

FARMERS' KNOWLEDGE, ATTITUDE AND PRACTICES OF MASTITIS IN DAIRY COWS AT SELECTED AREAS OF BANGLADESH

M. A. Rahman¹, Y. A. Sarker^{2*}, M. M. Parvej³, A. Parvin⁴, M. A. Rimon⁵, M. Tarafder⁶,
S. Sultana⁷ and A. K. Saha⁷

¹Institute of Agribusiness and Development Studies, ²Department of Pharmacology, ⁵Department of Surgery and Obstetrics, Bangladesh Agricultural University, Mymensingh-2202, Bangladesh; ³Department of Anatomy and Histology, Sylhet Agricultural University; ⁴Agribusiness (Animal Health), ⁷ACI Animal Health, ACI Ltd. Dhaka, Bangladesh; ⁶Store Officer (Medicine), Office of the Deputy Director, Livestock Medicine Store, Department of Livestock Services, Dhaka, Bangladesh

ABSTRACT

The research work was designed to assess farmers' knowledge, attitude and practices about bovine mastitis. The data were collected by using structured questionnaire through face to face interview techniques among the 65 dairy farmers of Dhaka, Mymensingh, and Gazipur. Disproportionate stratified random sampling was used to select the farmers based on study areas. Most of the studied farms are small (75.4%) in the studied area, only a few (10.8%) farms were large in Dhaka. In Gazipur and Mymensingh almost (86.2%) farms were small and rest of (13.8%) was medium. According to farmer's knowledge, major cause of mastitis was microorganisms (46.15%), but 20% farmer reported that it is due to injury and 27.69% farmer don't know the causes of the mastitis. Most of the farmers (87.7%) think that the source of infection is unhygienic floor, but others have no clear conception about it. Before milking only 23.10% farmers' wash the whole udder where 58.5% used single towel. About 76.9% farmers have no knowledge of screening mastitis and only 9.2% of total farmers performed regular mastitis checking. Among the farmers, 55.4% are used antiseptic solution during washing the floor and others wash their floor only by water. Highest number of farmer use Tube well water (44.6%) for daily management of their farms. Most of the farmer takes suggestions from village doctor or pharmaceutical representative (64.62%) for maintaining the diseases condition. This study recommends that identification of factors associated with sub-clinical mastitis will help to take necessary steps to reduce the prevalence of sub-clinical mastitis. The most effective way to control sub-clinical mastitis is to take preventive measures such as regular cleaning of the floor, keeping the udder clean, milkman's cleanliness, and dry cow therapy especially in high yielding dairy cows.

Keywords: Dairy cows, KAP, mastitis, risk factors

INTRODUCTION

The economy of Bangladesh is based primarily on agriculture; livestock is an essential component of the rural economy and the livelihood of the subsistence farmers. The country has a sub-tropical monsoon climate and most of the population is living in rural areas. Bangladesh has a suitable environment for the rearing of cattle. Animal production is one and a very important facet of agriculture. In the tropics it is no less important than in developed countries. Dairying is a good source of income to the small and marginal farmers. The feed required for milk production can be met from their limited land resources as most of the animals are ruminants and the majority of their food can be derived from forages, coarse roughages and agricultural byproducts, without incurring much additional cost. Diseases of these dairy cows are also a threat to this sector. Among the diseases mastitis is a significant one and most of the farmers are under the threat of mastitis. (Rahman *et al.*, 2010)

Mastitis is the inflammation of the parenchyma of mammary glands regardless of the cause, and it is characterized by a range of physical and chemical changes in the milk and pathological changes in the glandular tissue (Radostits *et al.*, 2007). It is the most prevalent infectious diseases of dairy cows (Andrews *et al.*, 2004). Mastitis is said to be subclinical when there is evidence of inflammation, e.g., a high somatic cell count in the

*Corresponding e-mail address: yousufbau115@gmail.com

milk without any visible abnormality of the milk or udder (Radostits *et al.*, 2007). Subclinical mastitis (SCM) is a major problem affecting dairy animals all over the world. It is 15 to 40 times more prevalent than clinical mastitis and causes high economic losses in most dairy herds and responsible for much greater loss to the dairy industry in Bangladesh (Kader *et al.* 2003). In Bangladesh, the prevalence of SCM is recorded from 20 to 44 % at cow level based on California Mastitis Test (CMT) (Rahman *et al.*, 2009; Islam *et al.*, 2010; Rabbani and Samad, 2010).

The primary cause of mastitis in cattle, goats and sheep are well-recognized groups of microorganisms such as *Streptococcus* sp., *Staphylococcus* sp., *Pasteurella* sp. and *Escherichia coli*, *Enterobacter* sp. and *Klebsiella* sp. The source of infection is contagious pathogens, environmental pathogens and other pathogens (Khan and Muhammad, 2005). Mastitis is caused by many different infectious agents commonly divided into contagious pathogens (*Streptococcus agalactiae*, *Staphylococcus aureus*, *Mycoplasma bovis*) causing contagious mastitis and Environmental pathogens (*Streptococcus uberis*, *Streptococcus dysgalactiae*) are most prevalent and Gram negative bacteria (*Escherichia coli*, *Klebsiella* sp., *Citrobacter* sp., *Enterobacter* sp. etc.) causing environmental mastitis (Radostits *et al.*, 2000). There are numerous risk factors identified by many researchers that influence the occurrence of subclinical mastitis such as age, parity, lactation stage, milk yield, breed, previous mastitis record, floor type, disinfection of fingers and teat dipping, etc. (Doherr *et al.*, 2007; Karimuribo *et al.*, 2008; Madut *et al.*, 2009).

However, proper milking procedure and hygiene may be the easiest and most economical way to control intramammary infections (Hutton *et al.*, 1990). Teat and udder skin should be healthy before milking and free of sores, wounds, or chapping where *S. aureus* could colonize the teat end and surrounding skin (Fox and Norell, 1994). Cleanliness at milking time is also important. Minimal use of water and pre-milking teat antiseptics may reduce new intramammary infections. Additionally, the advent of post milking teat antiseptics has been important in contributing to decreasing contagious IMI. When teats were dipped after milking and cows were treated with penicillin-dihydrostreptomycin at dry-off, intramammary infections caused by major mastitis pathogens decreased by 75% and 45%, respectively. Post-dipping alone has been estimated to decrease the rate of new IMI by 50% (Nickerson and Boddie, 1997).

In Bangladesh, there are some reports on the magnitude of the disease. But information relating to its risk factors related to farmers knowledge, attitude and practices is scant (Kahir *et al.*, 2008; Uddin *et al.*, 2009). Such information is important to understand the farmers' perspective regarding mastitis and when designing appropriate strategies that would help reduce its prevalence and effects. This paper systematically describes the farmers' knowledge, attitude and practices of mastitis in lactating dairy cows in selected areas of Dhaka, Mymensingh, and Gazipur districts of Bangladesh.

METHODOLOGY

Study design, study population and sample size

A cross-sectional study was carried out from September to December, 2016 among the 65 dairy farmers of Dhaka (n=30), Mymensingh (n=20) and Gazipur (n=15). Disproportionate stratified random sampling was used to select the farmers based on study areas, i.e., the farmers were divided into three strata on the basis of farm size (Small: <20 cows, Medium: 20-60 cows and Large: >60 cows), and then a simple random sample was selected within each stratum in such a way that different strata did not have the same sampling ratio.

A well-structured questionnaire was used focused on the knowledge, attitude and practices (KAP) of farmers regarding the disease mastitis. Questionnaire was prepared into three consecutive sections to obtain three objectives of this study.

Data collection

Data were collected by face to face interview. Questionnaire was prepared in English but during data collection question was asked in Bangla. Before data collection farmer's consent was taken. Number of respondents was 65 for data collection.

Data analysis

The collected data were accumulated, grouped and interpreted according to the objectives of the study. All the data were compiled by Microsoft Excel and descriptive analysis was done SPSS IBM 20.

RESULTS AND DISCUSSIONS

This study is performed to know the farmers' knowledge, attitude and practice of mastitis in selected areas. Most of the studied farms are small (75.4%) in the studied area, only a few (10.8%) farms were large in Dhaka. In Gazipur and Mymensingh almost (86.2%) farms were small and rest of (13.8%) was medium.

According to farmer's knowledge, major cause of mastitis was microorganisms (46.15%), but 20% farmer reported that it is due to injury and 27.69% farmer don't know the causes of the mastitis. Most of the farmers (87.7%) think that the source of infection is unhygienic floor. But others have no clear conception about it. About 76.9% farmers have no knowledge of screening mastitis and only 9.2% of total farmers performed regular mastitis checking.

Among the farmers, 55.4% are used antiseptic solution during washing the floor and others wash their floor only by water. Highest number of farmer use Tube well water (44.6%) for their farms. Most of the farmer takes suggestions from village doctor or pharmaceutical representative (64.62%) for maintaining the diseases condition. Details results were shown in Table 1.

Mastitis is a difficult problem to comprehend because, it is a disease caused by many factors, both in large and in small-scale herds. Micro-organisms are responsible for the infection, but for them to enter the mammary gland and establish themselves to the point that they cause an infection, a multitude of factors may be involved. There are many factors acting simultaneously, and the disease generally involves interplay between management practice and infectious agents, but with other factors, such as genetics, udder shape or climate. (Awale *et al.*, 2012; Sori *et al.*, 2005).

Being aware that especially sub-clinical mastitis is highly spread through herds in developing countries like Bangladesh, it is important to identify risk factors and to assess their contribution to the occurrence of the disease. Identification of area-specific and/or farm-specific risk factors is important for the design of control programmes for mastitis in cows (Almaw, 2004; Molla and Melaku, 2012).

All of the farmers clean the teats of dairy cows with running water prior to milking, but, as observed earlier (Mungube *et al.*, 2004), the implementation of mastitis preventive measures such as using separate drying cloths for each cow, and practicing pre- and post-milking teat dipping are noted to be infrequent amongst the farmers. In our survey 58.5% farmers use single towel and 41.5% farmers use no towel at all to clean the teat where a lower prevalence of both clinical and sub-clinical mastitis has been reported on farms where separate towels for teat cleaning and post-milking teat dipping were routinely practiced (Kivaria *et al.*, 2007). Despite the fact that some of these risk factors are not found to be significant in study, presumably due to low sample sizes, the need to implement mastitis preventive measures such as the use of pre-milking and post-milking teat dipping cannot be overemphasized.

Prevalence of mastitis depends on the frequency of floor cleaning. All farmers were aware about the floor hygiene. The prevalence of mastitis was also significantly affected by floor conditions (completely dry vs. partly or completely wet and soiled floor). This can be explained by the fact that farms with soil floor would dry more quickly than the brick floor (Sharma *et al.*, 2008). As a result soiled floor animal were less affected than brick block floor. But wet soiled floor (less absorbable) are most harmful for dairy animal to cause mastitis. It appeared that the floor was a potential source for mastitis organisms to enter the udder through the teat orifice (Wakwoya *et al.*, 2006).

Table 1. Farmers knowledge, attitude and practice of mastitis in selected Farms (N=65)

Sl. No.	Parameter of farmers' Knowledge, attitude and practice	Frequency (%)	
1	Aware of mastitis	Yes	64 (98.5%)
		No	1 (1.5%)
2	Cause of mastitis	Microorganism	30 (46.15%)
		Malnutrition	4 (6.15%)
		Injury	13 (20.0%)
		Unknown	18 (27.69%)
3	Source of infection	Unhygienic floor	57 (87.7%)
		Instruments/ Due to sucking	3 (4.62%)
		Unknown	5 (7.70%)
4	Cow to cow Transmission	Yes	8 (12.3%)
		No	57 (87.70%)
5	Knowledge of screening mastitis	Yes	15 (23.1%)
		No	50 (76.9%)
6	Regular mastitis checking	Yes	6 (9.2%)
		No	57 (87.7%)
		Sometimes	2 (3.1%)
7	Taking prevention measure before onset of clinical symptoms	Positive	61 (93.8%)
		Negative	4 (6.2%)
8	Mastitis occurred within one year of his/her farm	Yes	58 (89.2%)
		No	7 (10.8%)
9	Necessary of hygienic floor	Positive	65 (100%)
		Negative	0 (0%)
10	Floor type	Soil	30 (46.15%)
		Brick block	35 (53.85%)
11	Necessary of antiseptic use	Positive	56 (86.2%)
		Negative	9 (13.8%)
12	Udder cleaning	Yes	65 (100%)
		No	0 (0%)
13	Using of antiseptic by farmers	Yes	29 (44.6%)
		No	36 (55.4%)
14	Hand-washing of milkman	Yes	64 (98.5%)
		No	1 (1.5%)
15	Method of udder preparation before milking	Wash whole udder	15 (23.1%)
		Wash only teat	50 (76.9%)
16	Using of cloth during udder/teat wash	Single towel	38 (58.5%)
		Separate towel	0 (0.0%)
		No towel	27 (41.5%)
17	Type of lubricant used by farmers	Oil	61 (93.8%)
		Petroleum jelly	4 (6.2%)
		Pond	0 (0.0%)
		Tube well	29 (44.6%)
18	Water source in farm	Pump	22 (33.8%)
		WASA	9 (13.8%)
		Others	5 (7.7%)
		Veterinary surgeon	23 (35.38%)
19	Advice taken by farmers	Others (Village doctor, pharmaceutical company personnel)	42 (64.62%)
20	Information about CMT kit	Known	19 (29.2%)
		Unknown	46 (70.8%)

In conclusion, the study shows that different factors are significantly associated with the occurrence of subclinical mastitis, which needs to be considered in the control of the disease. Research revealed that farmers are aware about the disease but they have some misconception about disease. Workshop and training should be arranged for the dairy farmers' for better management practices of sub-clinical mastitis. In addition, frequent cleaning should be done in the barns of straw fed cows so that fewer amounts of straws are left to contaminate the barn environment mixed with urine, feces, and other wastes.

ACKNOWLEDGEMENTS

The authors would like to acknowledge Agribusiness (Animal Health) - ACI Ltd. Dhaka, Bangladesh for their support during the survey. The authors are grateful to the dairy farmers who participated in the study.

REFERENCES

1. Almaw G (2004). A cross-sectional study of Bovine mastitis in and around Bahir Dar and antibiotic resistance patterns of major pathogens. M.S. Thesis in the Department of Veterinary Medicine, Addis Ababa University, Ethiopia.
2. Awale MM, Dudhatra GB, Kumar A, Chauhan BN, Kamani DR, Modi CM, Patel HB and Mody SK (2012). Bovine mastitis: A threat to the economy. Open Access Reports. Online 1:295.
3. Doherr MG, Roesch M, Schaeren W, Schallibaum M and Blum JW (2007). Risk factors associated with subclinical mastitis in dairy cows on Swiss organic and conventional production system farms. *Veterinary Medicina* 52:487-495.
4. Fox LK and Norell RJ (1994). Staphylococcus aureus colonization of teat skin as affected by post milking teat treatment when exposed to cold and windy conditions. *Journal of Dairy Science* 77:2281.
5. Hutton CT, Fox LK and Hancock DD (1990). Mastitis control practices: differences between herds with high and low somatic cell counts. *Journal of Dairy Science* 73:1135.
6. Islam A, Samad A, and Rahman AKMA (2012). Prevalence of subclinical caprine mastitis in bangladesh based on parallel interpretation of three screening tests. *International Journal of Animal and Veterinary Advances* 4:225-228.
7. Islam MA, Islam MZ, Islam MA, Rahman MS and Islam MT (2011). Prevalence of subclinical mastitis in dairy cows in selected areas of Bangladesh. *Bangladesh Journal of Veterinary Medicine* 9:73-78.
8. Islam MA, Rahman AKMA, Rony SA, Islam MS (2010). Prevalence and risk factors of mastitis in lactating dairy cows at baghabari milk shed area of Sirajganj. *Bangladesh Journal of Veterinary Medicine* 8:157-162.
9. Kahir MA, Islam MM, Rahman AKMA, Nahar A, Rahman MS and Song HJ (2008). Prevalence and risk factors of subclinical bovine mastitis in some dairy farms of Sylhet district of Bangladesh. *Korean journal of veterinary Service* 31:497-504.
10. Karimuribo ED, Fitzpatrick JL, Swai ES, Bell C, Bryant MJ, Ogden NH, Kambarage DM and French NP (2008). Prevalence of subclinical mastitis and associated risk factors in smallholder dairy cows in Tanzania. *Veterinary Record* 163:16-21.
11. Khan AZ and Muhammad G (2005). Quarter-wise comparative prevalence of mastitis in buffaloes and cross-bred cows. *Pakistan Veterinary Journal* 25:9-12.
12. Kivaria FM, Noordhuizen JPT and Kapaga AM (2004). Risk indicators associated with subclinical mastitis in smallholder dairy cows in Tanzania. *Tropical Animal Health and Production* 36:581-592.
13. Madut NA, Gadir AEA and Jalii IME (2009). Host determinants of bovine mastitis in semi-intensive production system of Khartoum state, Sudan. *Journal of Cell and Animal Biology* 3:71-77.
14. Mungube EO, Tenhagen BA, Kassa T, Regassa F, Kyule MN and Greine M (2004). Risk factors for dairy cow mastitis in Central Highlands of Ethiopia. *Tropical Animal Health and Production* 36:463-472.
15. Nickerson SC and Boddie RL (1997). Mastitis prevention. *Louisiana Agriculture* 40:24.
16. Radostits OM, Gay CC, Blood DC and Hinchcliff KW (2000). Mastitis In: *Veterinary Medicine, A Textbook of the Diseases of Cattle, Sheep, Pigs, Goats and Horses*. 9thEdn. W B Saunders Co. Philadelphia, USA pp. 603-612.
17. Rahman MA, Bhuiyan MMU, Kamal MM and Shamsuddin M (2009). Prevalence and risk factors of mastitis in dairy cows. *The Bangladesh Veterinarian* 26:54-60.
18. Rahman MM, Islam MR, Uddin MB, Aktaruzzaman M (2010). Prevalence of subclinical mastitis in dairy cows reared in Sylhet district of Bangladesh. *International Journal of Biosciences* 1:23-28.
19. Sharma N, Maiti SK and Pandey V (2008). Sensitivity of indirect tests in the detection of subclinical mastitis in buffaloes. *Veterinary Practitioner* 9:29-31.

Rahman and others

20. Sisay G, Alo M, Ketema B, Teshale S, Fanos T and Tariku J (2012). Study on prevalence of bovine mastitis and its major causative agents in West Harerghe zone, Doba district, Ethiopia. *Journal of Veterinary Medicine and Animal Health* 4:116-123.
21. Sori H, Zerinhum A and Abdicho S (2005). Dairy cattle mastitis in and around Sebeta, Ethiopia. *International Journal of Applied Research in Veterinary Medicine* 3:332-338.
22. Uddin MA, Kamal MM and Haque ME (2009). Epidemiological study of udder and teat diseases in dairy cows. *Bangladesh Journal of Veterinary Medicine* 7:332-340.
23. Wakwoya A, Molla B, Belihu K, Kleer J and Hildebrandt G (2006). A cross-sectional study on the prevalence, antimicrobial susceptibility patterns and associated bacterial pathogens of goat mastitis. *International Journal of Applied Research in Veterinary Medicine* 4:169-176.