

**PREVALENCE AND THERAPEUTIC MANAGEMENT OF  
ANOESTRUS IN CATTLE AT SHERPUR UPAZILA OF  
BANGLADESH**

**A THESIS**

**BY**

**MD. SAMSUZZAMAN**

**REGISTRATION NO. 1705043**

**SEMESTER: JULY-DECEMBER, 2018**

**MASTER OF SCIENCE (M.S)**

**IN**

**MEDICINE**



**DEPARTMENT OF MEDICINE, SURGERY AND OBSTETRICS  
HAJEE MOHAMMAD DANESH SCIENCE AND TECHNOLOGY  
UNIVERSITY, DINAJPUR-5200**

**DECEMBER, 2018**

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**DEDICATED  
TO MY  
BELOVED PARENTS AND TEACHERS**

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## **ABSTRACT**

Reproductive and production disorders of dairy cattle significantly reduce their productivity which is of great concern of dairy producers worldwide because most reproductive disorders adversely affect the future fertility. Rural people of Bangladesh rear cow mainly for milk production. Milk production is related with parturition. There are many cows suffering from reproductive disturbance like anestrus that delayed conception and parturition. Therefore, it is necessary to reduce the factors those are affecting anestrus in dairy cows. The present study was conducted to determine the prevalence of anoestrus in cattle in relation with age, seasonal variation and breed along with evaluation of the therapeutic response of different commercially available nutritional drugs against anoestrus in cattle at Sherpur Upazila of Bangladesh. In this investigation, out of 977 dairy cattle, 109 were positive for anoestrus. Active surveillance system was used to collect data from the selected farms through questionnaire survey over a period of one year from January 2018 to December 2018. The investigation revealed that the overall prevalence of anoestrus in cattle was 11.16 %. The highest prevalence of anoestrus was 13.51% found in animals greater than 4 years of age and moderate 10.24% in heifer and lowest 8.90% in animals of 3-4 years age group. It was recorded that 15.8% prevalence was significantly ( $p<0.05$ ) found higher in rainy season followed by 10.75% in winter season and 7.51% in summer season. Cross bred animals showed significantly ( $p<0.01$ ) higher 12.61% anoestrus than local breed 8.20%. Animal under the study taken for nutritional therapeutic management reveal that combination therapy showed more effective result than the single one. Results indicated unsatisfactory feeding, housing, and health management practices are the main cause of low fertility of dairy cows. Lack of scientific knowledge, low access to breeding, and health services further contributed to low productivity and fertility.

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## **CHAPTER I**

### **INTRODUCTION**

Livestock is an integral component of the complex farming system in Bangladesh as it is not only a source of meat protein but also a major source of farm power services as well as employment. The livestock sector provides direct employment opportunity for 20% of the total population and partly employment for another 45% (Livestock economy in Bangladesh 2017-2018). The contribution of the livestock sector to GDP was 1.54% and the GDP growth rate of livestock sector was 3.40% in the year of 2017-2018 (Livestock economy in Bangladesh 2017-2018). Although the share of the livestock sector in GDP is small, it's contribution to meet the daily protein requirements, cultivation production and export are significant. Bangladesh having a large livestock population. According to the report of livestock economy of Bangladesh 2017-2018, the total cattle population is 24.08 million. And now-a-days dairy farming plays an important role in our national economy, because cattle produce about 94.06 lakh metric ton of milk (actual demand, 150.29 lakh metric ton) and 72.60 lakh metric ton meat (actual demand, 72.14 lakh metric ton) in 2017-2018 that cover the major portion of our national protein demand (Livestock economy in Bangladesh 2017-2018). Moreover, livestock products namely, leather and leather products, hides and skins are important exportable items. Among all livestock population, cattle are one of the most important part for rural agricultural farming system in Bangladesh and it has been playing an important role in the economy by providing food, draft power, transport, hides, bone, biogas etc. Although cattle are performing a vital role, maximum of them are emaciated and frequently affected with several types of diseases due to poor management practices and geo-climatic condition of Bangladesh. Among various constrains in the development of dairy industry, reproductive disorder are the most important limiting factors that cause significant economic loss to the rural farmer as well as affect our national economy negatively. Efficient reproduction is a prime criterion for the prosperity of livestock industry. Regular breeding of cows with a shorter calving intervals considered to be economical due to reduction in the maintenance cost of dry period. Early reestablishment of cyclic ovarian activity and post-parturient recovery of the uterus are essential to maintain an acceptable calving to conception interval. In order to make dairying an economical and viable industry, full genetic potential in terms of milk production can be explored only when reproduction is normal (Beckett and Lean, 1997).

Reproduction is closely associated with interaction of hormonal and nutritional status of body. The female is expected to exhibit oestrus within a couple of months after parturition. However, there is a variable anoestrus period following calving in the cow. The occurrence of first post-partum heat is dependent on a number of factors such as involution of uterus, endocrine constitution, hormonal balance, nutritional status, uterine health, mammary function, season, parity, suckling and others (Arthur *et al.*, 1982). However dairy cows are exposed to considerable stress factors during early post-partum period, which have deleterious effects on female reproductive efficiency (Torres *et al.*, 1997). These factors are onset of lactation, negative energy balance (Granfield and Buitier, 1991), loss of body condition (Heinonen *et al.*, 1988) and periparturient disorders (Nakao *et al.*, 1992). Alteration in the hormonal and biochemical milieu in the animal system may also be responsible for anoestrus.

Anoestrus is the most common single cause of infertility in cattle (Roberts, 1971). In cows, it is observed most commonly after parturition as post-partum or pre-service anoestrus, or following service as post-service anoestrus, where conception does not occur. It accounts for 8.9% (Roine, 1973), 7.925 % (Rao and Kesavmurthy, 1972), 30.42% (Yadav *et al.*, 2004) of total infertility problems in cows. Khan *et al.*, (1967) reported the incidence of anoestrus as 12.13% in Haryana cows. Numerous causes of anestrus in cattle have been described by various workers viz. A conspicuous increase in Ca: P ratio (Naidu and Rao, 1982), seasonal effects (Hansen, *et al.*, 1985 and Yadav *et al.*, 2004), hormonal imbalance (Short *et al.*, 1990), level of milk production (Lopez *et al.*, 2004) and suckling (Montiel and Ahuja, 2005).

In anestrus animal there is inadequate hypothalamic stimuli for the release of gonadotropin (Shokier, 1959), that is why a wide range of hormonal and no hormonal treatment programmes have been used to induce oestrus cycles in anoestrus cows to coincide with the start of the breeding season. The treatment programmes structured to increase progesterone; estradiol and LH concentrations at the appropriate times during the period leading to the first ovulation, and an induced pre ovulatory gonadotropin surge have been demonstrated to induce oestrus cycles of normal duration and acceptable fertility in a majority of anoestrus cows. Post-partum anoestrus is due to imbalance in hormones levels particularly oestrogen and progesterone which results due to its less production from various stress factors and negative feedback mechanisms. A knowledge of the levels of gonadotrophic and steroid hormones in the body fluids of the cow,

particularly those in circulating blood is valuable in understanding endocrine control of the oestrus cycle (Salisbury *et al.*, 1978). In order to obtain a complete understanding of the complex endocrinological events required for normal reproduction, quantification of the reproductive hormones in various tissues and fluids is necessary (Cole and Cupps, 1977). Estimation of hormones might be a potential aid in characterizing this problem in post-parturient cows. Correction of hormonal imbalance, negative energy supply, and improper nutritional management and diseases control may be the possible solution for this problem.

The objectives of this study are-

1. To determine the overall prevalence of anoestrus in cattle at Sherpur upazila in Bogura district.
2. To know the age, season and breed wise prevalence of anoestrus in cattle.
3. To evaluate the therapeutic response of different commercially available nutritional drugs against anoestrus.

## CHAPTER II

### REVIEW OF LITERATURE

#### Background

The factor that most limits early conception of suckled cows is the proportion of cows that are not cycling (anestrus) at the beginning of the breeding season (Short *et al.*, 1990). Other factors influencing the incidence of anestrus were reviewed (Stevenson *et al.*, 1997a). Continual presence of a suckling calf prolongs anestrus and delays the reinitiation of estrous cycles (Williams, *et al.*, 1990). Insufficient energy and protein intake and insufficient body condition at calving are also limiting factors, but temporary or permanent weaning of the calf usually initiates estrus within a few days (Williams, 1990). Primiparous cows generally have a more prolonged anestrus because of their additional growth requirement (Short and Adams, 1988; Short *et al.*, 1990). Nutrients are used by cows according to an established priority (Short and Adams, 1988). The first priority is maintenance of essential body functions to preserve life. Once that maintenance requirement is met, remaining nutrients accommodate growth. Finally, lactation and the initiation of estrous cycles are supported. Older cows have no growth requirement, thus nutrients are more likely to be available for milk synthesis and initiation of estrous cycles. Because of this priority system, young growing cows generally produce less milk and are anestrus longer after calving.

Since 1994, we have treated more than 3,269 beef cows with various hormonal treatments to synchronize estrus, ovulation, or both, in an attempt to achieve conception early in the breeding season and maximize the proportion of cows pregnant to genetically superior AI sires (Stevenson *et al.*, 1997a). As part of these studies, we measured the incidence of cyclicity at the beginning of the breeding season, both prior to hormonal injections and in response to these treatments. The major risk factors that limit a high rate of cyclicity at the beginning of the breeding season include age of cow, body condition, and days postpartum (Short *et al.*, 1990). The objectives of this report were to quantify the effects of body condition, parity and days postpartum of suckled beef cows on the initiation of estrous cycles and to determine their influence on the proportion of cows cycling before and in response to hormonal treatments, as well as their effect on resulting fertility of such treatments.

**Short *et al.*, (1990)**, Reported that postpartum infertility is caused by four factors: general infertility, lack of uterine involution, short estrous cycles and anestrus. The general infertility component is common to any estrous cycle and reduces potential fertility by 20 to 30%. Incomplete uterine involution prevents fertilization during the first 20 d after calving but is not related to anestrus. Short estrous cycles prevent fertility during the first 40 d after calving by causing the cow to return to estrus before pregnancy recognition occurs. Anestrus is the major component of postpartum infertility and is affected by several minor factors: season, breed, parity, dystocia, presence of a bull, uterine palpation and carry over effects from the previous pregnancy as well as two major factors: suckling and nutrition. These major factors have direct effects on anestrus but also interact with one or more other factors to control postpartum anestrus. Physiological mechanisms associated with anestrus involve blockage of the GnRH “pulse generator” in the hypothalamus, but other pathways also must be involved because bypassing the pulse generator is not an effective treatment for all cows. The primary cause of anestrus probably is different for different stages of anestrus. The mediating mechanisms for anestrus are not involved with prolactin, oxytocin, the adrenal or direct neural input from the mammary gland but are at least partially involved with blood glucose and the endogenous opioid peptide system. Management options to decrease the impact of anestrus and infertility include: 1) restrict breeding season to 545 d; 2) manage nutrition so body condition score is 5 to 7 before calving; 3) minimize effects of dystocia and stimulate estrous activity with a sterile bull and estrous synchronization; and 4) judicious use of complete, partial or short-term weaning.

**Abeygunawardena *et al.*, (2004)**, Reported that *Bos indicus* breeds, commonly known as Zebu cattle, have spread from their center of origin in Western Asia into large areas of Asia (including the Asia-Pacific basin), Africa, South and Central America (including the Caribbean islands). The original Zebu genotype, however, has been modified by planned and unplanned cross-breeding programs involving many native and *Bos taurus* breeds in their new habitats. Though accurate estimates are not available, more than half of the world’s cattle population includes a proportion of *B. indicus* germ plasm. *B. indicus* native breeds have developed by natural selection over centuries for their ability to survive in rough, harsh tropical environments. Most of these non-descript breeds still exhibit high fertility, in terms of calving rates, and disease resistance but they grow very slowly and take well over 3 years to reach puberty and produce only a few liters of milk

over a short lactation period. Selection has been carried out in some areas and distinct Zebu breeds have been developed that have moderately high growth rate and milk production. However, they are slow breeders and have extended pre-pubertal and postpartum anestrus periods, compared to their temperate counterparts exposed to similar environment and management. The reproductive biology of *B. indicus* is similar to that of *B. taurus*. Most of the proven management, nutritional, hormonal and biotechnological interventions developed through experimentation with *B. taurus* breeds are equally applicable to *B. indicus* and their crosses. Zebu breeds predominate in most tropical countries where the majority of the human population lives. If meat and milk production are to be increased in the tropics, Zebu cow productivity, in terms of number of calves produced per life time or per unit area of land, must be increased and the time from birth to slaughter must be reduced. This goal could be achieved either by selection within local Zebu populations or through planned cross-breeding with *B. taurus* breeds. Because the productive and reproductive potentials of Zebu cattle are relatively low, worthwhile gains could only be achieved by selection over many generations. This would require substantial investment in labor, feed and drugs that may not be economic since the return from such investment is relatively low. However, many studies have shown that cross-breeding with *B. taurus*, which combines additive, dominance and epistatic effects of the two genotypes, ensures high productive and reproductive performance. Therefore, planned cross-breeding with suitable *B. taurus* breeds, although demanding additional investment in labor, feed and drugs, will still be economic because the return far exceeds the costs.

**Talukder et al., (2005)**, Conducted a study to identify the reproductive problems of dairy cows of Bangladesh Agriculture University (BAU) dairy farm initially different reproductive parameters in five genetic groups of cows and identified 10 cows as less performer. Jersey cross and Holstein Friesian cross were found as the less performer (30% reproductive disorder) followed by Sindhi and Sahiwal crossbred cows (20% reproductive disorder) and Red Chittagong was found as the best performer (0% reproductive disorder). The reproductive records of these 10 cows further taken into consideration and found to be anestrus. The cause of anestrus were further confirmed by rectal palpation and led to the anestrus due to unknown reason (20%) and ovarian abnormalities (80%). The ovarian abnormalities recorded to be as hypoplasia, deformed ovaries and cystic ovaries and their incidence percentages were 30, 20 and 30,

respectively. For probable remedies related reproduction management were provided and the incidence (%) of improvement found in Jersey, Sindhi, Holstein Friesian and Sahiwal crossbred's cows were 66.7, 0.0, 33.3 and 100.0, respectively. It is concluded that Red Chittagong cows encountered least reproductive complains in BAU dairy farm. Moreover, Jersey and Holstein-Friesian crosses were found to be more susceptible to reproductive disorders than crosses of Sindhi and Sahiwal cows.

**Samanta *et al.*, (2005)**, Conducted a study to evaluate the effect of feeding different mineral supplements on health and reproductive performance. Post partum anoestrous cows (50; 4–6 years aged) were selected in new alluvial zone of West Bengal (Ghatal Block). The animals randomly divided into five groups in a completely randomized design were offered diet either without mineral supplementation (c), with mineral supplement (M), with mineral supplement and Phytase @ 2.5% of the mineral supplement (MP), with mineral supplement, Phytase @ 2.5% of the mineral supplement and vitamin AD @ 49500 and 4500 IU/animal/d respectively (MPV) or with mineral and vitamin AD @ 49500 and 4500 IU/animal/d respectively (MV). The mineral supplement contained 18.5% Ca, 16.3% P, 1.29% Zn, 0.33% Cu and 1.13% Mn. Concentration of plasma aspartate amino transferase (AST), alkaline phosphatase (AKP), total protein and albumin was increased ( $P<0.01$ ) when mineral supplement was used in diet. Addition of vitamin AD and or phytase with mineral supplement showed improvement of plasma proteins concentration than using mineral supplement only. Concentration of plasma cholesterol was higher in MV which is comparable to MPV and MP, but differed ( $P<0.01$ ) from Cand M. Plasma Ca and P was higher ( $P<0.01$ ) in MPV and MP compared to other. Concentration of plasma trace minerals was increased ( $P<0.04$ ) when different forms of mineral supplement were fed compared to control. Plasma Cu and Zn were higher ( $P<0.01$ ) in MP and MPV cows whereas Fe and Mn of M MP MPV and MV were comparable. Feeding of mineral supplement improved % of estrous and conception rate which was again improved when phytase and or vitamin AD was added with it The results indicated the usefulness of feeding phytase and/or vitamin AD with mineral supplement to improve health status plasma trace minerals % estrous and conception rate in post partum milch anoestrous cows.

**Sood *et al.*, (2009)**, Carried out a study comprised of 2092 crossbred cows presented for A.I. during a normal oestrus (E1). Some of these cows were presented again during MCE (Group I;  $n = 51$ ), whereas others were not reported for any evidence of MCE (Group II;

n = 2041). Some cows in Group I (n = 42) and Group II (n = 525) were submitted again during subsequent normal estrus (E2) for second A.I. The prevalence of MCE was 2.43% and was expressed at an average interval of  $9.1 \pm 0.5$  days after E1 in Group I cows. The average inter estrus interval between E1 and E2 was  $21.2 \pm 1.2$  days in Group I, which was similar ( $P > 0.10$ ) to  $20.9 \pm 1.1$  days in Group II. In Group I, good uterine tone was more common (67.8%) during E1, whereas mild (34.5%) or moderate (48.3%) uterine tone was preponderant during MCE. Also, the genital discharge in majority of the Group I cows was clear, copious and stringy (80.6%) during E1, whereas the majority of these cows had either clear and scanty (61.3%) or turbid and scanty (25.8%) genital discharge during MCE. A large proportion of Group I cows (82.3%; 42/51) did not conceive from A.I. during E1. This requires endocrine readressal. It was concluded that cows presented for A.I. with a subdued estrus in the form of a scanty genital discharge and varying uterine tone, most likely mild or moderate, should be ruled out for MCE, especially in the absence of a proper breeding record.

**Gupta et al., (2012),** Conducted a study to evaluate the effect of exogenous insulin alone and in combination with GnRH on estrous induction and fertility response in true anestrus buffalos. Forty buffaloes with inactive ovaries were randomly allocated into Four groups: Group-I (G1, n=10) treated with long acting bovine insulin at the dose rate of 0.25 IU/ kg body weight subcutaneous once daily for 5 consecutive days, Group-II (G2, n=10) treated with GnRH where each buffalo received an intramuscular injection of 20 µg of Buseralin acetate (Day 0); Group-III treated with insulin plus GnRH (G3, n=10) in which each buffalo received a subcutaneous injection of long acting bovine insulin at the dose rate of 0.25 IU/kg body weight subcutaneous once daily for 5 consecutive days and an intramuscular injection of 20 µg of Buseralin acetate on Day 4 ; and the control group (G IV, n=10) in which each buffalo given an intramuscular injection of 2.5 ml of sterile saline on Day 0. In response to the treatment induction of estrus in higher number of animals using insulin in combination of GnRH (G-3, 60%) as compared to insulin alone (G1, 50.00%) and GnRH alone (G2, 40%), however no animal induced in estrus in control group (G4, 0.0%). The onset of estrus interval (days) following start of treatment was shorter in G-2 ( $9.5 \pm 3.18$ ), as compared to G-3 ( $15.5 \pm 4.61$ ) and G-1 ( $25 \pm 0.94$ ) respectively. The ovulation rate at induced estrus was 100% in all the treatment groups. All the animals bred at induced estrus with the 100% conception i.e. in G-1, G-2 and G-3, respectively. Thus, above studies suggested that the exogenous administration of long acting bovine insulin enhance the ovarian function and fertility response in true

anoestrous dairy animals so this may be used as alternative hormonal therapy for management of anoestrus dairy animals.

**Kamal *et al.*, (2012)**, Conducted a study to determine the underlying disorders and effective treatment of postpartum anoestrus. Rectal examination accompanied by ultrasonography was performed twice in a 10-day interval on crossbred (Holstein x Zebu) anoestrus cows at = 60 days postpartum to diagnose their cyclic status. Cows diagnosed as silent estrus and true anoestrus were allotted to different treatment and Artificial Insemination (AI) protocols. The pregnancy was diagnosed thereafter by ultrasonography between 30-35 days post AI. The prevalence of anoestrus was 18.5% (83 out of 448 cows) as reported by the farmers with silent estrus 53.0% (n = 44), true anoestrus 42.2% (n = 35), cystic ovarian disease 2.4% (n = 2) and uterine infections 2.4% (n = 2) as the underlying disorders. Treatment of silent estrus was revealed estrus and conception; respectively, in 52 and 43% cows carefully monitored of estrus signs for AI (Group I, n = 23) and in 73 and 45% prostaglandin treated cows with AI on observed estrus (Group II, n = 11). Prostaglandin treatment followed by timed AI with GnRH administration at first AI (Group III, n = 10) revealed 60% conception. The difference in rates of conception was not significant among different treatment groups ( $p > 0.05$ ). Treatment of true anoestrus was revealed estrus and conception; respectively, in 82 and 64% nutritionally supplemented cows (Group IV, n = 11) and in 50 and 40% suckling restricted cows (Group V, n = 10). GnRH treatment followed by PGF $2\alpha$  administration and timed AI with GnRH at first AI (Group VI, n = 9) revealed 44% conception. Control anoestrus cows (Group VII, n = 5) without any treatment did not show estrus. The difference in rates of conception was significant ( $p < 0.05$ ) between the groups. In conclusions, close monitoring of silent estrous cows for estrus and nutritional supplementation for true anoestrus could be effective tools for successful reproduction.

**Angesom *et al.*, (2013)**, Carried out a survey to determine major prepartum and postpartum reproductive problems of dairy cattle in three selected dairy farms in Debre Zeit town. Retrospective data analysis together with survey on major prepartum and postpartum reproductive problems were carried out through regular clinical follow up. A retrospective analysis of clinical data collected from a total of 711 cows in three farms was done and 44.3% of the cows were found with major prepartum and postpartum reproductive problems. Postpartum anestrus (12.9%) was the major reproductive problem followed by repeat breeding (11.4%) in the retrospective study. A total of 104

cows were used in the regular follow up and 33.6% (n =35) were found to be affected either with one or more of clinical reproductive problems. Postpartum anestrus (12.5%) was found to be the leading reproductive problem followed by repeat breeding (10.6%), metritis (8.7%), abortion (6.7%), retained placenta (3.8%), dystocia (2.9%) and prolapse (1.9%). Statistical analysis was performed to evaluate the difference in prevalence of the major reproductive problems on the basis of parity and body condition score. Hence, the impact of increasing parity on the occurrence of reproductive problems was examined and there is a direct relationship between increasing parity and prevalence of the reproductive problems with a highly significant variation ( $P<0.01$ ) between primiparous and pluriparous cows. There is an inverse relationship of body condition and prevalence of reproductive problems with a highly significant variation ( $P<0.01$ ). This study demonstrated that anestrus, repeat breeding, metritis and abortion were noticed as the most common major reproductive problems in the study farms in Debre Zeit town, Central Ethiopia.

**Khair et al., (2013)**, Conducted a study to determine the incidence of some reproductive diseases (RD) like abortion, anoestrus, metritis, repeat breeder, retained placenta and one production disease like clinical mastitis in cross-bred dairy cattle in Shahjadpur upazila of Sirajgonj district in Bangladesh. Two hundred fifty (250) farms having at least two cross-bred dairy cattle were randomly selected for this study using an active surveillance system. The study was conducted over a period of twelve months from March 2012 to February 2013. Epidemiological data and samples from diseased cattle were collected and analyzed. There corded reproductive disorders were diagnosed and treated by the veterinarians on the basis of history, physical examination, clinical and laboratory findings. The incidence rate, cumulative incidence and seasonal incidence of reproductive (RD) and production (PD) disorders were measured. The overall incidence rate and cumulative incidence of RDs and PDs were 33/tcm (10000 cattle-months at risk) and 3.9% respectively. The incidence rate and cumulative incidence of repeat breeder were highest as 11/tcm and 1.29% respectively followed by anoestrus (7/tcm and 0.81%), metritis (3/tcm and 0.34%), retained placenta (2/tcm and 0.27%) and abortion (2/tcm and 0.20%). The incidence rate and cumulative incidence of clinical mastitis were 8/tcm and 1.0% respectively. A decreasing trend of cumulative incidence of mastitis, metritis and abortion was noted from summer, rainy to winter seasons. The cumulative incidence of anoestrus was highest in rainy (0.34%) then summer (0.27%) and lowest in

winter (0.21%). The proportionate incidence was highest for repeat breeder (32.76%) followed by mastitis (25.86%) and anoestrus (20.69%). The incidence of the diseases we reported were low in comparison to the published prevalence of these diseases. When the incidence of a disease is low but animals affected have the condition for a long period of time, the prevalence will be high relative to the incidence. Repeat breeder, anoestrus and mastitis should get top priority in reproductive and production disease research to gain more knowledge and in extension to control them in Bangladesh context.

**Maji and Samanta (2013)**, Conducted a study where total of 823 numbers of cattle (342 Crossbred Jersey and 481 Non-descript) were presented for gynaeco-clinical examination after considering specific history of cattle at 26 fertility camps during January 2006 to December 2008 in flood prone rural areas of Howrah district of West Bengal, India. Statistical analysis of the data pointed out that among overall infertility problem incidence of anestrus and repeat breeding were 67.68 % and 32.32 % respectively. Incidence of anestrus was higher in Non-descript cattle (53.86 %) than that Crossbred Jersey cattle (46.14 %) and incidence of repeat breeding was also significantly ( $P < 0.001$ ) higher in non-descript cattle (68.05%) than that of crossbred (31.95%) animal. Irrespective of breeds the incidence of true anestrus, sub-estrus, anestrus due to pyometra with persistent corpus luteum and infantile genitalia with other congenital disorders were 81.51 %, 9.34%, 1.44% and 7.71% respectively. It also revealed that incidence of repeat breeding due to anovulatory estrus, follicular cyst and uterine infection were 43.61%, 46.24%, and 10.15% respectively which were also significantly higher ( $P < 0.001$ ) in Non-descript cattle in comparison with Crossbred Jersey (72.4 vs. 27.0 %, 59.34 vs. 40.65% and 88.89 vs. 11.11% respectively for ND vs. CBJ).

**Kamal et al., (2014)**, Used ultrasonography and a structured questionnaire in a cross-sectional study to gather data on the prevalence and risk factors for anestrus in crossbred cows at  $\geq 60$  days postpartum in 273 small holder farms. The prevalence of anestrus was 18%. The odds ratio (OR) for true anestrus was 17.52 and 2.81 times higher ( $P < 0.05$ ) in cows with poor ( $\leq 2.0$ ) and excessive ( $> 3.5$ ) body condition score (BCS), respectively, compared to those with optimal BCS (2.5–3.5), 2.82 times higher in suckled than in non suckled cows ( $P = 0.03$ ), and 2.53 times higher in cows that calved during the cold season than in those that calved during the hot season ( $P = 0.03$ ). The OR for anestrus was 1.62 times higher ( $P = 0.017$ ) in cows managed by an employee than in those managed by the farmers themselves ( $P = 0.001$ ), and 2.66 times higher ( $P = 0.003$ ) in

small farms ( $\leq 5$  cows) than in large farms ( $\geq 11$  cows). The OR was 0.71 to 0.46 times lower in farms having a guaranteed market to sell milk than those with an uncertain traditional milk market ( $P < 0.05$ ). Maintaining optimal BCS of cows, farmers' training on management of cattle reproduction, and development of a market linkage to sell milk would improve the number of cows for breeding by 60 days postpartum.

**Ararsa and Wubishet (2014)**, Conducted a study to identify the major reproductive health problems and its associated risk factors in indigenous Borena breed cows in Borena zone in Southern Ethiopia between September 2013 and February 2014. Out of the total 409 cows examined, 195 (47.7%) were having at least one of the reproductive problems identified by either questionnaire interview ( $n=329$ ) or regular follow up ( $n=80$ ) of individual cows. The major reproductive health problems identified in the study were mastitis (21.3%;  $n=87/409$ ), abortion (12.2%;  $n=50/409$ ), repeat breeder (10.3%;  $n=42/409$ ), anestrus (10.3%;  $n=42/409$ ) and retained fetal membrane (RFM; 7.6%;  $n=31/409$ ). The rate of abortion increased significantly ( $p=0.001$ ) with the increase in the stage of gestation. Laboratory findings indicated that brucellosis and mastitis had great roles in reproductive health problems of dairy cows in the study area with prevalence rates of 2.91% and 68.41%, respectively. In conclusion, the study revealed that several reproductive health problems such as mastitis, abortion, repeat breeder, anestrus and RFM are mostly prevalent in dairy cows in Borena zone in southern Ethiopia.

**Kumar *et al.*, (2014)**, Reported that anestrus is a functional disorder of reproductive cycle in cattle and buffalo which is characterized by absence of overt signs of estrus and also affecting the livestock enterprise to a great extent. Incidence of anestrus is more in buffalo than the cattle, and problem is severe during summer. Anestrus is a multifactorial problem but its occurrence signals the inadequate nutrition, environmental stress, uterine pathology and improper managemental practices. It can be classified based on physiological and pathological conditions of the animals. Diagnosis is based on the exploration of the different causative factors involved in. Many therapeutic agents (hormonal and non hormonal) have been used, however, as such there is no single panacea to correct it. Though, recruitment and emergence of follicular wave is usually not affected, the derangement in subsequent growth and development and ovulation of dominant follicle leads to anovulatory anestrus. In order to achieve efficient management

strategies, further research is needed for better understanding of its etiology, diagnosis and therapeutics.

**Mekonnin *et al.*, (2015)**, Conducted a cross sectional study in and around Mekelle, Tigray, Ethiopia from November 2013 to May 2014 with the aims to assess reproductive performance and prevalence of reproductive problems in crossbred (Holstein Friesian x Zebu) dairy cattle. A questionnaire survey methodology was used. The study sampled 177 randomly selected dairy farms comprising 1013 crossbred dairy cattle (736 cows and 277 heifers). The mean age at first service, age at first calving, first postpartum estrus and calving interval were 24.8 months, 35.3 months, 114.5 days and 401.5 days, respectively. Prevalence rates of reproductive problems recorded in the study area were anestrus (37.8%), repeat-breeding (21.0%), dystocia (11.6%), retained fetal membranes (11.5%), endometritis (6.6%), abortion (6.4%), prolapsed uterus/vagina (2.9%), stillbirth (2.0%) and freemartin (0.2%). Incidence of abortion did not vary with parity and stages of gestation. Breeding and the possible causes of missing insemination/mating while animals were in estrus are problematic. In conclusion, this study has revealed that the reproductive performance of crossbred dairy cattle was not optimal, and anestrus, repeat-breeding, dystocia, retained fetal membranes, endometritis and abortion were the major reproductive problems. More effective breeding and reproductive health management should be considered to improve the fertility of this crossbred cattle herd. Awareness and training should be provided to the farming community to improve the productivity in the region.

**Lim *et al.*, (2015)**, Conducted a study to estimate the proportion of reproductive disorders among dairy cattle. The factors analyzed were; milk yield, cow parity, periparturient disorders, and reproductive status. The result of this study showed the incidence of reproductive disorders in high yielding dairy cows was prevalent. Repeat breeding was the major postpartum reproductive problem comprising (42.3%) of the samples. Higher reproductive disorders were also associated with lower parity. These disorders subsequently reduced reproductive performance by prolonged intervals from calving to first artificial insemination and from calving to pregnancy. Abnormalities in the reproductive system such as repeat breeder, silent heat, anestrus and ovarian cysts, as well as lower fertility have been recorded during the summer months (June to August). In conclusion, the study revealed that incidence of repeat breeder is mostly prevalent in dairy cows. Moreover, the incidence of reproductive disorders was higher in

summer season and hence appropriate preventive and or therapeutic measures as per the type of abnormalities need to be undertaken.

**Enda *et al.*, (2016)**, Conducted a study from November 2015 to April 2016 in Wolaita Sodo town to determine the major reproductive health problems of dairy cattle in the selected dairy farms. A total of 104 dairy cattle (33 cross breeds and 71 Jersey breeds) which were kept under two different management system (33 intensively and 71 semi-intensively) were included in the study. Out of 104 dairy cows 37 (35.5 %) were found to be affected either by one or more of reproductive problems. Anestrous, abortion, repeat breeding and retained fetal membrane was found to be the major reproductive health problems with incidence of 4.8, 4.8, 23.1 and 2.9%, respectively. The overall prevalence of reproductive problems showed significant difference ( $p < 0.05$ ) with respect to body condition and age of dairy cows where major reproductive health problems were observed more frequently in poor body conditioned and older cows. Whereas, the parity, breed type were found to be without significant influence ( $p > 0.05$ ) on the occurrence of reproductive problems of cows. Reproductive health problems were the major challenge in the productivity of dairy cows in the farms. This particular study indicated the reproductive disorders identified were one of the major reproductive disorders responsible for the low reproductive performance of dairy cows. Routine and periodical examination of cows during postpartum period was essential; since most cows acquire uterine infection during this period. Therefore, it is recommended that awareness creation to farm owners, attendants and improved management such as, proper feeding, accurate heat detection, considering the size of sire and dam while using AI and health management should be improved to minimize the occurrence of these problems and associated economic losses in the dairy farms of the area.

**Khan *et al.*, (2016)**, Conducted a study to determine the incidence of major reproductive problems of dairy cattle reared under a semi-intensive system by small and marginal farmers in Meghalaya province of North-Eastern India. In a 3 years study, a total of 576 crossbred dairy cattle (212 Holstein Friesian cross and 364 Jersey cross) from all districts ( $n=11$ ) of Meghalaya were assessed with the survey, clinical examination, and personal observations. Out of the total animal assessed, 33.85% ( $n=195$ ) were found to be affected with one or more of the clinical reproductive problems. Repeat breeding (RB), anestrus, retention of fetal membrane, and abortion were found to be the major clinical reproductive problems. Out of the total animal affected with reproductive disorders, the

incidence of anestrus, RB, retention of fetal membrane, and abortion was found to be 31.79% (n=62), 24.61% (n=48), 14.35% (n=28), and 11.25% (n=22), respectively. In addition, dystocia (5.12%), prolapse (1.53%), endometritis (4.61%), and pyometra (6.66%) were minor clinical reproductive problems. There was a significant difference in the incidence of reproductive disorders with respect to breed, age, and parity. It was revealed from this study that RB, anestrus, retention of fetal membrane, and dystocia are the major clinical reproductive problems in Meghalaya. Results indicated unsatisfactory feeding, housing, and health management practices are the main cause of low fertility of dairy cows. Lack of scientific knowledge, low access to breeding, and health services further contributed to low productivity and fertility.

**Noonari *et al.*, (2016)**, Undertook a study on the effect of provision of vitamin-mineral mixture during post-partum anestrous period, and resumption of ovarian activity was investigated. The study was conducted on cross-breed dairy cows (n=66) suffering from post-partum anestrous, being divided into treatment group (n=56). Treatment group, supplemented with vitamin-mineral mixture, resumed ovarian cyclicity within 8-62 days post treatment while only 20% of control group showed cyclicity in the same period. Regression analysis applied among variables i.e., age of animal, milk production and ovarian resumption showed the relation to be highly significant ( $P < 0.001$ ). It was observed that ovarian resumption has positive correlation with milk production ( $b=3.064$ ) and age of the animal ( $b=0.469$ ).

**Ayisheshim *et al.*, (2017)**, Conducted a study commencing from October 2014 to April 2015 in urban and peri-urban areas of Gondar town, of the Amhara National Regional State of Ethiopia to identify the major reproductive problems in dairy cows. A total of 401 dairy cows were examined for the major reproductive problems by classifying the methods of studying as questionnaire survey and regular follow up. Owner of 401 cows from 80 dairy farms and small holder farmers (households) were questioned for the major reproductive problems and found 100 (24.9%) affected animals and again from 401 dairy cows owner of 100 cows from 15 dairy farms and small holder farmers (households) were regularly followed and out of them 37 (37.0%) have at least one of the reproductive problems. The questionnaire survey of reproductive problems according to their relative importance were 24 (6.0%) anestrous, 18 (4.5%) repeat breeder, 16 (4.0%) endometritis, 15 (3.7%) dystocia, 11 (2.7%) abortion, 8 (2.0%) mixed cases and 7 (1.7%) retained fetal membrane (RFM). Parallel to questionnaire survey regular follow up study

was takes place on 100 dairy cows from 15 dairy farms and small holder farmers (households) and out of them 7 (7.0%) anestrus, 6 (6.0%) abortion, 6 (6.0%) dystocia, 6 (6.0%) endometritis, 5 (5.0%) RFM, 4 (4.0%) mixed cases, and 3 (3.0%) was repeat breeders. SPSS version 20 was used for chi-square test and  $p < 0.05$  was taken as statistically significant. The prevalence of reproductive problems showed statistically significant difference ( $p < 0.05$ ) with respect to parity, age, body condition score, farm scale, cleanness, methods of service and types of feeding practice, but significantly associated with respect to breed in both questionnaire survey and regular follow methods of study. This result shows no significant difference ( $p > 0.05$ ), between the two study methodology within the reproductive problems. This particular study indicates that an reproductive problem, which includes anoestrus, RFM, abortion, dystocia, endometritis and repeat breeding, were one of the major factor for the low fertilizing ability of dairy cows in urban and peri-urban area of Gondar town. Therefore, the dairy breeders should be providing additional feed to fulfill nutritional requirement of animal, improving cleanness and feeding practice of the animal.

**Rahman et al., (2018)**, Conducted a study to detect anestrus in dairy cow through rectal palpation of ovarian cyst and its therapeutic management at the rural areas of Bangladesh. In this investigation a cattle group of 46 indigenous and cross bred cows of first to fifth parturition with poor to moderate BCS and age between 2.5-7.5 years were examined. Data related to age, breed, parturition and insemination type were recorded in a registrar book. 35 cows were examined in upazila veterinary hospital and 11 cows in some small sized dairy farms of Bera upazila, Pabna, Bangladesh. The presumptive diagnosis of anestrus through rectal palpation and its therapeutic management was found effective. The ovaries of those cows were examined through rectal palpation where 58.70% were suspected as nutritional anoestrus whereas Follicular and luteal cysts were 19.57% and 13.04% respectively. Anestrus due to ovarian hypoplasia were diagnosed in 8.69% cows. Old cross bred cows (69.57%) ages between 5.5 to 7.5 years were more susceptible to anestrus than that of 2.5-5.5 years' indigenous cows (30.43%). Cows affected from follicular cyst were treated with 2.5 ml intramuscular injection of GnRH hormone {Fertilon(R)} and cows affected from luteal cyst were treated with 5 ml intramuscular injection of PGF2 $\alpha$  {Dinoprost (R)} and prognosis were recorded as 66.67% and 50% respectively. Ovarian hypoplasia and none recognized cases were first treated with Inj. Fertilon (R) 2.5 ml intramuscularly and after 10-12 days Inj. Dinoprost

(R) 5 ml intramuscularly and 75 % cases showed positive response. Our results reflect the present scenario of anestrus and its management. Further study on pathophysiological mechanism of ovarian cyst that leads the anoestrus in dairy cows can give a new window to fight against anestrus in dairy cows.

**Verma *et al.*, (2018)**, Reported a incidence of reproductive disorders in cows from the data available as a cases registered at Teaching Veterinary Clinical Complex, College of Veterinary science and Animal Husbandry, N.D.U.A.T, Kumarganj Faizabad from July 2004 to June 2014. The overall incidence of reproductive disorders was observed as 21.40 % in cows. The incidence of repeat breeding, Retention of placenta, anoestrus, endometritis, prolapse, pyometra, dystocia, cervitis and abortion was recorded as 4.39, 1.65, 3.32, 2.15, 1.09, 1.91, 1.26, 4.24 and 0.72 percent, respectively. It could be inferred that incidence of repeat breeder was highest among the reproductive disorders. These disorders can be managed by adopting good nutritional and managerial facilities in the herd.

**Nishi *et al.*, (2018)**, Carried out a study to determine the prevalence of anestrus problems in dairy cows associated with managerial factors such as housing system, feed quality, deworming and health management of dairy cows. Data were collected by interviewing the owner of the cows using questionnaires from selected private dairy farms and Rajshahi Dairy and Cattle Improvement Farm (RDCIF) at Rajshahi district during the period from January 2016 to December 2016. A total of 500 dairy cows were surveyed to find out the prevalence of anestrus problems in relation to housing system, feed quality, deworming and health management of cows. The raw data were then sorted, computed, coded and statistically analyzed with the help of latest version of SPSS statistics software package. Our findings revealed that, the overall prevalence of anestrus in cows was 40.2%. The housing system, feed quality, deworming and health management of cows influenced the prevalence of anestrus in cows. The prevalence of anestrus was the highest in poor housing system (45.16%) and the lowest in good housing system (36.17%). The prevalence of anestrus was not significantly ( $P>0.05$ ) influenced by the housing systems. Good quality of feed showed the lowest occurrence of anestrus problems (28.82%) and poor quality of feed showed the highest occurrence of anestrus problems (78.72%). The prevalence of anestrus in dairy cows was significantly ( $P<0.05$ ) influenced by the feed quality of cows. It was observed that the incidence of anestrus was higher in no deworming measure of farm (56.96%) and lower

was in regular deworming measure of farm (29.64%). The prevalence of anestrus was higher in no preventive measure of dairy cows (50.95%) and lower was in regular preventive measure of dairy cows (29.92%). Deworming and preventive measures had also significant ( $P<0.05$ ) effect on anestrus problems in dairy cows.

**Satapathy *et al.*, (2018)**, Conducted a survey in the villages of the Kakatpur block of Odisha to know the feeding habits of crossbred cattle, reproductive problem incidence and their blood mineral status. Survey was conducted among 306 CB cattle by a questionnaire, feeding practice were recorded; blood was collected for blood mineral status; different feeds and fodder were collected which were available to the animals. Out of 118 CB cows, 36.44% were found to be have reproductive problems while out of 188 CB heifers, 48.93% were had reproductive problems. As a whole 44.11 % were having reproductive problems. More number of anestrus cases were recorded among heifers. Proximate analysis and mineral analysis of feeds and fodder were conducted. From feeding practice, it was revealed that cattle were receiving less DCP and TDN because of less supplementation of concentrate feed, apart from that animals were not receiving any mineral mixture. Blood mineral analysis reflected that animals were deficient in macro mineral. Therefore, it can be concluded that low supplementation energy, protein macro and micro minerals deficiency were major reasons behind higher incidence of reproductive problems in Kakatpur block of Odisha. Therefore, concentrate feeding and mineral mixture supplementation was advised to the farmers.

**Suvarn *et al.*, (2018)**, Conducted a field study in and around the rural area of Danapur situated on western proximity of Patna and only those buffaloes were selected which did not show sign of estrus for one year after parturition and were maintained in small unorganized herd. The investigation was conducted in hot summer months (viz. March to June) season. The enumerated buffaloes were examined per rectally and a total of 38 apparently healthy buffaloes were selected with normal genitalia without having palpable corpus luteum on ovaries and pathological lesion. Selected animals were subjected to deworming prior to this study with broad-spectrum anthelmintic Fenbendazole (3 gms) once. The animals were first treated with PGF $2\alpha$  at the dose rate of (25 mg) intramuscularly on day '0'. The animals, which showed signs of estrus, were discarded from the experiment. The rest of the animals were supplied with mineral mixture in their ration at the rate of 30 gms per animal per day from day '8' to day '38'. The buffaloes, which resumed cyclicity during mineral mixture treatment, were also

discarded from further investigation. Finally total of 24 buffaloes were selected randomly and divided into four groups (six animals in each group) to observe the effect of Duraprogen at different dosages on resumption of cyclicity. Animals of group C (Control) were treated with normal saline (2 ml) on day 39, 43, 47 and 51 while those under Group T1, T2 and T3 were treated with Duraprogen (Progesterone, 250 mg) intramuscular on day 39. The animals of group T1 were further treated with Duraprogen (250 mg) on day 41, 43, 45, 47 and 49 (i.e. on alternate day). The animal of group T2 were further treated with Duraprogen (250 mg) on day 43, 47 and 51 (i.e. three day interval) while the animals of group T3 were further treated on day 46 (i.e. six day interval). The effect of Duraprogen had significant effect on resumption of cyclicity. The resumption of cyclicity was highly significant in group T1 in which repeated dosages of Duraprogen (250 mg) i.e. on alternate days were administered. The effect of Duraprogen on cyclicity decreases with decrease in frequency of dose i.e. on three day interval and on six day interval. On the basis of investigation, following conclusion were observed that: single dose of prostaglandin (PGF $2\alpha$ ) at the dose rate of 25 mg intramuscular had no effect on resuming estrus cyclicity in post-partum anestrus buffaloes, mineral mixture feeding at the dose rate of 30 gms per animal per day up to one month had non-significant effect on maintaining reproductive rhythm during summer season.

**Yohannes and Alemu (2019)**, Conducted a study to determine the prevalence of major reproductive problems and associated risk factors in dairy cows in Asella town, central Ethiopia, from November 2017 to April 2018. Face-to-face interviewing of the cow owners using a semi-structured questionnaire on the randomly selected dairy cows was employed to get the necessary information. A total of 310 dairy cows were studied, employing a questionnaire survey, out of which, 30.3% (n = 94) were affected by at least one or more clinical reproductive health problem. Dystocia, repeat breeder, retained fetal membrane, abortion; metritis, anestrus and uterine and vaginal prolapse were recorded with prevalence of 15.5%, 8.1%, 5.3%, 4.5%, 2.6%, 2.3% and 1.0%, respectively. The prevalence of clinical reproductive problems showed significant differences ( $P < 0.05$ ) with respect to parity, hygienic condition and age of an animal. The problems were more commonly reported in poor hygienic conditions, higher age groups and greater number of parities. This study indicated clinical reproductive problems, which included dystocia, repeat breeder, retained fetal membrane and abortion as the major factors responsible for the low reproductive performance of dairy cows in Asella town. Improvements in

management systems, proper heat detection and proper selection of bulls for breeding could help in minimizing reproductive health problems and hence, improve the reproductive efficiency of dairy cows.

**Deka *et al.*, (2019)**, Conducted a study on 8 Swamp buffalo cows and 8 heifers maintained at Network Project on Buffalo improvement (Swamp), College of Veterinary Science, Assam Agricultural University, Khanapara, Guwahati, to accumulate data on efficacy of bypass fat with or without minerals and vitamins fortification in the treatment of anoestrus. Efficacy of bypass fat in the treatment of anoestrus was studied on the basis of oestrus response, genital changes and level of some of the blood biochemical constituents. Bypass fat with minerals and vitamins was more effective than bypass fat alone for the treatment of anoestrus in Swamp buffalo cows and heifers resulting in higher oestrus response rate of 75 per cent. Level of serum leptin, calcium, phosphorus and cholesterol was found to be increased and that of ghrelin decreased with the period of treatment. Bypass fat fortified with minerals and vitamins could be effectively used for treatment of anoestrus in Swamp buffalo cows and heifers.

## CHAPTER III

### MATERIALS AND METHODS

#### 3.1. Place of Study

Sherpur Upazila in Bogura district of Bangladesh, the most important dairy zone of Bangladesh was selected as study area.



Figure 1: Map of Bangladesh



Figure 2: Map of Sherpur upazila

### 3.2. Study period

Active surveillance system was used to collect data from the selected farms over a period of one year from January 2018 to December 2018.

### 3.3. Study population and household Selection

The household selection of anoestrus was done according to the complain of the farmers. The farmers had a definite complain that their cows not came to oestrus without any diseases or abnormalities. For this research, total 130 house were selected where present 977 cows and heifer.

### 3.4. Selection of anoestrus cows

The selected animals were divided into different groups and performed general meeting to find anoestrus cows. Taking of history from farmers of susceptible anoestrus cows. Individual interview was taken from the farmers as with individual anoestrus cow. On the basis of history and discussion of the farmer, it was quite sure that the cows were inclined to anoestrus.



**Figure 3:** Taking of history and individual interview from farmers for data collection

### 3.5. Procedure

In questionnaire survey, observations were made and questions were asked to farmers about anoestrus and management systems, as described in the study of Hadush *et al.* (2013); including factors associated with reproductive health problems in dairy cows. The information including breed, disease, reproductive health, date of last calving and type of last services (AI/NS). The questionnaire had definitive option if it yes or no.

### 3.6. Physical examination

Physical examination was done by visual inspection, pulse and respiration rate and rectal temperature. Examination of the different organs and systems of the body was carried out by using the clinical methods of palpation, percussion and auscultation.

### 3.7. Clinical examination

The animals were clinically examined at veterinary hospital and temperature, pulses and respiratory rate from each of the animal were recorded. The presented clinical manifestations of various diseases of cattle were recorded and the farmer's statement and response to treatment in relation to diseases were recorded carefully.

### 3.8. Examination of genital tract of cows

To examine the breeding soundness, all anoestrus cows were examined by per rectal palpation of genital tract following standard method. Cows with any abnormalities of the reproductive organs detected by rectal examination or having any abnormal genital discharge were not included in the study.



**Figure 4:** Rectal palpation of cow



**Figure 5:** Rectal palpation of heifer

### 3.9. Grouping of animals for treatment against anoestrus in cattle

A total of 40 animals were taken for treatment purpose against anoestrus and the animals were grouped as-

Group A: Consisting of 10 animals which were treated with bolus Anox-D<sup>®</sup> (vitamin-A, E, C, D<sub>3</sub>) @ 2 boluses per animal orally in a day for 16 days.

Group B: Consisting of 10 animals which were treated with bolus Phoscal DB<sup>®</sup> (vitamin-D<sub>3</sub>, B<sub>12</sub>, Phosphorus, Calcium) @ 2 boluses per animal orally in a day for 16 days.

Group C: Consisting of 10 animals which were treated with combined bolus Anox-D @ 2 boluses and bolus Phoscal DB @ 2 boluses per animal orally in a day for 16 days.

Group D: Consisting of 10 animals which were observed without any treatment.

**Each bolus contain:**

Anox-D: Vitamin A-100000 IU, Vitamin E-30 IU, Vitamin C-200 mg, Vitamin D<sub>3</sub>-10000 IU

Phoscal DB: Calcium-1.25 gm, Phosphorus-1 gm, Vitamin D<sub>3</sub>-8000 IU, Vitamin B<sub>12</sub>-100 mcg

### **3.10. Estrus detection:**

Estrus detection was done by visual inspection of behavioural symptoms. Restlessness/bellowing, head mounting, vaginal sniffing, chin resting, soliciting, licking other cows, lip curling, not standing to be mounted, vaginal discharge.

### **3.11. Prevalence**

Prevalence were calculated as the number of cases of disease divided by population at risk and multiple by 100.

$$\text{Prevalence rate (\%)} = \frac{\text{Number of cases of disease}}{\text{Population at risk}} \times 100$$

**Anestrus:** Cows which failed to show clinical heat signs for 90 days or more after parturition (Hafez, 1993; Bekana *et al.*, 1994).

### **3.12. Statistical analysis**

The collected data was analysed by a statistical software namely, SPSS version 22. Associations between explanatory variables i.e age, sex, breed, season and prevalence were done by chi-square test. In all analysis, 95% confidence intervals and  $p < 0.05$  were set to indicate significance.

## CHAPTER IV

### RESULTS

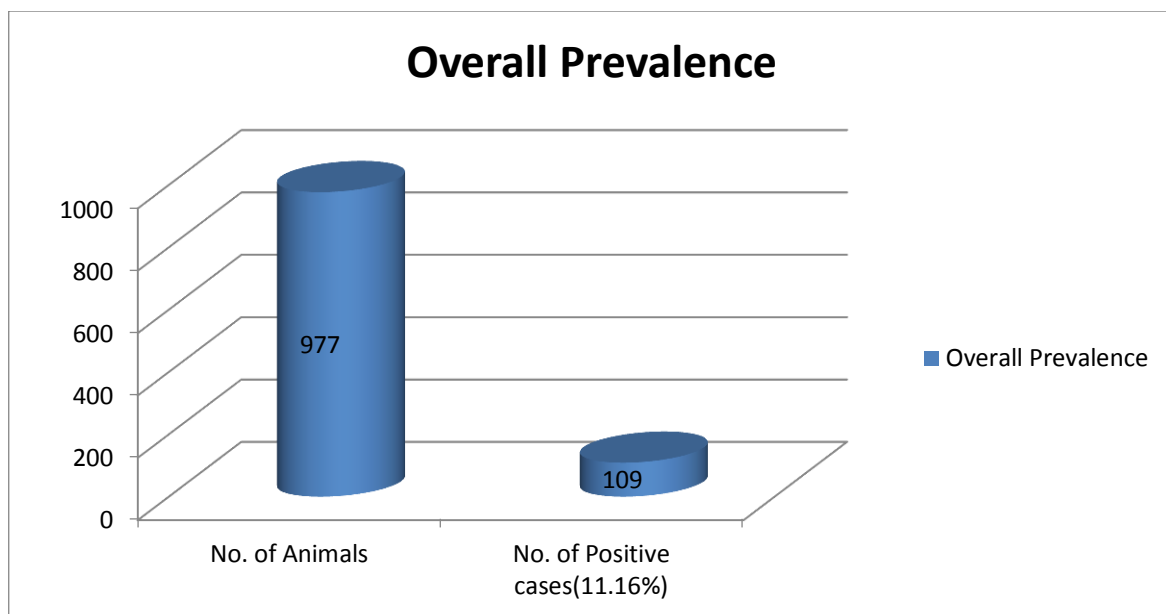
Present study was conducted to determine the prevalence of anoestrus in cattle in relation with age, seasonal variation and breed along with evaluation of the therapeutic response of different commercially available nutritional drugs against anoestrus at Sherpur Upazila of Bangladesh. In this investigation, out of 977 dairy cattle, 109 were positive for anoestrus. Active surveillance system was used to collect data from the selected farms through questionnaire survey over a period of one year from January 2018 to December 2018.

#### 4.1. Overall prevalence of anoestrus in cattle

Out of 977 cattle, 109 were positive for anoestrus indicating overall prevalence was 11.16% that shown in table 1 and Fig 6.

**Table 1:** Overall prevalence of anoestrus in cattle

| Name of Area                       | No. of Animals Examined | No. of Positive Cases | Prevalence (%) |
|------------------------------------|-------------------------|-----------------------|----------------|
| Sherpur upazila of Bogura district | 977                     | 109                   | 11.16          |



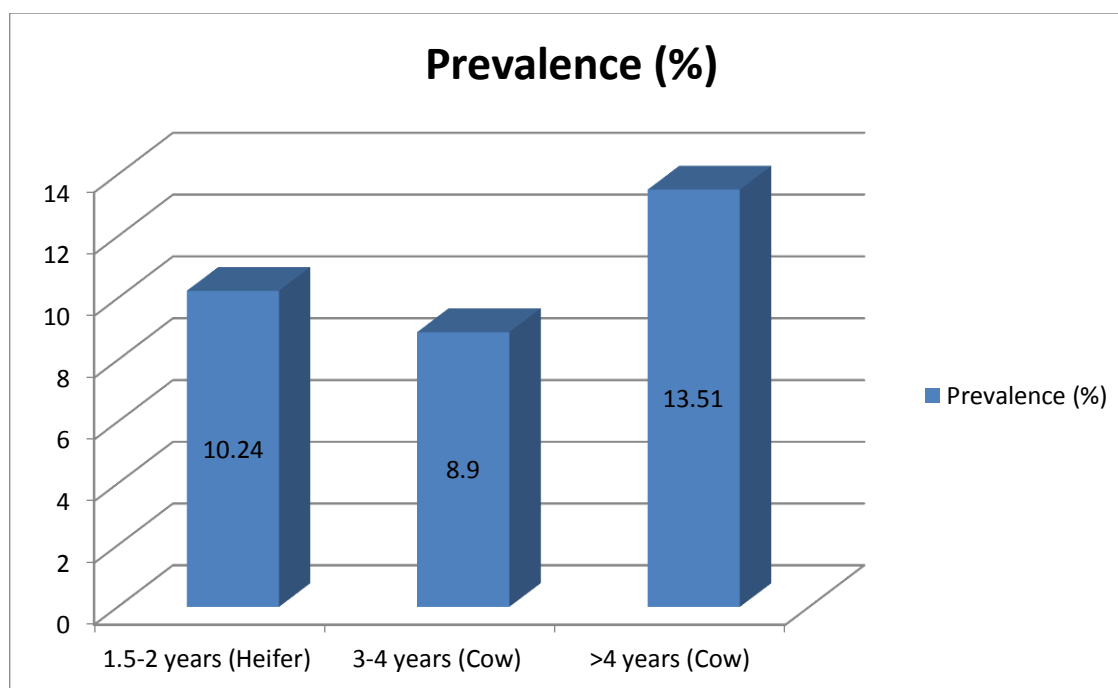
**Figure 6:** Overall prevalence of anoestrus in cattle

#### 4.2. Prevalence of anoestrus in cattle based on age

The prevalence of anoestrus was highest (13.51%) in animals greater than 4 years of age followed by moderate (10.24%) in 1.5 to 2 years age and lowest (8.90%) in animals 3-4 years old that shown in Table 2 and Fig 7. The variation was not statistically ( $p > 0.05$ ) significant.

**Table 2:** Prevalence of anoestrus in cattle based on age

| Age of animals       | No. of animals | No. of Positive cases | Prevalence (%) | $\chi^2$ value | Level of Significance |
|----------------------|----------------|-----------------------|----------------|----------------|-----------------------|
| 1.5-2 years (Heifer) | 244            | 25                    | 10.24          | 4.166          | 0.125                 |
| 3-4 years (Cow)      | 326            | 29                    | 8.90           |                |                       |
| >4 years (Cow)       | 407            | 55                    | 13.51          |                |                       |



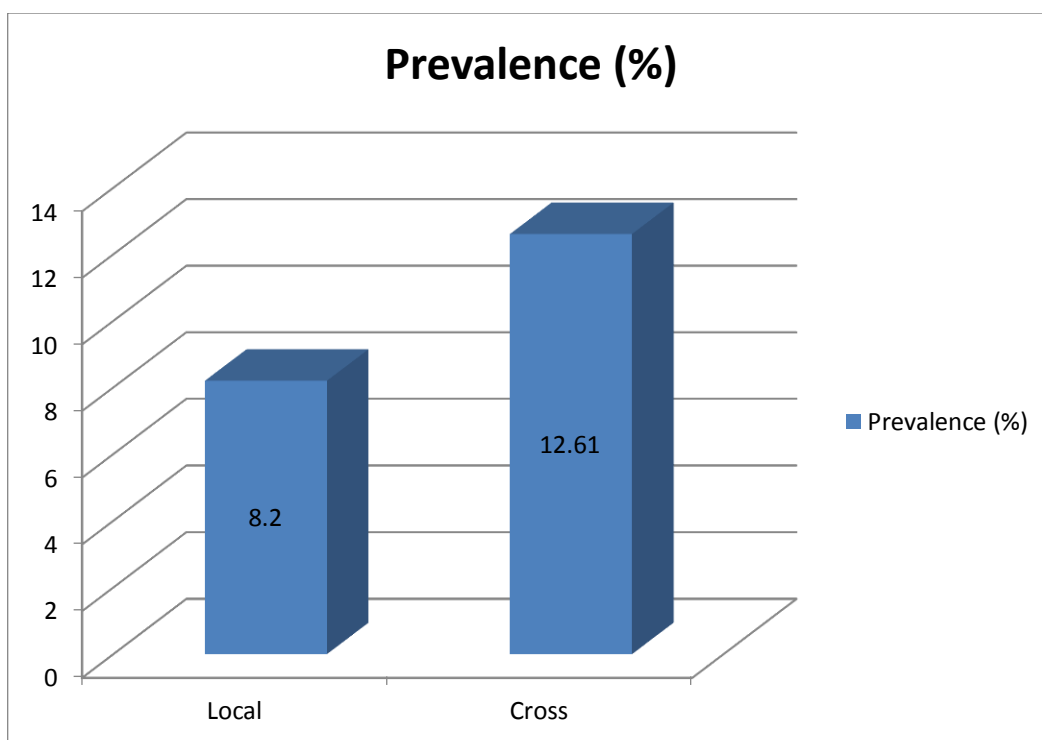
**Figure 7:** Prevalence of anoestrus in cattle based on age

#### 4.3. Breed-wise prevalence of anoestrus in cattle

Cross breed animals showed significantly ( $p < 0.05$ ) more anoestrus (12.61%) than local breed (8.20%) that shown in Table 3 and Fig 8.

**Table 3:** Breed-wise prevalence of anoestrus in cattle

| Name of Breed                 | No. of Cows | No. of Positive cases | Prevalence (%) | $\chi^2$ value | Level of Significance |
|-------------------------------|-------------|-----------------------|----------------|----------------|-----------------------|
| Local/<br>Indigenous<br>breed | 319         | 26                    | 8.20           | 4.318          | 0.038                 |
| Cross breed                   | 658         | 83                    | 12.61          |                |                       |



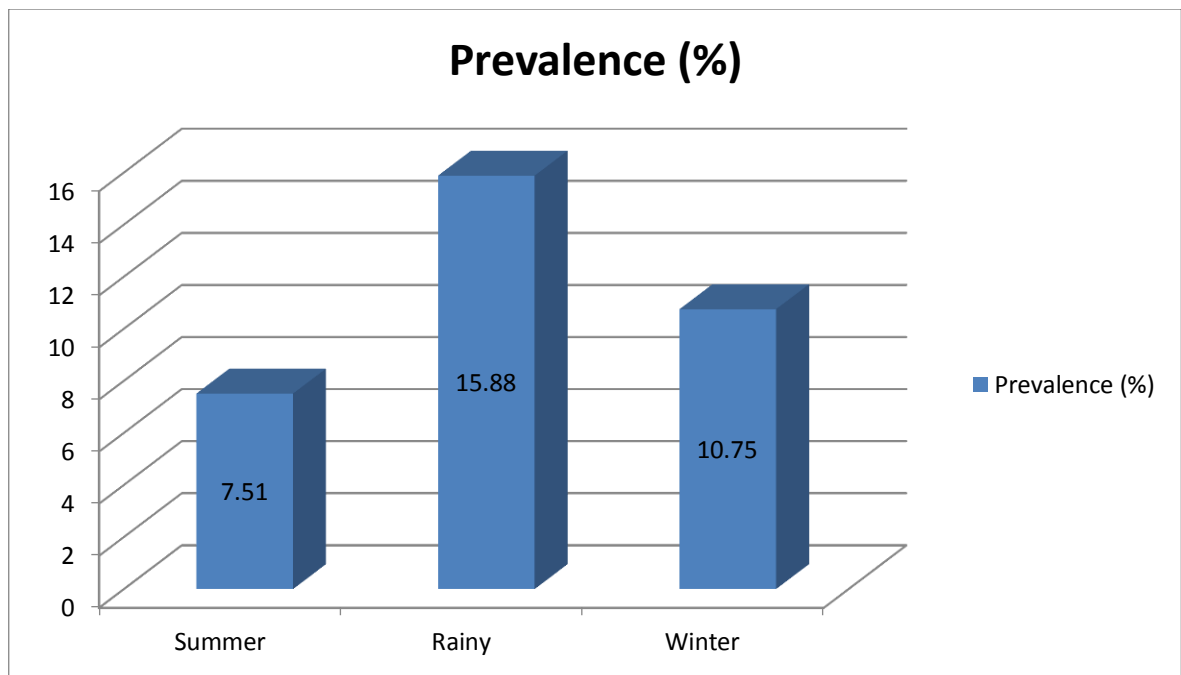
**Figure 8:** Breed-wise prevalence of anoestrus in cattle

#### 4.4. Season-wise prevalence of anoestrus in cattle

Anoestrus was significantly ( $p < 0.01$ ) more in rainy season (15.8%), moderate in winter season (10.75%) and the lowest in summer season (7.51%) that shown in Table 4 and Fig 9.

**Table 4:** Season-wise prevalence of anoestrus in cattle

| Name of Season | No. of Cows | No. of Positive cases | Prevalence (%) | $\chi^2$ value | Level of Significance |
|----------------|-------------|-----------------------|----------------|----------------|-----------------------|
| Summer         | 346         | 26                    | 7.51           | 11.346         | 0.003                 |
| Rainy          | 296         | 47                    | 15.88          |                |                       |
| Winter         | 335         | 36                    | 10.75          |                |                       |



**Figure 9:** Season-wise prevalence of anoestrus in cattle

#### 4.5. Comparative therapeutic response of nutritional drug in cattle

Out of 109 anoestrus animals 40 animals were selected for treatment with different nutritional drug and the efficacy was determined by close observation for next one month.

**Table 5:** Comparative therapeutic response of nutritional drug in cattle

| Name of group                | No. of animals treated | Name of the drugs used     | Dose and route of administration                                 | Observation                   |                                        |                                         | Remarks/Analysis   |
|------------------------------|------------------------|----------------------------|------------------------------------------------------------------|-------------------------------|----------------------------------------|-----------------------------------------|--------------------|
|                              |                        |                            |                                                                  | 17-25 days                    | 26-35 days                             | 36-46 days                              |                    |
| <b>Group A</b>               | 10                     | Bolus: Anox-D              | 2 boluses per animal orally in a day for 16 days.                | No animal showed estrus signs | No animal showed estrus signs          | <b>Two animals showed estrus signs</b>  | 20 % heat detected |
| <b>Group B</b>               | 10                     | Bolus: Phoscal DB          | 2 boluses per animal orally in a day for 16 days.                | No animal showed estrus signs | <b>Two animals showed estrus signs</b> | No animal showed estrus signs           | 20 % heat detected |
| <b>Group C</b>               | 10                     | Bolus: Anox-D + Phoscal DB | Anox-D@ 2, Phoscal DB@ 2 per animal orally in a day for 16 days. | No animal showed estrus signs | <b>Two animals showed estrus signs</b> | <b>Four animals showed estrus signs</b> | 60 % heat detected |
| <b>Group D Control group</b> | 10                     | Not treated                | No estrus signs found                                            | -----                         |                                        |                                         | -----              |

## CHAPTER V

### DICSCUSSION

#### 5.1. Overall prevalence of anoestrus in cattle

In the present study out of 977 animals examined, 109 cattle were found anoestrus representing overall prevalence is 11.16%. This value is closely related with the findings of Angesom *et al.*, (2013) who found 12.4 % anoestrus in cattle, higher than the earlier result of Khair *et al.*, (2013), Verma *et al.*, (2018), Enda *et al.*, (2016) and Ararsa and Wubishet (2014) but lower than the result of Kamal *et al.*, (2014) and Mekonnin *et al.*, (2015). This variation might be due to the differences in breed, nutritional status and other management system of cattle.

#### 5.2. Prevalence of anoestrus based on age

Analysis of data revealed that, old aged (>4 years age) animals showed more anoestrus (13.51%) as compared with the young (less than 2 years) and middle aged (2-3 years) animals. The present findings (13.51%) was lower than the findings (37.8%) of Mekonnin *et al.*, (2015) but higher than the findings of Enda *et al.*, (2016) and Angesom *et al.*, (2013). This might be due to nutritional status and other management system of the respective animals.

#### 5.3. Breed-wise prevalence of anoestrus in cattle

The prevalence of anoestrus was higher in crossbred (12.61%) animals than the local (8.20%) bred which is higher than the results of Khair *et al.*, (2013) and Enda *et al.*, (2016) but lower than the result of Kamal *et al.*, (2014) and Mekonnin *et al.*, (2015). This variation may be due to geographical location.

#### 5.4. Season-wise prevalence of anoestrus in cattle

The prevalence of anoestrus is higher in rainy (15.80%) season than the winter (10.75%) and summer (7.51%) season. But this result varies with the findings of Kamal *et al.*, (2014). He showed that prevalence of anoestrus was 18% and which was 2.53 times higher in cows that calved during the cold season than in those animals that calved during the hot season. This variation may be due to difference in availability of green grass in different seasons at the study area.

### **5.5. Therapeutic response of Anox-D and Phoscal DB against anoestrus**

Animals treated with a combination of Anox-D and Phoscal DB bolus and observation of the animal was done after 16 days upto next 30 days and signs of estrus were clearly visible in most of the animals. This result was almost similar with the result of Deka *et al.*, (2019) but lower than the finding of Noonari *et al.*, (2016). There are very few available data on the efficacy of sigle use of these drug previously.

## CHAPTER VI

### CONCLUSIONS

The aim of this study was to determine the prevalence of anoestrus and evaluation of the therapeutic response of different commercially available nutritional drugs against anoestrus in cattle at Sherpur Upazila of Bangladesh. The investigation revealed that the prevalence of anoestrus found in cattle was 11.16 %. The highest prevalence of anoestrus 13.51% was found in animals greater than 4 years of age and 10.24% in heifer and lowest 8.90% in animals 3-4 years. It was recorded that 15.8% prevalence was found in rainy season, 10.75% in winter season and the 7.51% in summer season. Cross breed animals showed 12.61% anoestrus and local breed 8.20%. And the combination therapy with Anox-D and Phoscal DB was much more effective than the single one.

**On the basis of above findings, the following conclusions may be inferred:**

- Overall prevalence of anoestrus in cattle was 11.16 %.
- The prevalence of anoestrus varies in all ages group and the highest (13.51%) prevalence was observed in greater than 4 years of age group followed by moderate (10.24%) in 1.5 to 2 years age group and lowest (8.90%) in animals 3-4 years of age.
- Anoestrus is more in rainy season (15.8%), moderate in winter season (10.75%) and the lowest in summer season (7.51%)
- Cross breed animals (12.61%) showed more anoestrus than local breed (8.20%).
- A combined treatment is much more effective than the single oral administration.

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