

*Research article***Performance of Rural and Peri-urban Dairying under Existing Management System in Jhenaidah, Bangladesh****Md. Abdus Samad¹, Md. Shaheenur Rahman², Sumaiya Parven¹, Ahmed Iqbal³ and Abu Jafur Md. Ferdous⁴**¹Doctor of Veterinary Medicine (DVM), Jhenaidah Government Veterinary College²Assistant Professor, Department of Animal Science and Nutrition, Jhenaidah Government Veterinary College³Scientific Officer, Department of Livestock Services (DLS) Dhaka, Bangladesh⁴Associate professor, Department of Dairy and Poultry Science, Jhenaidah Government Veterinary College

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ABSTRACT

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**Corresponding author:*

Cell: +8801717477286

Email:

shaheenjgvc.ac.bd@gmail.com

This study was conducted by a baseline survey to explore the current scenario of dairying in respect of productive and reproductive performance under existing management practices such as breeding, feeding, housing, disease prevention etc. at four upazillas of Jhenaidah district in Bangladesh. Majority of the farms in the study area are classed as small holder following semi-intensive method of rearing chiefly for three genotypes namely Indigenous (IG) (15.17%) Holstein Friesian (HF) crossbred (61.38%) and Shahiwal (SL) crossbred (23.45%). Along with rice straw and concentrate mixture, considerable amount of green grass as 6.32 ± 3.80 , 7.71 ± 3.0 and 7.90 ± 3.54 kg/day/cow was supplied to IG, HF Cross and SL Cross respectively. Although 82.76% respondents provided anthelmintic to their cattle but 88.28% did not vaccinate their stock. Bio security measures are often ignored resulted in prevalence of different diseases including Lumpy Skin Disease (LSD). Despite having no knowledge about frozen semen, 81.38% farm owner practice Artificial Insemination and among them 66.21% preferred semen of HF genotype. Age at first calving, length of dry period and post-partum oestrus of IG cows was significantly ($p < 0.01$) higher than that of HF and SL cows. Higher significant difference was observed in calving intervals and gestation period ($p > 0.05$). The average milk yields of IG, HF and SL cows were 0.96 ± 0.59 , 3.45 ± 1.00 and 1.94 ± 0.81 L/day/cow, respectively. The lactation length of HF and SL cows were significantly ($p < 0.05$) higher than of IG cows. Majority of the farmers' reaction regarding productive and reproductive performance of crossbred cows along with feed price, milk price, marketing system and veterinary service was disappointing to which this study recommend to address duly.

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1. INTRODUCTION

In Bangladesh, Livestock is an integral part of complex farming system; contributing significantly towards the development of nation through multidimensional approaches such as poverty reduction, employment generation and nutritional security etc. It also plays an important role in the economy of Bangladesh with a direct

contribution around 1.43% to the nation's Gross Domestic Product (GDP), which is 13.44% of the total Agricultural GDP and growth rate of livestock sector (Current prices) is 3.47% (DLS, 2020a). Bangladesh is a densely populated country and around 80% of the rural population are engaged in rearing cattle (Siddiki et al., 2010). About 70% people (20% directly and 50% indirectly) (DLS, 2020b) are dependent on

livestock sector which also reflects the significance of this sector. There are an estimated 24.39 million heads of cattle produced 106.80 lakh metric ton of milk against the demand of 152.2 lakh metric ton (DLS, 2019) which clearly indicates the necessity to boost up the milk production in Bangladesh. Smallholder farmers predominate agricultural sector in Zambia, Tanzania and other Sub-Saharan Africa countries (Mumba, 2012). In comparison to other developing countries, Bangladesh is the endeavour of smallholders farming where smallholder dairy producers are keeping the majority of the dairy cattle. According to FAO and NZAGRC, (2017a) the subsistence dairy cattle production system produces the largest share of milk production, contributing 77 per cent of total milk supply from cattle. It also reported that there are about 1.4 million dairy farms, comprising around 7.0 million people, working very small plots of land who typically own two cows FAO and NZAGRC, (2017b). Amongst these dairy farmers are some of the poorest and most marginalized such as women. Dairying, being part of the mixed farming systems in Bangladesh (Uddin et al., 2012a) is also considered as a strong tool to develop a village micro economy of Bangladesh (Shamsuddin, 1995). Majority of the cattle population in Bangladesh is non-descriptive types, which do not conform to any particular breed and termed as indigenous cattle. They are little in size and their milk production is lower than that of any exotic breeds. In our country, mainly there are two types of dairy cattle available, namely indigenous and crossbreds. The average production per day of indigenous and crossbred cows is 1.5 litters and 2.5 litters, respectively (Uddin et al., 2012b). On the other hand, Khan et al. (2009a) found that the milk production of HF Crossbred cows ranges from 5-8 L. Improper management system, scarcity of feed, infestation of diseases are recognized as the common causes behind their poor productivity. In response to the growing demand of milk and milk products dairy production has also been forwarded to peri-urban and urban areas. Jhenaidah is well known about its potential livestock population comprising both deshi and cross breed cattle. In Bangladesh, livestock farming is gradually shifting to semi-intensive and intensive system. In accordance with the country's vision of white revolution, farmers of this locality have been invested a lot in dairying, but the output they get is not satisfactory at all.

Urgent attention is a must to address the difficulties the dairy entrepreneurs are facing. Therefore, the present study is undertaken aiming to investigate the farmer's demography, housing and feeding and other managerial aspects and performance of dairy cattle and to identify the problems related to dairy cattle farming and their probable solutions.

2. MATERIALS AND METHODS

Study area and period

This study was conducted at 4(four) Upazilla of Jhenaidah district namely Jhenaidah Sadar, Kaliganj, Harinakunda and Kotchandpur during the period from November 2019 to December 2019 in order to investigate the performance of rural dairying under usual management practices. Jhenaidah is a district in the south-western part of Bangladesh and located at Latitude 23.54° N Longitude 89.00° E. It is a part of the Khulna Division, which is bounded with the Chuadanga, Kushtia, Magura and Jashore districts on the west, north, east and south respectively. It has an area of 1964.77 km².

Data collection and organization

A baseline survey of 145 households was conducted and the data were collected from the rural farmers during the period from November 2019 to December 2019. The farmers were selected based on the availability of dairy cattle farm and well communication facilities. Data were collected through face to face interviewing of farmer and personal visits to the randomly selected households involved in dairy farming. The questions were asked in a very simple manner with explanation of questions where necessary. A questionnaire was designed to capture information related to general characteristics of the households and the parameters included species, age, breed, feeding, housing, vaccination, deworming, lactation period (days), daily production (L), reproductive (oestrus, service, semen, conception rate) performance and disease history. Farmers were selected by random sampling procedure and baseline survey of 145 households located in 76 villages at 4 Upazillas in Jhenaidah. The Upazilla livestock officer (ULO) and veterinary surgeon (VS) were the source of some secondary information regarding the cattle population, milk and meat production, genotype, breeding strategy, vaccination, disease outbreak etc. in their respective Upazillas.

Statistical Analysis

The obtained data were analysed for T-test (Independent Samples t-test) by using statistical software SAS (Statistical Analysis Software) and Stata (STAT/IC-14.0), (Stata Corp, 4905, Lake Way Drive, College station, Texas, USA) to calculate mean and standard deviation (SD) of different genotypes and to know the significance level of different traits among three groups of cattle. Descriptive statistics such as percentages, averages, frequency and standard deviations were used to summarize and present the results. Statistical significance was accepted at $p \leq 0.05$

3. RESULTS

Farmers and farms features

Table 1 represents the key variables in terms of age, gender, family size and level of education reflecting the farmers' characteristics and farm

size, housing system and fodder cultivation indicating farms features. In terms of age structure, most of the farmers were between 31-45 years which corresponds to 43.44% followed by 35.86% and 20.69% were old and young ages respectively. With regards to the gender, most of the households were male (77.24%) whereas 22.76% respondents were females involved in dairy cattle rearing. In case of family size, greater proportion (53.8%) of the respondents belonged to families consists of 4-5 members. Concerning the level of education, majority of the farmers' level was up to primary (representing 30.34%) whereas 20% did not have any education. There were as many as 11.03 per cent graduate found involved in dairy farming. The farm size varied from 1-2 to <8 cows. More than half of the farmers (62.76%) had a herd size of 1-2 and 22.76% had 3-4 cattle per household. With regards to housing system, semi-intensive

Table 1. General features of farmers and farms in the study area

| Characteristics | Variable | Categories | Frequency | Percentages (%) |
|------------------|--------------------|----------------|-----------|-----------------|
| Farmers | Age | Up-to 30 Years | 30 | 20.69 |
| | | 31-45 Years | 63 | 43.44 |
| | | Old (46 Above) | 52 | 35.86 |
| | Gender | Male | 112 | 77.24 |
| | | Female | 33 | 22.76 |
| | Family size | 2-3(number) | 12 | 8.27 |
| | | 4-5(number) | 78 | 53.8 |
| | | 6 to above | 55 | 37.93 |
| | Educational status | No | 29 | 20 |
| | | Primary | 44 | 30.34 |
| Secondary | | 24 | 16.55 | |
| Higher secondary | | 32 | 22.07 | |
| Graduate | | 16 | 11.03 | |
| Farm | Farm size | 1-2 (number) | 91 | 62.76 |
| | | 3-4(number) | 33 | 22.76 |
| | | 5-8(number) | 21 | 14.48 |
| | Housing system | Scavenging | 48 | 33.1 |
| | | Semi-intensive | 97 | 66.9 |
| | Fodder cultivation | Yes | 28 | 19.31 |
| | | No | 117 | 80.69 |

system was preferred by about 66.9% households and the rest practiced scavenging (grazing road sides and chars) method of rearing. Only 19.31% of households possessed fodder land and engaged with fodder production.

Frequency of households (HH) rearing different dairy cattle genotypes

Concentration of different genotypes housed at four different Upazillas' is presented in Table 2.

There were three different cattle genotypes found in the study area namely Indigenous (IG), Holstein Friesian × Local (HF cross) and Shahiwal × Local (SL cross). It was found that more than sixty per cent (61.38) of the households' rear HF crossbred cattle while the proportion of households engaged in keeping IG and SL crossbred were 15.17% and 24.83% respectively. It was also found that HF crossbred preferred by majority of the households (31.0) in

Jhenaidah sadar (peri-urban area) while it was least (17.0) in Kotchandpur upazila.

Feeding management

The types and amount of feed offered to their cattle in study area are summarized in Table 3. Rice straw was found as the major feed supplied to the dairy cattle in the study area along with considerable amount of green grass and a minimum amount of concentrate. The average amount of rice straw supplied to Indigenous, HF

Cross and SL Cross were 14.24 ± 2.69 , 17.92 ± 2.86 and 16.06 ± 2.70 kg/day/cow, respectively. Allocation of green grass (cultivated and cut and carry) and concentrate mixture (broken rice, broken corn, gram husk, mustard oil cake, coconut oil cake, salt etc.) for Indigenous, HF Cross and SL Cross were 6.32 ± 3.80 and 0.95 ± 0.49 , 7.71 ± 3.00 and 1.83 ± 0.65 , 7.90 ± 3.54 and 1.6 ± 0.67 kg/day/cow, respectively. Feeds are supplied to cows on the basis of availability, not on the basis of nutrient requirement in the survey area.

Table 2. Households in upazillas' containing different cattle genotype

| Breeds | Jhenaidah sadar n (%) | Kaliganj n (%) | Kotchandpur n (%) | Harinakundu n (%) | Per cent of total households |
|----------------|-----------------------|----------------|-------------------|-------------------|------------------------------|
| Indigenous | 3 (7.5) | 7(20.0) | 8 (22.86) | 4 (11.42) | 22 (15.17) |
| Holstein | 31 (77.50) | 18 (51.43) | 17 (48.57) | 23 (65.71) | 89 (61.38) |
| Friesian cross | | | | | |
| Shahiwal cross | 6 (15.0) | 10 (28.57) | 10 (28.57) | 8 (22.86) | 34 (23.45) |
| Sub Total | 40 | 35 | 35 | 35 | |
| Total (N) | | | 145 | | |

N= Total number of households, n= households rearing the respective breed, % = per cent households in each upazila

Table 3. The average amount of feed provided to cattle (Mean \pm SD)

| Feed Types | Indigenous | HF Cross | SL Cross |
|-----------------|------------------|------------------|------------------|
| Rice straw(kg) | 14.24 ± 2.69 | 17.92 ± 2.86 | 16.06 ± 2.70 |
| Green Grass(kg) | 6.32 ± 3.80 | 7.71 ± 3.00 | 7.90 ± 3.54 |
| Concentrate(kg) | 0.95 ± 0.49 | 1.83 ± 0.65 | 1.6 ± 0.67 |

SD= Standard Deviation

Disease management

Disease management is considered as one of the pre-requisite of successful cattle rearing. Response of farmers to diseases and relevant practices are depicted in table 4. A large number of farmers (88.28%) are not involved with vaccination program. But reversely (82.76%) farmers were engaged with deworming of their cows. Majority of the farmers (82.06%) in the study area found ignorant about taking bio security measures while as many as 17.94% farmers practice such measures. Among the total household visited 45.51% reported at least one disease with which their cattle suffered. Lumpy Skin Disease (LSD) was found the highest in number (20.69%).

Reproductive characteristics

The breeding characteristics of cows in terms of oestrus, service type, semen used, source of

semen and service per conception are reflected in Table 5. About 73.1% of the respondents reported that their cows have shown regular sign of oestrus. About 14.48% of the farmers in the study area still use natural breeding and 81.38% farmers inseminated their cows artificially with frozen semen of exotic breeds and merely 4.14% do both. The semen of HF was found almost three times as popular as SL semen which was accounted as 66.21% for the former and 33.79% for the later. In response to the question regarding number of services required per conception, about 88% respondents replied either single or double dose is required. They also asked about whether they have any knowledge about frozen semen or not and surprisingly three quarter (75.17%) replied negative. It was found that majority (61.38%) of artificial insemination (AI) service provided by Upazilla Livestock Office (Government entity) and the rest by BRAC (a non-government organization).

Table 4. Response of farmers regarding disease history and preventive measures

| Cases | Criteria | Frequency | Percentages (%) |
|-----------------------|-------------|-----------|-----------------|
| Vaccination | Yes | 17 | 11.72 |
| | No | 128 | 88.28 |
| Deworming | Yes | 120 | 82.76 |
| | No | 25 | 17.24 |
| Bio security measures | Yes | 26 | 17.94 |
| | No | 119 | 82.06 |
| Diseases history | LSD | 30 | 20.69 |
| | FMD | 11 | 7.58 |
| | LSD and FMD | 5 | 3.44 |
| | Mastitis | 7 | 4.83 |
| | Diarrhoea | 13 | 8.97 |
| | Sub Total | 66 | 45.51 |

LSD= Lumpy Skin Disease, FMD= Foot and Mouth Disease

Table 5. Breeding information of dairy cattle

| Breeding History | Criteria | No of Respondents | Percentages (%) |
|---------------------------|--------------------|-------------------|-----------------|
| 1. Oestrus | Regular | 106 | 73.1 |
| | Irregular | 39 | 26.9 |
| 2. Types of service | AI | 118 | 81.38 |
| | Natural | 21 | 14.48 |
| | Both (Natural+ AI) | 6 | 4.14 |
| 3. Semen used | HF | 96 | 66.21 |
| | SL | 49 | 33.79 |
| 4. Service per conception | Single | 95 | 65.52 |
| | Double | 33 | 22.76 |
| | Third | 12 | 8.27 |
| | Fourth | 5 | 3.44 |
| 5. Knowledge about Semen | Yes | 36 | 24.83 |
| | No | 109 | 75.17 |
| 6. Source of semen | Government | 89 | 61.38 |
| | BRAC | 56 | 38.62 |

Reproductive performances

Different reproductive performances of dairy cattle under study area are illustrated in the table 6. There was a significant difference between the ages at first calving among the available breeds. Ages at first calving was calculated as 39.47 ± 5.00 , 36.72 ± 4.30 and 36.84 ± 4.18 months for Indigenous, HF and SL cows respectively. Taking service per conception into consideration, the variation among the breeds was found insignificant. The average number of services per conception for Indigenous, HF and SL crossbred cows were 1.37 ± 0.45 , 1.22 ± 0.55 and 1.28 ± 0.62 , respectively. The average length of postpartum oestrus and dry periods varied significantly among the concerned breeds. HF showed the minimum days (94.20 ± 6.57) of postpartum oestrus while Indigenous cow experienced the maximum days (156.68 ± 14.64) of dry period. Turning to calving interval and gestation period, no significant variation was

found in any case. Longest calving interval (390.45 ± 37.15 days) was recorded for Indigenous cow followed SL and HF cows were (381.74 ± 30.98 days) and (366.5 ± 29.55 days) respectively. The average gestation length was recorded around 274 days in all types of dairy cattle breed within the surveyed area.

Productive performances

Productive performances of dairy cattle in terms of daily milk yield and lactation period are presented in the table 7. Indigenous cattle were found as the lowest producer whereas HF crossbred cattle were the highest. The average milk yields of Indigenous, HF and SL crossbred cows were 0.96 ± 0.59 , 3.45 ± 1.00 and 1.94 ± 0.81 L/day/cow, respectively (Table 7) and this variation was significant ($p < 0.001$). Lactation period among the breeds also varied significantly ($p < 0.005$). The average lactation period of Indigenous, HF and SL crossbred cows were 187.56 ± 32.60 , 225.83 ± 29.03 and 189.66 ± 31.78 days, respectively.

Challenges faced by the farmers

The current study also targeted to pin point major problems faced by farmers which is represented in table 8. The results revealed that majority of the respondent replied negative in response to questions regarding on the following issues. More than sixty per cent (61.38%) of the farmers fell short of capital for running their farms. Similar percentages of farmers faced difficulties

in supplying adequate amount of feed and selling their milk, which were accounted to 55.86% and 53.10% respectively. The study found that most of the respondents (81.38%) claimed price of concentrate feed was beyond their capacity where as 76.55% farmers were unhappy with the price of milk. Another important problem faced by the farmers was costly veterinary services. About three quarter (74.48%) of them was unable to pay for veterinary services.

Table 6. Reproductive performances of indigenous and crossbred cows (Mean \pm SD)

| Categories | Indigenous | HF Cross | SL Cross | P-value |
|--|--------------------|--------------------|--------------------|---------|
| Age at 1 st calving(months) | 39.47 \pm 5.00 | 36.72 \pm 4.30 | 36.84 \pm 4.18 | 0.0001 |
| Service/conception(No) | 1.37 \pm 0.45 | 1.22 \pm 0.55 | 1.28 \pm 0.62 | 0.350 |
| Post-partum oestrus (days) | 105.40 \pm 13.82 | 94.20 \pm 6.57 | 110.37 \pm 13.93 | 0.0001 |
| Dry Period(days) | 156.68 \pm 14.64 | 137.29 \pm 15.95 | 152.88 \pm 15.84 | 0.001 |
| Calving intervals(days) | 390.45 \pm 37.15 | 366.5 \pm 29.55 | 381.74 \pm 30.98 | 0.123 |
| Gestation period(days) | 274.05 \pm 5.46 | 273.47 \pm 5.04 | 274.37 \pm 5.18 | 0.694 |

SD=Standard Deviation

Table 7. Performance of dairy cattle in different genotypes

| Cattle Breed | Mean \pm SD | |
|-------------------------|---------------------|------------------------|
| | Daily milk yield(L) | Lactation Period(Days) |
| Indigenous | 0.96 \pm 0.59 | 187.56 \pm 32.60 |
| Holstein Friesian Cross | 3.45 \pm 1.00 | 225.83 \pm 29.03 |
| Sahiwal Cross | 1.94 \pm 0.81 | 189.66 \pm 31.78 |
| P-value | 0.0001 | 0.032 |

SD= Standard Deviation, L= Litter

4. DISCUSSION

In present study, performance of rural dairying under existing management practices and the challenges faced by the farmers were investigated. Before any intervention being made it is urgent to understand the status of the farms as well as farmers. Based on the study, most of the farms in the study area can be categorized as small scale. Age structure, gender dominancy and educational status are almost similar with the finding of Uddin et al., (2012c).It has been observed that participation of young people in dairying is much lower than that of the older people and the principal reason behind this trend identified is lack of capital. Quddus, (2018a) also pointed out inadequate capital supply for the marginal farmers. The present study shown that more than three-fourth of households was run by male which is usual feature of male dominated society of Bangladesh. Despite having potentiality to be entrepreneur in this sector, they are often neglected since male are ultimate decision maker. Modern farm management demands for well educated person to make it a

successful enterprise. Although majority of the farms in the study area are still in the hands of farmers having no or primary level education but there is a growing number of people having higher education are engaged in dairying that could be due to the promising prospect of this sector. Number of dairy cattle is also a crucial factor in small scale farming. Among cattle owners, about 62.76% have lower number (1-2) and this could be due to insufficient capital, shortage of lands and feeds. Method of rearing has a considerable effect of productivity of cows. This study identified that the Semi-intensive method of rearing was followed by greater proportion (66.9%) cattle owners. Similar pattern of farming is discovered by Dipu et al., (2019). Although fodder is essential for dairy farming but more than 80 per cent farmer in the study area do not cultivate any fodder, rather they fed their cows with purchased grass, roadside grass, tree leaves as succulent feeds. Hoque et al., (1999) found that more than 84% of the farmers managed feed from both sources (own and purchased) for their cattle even though 15% fully

depended on purchasing feed from local market. Scarcity of land, competition with cereal crops, and unavailability of quality fodder seeds emerged as key factors regarding this issue.

Table 8. Responses of respondents to major problems they faced

| Issues | Criteria | Frequency (n) | Percentages (%) |
|----------------------------|--------------|---------------|-----------------|
| Capital shortage | Yes | 89 | 61.38 |
| | No | 56 | 38.62 |
| Feed shortage | Yes | 81 | 55.86 |
| | No | 64 | 44.14 |
| High price of concentrate | Yes | 118 | 81.38 |
| | No | 27 | 18.62 |
| Low price of milk | Yes | 111 | 76.55 |
| | No | 34 | 23.45 |
| Marketing problem of milk | Yes | 77 | 53.10 |
| | No | 68 | 46.89 |
| Cost of veterinary service | Affordable | 37 | 25.52 |
| | Unaffordable | 108 | 74.48 |

n= Number of respondents

From Table 2 it is found that HF crossbred cow is preferred by more than 60% of the households which might be due to the genetic superiority of it in terms of productivity over IG or Shahiwal crossbred. Majority of the farmers in Jhenaidah sadar found interested in HF crossbred which could be due to peri urban environment where facilities such as artificial insemination, veterinary services are more accessible than that of rural areas. Concerning feeding management, substantial amount of rice straw and green grass was fed to all types of cattle which contradict the finding of Sarker et al., (2017) who reported the average availability of green grass of our livestock is only 2.5 kg/h/day. It has become evident that there some people in the study area having land but do not have dairy cattle, started to cultivate and marketed fodder to the cattle owners. This could make this availability. However, concentrate supply was found much lower than what required and it could be attributed to its higher price. Khan et. al., (2009) also revealed that concentrates are not available to the farmers at the affordable prices.

With regards to disease management, farmers' response to vaccination and deworming programme was seen as opposite dimension. More emphasis on deworming program might be accounted for low cost involvement, while high cost, unavailability and lack of knowledge resulted in over eighty per cent cattle remain unvaccinated. Regarding bio security, more than eighty per cent farmers do not have any knowledge about such measures which might be responsible for higher percentage of Lumpy Skin

Disease. Most of the common diseases such as FMD, Mastitis, and Diarrhoea are prevalent in the study area that demands special veterinary care.

Study regarding reproductive characteristics and breeding management is extremely important in successful dairying. While irregular oestrus in crossbred cow has been emerged as a common problem in Bangladesh, more than 70% respondents of this study area claimed their stock in regular oestrus. This could be attributed to feeding green grass and rearing cattle experienced first or second lactation. A Significant proportion of farmers' preference towards artificial insemination (AI) services is due to availability of frozen semen at low price, quick services from AI technician and of course desire for high yielding crossbred progeny. Farmers who were interested in dairying, they used semen of HF bull while semen of Shahiwal is preferred by farmers engaged in cattle fattening. Reasons behind the results of service per conception were much better and owners replied that they have become expert in oestrus detection and get their cows inseminated within the time limit. Farmers trust on government and non-government organizations leads them to source their semen despite having no knowledge about the quality of frozen semen. Islam et al. (2002a) revealed that age at first calving of Friesian cross, Shahiwal cross and Indigenous cows were 36.25 ± 3.48 , 37.26 ± 3.01 and 40.03 ± 3.54 months respectively which are nearly similar to the present study. Another study by Miazi et al., (2007a) supports the present finding

regarding age at first calving of Holstein Friesian crossbred and Indigenous cows. However, information about the age at first calving in the present study was higher than 32.7 and 31.9 months as reported by Yifat et al. (2009).

In current study, it is found that Indigenous cows require more service per conception than crossbred cows. Mureda E and Mekuriaw Zeleke Z (2007) reported that in small scale dairy production system, the numbers of service per conception were 1.9 ± 0.2 for Friesian \times Zebu. From another study, Islam et al., (2002b) revealed that the average SPC for Friesian cross, Sahiwal cross, Sindhi cross and indigenous dairy cows were 1.65 ± 1.65 , 2.05 ± 1.17 , 2.206 ± 1.01 and 1.41 ± 0.56 , respectively. The results of the current study however, lower from these findings.

Post-partum oestrus of IG cows was significantly higher ($p < 0.05$) than that of HF crossbred and SL crossbred cows which is quite different from Rokonzaman et al., (2009) who reported the period in Holstein Friesian crossbred and indigenous cows were 86.48 ± 23.67 and 121.2 ± 52.90 days respectively. Furthermore, the result of the present study disagrees with the findings of Saha et al., (2015) who reported insignificant effect of breeds on post-partum oestrus period which ranged from 80.2 ± 17.5 and 84.8 ± 21.0 days for Holstein Friesian \times local zebu and local zebu respectively. Calving intervals were quite similar ($p > 0.05$) in IG, HF and SL cows. Miazhi et al., (2007b) concluded that there were significant differences ($p < 0.01$) among the calving interval of different types of dairy cows. Hunduma Dinka (2012) recorded calving interval of crossbred dairy cow under small holder condition 372.8 ± 5.9 days which is similar with the present findings. There was no significant ($p > 0.05$) difference was found in gestation length among the breeds concerned in the study area. The result agrees with Majid et al., (1995) who mentioned a non-significant variation in gestation period among different crossbreds. They found a range of gestation period of 270-285 days and no significant variations was observed in gestation length among different breeds and crossbreds. Average dry period of HF and SL cows were lower than IG cows. The average milk yield of HF and SL cows were significantly ($p < 0.001$) higher than the IG cows. From the result it shows that average daily milk yield of HF crossbred was about 3.5 times higher

than that of IG cows which might be due to the genetic configuration. This result is near to the findings of Halim, (1992) who showed that average milk yield of crossbred dairy cows was 3.09 L/ d/cow.

A significant difference was found in lactation length ($p < 0.01$) among IG, HF and SL cows. The average lactation of HF cows was 38 and 36 days higher than IG and SL cows respectively. The lactation length in the present study inconsistent with the findings of Hasan (1995b) who revealed the average lactation period of Jersey, Holstein, Sahiwal and Sindhi crosses were 286, 272, 262 and 255 days, respectively. Whereas Khan et al., (1991) reported that the average lactation period of Pabna, Sindhi cross and Sahiwal cross were 200, 251 and 282 days, respectively. The results of the present study do not match with the previous studies. This variation could be due to influences of genetic (semen used), environmental, housing and feeding management in the respective study areas.

With regards to the challenges faced by the cattle owner, credit shortage has been emerged as a common problem resulted in small number of cattle in rural households. This information is in agreement with the findings of Quddus, (2018b) who states that marginal farmers do not have access to formal credit facilities and they become helpless to get adequate capital supply. Scarcity of land, unavailability of good quality fodder seeds and more emphasis on crop cultivation leads to shortage of feed in the study area. Moreover, a significant proportion of the respondents become unable to feed concentrate to their cattle because of its high price. Prices of this feed are set by the manufacturer on which government authorities have little control might be responsible for such a high price of concentrate feed. Quddus, (2018c) found that low price of the milk is a constraint for smallholders which has also become evident in the present study. Improper marketing channel is identified by majority of the respondents as one of the reasons behind incurring loss on selling their milk. Shantana R and Proloy, (2003) also reported that dairy farmers are facing marketing challenges in Bangladesh. In addition, quack takes the opportunity of severe shortage of government veterinary surgeon, demanding high fees for veterinary service claimed by majority of the respondents.

5. CONCLUSIONS

This study revealed a growing popularity of dairy farming with Holstein Friesian crossbred cow among fairly educated people in rural and peri-urban community. It has also been observed that despite best possible management practices by the farmers in that community, the performances of crossbred cows were far below their genetic potentiality. Therefore, the study suggests further investigation to identify the root cause of substandard productivity of along with economic analysis to reach a decision whether the crossbred dairy cow could be considered as asset or liabilities for the dairy entrepreneurs of Bangladesh.

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