PREVALENCE AND ANTIBACTERIAL SUSCEPTIBILITY IN MASTITIS IN BUFFALO AND COW IN AND AROUND THE DISTRICT LAHORE-PAKISTAN

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ABSTRACT
A total of 450 milk samples including both 272 buffalo and 178 cow were randomly collected in and around the District Lahore to study the incidence of mastitis and antibiotic sensitivity by performing culture and sensitivity test. The prevalence of mastitis in buffalo was found to be 20.98% while in cow 24.71%. The prevalence of both clinical and subclinical mastitis in buffalo were 40.35%, 59.64% and in cow 61.26%, 30.63%, respectively. The milk samples mixed with both mucus and blood in buffalo and cow were 5.51% and 4.49% respectively. Quarters wise prevalence of mastitis was 47.72%, 11.36%, 36.36% and 4.54% in the left fore, left hind, right fore and right hind quarters in cow, in buffaloes, it was 0%, 68.96%, 11.49% and 19.54% in the left fore, left hind, right fore and right hind quarters, respectively. The disease was found to be highly sensitive to ciprofloxacin in buffalo while gentamicin in cow.

Keywords: Antibiotics, Buffalo, Cow, Ciprofloxacin, Gentamicin, Mastitis

INTRODUCTION
Buffalo and cattle are mostly reared for milk production. A disease, mastitis renders them useless for this purpose. Milk production usually decreases and blood alone or mixed with mucus in milk. It is one of the most important reasons for termination of lactation and unwanted culling of dairy buffalo (McDowell et al., 1995). This disease complex is the outcome of interaction of various factors associated with the host, pathogens and the environment. The productive efficiency of dairy animals is adversely affected by suboptimal management, poor nutrition and various diseases in particular mastitis, which is one of the most important impediments confronting the economic milk production in Pakistan. It is a multifactor and the most costly disease of the dairy industry throughout the world (DeGraves and Fetrow, 1991) that affects both quality(Barbano, 1989) and quantity of milk (Arshad et al., 1995). Field surveys of major livestock diseases in Pakistan have indicated that mastitis is one of the most important diseases of dairy animals in the country (Hussain et al., 2005).

In Pakistan and other developing countries owing to small herd sizes, the animals are predominantly hand-milked. Infectious agents of mastitis may be transmitted from infected to un-infected animals through milker’s hand (Oliver, 1975) especially because milk is often used as a lubricant for milking. According to Motie et al., (1985) mastitis in hand-milked cows is nearly twice as frequent as in machine-milked ones (25.1 VS 14.6 %). The infection originates either from the infected udder or the contaminated environments. The major sources of pathogens and means of transmission include infected quarters and soiled udder, contaminated milking machines, teat cups, milker’s hands, washing clothes, flies and surgical instruments. Moreover, the stage of lactation, lactation number, trauma to udder, teat and teat canal, loose teat sphincters, lesions on teat skin, immunological status of each mammary gland, bulk of infection in the environment and management conditions are amongst the determinants which dictate the level of

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mastitis incidence (Radostitis et al., 2000).
Clinical mastitis is an individual problem which is characterized by the changes in the udder and milk drawn from it, whereas, sub clinical mastitis is herd problem because it constitutes a reservoir of infection which could be transmitted to other animals of herd. The frequency, severity, and economic impact of mastitis are known to depend upon the preventive and management approaches. It has also been observed that the incidence and the patterns of causative agents markedly differ from place to place, herd to herd, and time to time. Studies in different states within India reflected high incidence of the disease for past seven decades.
The present study was, therefore designed to determine the frequency distribution of mastitis in dairy buffaloes and cows and to determine the association of some host and pathogen(s) related determinants with the disease.

ANIMALS, MATERIALS AND METHODS
A total of 450 animals (n=272 buffaloes n=178 cattle) of 50 randomly selected livestock farmers were screened to find out the epidemiology of clinical and sub-clinical mastitis in the study area. Milk samples were also brought to the laboratory from un-treated diseased animals were immediately cooled and transported to Provincial Diagnostic Laboratory, Livestock and Dairy Development, 16-Cooper Road, Lahore in the ice box for microbiological examination. Clinical mastitis was diagnosed when there were visible or palpable signs of udder inflammation along with the changes in milk secretions whereas sub-clinical mastitis was diagnosed by using the Surf Field Mastitis Test (SFMT) according to method described by Muhammad et al. (1995). A comprehensive questionnaire focusing on data related to cattle and buffaloes, host and managerial determinants/risk factors associated with mastitis was completed in the presence of each livestock farmer whose animal was selected for the present study.

Microbiological Examination
Microbiological examination of milk samples begin within 8 hours of collection. Procedure described by National Mastitis Council Inc., U.S.A. (1990) was followed for the collection of milk samples. After discarding the first few streams, about 10 ml of milk was collected aseptically. Procedures described by National Mastitis Council Inc., USA (1987) were followed for culturing the milk samples and identification of mastitis pathogens. The samples were shaken eight times to get a uniform dispersion of the pathogens. Using a platinum-rhodium loop, 0.01 ml of milk sample was streaked onto MacConkey’s agar plate. Milk samples were cultured on a 100 mm plate by plating and incubated at 37°C for 48 hours. Guidelines of National Mastitis Council Inc (1987) on the significance of colony numbers in pure or mixed cultures were used to categorize a sample as infected or contaminated. The colonies of the microorganisms were isolated with platinum loop, mixed in distilled water and then mersed on Petri dish with antibiotics disks. Eight different antibiotics i.e. Gentamycin, Ciprofloxacin, Norfloxacine, Ampicillin, Streptomycine, Chloramphenicol, Pencillin and Amoxicillin were evaluated for sensitivity of mastitis and for their efficacy. These antibiotics were injected intra-muscularly at the dose rate of 1ml/10kg live body weight of the animal.

Statistical data analysis
The data was statistically analyzed by applying percentage only.

RESULTS
In the present study, the overall prevalence of mastitis was found 22.44% including 24.71% in cow and 31.75% in buffaloes (Table-I). The overall prevalence of mastitis was lower in buffaloes as compared to the crossbred cows. This lower prevalence might be attributed to the tighter teat sphincter of buffaloes as compared to that of cows (Uppal et al., 1994). There was higher incidence in hindquarters in buffaloes than the crossbred cows and among hindquarters, right hindquarters were found to be more susceptible. Iqbal (1992) reported that the prevalence of hind quarters was higher in hindquarters as compared to the forequarters and slightly higher in right quarters than left ones. In case of forequarters, both species were equally affected, also reported by Rehman (1995).

Table I: Prevalence of mastitis in buffalo and cow in District Lahore.

<table>
<thead>
<tr>
<th>Species</th>
<th>Number of animals</th>
<th>Prevalence of mastitis (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Examined</td>
<td>Affected</td>
</tr>
<tr>
<td>Buffalo</td>
<td>272</td>
<td>57</td>
</tr>
<tr>
<td>Cow</td>
<td>178</td>
<td>44</td>
</tr>
<tr>
<td>Total</td>
<td>450</td>
<td>101</td>
</tr>
</tbody>
</table>

The prevalence of clinical mastitis in cow was observed to be 61.36% while in buffaloes it was 40.35% (Table II). These findings are in close alignment with the findings of Nooruddin et al. (1997) and Bilal et al. (2004). The prevalence of sub-clinical mastitis was also found higher in buffaloes (59.64%) than in cow (30.63%). Dangore et al. (2000) and Allore (1993) reported low prevalence of sub-clinical mastitis in dairy cows, which is in accordance with the findings of the present study.
Table II: Types of mastitis in buffalo and cow in District Lahore.

<table>
<thead>
<tr>
<th>Species</th>
<th>Clinical</th>
<th>Sub-clinical</th>
</tr>
</thead>
<tbody>
<tr>
<td>Buffalo (n=57)</td>
<td>23 (40.35%)</td>
<td>34 (59.64%)</td>
</tr>
<tr>
<td>Cow (n=44)</td>
<td>27 (61.36%)</td>
<td>17 (30.63%)</td>
</tr>
<tr>
<td>Total (N=101)</td>
<td>50 (49.50%)</td>
<td>51 (50.49%)</td>
</tr>
</tbody>
</table>

In mastitis, there is drastic change in the milk, taste and consistency. In sub-clinical mastitis there was bad taste and odor, in second stage, there was watery discharge, in third stage, mucus mixed with milk and in fourth stage, blood mixed with milk from the effect test which resulted in culling of animal if not properly treated. The changes in the milk due to mastitis are shown in Table III. The milk with bad taste and odor was found 8.08% in buffalo and 6.74% in cow. The milk mixed with mucus and blood alone or both was 6.61% and 7.35% in buffalo and in cow 7.35% and 5.61%, respectively while milk with mixed mucus and blood was 5.51% in buffalo and 4.49% in cow respectively. These findings are in agreement to that reported by Khan and Muhammad (2005).

The prevalence of clinical mastitis in relation to quarters was determined and it was found that prevalence was higher in fore quarters than in rear quarters in cow and higher in rear quarters than in fore quarters in buffaloes. Prevalence was 47.72%, 11.36%, 36.36% and 4.54% in the left-fore, left-rear, right-fore and right-rear quarters, respectively, in cow. In buffaloes, the prevalence was 0%, 68.96%, 11.49% and 19.54% in the left fore, left rear, right fore and right rear quarters, respectively (Table IV).

Table III: Physical characters of the milk.

<table>
<thead>
<tr>
<th>Species</th>
<th>Normal</th>
<th>Bad taste and odor</th>
<th>Watery</th>
<th>Mucous</th>
<th>Blood</th>
<th>Mucus mix with Blood</th>
</tr>
</thead>
<tbody>
<tr>
<td>Buffalo (n=272)</td>
<td>185 (68.01%)</td>
<td>22 (8.08%)</td>
<td>12 (4.41%)</td>
<td>18 (6.61%)</td>
<td>20 (7.35%)</td>
<td>15 (5.51%)</td>
</tr>
<tr>
<td>Cow(n=178)</td>
<td>122 (68.53%)</td>
<td>12 (6.74%)</td>
<td>8 (4.49%)</td>
<td>18 (4.49%)</td>
<td>10 (5.61%)</td>
<td>8 (4.49%)</td>
</tr>
<tr>
<td>Total (N=450)</td>
<td>307 (68.22%)</td>
<td>34 (7.55%)</td>
<td>20 (4.44%)</td>
<td>36 (8%)</td>
<td>30 (6.66%)</td>
<td>23 (5.11%)</td>
</tr>
</tbody>
</table>

Table IV: Quarter-wise Incidence of Mastitis in buffalo and cow

<table>
<thead>
<tr>
<th>Species</th>
<th>Left fore quarter</th>
<th>Right fore quarter</th>
<th>Left hind quarter</th>
<th>Right hind quarter</th>
</tr>
</thead>
<tbody>
<tr>
<td>Buffalo (n=87)</td>
<td>- (0%)</td>
<td>10 (11.49%)</td>
<td>60 (68.96%)</td>
<td>17 (19.54%)</td>
</tr>
<tr>
<td>Cow (n=44)</td>
<td>21 (47.72%)</td>
<td>16 (36.36%)</td>
<td>5 (11.36%)</td>
<td>2 (4.54%)</td>
</tr>
</tbody>
</table>

The culture sensitivity test indicated that the disease was highly sensitive to Ciprofloxacin in buffalo and gentamicin in cow while sensitive to Norfloxacin in both buffalo and cow. It was found that all other antibiotics shown resistance to the bacteria (Table V). These findings are in agreement with findings of Mustafa et al., 2007. Sumathi et al., 2008 also found gentamicin effective while Guerin et al., 2002, Gianneechini et al., 2002, Ebrahimi et al., 2002 and Erskine et al., 1986 found gentamicin resistant.

CONCLUSION

The prevalence of clinical and sub-clinical mastitis in buffalo and cow was higher in hindquarters than forequarters and among hindquarters, left hindquarters were more susceptible than the right. With the advent of improved diagnostic tests, more understanding of the disease and availability of third generation antibiotics, and improved ways and means to upkeep the hygiene and management, the opportunities of clean milk production in periurban can be raised.

Table V: Antibiotic Response using CST for the treatment of Mastitis in buffalo and cow

<table>
<thead>
<tr>
<th>Species</th>
<th>Gentamicin</th>
<th>Ciprofloxacin</th>
<th>Norfloxacin</th>
<th>Enorfloxacin</th>
<th>Ampicillin</th>
<th>Streptomycine</th>
<th>Chloramphenicol</th>
<th>Penicillin</th>
<th>Amoxicillin</th>
</tr>
</thead>
<tbody>
<tr>
<td>Buffalo (n=87)</td>
<td>S</td>
<td>H.S</td>
<td>S</td>
<td>R</td>
<td>R</td>
<td>R</td>
<td>R</td>
<td>R</td>
<td></td>
</tr>
<tr>
<td>Cow (n=44)</td>
<td>H.S</td>
<td>S</td>
<td>S</td>
<td>R</td>
<td>R</td>
<td>R</td>
<td>R</td>
<td>R</td>
<td></td>
</tr>
</tbody>
</table>

HS=Highly Sensitive; S=Sensitive; R=Resistant; CST=Culture and Sensitivity test
REFERENCES


