CHAPTER-1

INTRODUCTION

Goat rearing is very popular in Bangladesh due to high fertility, prolificacy, superior quality chevon, best quality skin, early sexual maturity, resistance against common diseases, short kidding interval, and very good tropical adaptability. The total goat population of our country is 24.2 millions (DLS, 2012) & they contribute 8% of the total milk production (BBS, 2012). Reproductive disorders of goat are common in Bangladesh and causes economic problems. It has negative effect on meat production since pregnancy and parturition are prerequisite for reproduction.

Pregnancy diagnosis is the most important part of management of goat. A proper pregnancy diagnosis of goats enable farmers to separate non pregnant goats from herds and thereby save on expenses for feed, labour, vaccination etc. Moreover, special attention and supplementary feed would then be available for pregnant goats. There are many techniques for pregnancy diagnosis. Non-return to oestrus is a cheap, practical and widely used method for detection of pregnancy between post insemination days 17 and 21 and does without signs of oestrous are assumed to be pregnant. Abdominal inspection, transabdominal palpation and increased live weight could be indicative for pregnancy in goats but they are reliable only after the second half of gestation, laparoscopy, laparotomy and vaginal biopsy are the accurate but invasive and thus, inappropriate for the routine practice because they require equipment and specialized skills. Udder examination and palpation are of low accuracy and their independent application for pregnancy diagnosis is not suitable. Blood, milk and faecal progesterone assays could indicate pregnancy in goats after the 21st post insemination day until the end of gestation. Ultrasonography scanning is a most common, quick, simple, reliable and comparatively chief method for detection of pregnancy status in veterinary practice. This method also enables to show early pregnancy status. The accuracy of the method is about 100% on post insemination day 25–30 using the transrectal approach, whereas via the transabdominal approach, this accuracy is attained between the 40th and the 45th

day (Amer, 2008). Ultrasonography pregnancy check is non invasive and less stressful for the animal than laparotomy or laparoscopy (Medan et al., 2004). During ultrasonography scanning, fetal heart beats, umbilical blood flow and middle uterine artery sounds resulted 100%, 100% and 72% pregnancy accuracy, respectively (Wani et al., 1998). Ultrasonography scanning method also predicts the fetal number (Fukui et al., 1986), estimate gestational age (Russel and Goddard, 1995). B-mode real-time ultrasonography is an accurate, rapid and simple imaging technique used for the detection of pregnancy in goats. However in Recent years, real-time ultrasonography has been used more frequently for pregnancy diagnosis in small ruminants (Romano and Christians, 2008). Real-time ultrasonography for early pregnancy detection in goats has been performed either transrectally or transabominally (Padilla-Rivas et al., 2005). Medan et al. (2004) suggested that early and accurate diagnosis of pregnancy in addition to determination of fetal number is an added advantage for the maintenance of high levels of reproductive efficiency in herd management practices. Abdominal palpation is only the tools for pregnancy diagnosis in goat in our country. Sometimes this technique could not convey the confirmatory result. Moreover, abdominal palpation is not suit for early detection of pregnancy in goat. In our country, there is a lack of report on pregnancy diagnosis using ultrasonography scanning in animals.

Objectives:

- To see the effect of synchronization on conception rate.
- To establish ultrasonography as a method for detection of pregnancy in goat.

CHAPTER-2

METHODOLOGY

2.1 Animals and their management

Goats (100) were selected from SAQTVH, CVASU and Chittagong Metropolitan area. Jamunapari or Black Bengal goats with the history of early pregnant or natural service has been done, previously delivered the fetus and pubertal goats. The experimental goats were under traditional management provided by farmers. Some concentrate including wheat bran, rice polish and common grazing with sufficient water were the feeding management. Farmers were kept their goats in plain house. Anthelmintics were supplied to the all selected non pregnant goats.

2.2 Estrous synchronization, heat detection and hand mated by buck

The non pregnant and disease free goats were divided into two groups; A(n=35) and B(n=30). The goats under group A were treated with GnRH (Injection Fertilion®, Techno Drugs Lit, Bangladesh) and 9 days later PGF2α (Injection Ovuprost®, Cloprostenol sterile injection, Bomac Laboratories Ltd, New Zealand, Reneta Animal Health Division) i/m for estrous synchronization. The goats under group B were not given any treatment for estrous synchronization considered as control. All the goats were observed for detection of estrous behavior. Estrus goats were allowed to mate with buck for natural mating.

2.3 Ultrasonographic examination

Transabdominal ultrasonographic examination was performed to all primary selected goats. The pregnant goats were identified and measured the EDD. Post mated (45-50)

days goats were subjected to ultrasonography scanning for the presence of fetuses using a Digital Ultrasonic Diagnostic Imaging System with Convex abdominal Ultrasonic Transducer 5.8 MHz (Model Medison 600V, Korea).

2.4 Statistical analysis

The data were subjected to analysis of normal statistics, variance with respect to estrous synchronization, ultrasonographic examination, and diseases using SPSS 17.0 computer program package (SPSS, Chicago, IL, USA). Chi-square test with Fisher's exact test was done to evaluate the effect of estrous synchronization on estrus and conception rate compared with control. Similar test was done to observe the effect of ultrasonography to detect pregnancy on early and late gestation period. Significance was accepted at $p < 0.05$.

CHAPTER-3

RESULTS AND DISCUSSION

Out of 100 goats 35 goats were pregnant on the basis of history, 45 goats were in post partum period and 20 goats were pubertal but non-pregnant. By ultrasonography out of 35 pregnant goats (on basis of history) 45.71% goat found pregnancy positive, 48.57% goat found pregnancy negative and 5.71% goat had uterine infection. Among 45 post partal goats by ultrasonography screening 4.44% goat were pregnant, 88.88% goat were non-pregnant and 6.66% goat having uterine infection. Among 20 pubertal goats all found non-pregnant (Table 1).

Table1: **Categorize the goats using ultrasonography scanning**

Parameters	**Number of goats examined**	**Pregnant**	**Non pregnant**	**Uterine infection**
Pregnancy detected using ultrasonography	35	16(45.71%)	17(48.57%)	2(5.71%)
Uterus scanning in post partal goats	45	2(4.44%)	40(88.88%)	3(6.66%)
Pubertal but non pregnant goats	20	0(0%)	20(100%)	0(0%)
Total	100	18	77	5

Oestrous synchronization is the treatment of a group of animals or single animal so that oestrous and ovulation occurs at pre determined time rather than randomly. It creates the opportunity for timed breeding and kidding, thus taking advantages of seasonal variation of forage availability, photoperiod, labour resources and market demands. In small ruminant, estrus synchronization is achieved either by reducing the length of luteal phase of the estrous cycle with prostaglandin F2α or its analogues or by extending the cycle artificially with exogenous progesterone or more potent

progestagens (Abdalla et al., 2014). Hormones such as GnRH, PMSG, FSH, and LH may be used to increase pregnancy rate and number of lambs (Monika, 2001). In our study Among 65 non-pregnant goats 35 goats were synchronized and 30 goats kept as control group. Out of 35 synchronized goats 71.42% goat showed sign of oestrous and conception rate was 48.57%. Among 30 control goat 50% goat showed sign of heat and the conception rate was 26.67% (Table 2).

Table 2: Effects of oestrous synchronization on CR

	Synchronized group	**Control group**
No. of animal	35	30
Oestrous synchronization	35	-
Estrus observed rate	25(71.42%)	15(50%)
No. of goat bred on estrus	25	15
Pregnancy detected by ultrasonography	17	8
Conception rate	48.57%	26.67%

In this report as hormonal drug GnRH and PGF2α used which is almost similar with the study of Khandoker et al., (2008); Zeuh et al., (2014) and Abdalla et al., (2014). Freitas et al., (1996) has used fluorogestone acetate-impregnated vaginal sponges for synchronizing goats that is dissimilar to this report. The conception rate in this experiment synchronized and control group were 48.57% and 26.67% which is almost similar with the finding of Khandoker et al., (2008) who showed 42.86% and 40.00% conception rate in Black bengal goat after synchronizing with PGF2α injection 2ml and 1ml. Ishwar and Puney (1990) also reported the same result of our finding. On the other hand, the conception rate was higher than that of Akusu and Egbunake (1984), who observed 24-62% conception rate in maiden and pluriparous does, respectively.

Early diagnosis of pregnancy in goats is useful to make culling/rebreeding decisions, for food allotment, and clinical and research purposes. Traditional methods for pregnancy diagnosis in small ruminants are palpation through external abdomen and

noting udder enlargement. However, these methods are applicable only in late pregnancy. The technique of transabdominal ultrasonography has been used with great accuracy as a means for pregnancy diagnosis and estimation of fetal numbers in sheep (Buckrell, 1988 and Garcia et al., 1993), goat (Martínez et al., 1998; Gonalez et al., 2004), deer (Revol and Wilson, 1991), and reindeer (Vahtiala et al., 2004). In this experiment within 45 pregnant goats 35 goats were pregnant on the basis of history and 10 goats were pregnancy negative. But ultrasonographic screening revealed 57.14% pregnancy positive case (Table 3)

Table 3: Status of pregnancy diagnosis by ultrasonography scanning

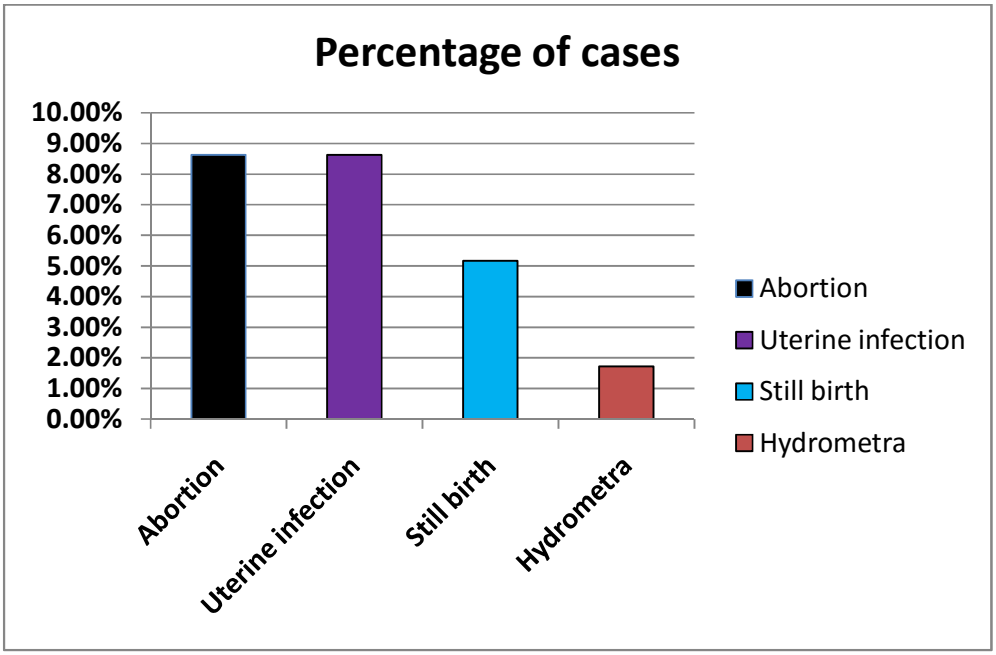
Early pregnancy diagnosis (< 60 days)	**Parameters**	**No. of pregnant**	**No. of correct diagnosis**	**Accuracy (%)**
Ultrasonography scanning(n=45)	Pregnant	35	20	57.14
	Non pregnant	10	8	80
	Live fetus	20	20	100
	Death fetus	0	0	100
	EDD	35	10	25.57
Late pregnancy diagnosis (>60 days)	**Parameters**	**No. of pregnant**	**No. of correct diagnosis**	**Accuracy (%)**
Ultrasonography scanning(n=20)	Pregnant	15	15	100
	Non pregnant	5	5	100
	Live fetus	10	10	100
	Death fetus	5	5	100
	EDD	11	9	81.81

Early pregnancy diagnosis (within 60 days) was done for 20 cases. Among these 20 goats all had live fetus. But the expected date of delivery was measured for 10 goats and the accuracy was 25.57%. Anwar et al. (2008) described a real time B-mode ultrasound scanner equipped with a 3.5 MHz probe (Aloka SSD-500, Aloka Co., Ltd.,

Japan) for early pregnancy diagnosis of sheep where as we used 5.8 MHz transducer (Model Medison 600V, Korea) for pregnancy diagnosis in goat. Fowler and Wilkins, (1984) showed 95% accuracy in the diagnosis of pregnancy from 40 to 50 days using a 3 MHz probe which is much higher than our study where we found 57.14% accuracy. The variation might be due to different sample size, different synchronization protocol, use of backdated ultrasonographic machine. Anwar et al. (2008) reported 100% accuracy in pregnancy diagnosis at 42 days of gestation which is not consistent with this study. 20 goats were diagnosed for pregnancy during late gestation and the accuracy was 100% which are similar to the study of Medan et al. (2004); Amer, (2008); Abdelghafar et al. (2010); Omontese et al. (2012). Kumar et al (2015) showed pregnancy diagnosis and development of fetus using two dimensional (2D) and three dimensional (3D) ultrasound which is not alike this study.

Reproductive disorders of goat cause the great economic problems. Reproductive abnormalities have been described as the largest single cause of loss of livestock production (McDowell, 1972). It has negative effect on meat production since pregnancy and parturition are prerequisite for reproduction. Reproduction of goats has an impact on successful fertility (Sattar and Khan, 1988). Reproductive disorders includes abortion, still birth, metritis, uterine infection. History of expelled out of fetal membrane, bloody discharge from vagina, expulsion of immature dead or live fetus etc. was found in abortion case. Those cases were examined by ultrasonography and found no fetus in the uterus. In case of still birth dead fetus was seen in ultrasonography. In this experiment for identifying reproductive disorder 58 goats were brought under ultrasonographic screening. Out of 58 goats 8.62% goats having abortion, 8.62% having uterine infection, and 5.17% having still birth and 1.72% having hydrometra (Figure 1).

Figure 1: Diagnosis of diseases in uterus by ultrasonography scanning



Sultan et al. (2015) reported 21.8% abortion in goat in Mymensingh district which is much higher than our findings. This variation might be due to difference in sample size, different geographical location, different feeding and managemental system. Lucky et al. (2015) described abortion 12.5% and 3.12% still birth in goat in Sylhet district that is almost similar to our findings.

PHOTO GALLERY

Fig1: Examination of fetus by ultrasonography

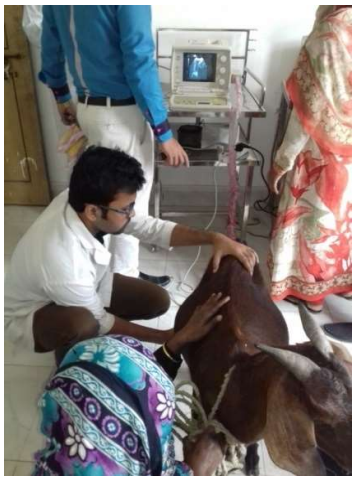


Fig2: Examination of fetus by ultrasonography

Fig3: Vertebral column of fetus

Fig4: Prostaglandin (PGF2α)

Fig5: Gonadotropin releasing hormone (GnRH)

CHAPTER 4

LIMITATIONS

- The number of clinical cases was too small.
- The duration of the study was too short to collect data.
- Financial insufficiency.

CHAPTER 5

CONCLUSIONS

The conception rate in synchronized does was more higher than non-synchronized does. Synchronization was performed by GnRH and PGF2α hormones. By ultrasonographic examination pregnancy diagnosis was highly accurate in late pregnancy (> 60 days) than early pregnancy (< 60 days).

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BIOGRAPHY

I am Jewel Chandra Bhowmik passed Secondary School Certificate (SSC) examination from Oter Hat High School, Noakhali, Chittagong in 2009 and then Higher Secondary Certificate (HSC) examination from Government Science College, Dhaka in 2011. I enrolled my internship program for Doctors of Veterinary Medicine (DVM) Degree in Chittagong Veterinary and Animal Sciences University (CVASU), Bangladesh. The desire of my life is to construct a world where human and animal will live happily together in the nature. So I am proud of my journey through CVASU to prostrate my desire of being a veterinarian. I have interests in molecular biology, physiology and medicine. I want to work on anthelmintic resistance of livestock in Bangladesh. I like reading books and travelling. I hope the journey of my life will be more longer will all of my interests.