**Chapter-I**

**INTRODUCTION**

Bangladesh has a high number of cattle population (21.5 million) with about 3.3 million cows in milk (BBS, 2011). The udder and its teats are the most important physical assets of milch cow, which play a vital role in sustainable economic milk production. It is also recognized that the udder characteristics are very important in respect to milk production. Due to position, size, shape and anatomical feature of udder, the dairy cows are susceptible to infection and injuries, which results in mastitis (Shukla *et al.,* 1997). The morphology of teat, especially apex and teat canal are recognized as parts of the passive defence mechanisms against intramammary infection.

Mastitis is defined as an inflammation of the mammary gland and is almost always associated with bacterial infection. It is one of the major problems of the dairy industry world wide including Bangladesh. It is also predominantly associated with some other risk-factors described elsewhere particularly on farms and cows (Kivaria *et al.,* 2004; Van Schaik *et al.,* 2005). Experience in mastitis control indicates that while the occurrence of inflammation in the udder may not be entirely preventable in all cows within herd, the intensity of clinical attacks may be reduced significantly through selection and better management. Information on selection (particularly for cross-bred dairy cows in Bangladesh) of genetic characteristics related to individual resistance against mastitis and in establishing management of udder health control is a necessary prerequisite. Study on mastitis like morphological relationship of udder and teats with mastitis (Ahmed *et al.,* 2005) have been carried out in Bangladesh. However, this comprehensive study will find out the prevalence of udder and teat diseases and their association with udder and teat characteristic, milk yield and milk flow rate in dairy cows . To diagnose mastitis, it is important to learn about the clinical signs of mastitis. The sign varies with the stage of mastitis. In acute cases, the udder becomes cold to touch and in chronic mastitis it becomes hot. The treatment procedure is also depended on the clinical signs and the stage of mastitis. Any wrong diagnosis can increase the danger of mastitis as well as decrease the milk production.

**Chapter-II**

**REVIEW OF LITERATURE**

Literatures on various aspects of udder diseases in dairy cows is highly voluminous. However, the following literatures have covered clinical mastitis, udder wounds and teat obstruction.

**2.1 Etiology of udder diseases**

A range of microorganisms were isolated from sub clinical cases of mastitis in cows such as *S .aureus,*  *S.epidermidis,* *Streptococcus. Uberis, Str. agalactiae,* *Str. dysgalactiae,* *Corynebacterium pyogenes, Corynebacterium bovis* and *coliform* ( Gonalez *et al.* 1990).

The overall monthly incidence of clinical mastitis was reported to be 4.06% in farm cattle in India (Probhakar et al;1995). This study isolated the following organisms causing clinical mastitis: *S. aureus*, *E. coli*, *Str. Agalactiae, Pseudomonas* spp, *Str. pyogene*s, *Klebsiella* spp, *Str. dysgalactiae, Proteus* spp, *Str. uberis, and Diptheroids.*

Complete teat cistern obstruction may be congenitl or acquired before the first lactation or acquired a diffuse cisternal obstruction or pencil obstruction during dry period. The condition is thought to be caused by intramammary infection or blunt trauma during calfhood. Such infections

can be initiated by aggressive nursing of incompletely weaned heifer Other causes include improper bedding containing sharp substances, bites from dogs, etc., and udder wounds are sometimes caused maliciously or otherwise by utensils used in the cow-shed. Wounds involving the teat canal or the milk-sinus, allowing the escape of milk, seldom heal satisfactorily and a fistula often results (Chakrabarti, A.2009).

**2.2 Prevalence and Risk factors of udder diseases:**

In Bangladesh, the frequency of staphylococcal mastitis has been reported to range from 25.5 to 43.8% in cattle. The organisms cause Staphylococcal mastitis in cattle are *S. aureus S. intermediusand S. hycusin S. epidermidis, S. chromogenes, S. warneri, S. xylosus, S. simulans* and *S. sciuri .*

The incidence of diseases in mammary gland in cows varied from 24.1 to 32.8% during the first four lactations. The occurance of diseases in mammary gland has been reported to be more in high milk yielding cows (Harrop *et al*. 1984).

The prevalence of bovine udder diseases in the western hills of Nepal was the highest (17.6%) during the first lactation, declining in successive lactation. The prevalence was higher in young animals and found more than 88.8% during the first month of lactation ( Joshi and shrestha,1995).

The herd level prevalence of mastitis appeared to be 8.8% in Pakistan of which lactating animals contributed 8.3%. The prevalence of sub clinical mastitis was recorded to be 14.3% in samples obtained from different quarters of udder of cattle in Lahore, Pakistan. The highest prevalence of mastitis was observed in 6-8 years old cows and buffaloes in Pakistan. The prevalence of mastitis was the highest (53.6%) during early lactation followed by middle (22.0%) and late lactation (24.4%). The prevalence was also higher in high yielding animals than that of less yielding ones. Surgery in udder were more prone to mastitis (4%) (Qazi *et al,* 1999).Teat edema, blood in milk and milk leakage at calving were potentially associated with clinical mastitis caused by *Staphylococcus aureus* (Waage et al, 2000). Improper milking methods were also associated with the occurance of mastitis in the cattle farm (Thirunvukkarasu *et al.*1998).

**2.3 Control of udder diseases:**

Practices such as good [nutrition](http://en.wikipedia.org/wiki/Nutrition), proper milking [hygiene](http://en.wikipedia.org/wiki/Hygiene), and the culling of chronically infected cows can help to prevent udder diseases. Ensuring that cows have clean, dry bedding decreases the risk of infection and transmission. Dairy workers should wear gloves while milking, and machines should be cleaned regularly to decrease the incidence of transmission (Radostits *et al.* 1995).

Awareness of the economic losses associated with mastitis is resulting in a desire for mastitis control programs. Control programs are focused on detection of mastitis (by the above methods), identification of the causative agent(s) and prevention of transmission by removing the source of the agent (milk contaminated fomites, bedding, persistently infected cows, etc.) ( Faye *et al.* 1998).

Environmental pathogens are more difficult to control than the contagious pathogens. Many of these organisms are resistant to germicides in teat dip and antibiotics in dry cow therapy. Identification of the source and removal (bedding, ponds, mud) is the key to control. Udders can be clipped to minimize the amount of manure clinging to the glands. Only clean dry teats should be milked. Teats should be pre-dipped with germicide before milking. Cows should be kept standing after milking (offer them feed). The milking parlor should be kept clean. The teat dipper should be kept clean; organisms an survive in many germicides. Pipelinesor water heater may need to be replaced in cases of *Pseudomonas* contamination.

**Chapter-III**

**METHODOLOGY**

**3.1 Clinical placements of the study:**

In order to estimate the frequency of udder diseases and their therapeutic management, a clinical survey was carried out from July to December, 2012 at different national and International Internship placements. The placements included Upazilla Veterinary Hospital (UVH), Nilphamari; Shahidul Al Quadery Teaching Veterinary Hospital (SAQTVH), CVASU; Veterinary College and Research Institute (VCRI), Namakkal; Madras Veterinary ollege (MVC), Chennai.

**3.2 Number of clinical cases:**

 A total of 18 clinical cases of dairy cow were studied in order to make presumptive diagnosis based on clinical signs and preliminary clinical diagnostic tools.

**3.3 Data collection:**

A clinical data sheet was developed to record animal level data. In addition clinical signs and symptoms Age, breed, stage of lactation, and therapeutic management details were recorded.

**3.4 Diagnostic methods:**

We performed California mastitis test to detect somatic cells and then diagnose subclinical mastitis according to the following steps:

**Fig.: CMT solution and four wells**

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**Added 2-3 ml of CMT solution in each well.**

**2-3ml milk from each quarter was collected in each of four well.**

** **

**A purple color gelatinous mass was observed in positive cases.**

**Then mixed the CMT solution with milk**

 **3.5 Data Analysis**

All collected data were entered into Microsoft word spreadsheet. The frequency of different categories of udder diseases or conditions, observable clinical signs and treatment management were expressed in frequency numbers.

**Chapter- IV**

**RESULTS**

**4.1** Among the recorded mastitis cases in cattle, subclinical mastitis contributed 8 and clinical mastitis contributed 4 cases. Other teat problems were less numbers than mastitis in cattle(6). The detailed results were presented in Table 1.

**Table 1: Frequency of udder diseases or conditions in cattle estimated from four internship placements.**

|  |  |  |  |
| --- | --- | --- | --- |
|  | Bangladesh | India |  |
| Disease/ disease conditions | UVH, Nilphamari | SAQTVH,CVASU | VCRI, Namakkal | MVC, Chennai | **Total** |
| Subclinical mastitis  | 3 | 2 | 2 | 1 | **8** |
| Clinical mastitis  | 1 | 1 | 2 | 0 | **4** |
| Teat injuries  | 0 | 1 | 2 | 1 | **4** |
| Teat obstruction  | 0 | 0 | 1 | 1 | **2** |
| **Total** | **4** | **4** | **7** | **3** | **18** |

**4.2 Observable clinical signs of mastitis in cattle:**

Among observable clinical signs mild discoloration (12) of milk ranked the highest frequency followed the category of swollen, hot, and painful udder (8), depression (6) and other signs by Table 2

**Table 2: Frequency of observable clinical signs of mastitis in cattle regardless of different stage of mastitis (N=12).**

|  |  |
| --- | --- |
| Signs | Frequency no. |
| Discolored milk | 12 |
| Swollen, hot, & painful udder | 8 |
| Depression | 6 |
| Flakes & clots in milk | 5 |
| Fever | 4 |
| Increase pulse rate | 4 |
| Loss of appetite | 4 |
| Dehydration | 4 |

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**Fig.: Clotted milk comes from udder qqqquarter**

**Fig.: Swollen udder**

**4.3 Frequency of clinical signs of teat injuries and teat obstruction:** The detailed recordings are presented in Table 4.

**Table 3:** Frequency of observed clinical signs of teat injuries (N=4).

|  |  |
| --- | --- |
| Signs | Frequency |
| Swollen & discolored skin | 4 |
| Leathery texture in skin | 3 |

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**Fig.: Injuries in the left teat**

**Table 4:** Frequency of recorded clinical signs of teat obstruction (N=2).

|  |  |
| --- | --- |
| Signs | Frequency |
| Insufficient milk comes from the affected quarter | 2 |
| Flabby & meaty teat | 2 |
| Cisternal obstruction | 1 |
| Palpable fibrosis | 1 |

**Table 5: Treatment managements of udder problems in cows**

|  |  |  |
| --- | --- | --- |
| Diseases | Treatment | Treatment response rate |
| Sub clinical mastitis(N=8) | * Neomastipra: 1 syringe/affected quarter at every 12 hours; Neomastipra contains benzylpenicillin 1000000 IU, dihydrostreptomycin 62.4mg, neomycin 36mg, polymyxin 350000 IU, Sulphadimidine 250mg hydrocortisone 20mg), Pharma and pharma Ltd; Bangladesh for 3 days after milking.
 | 60-80% |
| Clinical Mastitis(4) | * Neomastipra: As described for subclinical mastitis.
* Gentasone-5: 1ml/10kg body weight, I/M for 1st day at 12 hours interval and then at 24 hours interval for 5 days; Gentasone-5 contains 50mg Gentamycin, Chemist Ltd; Bangladesh
* Kop-vet 3mg/kg body weight daily for 3 days; each 100ml of kop-vet contains ketoprofen 10mg, Square Ltd; Bangladesh.
 | 40% (only mild and moderate cases) |
| Teat injury(4) | **Superficial wounds** to the udder and teats were cleaned with antiseptic solution(povisep solution) and treated with frequent application of antiseptic powders (Sumid vet). In case of Wounds at the teat orifice was dressed with antiseptic creams (Neobet) and bandaged after milking. Given prophylactic treatment with Gentasone-5 at 1ml/10kg body weight, I/M for 1st day at 12 hours interval and then at 24 hours interval for 5 days; each ml contains 50mg Gentamycin),  | 100% |
| Teat obstruction(2) | The intermittent disruption of milk flow was removed by forced pressure downward on the teat cistern and sometimes by use of specialized instruments inserted through the teat canal. Then a course of antibiotic was continued for 5 days (Gentasone-5 at 1ml/10kg body weight, I/M for 1st day at 12 hours interval and then at 24 hours interval for 5 days. | 100% |

**Chapter-V**

**DISCUSSION**

The frequency of udder diseases in dairy cattle in the present study corresponds to the earlier studies in Bangladesh and India (Joshi and Shrestha, 1995; Chakrabarti, 2003; Haque, 2009 ;). They found the incidence of diseases in mammary gland in cows varied from 24.1 to32.8% during the first four lactation. The occurance of diseases in udder has been reported to be higher in high yielding cows (Harrop et. Al. 1994). The prevalence was higher in young animals and found more than 88.8% during the first month of lactation (Joshi and Shrestha, 1995).

The result of this observation revealed that the frequency of udder diseases is higher in India than Bangladesh due to higher proportion of high yielding variety. Among all of the udder diseases, sub clinical mastitis is more frequent than that of other udder diseases. But the control system is more strong in India, that’s why production is also higher in India than Bangladesh. The farming system, feeding system and all of the management system is very much hygienic in India. But in Bangladesh, we have seen that most of our dairy farmer are undereducated and don’t know how to maintain the hygiene of the farm.

 The major microorganisms were isolated from subclinical cases of mastitis in cows included- *S. aureus,*  *S. epidermidis,* *Streptococcus Uberis, Str. agalactiae,* *Str. dysgalactiae,* *Corynebacterium pyogenes, Corynebacterium bovis* and *coliform.* Gonalez *et. al.* 1990, isolated these organisms from his experiment in the cases of subclinical mastitis.

From the history of teat wounds, we had known in this study that it was caused by aggressive nursing of incompletely weaned heifer or sometimes it may be due to improper bedding containing sharp substances, bites from dogs, etc. Some owner also complained that, it occurred by the utensils used in the cow shed. these are agreed with Chakrabarti, (2009).

In the observed dairy cattle, major clinical signs recorded in the study were flakes and clots in milk (41.6%), swollen, hot, and painful udder (66.6%), discolored milk (100%), fever, increase pulse rate, loss of appetite, dehydration & depression (33.3%) in the cases of mastitis (Table-2). Again Swollen & discolored skin with Leathery texture in skin were the signs of teat injuries (Table-3). In the cases of teat obstruction, the sign we found were flabby and meaty teat, cesternal obstruction, palpable fibrosis, and finally milk did not comes from the udder (Table-4). Ahmed et.al.(2010) recorded that hot & painful udder in acute mastitis and cold udder in chronic mastitis, which are similar to the present study.

 In this study mastitis and teat injury were treated with systemic antibiotics, Non Steroidal Anti Inflammatory Drugs (NSAID, anticeptic solution and powder along with antibiotic respectively. These results are agreed with Kivaria.*et.al*. (2004).

**Chapter-VI**

**CONCLUSION**

The study was conducted with total of 18 clinical cases of different animal species in India & Bangladesh. The result from the study indicate some points of comparison between India & Bangladesh, points including frequency, prevalence and risk factors of udder diseases of cattle. Purpose of this study was to identify the causes, sources of causes; to diagnose udder diseases; and to control udder diseases. From the consideration of the points the study revealed that the frequency of udder diseases is higher in India than Bangladesh due to higher proportion of high yielding variety. Among all of the udder diseases, sub clinical mastitis is more frequent than that of other udder diseases. But the control system is more strong in India, the farming system, feeding system and all of the management system is very much hygienic in India; that’s why production is also higher in India than Bangladesh. The American Veterinary Medical Association’s Veterinarian’s Oath (20011) places equal emphasis on professional obligations for protecting animal health, relief of animal suffering, conservation of animal resources, and promoting public health, as do similar oaths from other countries. So the veterinarian of Bangladesh should give the emphasis to maintain the hygiene of dairy farm to control and prevent udder diseases and also the people should be informed about it.

**Chapter-VII**

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