PREVALENCE OF SUB-CLINICAL MASTITIS AT BANARIPARA UPAZILLA, BARISAL

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ABSTRACT

A study was aimed to determine the prevalence of sub-clinical mastitis and also determine the other risk factors that intensify this condition. Prescribed questionnaire was used to take baseline information of the animals and farms and California mastitis test kit was used to determine the SCM in lactating cow at farm level. It appears from this study that an overall prevalence of SCM was 51.56% in milking cows at Banaripara Upazilla, Barisal. Crossbred cows were significantly affected with SCM than local breed lactating cows. The farm type affect significantly ($p<0.05$) on the occurrence of this diseases. The prevalence of sub-clinical mastitis in cow was significantly ($p<0.05$) higher in 3rd (80%) parity compared to 1st (38.09%) and 2rd (45.83%) parity as well as non pregnant cows (55.55%) are more prone to infection than pregnant cow (46.43%). The farm floor condition and aged cows don't have any effect on SCM. Prevalence of sub-clinical mastitis was significantly ($p<0.05$) higher in high yielding (87.5%) cows than medium (70%) to low (33.33%) yielding cows. A well documented continued research and educational effort is required to increase producer awareness of cost due to mastitis to the dairy enterprise. From this study it was concluded that cow breed, farm type, parity of cows, physiological status of animal and milk yield per cow were found to be important risk factors associated with the occurrence of sub clinical mastitis in dairy cows. The occurrence of this disease remains a substantial problem for dairy producers.

Keywords: Prevalence, sub-clinical Mastitis, California Mastitis Test, Barisal.

INTRODUCTION

Bovine mastitis is a single most common disease syndrome of adult dairy cows recognized mainly as clinical and sub-clinical types worldwide, which has great economic impact on dairy industry with complex multifactorial etiology (Nooruddin *et al.*, 1997). About 75-80% mastitis is subclinical, characterized by a significantly increased leukocyte count in milk (Bradley, 2002). In subclinical mastitis (SCM), there are no obvious clinical signs. Instead there is an increase in somatic cell counts of the milk (Radostits *et al.*, 2000).

SCM persists in the udder without causing any gross abnormality both in the gland and milk and only could be known only after laboratory examination. This condition is very much important due to the fact that it is about 15 to 40 times more prevalent than the clinical form, persists for long duration, difficult to detect, adversely affects milk quality and constitutes and act as a reservoir of microorganisms that can affect other animals within the herd due to its contagious nature (Schultz *et al.*, 1978). In Bangladesh contest this condition is more serious and causes much greater loss to the dairy industry every year. Some risk factors like pendulous udder with long teats, larger size of teat orifice in high yielding cows, traumatic injuries etc. may play an important role as inciting of mastitis. Predisposing factors such as poor management and hygiene and faulty milking machines are known to hasten the entry of infectious agents and the course of the disease (Majic *et al.*, 1993). In terms of economic loss mastitis is undoubtedly the most important disease with which the dairy industry has to contend. Once a cow suffers from mastitis it will never return to its normal milk production. Kader *et al.* (2003) reported that the annual economic loss due to reduced milk production alone caused by SCM in Bangladesh is Tk. 122.6 million (US $ 2.11 million). Besides causing huge losses to milk production, the sub-clinically affected animals remain a continuous source of infection to other herd mates. The prevalence of SCM in dairy cows may develop clinical mastitis at any time under certain stress factor(s). Early diagnosis of sub-clinical mastitis is essential because changes in the udder tissue take place much earlier than they become apparent and also could reduce the production cost as well as help to take necessary action to prevent clinical mastitis. Several diagnostic techniques have been used elsewhere like california mastitis test (CMT),

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white slide test (WST) and surf field mastitis test (SFMT) that are considered as simple, easily applicable, rapid indirect screening tests for determining SCM. Among them validity of CMT in diagnosis of SCM was established very well in various milking stages. Prodhan *et al*. (1996) reported that the prevalence of sub-clinical mastitis in milch cows was 16.25% with WST and 15.52% with CMT at Baghabari, Shirajgonj. Information on SCM in local and cross breed cows is however scanty. Especially, no study has been taken to find out on SCM in Banaripara upazilla of Barisal District. However, presently attempt was made to quantify the occurrence of SCM and associated risk factors. Therefore, the objectives of the present study were: to determine the prevalence of bovine SCM in local and cross breed cow and to determine associated risk factors in the study area.

MATERIALS AND METHODS

Study area and period
The study was carried out at Banaripara, Barisal. The study was conducted during the period from 23rd March to 14th May, 2014.

Data collection
Before taking samples the data was recorded through prescribed questionnaire. Dairy cows from small, medium and large farm are source of population. Cross and local breeds are available among dairy cows.

California Mastitis Test
Milk samples were collected aseptically from individual quarter of udder. The CMT was performed using Leucocytest® (France) according to company direction. Briefly, a plastic paddle with four receptacles was used for this purpose. After cleaning the teats, 2 ml of foremilk was stripped from 4 teats of each cow separately into the respective cup of the paddle. Equal amount (2 ml) of reagent was added to milk in each cup of the plastic paddle. Then the reagent and milk were mixed in the cups of the plastic paddle by a swirling motion. The result was evaluated immediately by visual examination. No coagulation or gel formation of milk was regarded as negative for subclinical mastitis and coagulation or gel formation of milk was regarded as positive for subclinical mastitis.

Grading of sub clinical mastitis milk

i) Negative (-ve): The mixture remained fluid without thickening or gel formation.
ii) Trace (±): A slight slime formation was observed. This reaction was most noticeable when the paddle was rocked from side to side.
iii) Moderate (+): Distinct slime formation occurred immediately after mixing the solution and milk. This slime sometime dissipated over time. When the paddle was swirled, fluid neither formed a peripheral mass nor did the surface of the solution become convex or "domed up".
iv) Distinct (++): Distinct slime formation occurred immediately after mixing the solution with milk. When the paddle was swirled, fluid formed a peripheral mass and the bottom of the cup used to be exposed.
v) Strong (+++): Distinct slime formation occurred immediately after mixing the solution with milk. This slime dissipated over time. When the paddle was swirled, the surface of the solutions became convex or "domed up".

Statistical analysis
The data obtained from the questionnaire and laboratory tests are analyzed by MS/Excel and SPSS statistical system. The data were organized to generate other variables including age, breed, parity, lactating time, herd size, milk yield. The prevalence of sub-clinical mastitis was calculated as the percentage of SCM affected cows out of the total lactating cows.

RESULTS AND DISCUSSION

Prevalence of sub-clinical mastitis compared with clinical mastitis

A total of 64 dairy cows handled at Banaripara Upazilla, Barisal. The study was conducted during the period from March to May; 2014. Among them 33(51.56%) cows were positive to CMT. In this study, the overall prevalence of subclinical mastitis was 51.56% in lactating cows (Table-1). This result was supported by other findings (Singh and Baxi, 1988) who reported that 54.0% prevalence of subclinical mastitis in cows in India.

Table 1. Prevalence of sub-clinical mastitis in cows at Banaripara Upazila, Barisal.

Total No. of cow Examined	No. of cow affected with sub-clinical mastitis	Prevalence of sub-clinical mastitis (%)
64	33	51.56%

Islam *et al.* (2011) who reported 29% overall prevalence of subclinical mastitis in lactating cows of Tangail, Bangladesh. Prodhan *et al.* (1996) reported a lower prevalence (15.8%) of subclinical mastitis in cows of Baghabari milkshed area, Shirajgonj, Bangladesh. These differences of prevalence rates of subclinical mastitis might be due to difference of breeds of animals, management practices and the tests used for screening of the milk samples.

Prevalence of sub-clinical mastitis in different types of breed

In this study, the prevalence of subclinical mastitis was significantly higher (p<0.05) in crossbreds cows (64.28%) compared to local cows (27.27%) (Table 2). This result is similar with the view of Rahman *et al*. (1997) and Nooruddin *et al*. (1997) who recorded higher frequency of sub-clinical mastitis in cross breeds. Cross breed cows produce more milk than the local zebus. Bigger size, long, and pendulous udder in cross breed cow might have picked up more infection resulting higher rate of infection.

Table 2. Prevalence of Sub-clinical mastitis in different types of breed.

Types of breed	No. of cows	No. of affected cows	Prevalence (%)	P-value
Cross	42	27	64.28	0.00489
Local	22	6	27.27	

Prevalence of sub-clinical mastitis in relation to farm type

It was observed that the prevalence of subclinical mastitis was comparatively higher in large (75%) farm compared to medium (33.33%) and small (46.34%) sized farm but this is no any significant difference (P>0.05). However, SCM was significantly higher (p<0.05) in large sized farm than small sized farm. This observation can support the report of Rahman *et al.* (2009). Certain herd factors can increase the risk of SCM due to specific mastitis pathogens. In case of large herd size the pathogen are spread rapidly than small herd size. This statement can also support the report of Nooruddin *et al.* (1997) they reported that percentage of SCM is higher in large and medium farm.

Table 3. Prevalence of Subclinical mastitis in relation to farm type

Farm type	Total No. of Farm	Total No. of cows	Total No. of cows examined	Total No. of Affected Cows	Prevalence (%)
Large (>16)	1	63	16	12	75%
Medium (6-15)	4	24	5	2	40%
Small (1-5)	35	104	43	19	44.18%
Overall difference					P=0.094
Comparative difference					
Large versus Medium					P= 0.1473
Large versus Small					P=0.0439
Medium versus Small					P= 0.8583

Prevalence of mastitis in different parity of dairy animals

Parity plays an important role in causing sub-clinical mastitis. The prevalence of sub-clinical mastitis in cows at different parity was presented on Table-4. There was no any significant difference among this parity group but when comparison was done between 1st and 3rd lactation the SCM was significantly higher (p<0-05) in 3rd lactation compared to 1st lactation. This result is in agreement with the observation made by Sing *et al*. (1982) who reported highest prevalence rate of sub-clinical mastitis in 2nd parity than 1st one. The finding of present study also support with the findings of Rasool *et al*. (1985) who observed an increased prevalence of sub-clinical mastitis in old animals.

Table 4. Prevalence of sub-clinical mastitis in accordance to different parity of dairy cow.

Parity status	Total no. of cows examined	Total no. of affected cows	Prevalence (%)
1st	21	8	38.09%
2nd	24	11	45.83%
3rd	10	8	80%
4th	9	6	66.67%
Overall difference			P=0.095
Comparative difference			
1st parity versus 2nd parity			P=NS
1st parity versus 3rd parity			P= 0.0291
1st parity versus 4th parity			P=NS
2nd parity versus 3rd parity			P=NS
3rd parity versus 4th parity			P=NS

Prevalence of sub-clinical mastitis on reproductive state

The prevalence of sub-clinical mastitis on reproductive state was presented in the table 6. The prevalence of sub-clinical mastitis was comparatively higher in non pregnant 57.14% compared to pregnant cows 46.43 % but this is no any significant difference (P>0.05).

Table 5. Prevalence of sub-clinical mastitis according to different reproductive status of animals.

status	Total No. of cows	Total No. of affected cows	Percentage (%)	P-value
Pregnant	28	13	46.43 %	0.47
Non pregnant	35	20	55.55%	

In pregnant animal the amount of milk production is reduced due to lower amount of prolactin release and lower nutritional level because fetus takes a great part on nutrition. Low milk production is less prone to sub-clinical mastitis (Nulin *et al.*, 1989).

Prevalence of sub-clinical mastitis of cow depending on floor component

SCM was comparatively higher in brick block floor than soiled floor but there was no significant difference (P>0.05). This can be explained by the fact that farms with soil floor would dry more quickly than the brick floor (Hogan *et al*. 1990). As a result soiled floor animal were less affected than brick block floor. But wet brick floors are most harmful for dairy animal to cause sub-clinical mastitis. It appeared that the floor was a potential source for sub-clinical mastitis organisms to enter the udder through the teat orifice.

Table 6. Prevalence of Sub-clinical mastitis of cow depending on floor component

Floor condition	No.of cows examined	No. of affected Cows	Prevalence (%)	P-value
Brick block floor	53	30	56.60%	0.0765
Soiled floor	11	3	27.27%	

Prevalence of Sub-clinical mastitis in relation to the age group of cows

It was observed that there is no any significant difference of SCM occurrence in different age group (Table-7). However, the prevalence is gradually increased in according with age. But these results were not agreed with other result. In this study very limited number of animals was studied.

Table 7. Prevalence of Sub-clinical mastitis in relation to the age group of cows

Age of cows (Yr)	No. of cows examined	No. of affected cow	Prevalence (%)	P value
1-3	17	10	58.82%	
4-6	42	24	57.14%	P= 0.9877
> 6	5	3	60.00%	

Prevalence of Sub-clinical mastitis in relation to the milk yield per cows

The association between the milk yield per cow per day and SCM was significant (p<0.05). The prevalence of SCM was comparatively higher in medium to high yielding cows (87.5%) than low yielding cow (Table 8). This finding was in agreement with the reports of Kader *et al.* (2003).

Table 8. Prevalence of SCM in relation to milk yield/day

Milk yield/day	No. of Cows examined	No. of affected cows	Prevalence (%)
Low (1-5L)	36	12	33.33%
Medium (6-10L)	20	14	70%
High (>10L)	8	7	87.5%
Overall difference			P= 0.030
Comparative difference			
High versus Medium			P= 0.334
High versus Low			P= 0.0031
Medium versus Low			P= 0.0084

CONCLUSION

The prevalence of subclinical mastitis in crossbred cattle is more than that of local cattle. The prevalence of subclinical mastitis is also higher in large farm type dairy farm. Other risk factors including parity, animal physical status and milk yield per day are closely co-related. A well documented continued research and educational effort is required to increase producer awareness of cost due to mastitis to the dairy enterprise.

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