failure in cattle is recognized today as serious challenge and one of the most serious economic problems in the cattle industries of Bangladesh. From this study, it is concluded that the most common reproductive disorders in cattle in Bangladesh are retained placenta, pyometra, endometritis, metritis and uterine prolapse. In this study, some organisms are identified from vaginal swabs which are *Escherichia coli, Streptococcus* spp*, Bacillus* spp *and Staphylococcus* spp. Main causes of this uterine infection are unhygienic delivery and mishandling during parturition. Hygienic measurement and safe delivery is suggested during parturition.

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