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Prevalence of clinical mastitis at Babugonj upazila in Barishal

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ABSTRACT

This research was conducted from August 2022 to December 2022 and its goal was to ascertain the prevalence of clinical mastitis in dairy animals that were lactating. During the investigation, 573 dairy animals were brought into the Upazila Veterinary Hospital in Babuganj, Barishal. Clinical mastitis was evident in 72 cattle and 21 goats following the signs and symptoms. According to species variation, mastitis prevalence in cattle and goats was 12.56% and 3.66%. Mastitis was common in cattle, with cross-breeds having a prevalence of 10.86% and local breeds having a prevalence of 5.09%. Mastitis was more common in Jamnapari goat breeds than indigenous, non-descriptive breeds, with prevalence rates of 9.83% and 7.37%, respectively. In comparison to medium (30.55%) and small size (20.84%) farms, large (48.6%) farms had the greatest proportion of mastitis in the case of cows, whereas small scale (57.15%) farms had the highest rate of mastitis in the case of goat farms. Mid-lactation had the highest prevalence of mastitis in cattle (58.33%), followed by early (29.17%) and late lactation (12.5%). In cows, one quarter is more affected (9.31%) than two or more (6.65%) quarters. The rate of mastitis in farms with a soiled floor or a floor constructed of clay (66.67%) is much greater than number in farms with a concrete or brick-block floor (33.33%) for cows. Similar findings were seen for goat farms, where the percentages were 85.72% for a soiled floor and 14.28% for a concrete or bricked floor. Mastitis was more common in cases of poor hygiene in both species, where 13.97% of cows and 10.65% of does were affected. In both bovine and goat mastitis, the response to therapy was favorable with Gentamicin (84.61%), Ceftriaxone (100%) and the combination of streptomycin and penicillin (76.92%).

Key Words: *Prevalence, Clinical mastitis, Babuganj, Cattle and Goat.*

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I. Introduction

Mastitis, a multifactorial aetiologically complicated disease, is one of the most significant diseases in the dairy industry globally (Tezera and Aman Ali, 2021). It develops when bacteria enter the cow mammary gland via the teat canal, causing an intramammary infection and an inflammatory response

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(Quinn et al., 2002). The name "Mastitis" is a combination of the Greek words "Matos", which means "breast" (mammary gland) and "itis," which implies inflammation. The disease is defined by pathological alterations in the glandular tissue that impact both the normal flow and quality of milk, as well as physical, chemical and bacterial abnormalities in milk (Radostits et al., 2007). Mastitis may also be divided into clinical and subclinical types depending on how the disease manifests. Clinical mastitis (CM) is a significant global production disease affecting the dairy industry (Hogeveen et al., 2011). Clinical mastitis (CM) is characterized by abnormal milk and swelling or pain in the udder and it may also show systemic symptoms such as anorexia, lethargy and an increased rectal temperature. The morphology of the mammary gland may also alter. Clinical mastitis has a detrimental economic effect on dairy farms since it results in abnormal milk, deteriorated milk quality, decreased output (up to 70%), milk discharge after treatment (9%), high treatment costs (7%), labour, early culling (14%) and mortality (Bari et al., 2016; Sharma et al., 2012). The subclinical type is when the udder and milk both seem normal and show no apparent signs of irritation (Andrews et al., 2008; Quinn et al., 2002).

The two categories of pathogenic microorganisms that cause diseases are infectious and environmental, respectively, based on specific traits of dissemination and contact with teats and ducts. *Streptococcus agalactiae* and *Staphylococcus aureus* are the primary causes of contagious mastitis, possibly caused by infections linked with cows. The leading causes of environmental mastitis are *Streptococcus dysgalactiae, Streptococcus uberis* and *Escherichia coli* (Smith, 2002). The risk factors for clinical mastitis on dairy farms have been the subject of several investigations (Singha et al., 2021). Dairy cows in Bangladesh have not been thoroughly explored for cow-specific risk factors associated with CM. Breed, lactation stage, parity and prior CM history might all increase the risk of developing CM (Bari et al., 2016). The contaminated surroundings, an excessively big udder, a teat injury, an udder wound, an unclean milker's hand and improper milking machine management were the most often cited predisposing factors for mastitis at the farm level (Bari et al., 2016; Kathiriya et al., 2014). Mastitis may affect dairy cows of all breeds. Most often, cross-bred cows have higher rates of mastitis than native-breed cows (Abdel and Sayed, 2009; Balaji and Saravanan, 2017). In the case of cows, the prevalence of mastitis increased with advancing age (Mahmud and Das, 2013). Compared to prior lactations, the prevalence was much greater in the fifth lactation (Hogeveen et al., 2011). According to Hoque et al. (2018), the risk of mastitis increases with the size of the parity. Chronic mastitis infections may be present in older animals, resulting in an accumulated risk of clinical disease (Green et al., 2007). High milk yield is a risk factor for clinical mastitis although within-breed differences in milk production do not affect the severity of E. coli mastitis (Kornalijnslijper et al., 2003). If the machine settings are right, direct and indirect milking machine impacts may account for up to 20% of new mastitis in specific herds and probably no more than roughly 10% in an average herd today (Middleton et al., 2014). Udder cleanliness influenced the prevalence of mastitis in the herd (Tongel and Brouček, 2010). Compared to cows managed with good drainage, those with poor floor drainage had a greater rate of mastitis (Bari et al., 2016).

Mastitis is still the most expensive infectious condition in the dairy sector and the major reason why dairy farms utilize antibiotics (Erskine, 2003). In contrast to supportive treatment alone, antibiotic therapy combined with supportive therapy led to less severe illness, greater clinical and bacteriological cure rates and lower recurrence rates in cows with clinical mastitis. It's important to make sensible antibiotic selections while treating clinical mastitis. Developing control programs for mastitis in cows depends on identifying risk factors. Therefore, it seems to be of utmost significance to avoid the occurrence of mastitis by early detection of the disease, as otherwise, it may be irreversible in most situations. Considering the aforementioned information, the current research was carried out to determine the prevalence of clinical mastitis in dairy animals at Babuganj upazila in Barishal and to discover the relationships between various risk variables and clinical mastitis in the study area.

II. Materials and Methodology

Study area

The study was conducted at Babuganj upazila under Barishal district to study the prevalence of clinical mastitis. Babuganj is located between 22°44' and 22°56' north latitudes and between 90°15' and 90°23' east longitudes. The data was collected from Upazila Livestock Office & Veterinary Hospital, Babuganj, Barishal.

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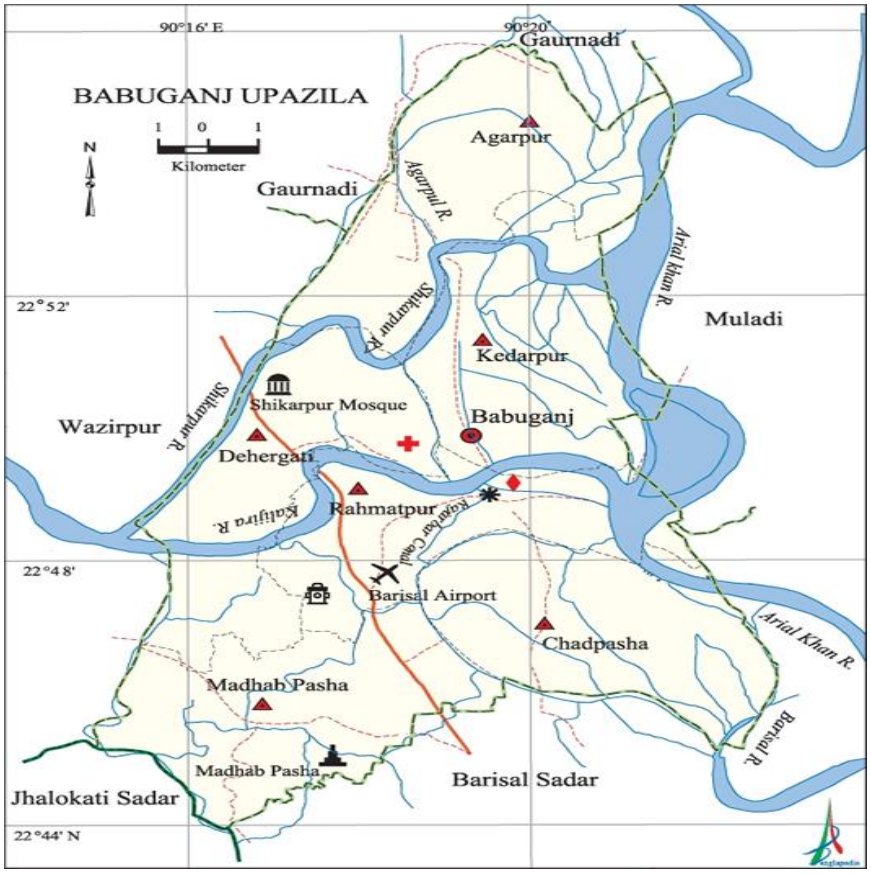

Figure 01. Geographical presentation of the study area

Study population

A total of 93 patients were diagnosed with clinical mastitis from Upazila Livestock Office & Veterinary Hospital, Babuganj, Barishal, during the study period of 5 months.

Period of the study

The study on the prevalence of clinical mastitis was conducted from August 2022 to December 2022 in the study area during the internship placement at Upazila Livestock Office & Veterinary Hospital, Babuganj, Barishal.

Methods and sources of data collection

This information was collected from the Upazila Livestock Office & Veterinary Hospital, Babuganj, Barishal. The research was conducted in the manner described below. A systematic questionnaire was created and the pre-tested questionnaire was completed. Age, breed, health state, farm size, the number of affected animals and management level were all included in the questionnaire. Open-ended queries were obtained and documented.

Diagnostic procedures

Clinical mastitis was identified in the lactating animals that had shown mastitis signs by physical examination. Clinical mastitis symptoms that were identified during the study period included swelling, pain, heat and abnormal mammary gland secretion (the presence of clots or flakes in milk or watery consistency), which is often accompanied by symptoms of systemic disturbance like fever, depression, anorexia and weakness.

Data Analysis

Microsoft Excel, 2016, was used to evaluate the data. The dependent variable was the prevalence of clinical mastitis, while the independent variables at the cow level were the total number of animals examined, herd size, age, breed, general physical condition, number of affected animals and their management.

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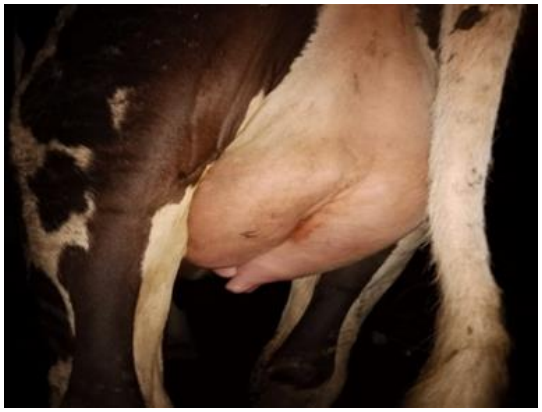

Figure 02. Abnormal udder conformation due to mastitis

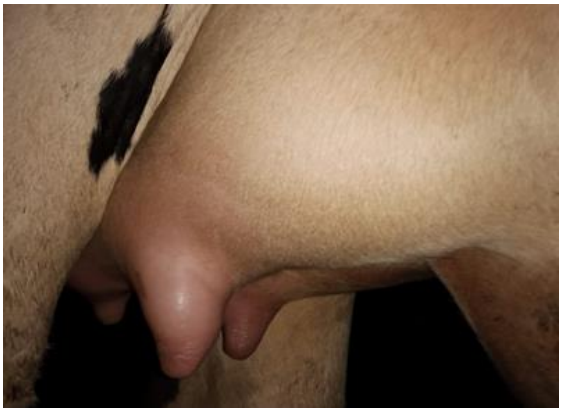

Figure 03. Redness and swelling of affected cow

Figure 04. Intra-mammary infusion

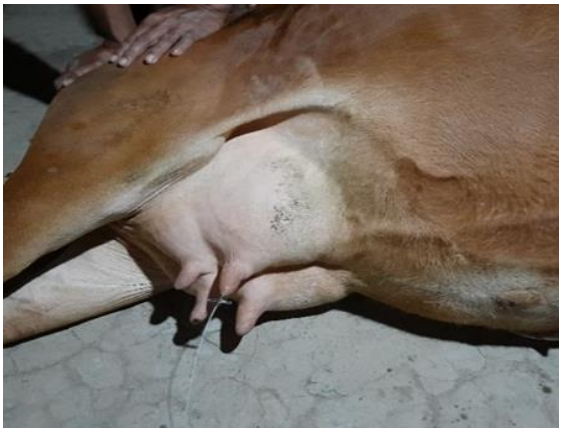

Figure 05. Teat siphon is used to remove blockage of udder.

III. Results and discussion

Prevalence of mastitis in different animal species

The prevalence of mastitis was 12.56% in cows and 3.66 % in the total population (Table 01). In this investigation, the prevalence of clinical mastitis was lower (12.56%) than that reported by Goswami et al. (2003) for dairy cows. Amin et al. (2011) discovered 19.9% of mastitis during the dry season.

Table 01. Prevalence of mastitis in different animal species

Species	Total no of cases	Mastitis	Prevalence (%)
Cows	451	72	12.56
Does	122	21	3.66

Prevalence of mastitis in case of breeds

The prevalence of mastitis is 10.86% in cross-breed cows and 5.09% in indigenous cows. In the case of does it is found that 9.83% prevalence in Jamnapari does, which is higher than indigenous breeds (7.37%). The higher prevalence of mastitis in cross-bred cattle revealed in the current study is also supported by other scientists (Bari et al., 2016). Other researchers' results showed that high-yielding cows are more likely than low-yielding ones to get an udder infection (Radostits et al., 2007).

Table 02. Prevalence of mastitis according to breeds

Types of breeds	No of cows/does	Prevalence (%)
Cross	49	10.86
Local	23	5.09
Jamnapari	12	9.83
Indigenous	9	7.37

Prevalence of mastitis with farm type

It was observed that the prevalence of mastitis was comparatively higher in large (48.6%) farms in case of cows compared to medium (30.55%) and small scale (20.84%) farms and for goat farms higher

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percentage of mastitis was seen in small scale farm (57.15%) (Table 03). Recent research shows that clinical mastitis is more common in herds with larger sizes. This conclusion has the potential to support Foysal et al. (2020). In the case of large herd size, the pathogens spread more rapidly than in small herd size.

Table 03. Prevalence of mastitis with farm type

Types of farms	Cows	Percentage (%)	Does	Percentage (%)
Large	35	48.6	-	-
Medium	22	30.55	9	42.85
Small scale	15	20.84	12	57.15
Total	72		21	

Prevalence of mastitis following different parity

A higher percentage of mastitis was observed during 3rd parity in case of cows and 4th parity in case of does, which was 37.5% and 42.85%, respectively (Table 04). The prevalence of mastitis increased with parity and age, consistent with previous researchers' findings (Abrahmsén et al., 2014; Rediet et al., 2013; Zeryehun et al., 2013). It might be caused by the body's physiological state that is gradually suppressed.

Table 04. Prevalence of clinical mastitis following different parity

Parity status	No of cows (%)	No of does (%)
1st	9(12.5)	1(4.76)
2nd	16 (22.22)	4(19.04)
3rd	27 (37.5)	7 (33.33)
4th	20 (27.77)	9 (42.85)

Prevalence of mastitis by lactation stage in cows

The lactation stage is divided into three groups according to time. Early lactation indicates lactation before 3 months, mid-lactation indicates between 3-6 months and late lactation refers to more than 6 months of lactation**.** In this research, the highest incidence of mastitis is seen at mid-lactation (58.33%) than early (29.17%) and late-lactation (12.5%), which is represented in (Table 05). This result is inconsistent with (Kayesh et al., 2014), who also found the highest incidence of mastitis in mid-lactation.

Table 05. Prevalence of mastitis following the lactation stage in cows

Lactation stage	No of cows	Percentage (%)
Early lactation (< 3 months)	21	29.17
Mid lactation (3-6 months)	42	58.33
Late lactation (>6 months)	9	12.5

Prevalence of mastitis on the reproductive state

In both species, non-pregnant and lactating cows had higher mastitis prevalence rates (12.4% in cows and 13.93% in does, respectively) than pregnant and lactating cows (3.54% and 3.27% in does) (Table 06). Because the fetus significantly impacts nutrition, pregnant and lactating animals produce less milk owing to decreased prolactin release and lower nutritional levels. As with this research, Kader et al. (2002) found that reduced milk production reduces the risk of mastitis.

Table 06. Prevalence of mastitis on reproductive state

Reproductive state	No of cows (%)	No of does (%)
Pregnant and Lactating	16 (3.54)	4 (3.27)
Non-pregnant and lactating	56 (12.4)	17 (13.93)

Prevalence of mastitis by the number of quarters affected

It has been shown that one quarter is more (9.31%) affected than two or more number (6.65%) of quarters in cows (11.47%) and (5.74%) in does respectively (Table 07). Because mastitis often begins with an infection in one teat before spreading gradually to additional teats (quarters). The likelihood of infection spreading to additional teats is decreased when therapy is administered. This research

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also looked at the number of quarter affection. In most of the cases, one-quarter was affected by mastitis.Lysozyme, lactoferrin, immunoglobulins and leukocytes are among the udder's defensive mechanisms that might alter the number of quarter affection (Radostits et al., 2007).

Table 07. Number of quarters affected by mastitis

Quarter affected	No of cows (%)	No of does (%)
One quarter	42 (9.31)	14 (11.47)
More than one	30 (6.65)	7 (5.74)

Prevalence of mastiti Prevalence of mastitis in comparison to other diseases

The prevalence of mastitis in comparison with other diseases was presented in (Table 08). The result shows that 16.23% of lactating animals were affected by mastitis compared with other diseases (83.77%) that were presented to ULOVH during the study period.

Table 08. Prevalence of mastitis in comparison to other diseases

Diseases	No of cases	Percentage (%)
Mastitis	93	16.23
Other diseases	480	83.77

Prevalence of mastitis in comparison to floor condition

The current study focused on the percentage of mastitis in the farms that have soiled floors or made of clay (66.67%) is significantly higher than that of the concrete or brick-block floor (33.33%) in case of cows as well as same results were observed for goat farms presented in (Table 09). This result supports Bari et al. (2016), who also found that the prevalence of mastitis was higher in the cows that are reared on bared floor. This is valid for the region covered by the current inquiry. More so than a concrete floor, a dirty floor is difficult to clean and disinfect.

Table 09. Prevalence of mastitis compared to floor condition

Floor-type	Cows	Percentage (%)	Does	Percentage (%)
Concrete or bricked floor	24	33.33	3	14.28
Soiled floor	48	66.67	18	85.72
Total	72		21	

Prevalence of mastitis concerning the hygienic condition of farms

Mastitis incidence in cows and does was lower under sanitary conditions than in unclean farms (1.99% and 6.55%, respectively) presented in (Table 10). This study's results are consistent with those of Sharma et al. (2011), who discovered that cows handled with a poorer drainage system had the greatest rate of mastitis.

Table 10. Prevalence of mastitis concerning the hygienic condition of farms

Category	Total cases: No of cows (%)	Total cases: No of does (%)
Hygienic	9 (1.99)	8 (6.55)
Unhygienic	63 (13.97)	13 (10.65)

Response to treatment in mastitis in case of cow

In this present study,78 infected cows were treated with gentamicin (Table 11). Among them 66 (84.61%) cows were cured out of them. A total of 2 infected cows were cured after being treated with ceftriaxone. A total of 13 cows were treated with Streptomycin-Penicillin and ten were cured (76.92%). Teat siphon (during block) and intramammary infusion were also used. This was in partial accord with the work of Iqbal et al. (2004), who also observed that the most effective antimicrobial medications against the isolated bacteria from bovine mastitis were gentamicin, enrofloxacin, norfloxacin and kanamycin. Tanwar et al. (2001), determined that *Staphylococcus spp*. was the most often discovered pathogen for mastitis. These isolates were susceptible to Ceftriaxone and Gentamicin. Similar to this, multiple additional research revealed that gentamicin, fluoroquinolones like enrofloxacin and ciprofloxacin had the greatest antibacterial activity against bacterial isolates (Sharif et al., 2009). Notably, the World Health Frontiers in Veterinary Medicine Organization and the World Organization for Animal Health have authorized the use of the antibiotics gentamicin and enrofloxacin in veterinary medicine (Ali et al., 2021).

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Table 11. Response to treatment in mastitis in case of cow

Antibiotics	No of animals	Cured (%)	Not cured (%)
Gentamicin	78	66 (84.61)	12 (15.38)
Ceftriaxone	2	2 (100)	-
Streptomycin and Penicillin	13	10 (76.92)	IV (23.07)

IV. Conclusion

Mastitis is regarded as the most expensive disease for the dairy industry globally. It results from interacting of several elements relating to the host, pathogens and environment. It may be claimed that mastitis is still a disease that would harm the expanding dairy sector even if the prevalence of clinical mastitis in cows was substantially lower in the study region. The frequency of clinical mastitis considerably greater in cross-bred cows, Jamnapari does, older animals, mid-lactation and third parity. Proper management methods should be maintained to decrease the frequency and financial losses associated with dairy farming. The study also showed that the higher prevalence of clinical mastitis in large, lower, medium and small-scale farms is due to management systems as well as proper knowledge of dairy farming. Strong dairy extension services that prioritized raising awareness and hygienic milking techniques are among them. Besides these, the delivery of animal health services must emphasize routinely checking dairy cows for mastitis, treating instances both during lactation and throughout the dry season and offering guidance on culling chronically diseased animals. Antibiotic usage should be controlled and ongoing antibiotic sensitivity monitoring should be part of the strategy. There must be well-documented continuing research and education efforts to make producers more aware of the costs associated with mastitis to the dairy industry.

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