**Chapter 1**

**Introduction**

Bangladesh is a developing country. The economy of Bangladesh mainly depends on agricultural development. Livestock mainly small and large ruminants is an integrated component of the existing farming systems, plays a vital role in income generation, family nutrition and family welfare of the small holder of the Bangladesh (*Asaduzzaman, 2000*). From ancient era to modern period it has been proved, high quality animal protein in the form of milk, meat is extremely important for the proper physical and mental growth of human being. In Bangladesh, around 9% of total protein for human consumption comes from livestock *(DLS, 2011*). In the urban areas the consumption of animal protein is high which is many times higher than the national average consumption of animal protein. Hides and skin of cattle, buffaloes, goats and sheep are valuable export items, ranked third in earnings foreign exchanges (*BBS, 2012*). As on Economic review of Bangladesh 2010/2011 fiscal year contribution of cattle and in national economy is 2.58%(2010/2011), Direct employment 20%, Partly employment 50%, foreign exchange only from hides & skin 4.31% and fuel supply from livestock around 25% specially in the rural areas (*Source: Economic review of Bangladesh, 2012*). In the fiscal year 2011/2012 the production of milk 3.46 Million Metric Tons, meat 2.33 MMT (*BBS, 2012*).

Though production of animal protein has maintained an upward trend, per capita availability of

animal protein presently in Bangladesh stands at around 43 gm meat/day, 64 ml milk/day and 49 eggs/year, but the recommended intake of 120 gm meat/day, 250 ml milk/day (DLS, 2011).

The develpoment of livestock can be hampered by various causes such as improper selection of breeds, lacks of proper management & feedindg, various types of systemic infectious & non-infectious diseases etc (*Blood et al., 2000).* Ruminants suffering from different GI problems. Diarrhea is a common clinical findings of GI tract problems that are caused by different infectious and non-infectiuos cause. The infectious causes are bacteria, fungi, viruses, protozoa and helminthes & the non-infectious causes are copper deficiency and molybdenum in excess amount, overfeeding, inferior milk replacers and many miscellaneous agent (*Price et al., 2007*). The prevalence of diarrhea in Bangladeh is 33.33% (*Alam et al., 2011*).). It occurs in all ages of animals. But it occurs mostly to the young, older and poorly nutrited animals those have low level of immunity (*Hoque et al. 2006*).

Diarrhea causes severe dehydration, anorexia, weakness to the animals (*Sissons, 2011*). The health condition become decreases day by day. The overall production by these animals become lower. The diarrheal disease is a great problem in ruminant, causing a high rate of morbidity and mortality (Debnath *et al.,* 1990). Oral rehydration therapy, adsorbents, antibiotic and antheminthic drugs in case of infectious and protozoal causes of diarrhea are the major treatment for cortrol of diarrhea(*Blood et al., 2000*).

Because of high morbidity & mortality of diarrhea & most common clinical problem of all ruminant that mostly caused by infectious agent but there is some limitations of treatment strategy.

Overall above mentioned background indicate that we need a proper treatment strategy for livestock management in diarrheic patient.

**Objectives of the study:**

* To evalute the prevalence of diarrhea among cattle and goat in Kaharole Upazilla..
* To measure the efficacy of different drugs against diarrhea.
* Direct observation of animal after therapy to examine accuracy of treatment.

**Chapter 2**

**Review of literature**

**2.1 Definition of diarrhea**

Frequent defaecation of fluid or semifluid faeces is known as diarrhea (*Chakrabarti, 2003*). Dysfunction or disease of the small and large intestine, the pancreas and the liver may cause diarrhea, these may be primary or secondary to systemic disease (*Dunn et al., 1997*).

Frequency of bowel motion differ in monogastric and polygastric animals, eg., cattle usually defaecates 11-18 times in 24 hours; horse 8-10 times in 24 hours; dog once or twice in a day (*Chakrabarti, 2003)*. Diarrhea depends on quality and quantity of foods; digestive efficiency; secretory activities of digestive glands and absorptive efficacy of intestinal mucosa.

**2.2 Etiology**

There are many causes of diarrhea in animals and the disease varies considerably in its severity depending upon the causative agent. Enteropathogens include bacteria, fungi, viruses, protozoa and helminthes. The **bacterial** agents are *Enterotoxigenic E.coli , Salmonellella spp. Clostridium perfringens type B and C i*n newborn calves, lambs and kids; Mycobacterium paratuberculosis in mature cattle, goats and sheep (*Amerine et al., 2000*).; **Fungal** agent is *Candida spp*. in young calves, kids and lambs; **Viruses** are *Rota* and *Corona* virus in young all species animals and explosive outbreaks, *Bovine virus diarrhea* occurs only in young cattle 8 months-2 years, sporadic outbreaks; PPR virus occurs only in goats and sheep in all ages of animals, **Parasites** are *Ostertagia spp. in* young cattle and lambs 10 weeks of age, *Nematodirus spp*., *Trichostrongylus spp*. in older lambs and goats; **Protozoa** are *Eimeria spp., Cryptosporidium spp*. occurs in young calves, lambs and kids and common outbreaks *(Blood et al., 2000).*

Nutritional deficiency such as copper deficiency and molybdenum in excess amount, overfeeding, inferior milk replacers and many miscellaneous agents causes diarrhea all species of animal (*Blood et al., 2000*). It has been proved that the native or indegenous animals have more registance than the exogenous. The stress of weaning in cattle is a risk factor for post weaning diarrhea (*John, 2009).*

**2.3 Prevalence of diarrhea**

According to *Poul et al*. (2011) the prevalence of diarrhea is higher in crossbred (61.8%) animals than that of local (49.2%) cattle & the crossbreed cattle were 1.7 times more susceptible than indigenous cattle due to their lower resistance to tropical diseases than indigenous animals.

The prevalence of infectious diarrhea in female animals is 59.5% and in male animals is 45% (*Paul et al., 2011*). *Saifuzzaman (1996*) reported that the percentage of infectious diarrhea in male and female cattle is 45.5% and 55.6% respectively. The higher percentage of diarrhea in the females may be due to the alteration in the physiological condition of the animals during pregnancy and lactation (production activity) and also the lack of feed supplement for production, which may lead to the lowering of body resistance of the females (*Jabber et al., 1983*).

The incidence of diarrhea varrried depending on their age in cattle. Highest rate of incidence is found in the older 60.3%, the lower rate of infection was found in the young animals 54.0% and the lowest rate of infection was recorded in the growing calves 44.4% (*Paul et al., 2011*). The reason for this variation in the incidence of infection in different age groups in cattle is difficult to explain but it might be due to an age related variation in resistance to disease and grazing habit (Okafor *et al*., 1988).

**2.4 Classification of Diarrhea**

**On the basis of duration,** there are two types of diarrhea, one is acute and another is chronic *(Sissons et al., 2011*).

Acute Diarrhea:

Diarrhea lasting less than 2 weeks is considered acute (*Hall, 2010).* Infectious agents are one of the factors associated with acute diarrhea (*Amerine et al., 2000*). Acute diarrhea is typically self limiting andparasitic or viral invasion, or by a non-infectious agent such as dietary indiscretion (*Daniel et al., 2006)*. Infectious agents are one of the factors associated with acute diarrhea. Some of these pathogens can cause an inflammatory response in the gut where the epithelial lining is damaged either by a toxin produced by the organism or by an organism invading the mucosa (*Bliss et al., 2006).*

Chronic Diarrhea:

Diarrhea lasting longer than two weeks but resolving within a month is known as persistent diarrhea (*Bushen et al., 2003*). This is typically a slower to resolve infection or continuing use of an offending agent (*Amerine et al., 2000*). Chronic diarrhea, on the other hand, lasts longer than four weeks (*Bliss et al., 2006*). Approximately most of the animal is thought to suffer from chronic diarrhea during any given period of time (*Schiller, 2009*). Chronic diarrhea can be the result of disease processes, medication, genetic abnormalities, or avariety of other causes (*Doughty, 2006).*

**2.5 Mechanism of Diarrhea**

Depending on the causative agent, diarrhea may be the results of at least four different mechanism (*Blood et al., 2000*).

* **Secretory diarrhea**
* **Osmotic diarrhea**
* **Exudative diarrhea**
* **Abnormal intestinal motility**

**Secretory diarrhea**

Secretory diarrhea occurs when there is an increase in the amount of fluid being drawn into the lumen of the bowel such that the ability of the intestines to reabsorb is overwhelmed (*Bliss et al., 2006*). Typically, infectious agents are the cause of secretory diarrhea but any substance that causes fluid to be pulled into the bowel can be the culprit (*Strasinger, 2008*). Infectious secretagogues include *Vibrio cholerae, E. coli, Camylobacter jejuni,* *Salmonella, Shigella,* and *Clostridium difficile* (*Farthing, 2006*). These pathogens secrete toxins that bind with the structures within the gut, altering, sometimes irreversibly, the amount of fluid secreted into the bowel (*Bliss, 2006*). As an example, the toxin excreted by the pathogen causes massive secretory diarrhea which, during its acute phase, can be as much as 40 liters in 24 hours (*Farthing, 2006*).

Non-infectious secretagogues include chemicals produced by certain types of cancer, prostaglandins produced in patients with bowel inflammation and substances not well absorbed such as fatty acids and bile acid (*Bliss et al., 2006*).

***Osmotic diarrhea***

Osmotic diarrhea occurs when there is a dysfunction in the ability of the intestine to reabsorb fluid as it flows through the lumen (*Kent et al., 2010*). This may be caused by incomplete breakdown or malabsorption of nutrients in the small intestine allowing a larger and more liquid mass to enter the colon (*Strasinger et al., 2008*). This fecal matter then creates a negative osmotic gradient causing leakage of more fluid into the gut increasing the stool volume (*Bliss et al., 2006*). The causes of this type of osmotic diarrhea are varied but can be broken down into decreased enzymatic availability (lactose intolerance), a genetic abnormality that decreases or eliminates the ability of the body to absorb certain nutrients, sugars that are poorly absorbed ( sorbitol, mannitol or lactose), “laxatives, magnesium containing antacids, amebiasis and antibiotic administration,” (*Strasinger et al., 2008*) as well as malabsorption of certain fats (*Bliss, et al. 2006*).

Other causes have more to do with changes within the bowel that decrease the ability to reabsorb fluid and nutrients as the stool is propelled through the lumen. Malnutrition, especially protein-calorie malnutrition causes “reversible atrophy of the villi and brush border” (*Bliss et al. 2006*), the structures within the intestine responsible for absorption. Resection of parts of the bowel, especially the terminal ileum, will mechanically decrease the body’s ability to absorb due to decreased length of intestine available (*Bliss et al., 2006*). Inflammation of the bowel due to infection or disease processes (Crohn’s disease) can be another cause of osmotic diarrhea.

Typically, osmotic diarrhea responds with decreased faeces volume when the animal fasts (*Binder, 2006*).

**Exudative diarrhea**

Acute or chronic inflammation or necrosis of the intestinal mucosa results in both a net increase in fluid production, inflammatory products, including loss of serum, proteins and a reduction in absorption of fluids and electrolytes (*Blood et al., 2000*). Examples include many of the diseases caused by bacteria, viruses, fungi, protozoa, chemical agents and tumors. The classic example is salmonellosis in which there is severe inflammation with the production of fibrinous, hemorrhagic enteritis. Other notable example include swine dysentery, bovine virus diarrhea and inorganic arsenic poisoning.

**Abnormal intestinal motility disorders**

During normal functioning of the intestines, solids and fluid are moved through the gut with peristaltic waves of the smooth muscles within the intestines. This movement is slow and may take 3-5 hours for the mass to move from the pyloric valve at the proximal point of the small intestine to the large intestine (*Guyton et al., 2000*). It may take as long as 24+ hours for the mass to move from the small intestine to the rectum to be expelled during defecation.

When the intestines are not functioning normally, motility can be either increased or decreased and both can lead to diarrhea (*Bliss et al., 2006).* Increased motility can be caused by infectious agents, changes within the bowel by inflammatory bowel disease or by irritable bowel syndrome (*Guyton et al., 2000*). This increased motility results in faster transport of faeces through the bowel so there is less chance for re-absorption of fluid from the large intestine. Counter-intuitively, decreased motility can also lead to diarrhea. Typically, decreased mobility will lead to constipation, which in its most severe form, can allow a large bolus of feces to form in the lower intestine and cause an impaction ( *Bliss et al., 2006*).

**2.6 Clinical signs of diarrhea**

According to *Wendy (2007),* clinical signs are detected on the basis of following criteria;

**1.  History**

a.  Large amounts of faeces, undigested faeces (protein, fat, carbohydrate present), and overall poor body condition characterize the patient with small bowel diarrhea.

b.  Frequent passage of small amounts of faeces, mucus in faeces, tenesmus and hematochezia characterize the patient with large bowel diarrhea.

**2**. **Examination of the patient**

The patient with small bowel diarrhea often exhibits weight loss and poor body condition (due to maldigestion or malabsorption of nutrients) while the patient with large bowel diarrhea typically is in good flesh and body condition.

**3.  Differentiation of small bowel from large bowel diarrhea**

|  |  |  |
| --- | --- | --- |
| **Differentiation of small bowel versus large bowel diarrhea** | | |
| **Parameter** | **Small intestine** | **Large intestine** |
| Feces | | |
| Volume | markedly increased | normal or increased |
| Mucus | rarely present | frequently present |
| Melena | may be present | absent |
| Hematochezia | absent except in HGE | fairly common |
| Steatorrhea | present with maldigestion or malabsorption | absent |
| Undigested food | may be present with maldigestion | absent |
| Color | variable: creamy brown, orange, green, clay | color variations rare |
| Defecation | | |
| Urgency | absent (except acute or very severe disease) | usually present, but not invariably |
| Tenesmus | absent | frequent but not always |
| Frequency | 2 - 3 times normal for patient | usually greater than 3X normal |
| Dyschezia | absent | present with distal colonic or rectal disease |
| Ancillary signs | | |
| Weight loss | may occur with maldigestion or malabsorption | rare except with severe colitis, neoplasia |
| Flatulence/borborygmus | may occur with maldigestion or malabsorption | absent |
| Halitosis | present with maldigestion or malabsorption | absent |

Table:Ettingers, (2009)

**2.7 Line of treatment**

According *to Blood et al*., (2000), the principles of treatment of diarrhea are:

* Removal of the causative agent
* Antimicrobials
* Alteration of the diet
* Fluids and electrolytes
* Intestinal protectants and adsorbents
* Antidiarrheal drugs.

**2.7.1 Removal of the causative agent**

Specific treatment is usually directed at intestinal helminthiasis with anthelminthics, antiprotozoan agents against diseases like coccidiosis and antimicrobial agents against the bacterial diarrhea (*Blood et al., 2000*). There are no specific treatments available for the viral diarrhea in farm animals (*Casburn et al., 2004).*

While considerable investigations have been done on the diarrhea on farm animals, the emphasis has been on the immunology, pathology, microbiology, and body fluid dynamics, each with different emphasis in different species. For example, there is considerable information on the microbiology and immunology of the common enteritides in calves and kids in addition to the extensive knowledge of the body fluid dynamics in calves.

**2.7.2 Antimicrobials**

Antimicrobial treatment tends to quicken the clinical resolution of diarrhea, prevent the progress of disease and reduce severity of associated clinical signs , such as fever, abdominal pain & vomiting (*Goodman e. al., 1999).* Supportive anti-dehydration therapy associated with adequate nutritional support, is the cornerstone of therapy (*Kosek et al., 2003).* Moreover dehydration can simulate toxaemia & mislead the clinical assesment of severity *(Daniel et al., 2006).*

While the routine use of antibiotics for infectious diarrhea in animals must be avoided, because it brings little benefit in most cases and is associated with the rise of antimicrobial resistance *(Daniel et al., 2006).* The most severe drawback of widespread use of antimicrobials for the treatment of infectious diarrhea is the consequently rising rates of antimicrobial resistency *(Bennish et al., 1992*). In order to decrease costs, as well as to reduce the posibility of increasing antimicrobial resistance among circulating strains, clinicians should choose the narrowest antibiotic regimen that covers the predicted organisms for each case (*Mates, 2000*).

Many different antimicrobial preparations for both oral and parenteral administration are available. Parenteral preparation are indicated in animals with acute diarrhea, toxemia and fever (*Blood et al. 2000).* In case of sub acute diarrhea with minimal systemic effects, oral preparation may be sufficient. The preparation and doses of the antimicrobials commonly used in bacterial diarrhea are ciprofloxacine groupes, sulfur drugs, metronidazole etc.

**2.7.3 Alteration of the diet**

If the cause of diarrhea is dietary in origin the feed should be removed until the animal has fully recovered; feed should then be replaced by another sources or reintroduced gradually. The digestibility of nutrients are reduced considerably and undigested feed provide a substrate for fermentation and putrifection to occur in acute diarrhea, the products of which may accentuate the malabsorptive state (*Daniel et al., 2006*). However, temporary removal of feed presents practical problems specially in the young. During the period of temporary starvation, the oral intake of fluids containing glucose and electrolytes is desirable and necessary to assist in maintaining hydration (*Blood et al., 2000*). If oral fluid intake is maintained, the total loss of water from feces and through the kidney in newborn calves with diarrhea is not significantly greater than in normal calves because the kidney will effectively compensate for fecal losses.When recovery is apparent, the animal’s usual diet may be reintroduced gradually over a period of few days.

**2.7.4 Fluids and electrolytes**

Newborn calves and kids, are more vulnerable to dehydration since their body surface to volume ratio is higher than adults, their metabolism is higher and their functional reserves are lower (*Burpee et al., 2008*). The clinician must therefore assess the degree of clinical dehydration and based on the history and clinical findings, estimate the degree of acidosis and electrolytes deficits which are likely to be present. Caregivers should be made aware of the signs of dehydration and encouraged to seek medical attention if these signs are encountered (*Koslap-Petraco, 2006*) ORT is the first line of defense for dehydration. If diarrhea persists after ORT is started or if dehydration occurs, the patient should be evaluated rather than being given over the counter medications.

Fluid should be given orally whenever possible to save the time and expense to avoid the complications which can arise from long term parenteral fluid therapy. The three major abnormalities of dehydration, acidosis and electrolyte deficit are usually corrected simultaneously with fluid therapy. When severe acidosis is suspected, this should be corrected immediately with a hypertonic (5%) solution of bicarbonate given IV at the rate of 5-7 ml/kgBW at a speed of about 100 mL/min (*Blood et al., 2000*). This is followed by the administration of electrolyte solutions in quantities necessary to correct the dehydration. With severe dehydration , equivalent to 10% of BW, large amounts of fluids are necessary.

**Table 1:** Relationship between dehydration & fluid deficit

|  |  |  |
| --- | --- | --- |
| **Animal** | **Dehydration** | **Fluid deficit** |
| 500 kg horse | 10% | 50L |
| 75 kg foal | 10% | 7.5L |
| 45 kg calf | 10% | 4.5L |

*(Blood et al.,2000)*

The initial hydration therapy should be given over the first 4-6 hours by continuous intravenous infusion, followed by maintenance therapy for the next 20-24 hours, or for the duration of the diarrhea if severe, at a rate of 100-150 mL/kg BW/24hours. In pre-ruminant calves with diarrhea, the fluid and electrolytes required for maintenance may be given orally in divided doses every few hours. In the early stage of acute diarrhea and for animals which are not severely dehydrated, the oral route can also be used successfully to correct dehydration and prevent it from becoming worse.

**2.7.5 Intestinal protectants and adsorbents**

Kaolin and pectin mixtures are used widely to coat the intestinal mucosa,inhibit secretions and increase the bulk of the feces in animals with severe diarrhea (*Blood et al. 2000*). Its positive effects exerted through the diet primarily consist in its adsorbent capability which may be useful for detoxification of the organism and for prevention of diarrheal diseases in animalsI (*Trekova, 2004*).

**2.7.6 Antidiarrheal drugs**

***2.7.6a Antimotility drugs***

Anticholinergic drugs and opiates are available to decrease intestinal motility. The anticholinergic drugs block the action of acetylcholine on smooth muscle and glands (*Blood et al., 2000*). In more-recent studies, however, antimotility agents, such as loperamide, have been to shown to be effective for the treatment of diarrheal diseases, significantly shortening the duration of the illness and the number of unformed faeces passed (*Ericsson, 1997*). Addition of loperamide to antibiotic therapy has consistently been shown to be effective in acute diarrhea, reducing the duration of diarrhea when compared with antimicrobial therapy alone. Combination of an antimotility agent such as loperamide with a single antibiotic dose is sufficient to control gastroenteritis, often within 24 h after therapy initiation (*Trckova, 2004*). Prolongation or worsening of disease or excretion of enteric pathogens was not seen. This results in decreased gastric secretion and emptying and reduction on both segmental and propulsive movements of the intestines. The opiates function as by producing an increase in segmentation while reducing propulsive movements in the intestine (*Blood et al., 2000*). The net effect is an increase in resistance to passage of intestinal contents and more complete absorption of both water and nutrients occurs with a subsequent decrease in the frequency of defecation.

***2.7.6 b Antisecretory drugs***

The antisecretory drugs are also available for the treatments of diarrhea due to the hypersecretory activity of enterotoxin produced by bacteria such as enterotoxigenic *E. coli.* (*Blood et al., 2000*). Antisecretory drugs include chlor-promazine, opiates, atropine and prostaglandin inhibitors. These medications have been shown to slow transit time within the intestine to permit more re-absorption of fluid (*Kent & Banks, 2010*).

**2. 8 Control**

The control and prevention of diarrhea in farm animals is a major topic and activity of large animal practice. The principles of control of enteritis (*Blood et al., 2000*) is include as following:

* Reduce infection pressure by controlling population density
* Ensure adequate non-specific resistance by adequate colostrums intake of neonatal farm animals and maintaining adequate nutritional status
* Vaccinate for those diseases for which there is an effective vaccine
* Minimize managemental and environmental stressors
* Monitor morbidity and mortality and ensure that a diagnosis is obtained so that control measures for newly introduced diseases into a herd can be instituted

**Chapter 3**

**Materials & Methods**

**3.1 Study Area & Period:**

The study was conducted from 16th july to 6th september, 2012 in the Upazilla livestock office, Kaharole, Dinajpur. Clinical cases that came into hospital were treated and recorded.

**3.2 Case selection:**

Randomly diarrheic patient were selected on the basis of relavent history and clinical signs that was caused by bacteria and protozoa. There were 18 cases selected and divided into 3 groups and each groups contained 6 cases. This groups were characterized on the basis of drugs that were administered to the cases. The table 1 shows the groups and the drugs that were administered.

Fig 2: Examination of feces in the perineal region in goat.

Fig1: Examination of feces in the perineal region in cattle.

**Table 2:** No. of groups and the drugs that were administered .

|  |  |  |
| --- | --- | --- |
| **Groups** | **No. of animals** | **Name of Drugs** |
| Group 1(G1) | 6 | Sulfurdrugs+Fluid therapy+Adjorbent(Diachalk, kaolin, pectin ) |
| Group 2(G2) | 6 | Ciprofloxacine +Fluid therapy+Adjorbent  (Diachalk, kaolin, pectin) |
| Group 3(G3) | 6 | Metronidazole+Fluid therapy +Adjorbent (Diachalk, kaolin, pectin) |

The commercially available drugs that were administered to the diarrheic patient among three groups according to their marketing company & trade doses are given on the following table.

**Table 3: Different marketing companies & trade doses of sulfur, ciprofloxacine, metronidazole drugs, fluid therapy & adjorbents used in present study.**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Name of drugs** | **Trade name** | **Drug forms** | **Trade dose** | **Company** |
| Sulfur drugs | Sulpha-3 | Bolus | 1for 35 kg for 1st day then 1/2 | Renata |
| Sulphadin | do | Do | Acme |
| Dimivet | Injectable | 15-30ml/50 kj; IM , IV | Square |
| Diadin | do | Do | Renata |
| Salidon | do | Do | ACI |
| Ciprofloxacine drugs | Ciprotab | Bolus | 1/50 kg | Techno |
| Civox vet | Do | Do | Popular |
| Cipro-A vet | Injectable | 1ml/10kg | Acme |
| Ciprosol | Do | Do | Techno |
| Metronidazole | Metrovet | Bolus | 1b/50 kg | Techno |
| Dirovet | Do | Do | Acme |
| Amodis | Do | Do | Square |
| Fluid therapy | Normasol 0.1%, 0.5%, 0.9% | Injectable | According to dehydration level | Opso-saline |
| DNS 0.1%, 0.5%, 0.9% | Do | Do | Opso-saline |
|  | Renalyte | Pulv | 0.5-1g/L | Renata |
| Electromine | Do | Do | Square |
| Adjorbent | Diavet | Pulv |  | General |

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**3.3 Experimental Protocol**

The cases were treated with the drugs that are commercially available product licensed for the treatment of diarrheic condition. The doses were followed according to international rules for the animals. Sulfur drugs were administered at 132-165mg/kg body weight, Ciprofloxacine 5mg/kg body weight, Metronidazole 20mg/kg body weight and the drugs were given either orally or parenterally. All the animal were examined on every 24 hours to assess their health conditions . In addition, degree of dehydration was assessed and the fluid was given according to the following table.

**Table 4:** Measurement of degree of dehydration

|  |  |  |  |
| --- | --- | --- | --- |
| **Degree of dehydration %** | **Retention of skin fold/sec.** | **Sunken eye** | **Fluid required(ml/kg b.wt.)** |
| 4-8(mild) | Absent | Not sunken | 25ml/kg body weight IV in first 4-6 hours followed by 140ml/kg over next 20 hours |
| 6-8(moderate) | 2-4 | Barely visible | 50ml/kg body weight IV in first 4-6 hours followed by 140ml/kg over next 20 hours |
| 8-10(severe) | 6-10 | Pronounced | 100ml/kg body weight IV in first 4-6 hours followed by 140ml/kg over next 20 hours |

The animal were examined at least for 3-7 days. The efficacy of the drugs was assessed on the basis of a reduction in the severity.

At the study period the faecal changes, degree of dehydration, temperature, degree of weakness were observed. In feces the changes were mainly in its consistency, color, odor, manner and frequency of defecation .

**Chapter 4**

**Results**

**4.1 Overall prevalence of diarrhea**

During internship placement at Upazilla Veterinary Hospital Kaharole, Dinajpur, 266 animals were came for different problems. Among them 18 animals were diarrheic patient. The overall prevalence of diarrhea among the animals was 14.77% (**Table 5).**

**Table 5 :-**Overallprevalence of diarrhea in animals

|  |  |  |
| --- | --- | --- |
| **Number of animals recorded** | **Number of animals affected with diarrhea** | **Prevalence (%)** |
| 266 | 18 | 14.77% |

**4.2 Prevalence of diarrhea in different species**

Table 6 shows, there were found no statistically significant difference of prevalence of diarrhea among the cattle and goats, these were 10% in cattle & 5.37% in goat**.**

**Table 6:** Prevalence of diarrhoea in different species

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Species** | **No. of positive cases** | **No. of negative cases** | **Total cases** | **Prevalence (%)** | **X2 Value** | **p-value** |
| Cattle | 8 | 72 | 80 | 10.0 | 1.23 | 0.13 |
| Goat | 10 | 176 | 186 | 5.37 |

**4.3 Prevalence of diarrhea in different sexes in cattle and goat**

Table 7shows the prevalence of diarrhea in two different sexes in cattle and goat. It revealed that the prevalence of diarrhea is higher in both female cattle & goat.

**Table 7:** Prevalence of diarrhea in two different sexes in cattle and goat

|  |  |  |  |
| --- | --- | --- | --- |
| **Species** | **Categories** | **No. of positive cases** | **Prevalence (%)** |
| Cattle | Male | 3 | 37.5 |
| Female | 5 | 62.5 |
| Goat | Male | 4 | 40.0 |
| Female | 6 | 60.0 |

**4.4 Prevalence of diarrhea in different breeds of cattle and goat**

Table 8 shows the prevalence of diarrhea is higher in Cross breed cattle than non descriptive cattle**.** But in goat the prevalence is higher in Black Bengal goat than Jamunapari.

**Table** 8**:** Prevalence of diarrhea in different breeds of cattle and goat

|  |  |  |  |
| --- | --- | --- | --- |
| **Species** | **Breeds** | **No. of positive cases** | **Prevalence (%)** |
| Cattle | ND | 5 | 37.5 |
| Cross breed | 3 | 62.5 |
| Goat | BBG | 6 | 60.0 |
| Jamunapari | 4 | 40.0 |

**4.5 Prevalence of diarrhea in different age groups of cattle and goat**

Table 9 shows the prevalence of diarrhea is higher in cattle under 3 years old but in goat the prevalence is higher under 20 months of age.

**Table 9:** Prevalence of diarrhea in different age groups of cattle and goat

|  |  |  |  |
| --- | --- | --- | --- |
| **Species** | **Age groups** | **No. of positive cases** | **Prevalence (%)** |
| Cattle | <3 years | 6 | 75.0 |
| > 3 years | 2 | 25.0 |
| Goat | < 20 months | 7 | 70.0 |
| > 48 months | 3 | 30.0 |

**4.6 Prevalence of degree of dehydration among the groups**

Table 10 shows that the moderate degree of dehydration in animals were more in all three groups are 50.0%, 66.7% & 66.7%.

**Table 10**: Prevalence of degree of dehydration in animals among groups

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Degree of dehydration** | **Group 1(G1)** | | **Group 2(G2)** | | **Group 3(G3)** | |
| **No. of animal treated** | **Prevalence (%)** | **No. of animal treated** | **Prevalence (%)** | **No. of animal treated** | **Prevalence (%)** |
| Mild dehydration | 2 | 33.3 | 1 | 16.6 | - | - |
| Moderate dehydration | 3 | 50 | 4 | 66.7 | 4 | 66.7 |
| Severe dehydration | 1 | 16.6 | 1 | 16.6 | 2 | 33.3 |

**4.7 Treatments response among three groups**

Table 11 shows that ciprofloxacine drugs shows faster recovery from the 2nd day of treatments and the full recovery attained 83.3% within 4 days.

**Table 11:** Treatments response among 3 groups

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Groups** | **Name of Drugs** | **Start improvement** | | | **Full recovery** | | |
| Day | No of animals(n=6) | Percentage % | Day | No of animals(n=6) | Percentage % |
| G1 | Sulfurdrugs+Fluid therapy+Adjorbent(Diachalk,kaolin,pectin ) | 2nd | 5 | 83.3 | 7th | 6 | 100 |
| G2 | Ciprofloxacine +Fluid therapy+Adjorbent  (Diachalk, kaolin, pectin) | 2nd | 5 | 83.3 | 4th | 5\* | 83.3 |
| G3 | Metronidazole+Fluid therapy +Adjorbent (Diachalk, kaolin, pectin) | 2nd | 4 | 66.7 | 6th | 6 | 100 |

\*=1 animal died

**Chapter 5**

**Discussions**

**5.1 Overall prevalence**

In present study, the prevalence of diarrhea was 14.77% in 266 cases, which is nearly similar with *Rahman et al. (1972*), 12.66% while *Kabir et al. (2010),* reported that the prevalence of diarrhea is 11.5%, which is lower than the present study. This variation in prevalence may be due to present ecological conditiion and animal husbandry practices.

**5.2 Breed wise prevalence**

The prevalence of diarrhea in cattle is higher in cross breed than non-descriptive breed which was recorded as 62.5% & 37.5% in my present study which is nearly similar than *Alam et al. (2011*) is reported as 61.1% & 36.8%. But in goat the prevalence in Black bengal & Jamunapari was 60.0% & 40.0%, which is slighly lower than *Paul et al. (2011), is reported as* 63.4% & 44.2%.

**5.3 Age wise prevalence**

In my study the prevalence of diarrhea in young and adult goat was 70% & 30%, which is similar as the report of *Kabir et al. (2010*), 68.7% & 31.30% and the prevalence in young and adult cattle was 75% & 25% in my present which is different from the prevalence that is recorded in *Paul et al.(2011),* 60.3% & 44.4.

**5.4 Sex wise prevalence**

The prevalence of diarrhea in two different sex in my report, was 37.5% & 65.5 % in male and female cattle which is slightly difference from *Paul et al. (2011*), 45.5% & 55.5%. In my present study the prevalence in male and female goat was 40% & 60%, which is similar as the report of *Kabir et al. (2010)*, 40% & 60%.

**5.5 Treatment response**

Group 1 the animals receiving treatments by sulfur drugs for 4 days showed full recovered 100%. But it takes 7 days to recovered perfectly. But according to *Miller et al.* (1969), the percentage of full recovery from diarrhea in cattle is 86.7 % within 5 days. *Egah et al. (2003)* reported that the resistance of sulfur drugs is developed to the animals.

In group 2 animals, ciprofloxacine drugs exhibited faster recovery from 2nd day of treatments about 83.3%o but complete recovery was attained 83.3% within 4 days but *Heinen, (2000*) reported the percentage of full recovery in ciprofloxacine drugs is 92.4% in cattle within 5 days of treatments. But probably one animal was died due to suffering from PPR. *Hakanen et al. (1999*) reported that unnecessary used of ciprofloxacine dugs, increased the resistancy to the patients. So, proper use of this drug should be attained.

In Group 3 metronidazole drugs was used & shows full recovery about 100% but the percentage of starting recovery is low about 66.7% and it takes more than recommended day of treatments. But *Hogenaquer et al. (1998)* used the drugs in 282 cases of acute diarrhea and percentage of full recovery is 74 % during the recommended days.

**Limitations of the study**

During study this report, I have faced many problems:-

* Shortage of the time was the main constrains, because it reduced the case number of study.
* Improper co-operation of owner

**Chapter 6**

**Conclusion**

Diarrhea is the major common disease condition and causes obstacle in livestocks developmets sectors. In the present study the prevalence of diarrhea is more in goat than cattle. For the treatments of the infectious diarrhea, three types of drugs such as sulfur groupes, metronidazole and ciprofloxa cine groups were selected. Among the three groups, ciprofloxacine drugs show the better response. The side effect of ciprofloxacine is less than metronidazole and sulfur drugs. So, the application of the ciprofloxacine drugs should be used for further treatments of infectious diarrhea to the cases to avoid the side effect of another drugs. Moreover the recovery of the cases will faster, so the developments of livestosk is possible without health hazards.

**Abstract**

The study was conducted in 18 diarrheic ruminant patient out of 266 cases during the period from 16th July/2012 to 6th September/2012 in Kaharole upazilla, Dinajpur. It was conducted to find out the prevalence and evaluation of different drugs regimen in ruminant diarrheic patient. The overall prevalence of diarrhea was 14.77% and species wise prevalence of diarrhea was 10% in cattle & 5.37% in goat**.** In case of breed wise distribution, the prevalence in cattle is higher in cross breed than non-descriptive breed which was recorded as 62.5% & 37.5% but in goat the prevalence was higher in Black bengal 60.0% than Jamunapari 40.0%. The prevalence of diarrhea is higher in female on both goat & cattle was 60.0% & 62.5% than in male cattle & goat was 40.0% & 37.5%. In age wise prevalence it was higher in young cattle & goat was 75.5% & 70.5% but in adult cattle & goat the prevalence was 25.0% & 30.0%. Regarding treatment responses among ciprofloxacine, metronidazole and sulfur drugs, ciprofloxacine showed the best result. So, my study recommended ciprofloxacine drugs as first choice for treating diarrheic patient.

**Key words:** Diarrhea, evaluation, ruminant, prevalence, breed.

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**Evaluation of Different Drugs regimen in Diarrheic Ruminant Patient at Kaharole Upazilla, Dinajpur**



AS THE PARTIAL FULFILLMENT FOR THE DEGREE OF DOCTOR OF VETERINARY MEDICINE (DVM)

**A Clinical Report Submitted by:**

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**Evaluation of Different Drugs regimen in Ruminant**

**Diarrheic Patient at Kaharole Upazilla, Dinajpur.**



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