Research Article

Cross-Sectional Survey on Food Animal Diseases and Pharmaceuticals Prescribing Pattern in Jhenaidah, Bangladesh

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Abstract | Information from Veterinary hospitals are reliable sources to assess different animal diseases along with their prescribing patterns. The present cross-sectional study has revealed the proportionate prevalence of food animal diseases and drug prescribing patterns practiced at four veterinary hospitals of Jhenaidah from February, 2019 to April, 2019. A total of 881 clinical case (435 cattle and 446 goat) records were evaluated systematically during the study period. The clinical cases were divided into medicinal, surgical and gynaecological category. Medicinal cases were in the highest percentage (88.8%) followed by surgical (7.2%) and gynaecological cases (4.1%). The highest proportionate prevalence of clinical cases in cattle was ectoparasite infestation (23.9%), followed by navel ill (1.8%) and infertility (0.9%), but non-specific fever (19.3%) was the highest followed by castration (5.3%) and dystocia (4.0%) were diagnosed in goat. At the same time the lowest proportionate prevalence in cattle was arthritis (0.4%), wound (0.1%) and retained placenta (0.4%), whereas in goat was acidosis (0.4%), atresia ani (0.1%) and pyometra (0.1%). To treat animal diseases, antimicrobials were the most often prescribed drugs (56.2%) followed by anthelmintic (26.6%) and nutritional supplements (5.3%). Sulpha drugs were the most commonly prescribed antimicrobials (29.3%), followed by combined preparation of β-lactamase and aminoglycosides (23.2%), whereas quinolones were less frequently prescribed against animal diseases (4.0%). This investigation might help to design control measures for the prevalent diseases and to develop a better prescribing pattern against animal diseases ensuring optimum production, food security and human health.

Keywords | Proportionate prevalence; UVH; antimicrobials; Drugs; Cattle

INTRODUCTION

Bangladesh is a densely populated country with 80% of the rural people engaged with cattle rearing (Siddiki et al., 2010). The total cattle and goat population of Bangladesh is 23.8 million and 26.2 million respectively (Anon, 2020). Compared to neighbouring countries like India, Nepal and Myanmar, Bangladesh has low produc-

tivity in milk production (Uddin et al., 2011). Estimated milk and meat production are 9.3 and 7.2 million metric tons respectively; having a deficiency of 5.6 million metric tons of milk and a surplus of 0.02 million metric tons of meat (Anon, 2017). Cattle and goat are extremely important to household farmers; because of having a direct link with family's income, welfare, and nutritional supplement (Sarker and Islam, 2011). It is important to maximize

production and improve animal health to provide the optimum output for farmers at all levels. Cattle, sheep, and goats are the major species contributing meat and milk supply chain of the country. Tropical climate of Bangladesh is favourable to different pests and parasites to produce animal diseases which are the most limiting factors for both productivity and high mortality of food animals (Dessie and Ogle, 2001). So, this study has been conducted to estimate the proportionate prevalence of different food animal diseases.

In Bangladesh, most of the sick animals are brought to the nearby veterinary hospital or clinic for diagnosis and treatment (Alam et al., 2018). Initially, the veterinarian makes close inspection of the animal based on the owners complain and conclude with a presumptive diagnosis. If necessary, they also collected the necessary samples and send them to the laboratory for further evaluation to confirm the disease diagnosis. After confirmation either through signs and symptom and/or laboratory report, they prescribe the animals with necessary medicine and advice. It is very usual to treat the infectious diseases with different antimicrobials. Antimicrobials are live-saving medication act against infectious organism responsible to cause disease. But the residue of antimicrobials remain within the body for a definite period (Chantziaras et al., 2014). So, exposure to antimicrobials is not unlikely to develop antimicrobial resistance in human if they use animal product like milk or meat when the residue is present within the animal body. The awareness of getting exposure to antimicrobials can rise among the people if they know the definitive percent of the use of antimicrobials in animals. So, this study has been conducted to estimate the use of different antimicrobials in food animals of Jhenaidah, Bangladesh. Altogether this study has been conducted aiming to estimate the proportionate prevalence of food animal's diseases and frequency of different antimicrobials prescribed against food animals' diseases.

MATERIALS AND METHODS

STUDY AREA AND STUDY DESIGN
A cross-sectional study was carried out at four Upazilla of Jhenaidah named- Jhenaidah Sadar, Kaliganj, Harinakunda and Kotchandpur from February, 2019 to April, 2019 due to having large-scale livestock production farmers particularly of cattle and goats which are usually reared in semi-intensive farming systems (Anon, 2011). This study has been conducted using hospital disease database and a total of 881 cases were identified and studied during the study period (Figure 1).
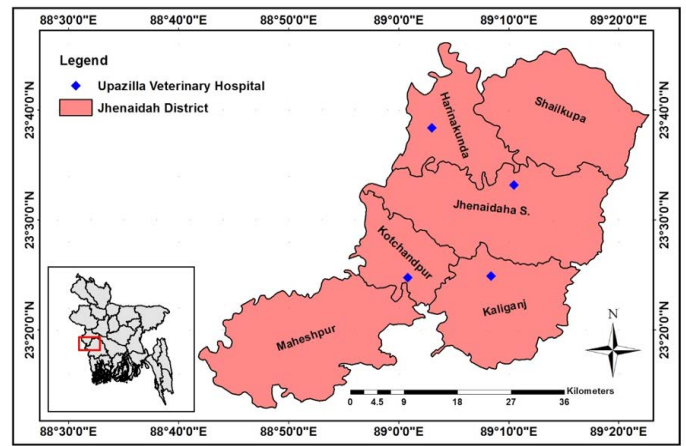

Figure 1: Geographical location of Jhenaidah and study sites.

UPAZILLA LIVESTOCK OFFICE
Upazilla Livestock Office is officially responsible to provide veterinary health care facilities to animal under specific Upazilla. In veterinary hospitals, the diagnosis is usually performed based on sign and symptoms. In case of some critical cases, the samples are usually collected and diagnosed the disease by using some diagnostic tools which are available at Upazilla Veterinary Hospital (UVH) or send the sample to the central laboratory for further investigation to confirm the diagnosis.

DATA COLLECTION, ORGANIZATION AND ANALYSIS
The data were collected from the case-record register of UVH. The data recorded into several headings including species, age, sex, signs, diagnosis and treatment of patients along with prescribed medication information.

The antimicrobials were categorised based on generic composition including aminoglycoside (gentamicin), β-lactamase, consisting of penicillin and cephalosporin, oxytetracycline and sulpha drugs. A combination of penicillin and streptomycin was included as a separate subgroup. Quinolones drug was listed as another subgroup and the other groups of drugs included anti-pyretic, anti-emetic, antihistaminic, saline and digestive stimulants.

The case record register of UVH has been filled up by Veterinary Surgeon (VS) based on disease history, owner complaint, symptoms, presumptive diagnosis of the following diseases. The clinical cases of animals were divided into medicinal, surgical and gynaecological categories based on the nature of the diagnosis.

After collection, the data was recorded into spreadsheets (Microsoft Excel 2016). After cleaning, coding and recoding as necessary, the data was forwarded in STATA/IC-14.0 (Stata Corp, 4905, Lakeway Drive, College Station, Texas, USA) for analysis. Finally, the result was expressed

as frequency number, percentages and 95% CI.

RESULTS

Proportionate Prevalence of Animal Diseases in Different Areas

Irrespective of species the proportionate prevalence of medicinal cases was 88.8% followed by surgical (7.2%) and gynaecological cases (4.1%).

Geographically medicinal cases were the most prevalent at Harinakunda (98.1%) followed by Kotchandpur (90.7%), Jhenidah (85.7%) and Kaliganj (84.1%). The surgical cases were prevalent at the highest in Kaliganj (11.8%) followed by Jhenidah (7.3%), Kotchandpur (6.9%) and then the gynaecological cases were the most prevalent in Jhenidah (6.8%) followed by Kaliganj (4.1%), Kotchaadpur (2.3%) and Harinakunda (1.9%) (Table 1).

Table 1: Proportionate prevalence of diseases in selected area

Upazilla	Medicinal (%)	Surgical (%)	Gynaecological (%)
Jhenaidah sadar	175 (85.7%)	15 (7.3%)	14 (6.8%)
Kaliganj	185 (84.1%)	26 (11.8%)	9 (4.1%)
Kotchandpur	78 (90.7%)	6 (6.9%)	2 (2.3%)
Harinakunda	364 (98.1%)	-	7 (1.9%)

Proportionate Prevalence of Different Diseases According to Species

In Cattle (n=435) the proportionate prevalence of medicinal, surgical and gynaecological cases was 93.3%, 4.1% and 2.5%, respectively. In goats (n=446) the proportionate prevalence was 84.3%, 10.1% and 5.6% estimated as medicinal, surgical and gynaecological cases, respectively (Table 2).

Overall proportionate prevalence of bloat was 1.6% in cattle and 2.5% in goat. The estimated proportionate prevalence of non-specific diarrhoeal cases was 11.5% in cattle and 11.8% in goat.

Non-specific fever was 7.6% in cattle and 19.3% in goat. The proportionate prevalence of FMD in cattle was 3.6%. The assessed proportionate prevalence of Mastitis was 1.6% and 2.2% in cow and doe, respectively. The dystocia was 0.7% in cattle and 4.0% was in goat. Besides, the retained placenta was 0.4% in cattle and 0.9% was in goat (Table 2).

Pharmaceuticals Prescribing Pattern

Overall antimicrobials were the most often prescribed (56.2%) medicine followed by anthelmintic (26.6%) and nutritional supplements (5.3%).

Antimicrobials were prescribed habitually in goat (60.2%) rather than cattle (39.8%). Vitamin and minerals were prescribed in the least amount in comparison to other medicines. Also, anthelmintic was highly prescribed for cattle (73.9%), then in goat (26.1%) (Table 3).

Antimicrobials Prescribing Pattern

To treat animal diseases, the most frequently prescribed antimicrobials were the Sulpha drugs in cattle (30.5%), then in goat (28.5%). However, the combined preparation of β-lactamase and aminoglycosides were mostly prescribed against cattle disease (16.2%) followed by goat disease (27.9%). Moreover, quinolones were prescribed in 3.6% and 4.4% cases in cattle and goat, respectively (Table 4).

DISCUSSIONS

Proportionate Prevalence of Different Diseases

In cattle, medicinal cases were more prevalent (93.3%) in contrast to surgical and gynaecological cases which is alike for goat patients as well. These findings suggested that other than surgical and gynaecological cases medicinal cases are the most prevalent in veterinary hospital of Jhenaidah which is in agreement with the study conducted by (Rahman et al., 2012) in Barisal. In this study, the estimated proportionate prevalence of bloat was quite higher in goats than in cattle which is supported by the study conducted in Barisal reporting 2.2% and 2.5% bloat in cattle and goat, respectively (Rahman et al., 2012) whereas Samad (2001) reported 1.83% prevalence of bloat in cattle and 3.98% in goat. However, Sutradhar et al. (2000) revealed 1.73% of cases of bloat in cattle from Upazilla Veterinary Hospitals in Mymensingh. So, it seems that bloat is a common digestive disturbance in goat compare to cattle which may be due to differences in feeding habit as sometimes goat eat unusual particles.

The estimated proportionate prevalence of non-specific fever was lower in cattle (7.6%) in contrast to goat (19.3%). This findings can be metaphorized with the earlier studies conducted by Samad et al. (2002) in Mymensingh and Rahman et al. (2012) in Patuakhali where the reported prevalence varied from 5.1% to 12.1% in cattle. Also, the earlier study conducted by Rahman et al. (2012) in Patuakhali and Alam et al. (2018) in Comilla reported the prevalence of non-specific fever ranged from 4.4% to 10.37% in goat. All of the previous findings differ from the present study which may be due to the difference in the study location.

Table 2: Proportionate prevalence of diseases and disorders in Cattle and Goats

Disease/Disorder	Cattle (n=435)		Goats (n=446)	
	Frequency (%)	95% CI	Frequency (%)	95% CI
Acidosis	4 (0.9)	0.2-2.3	2 (0.4)	0.05-1.6
Anorexia	49 (11.2)	8.4-14.6	77 (17.2)	13.8-21.0
Arthritis	2 (0.4)	0.05-1.6	5 (1.1)	0.3-2.5
Bloat	7 (1.6)	0.6-3.2	11 (2.5)	1.2-4.3
Babesiosis	9 (2.1)	0.9-3.9	3 (0.6)	0.1-1.9
Bottle jaw	2 (0.4)	0.05-1.6	11 (2.5)	1.2-4.3
Corneal opacity	-	-	3 (0.6)	0.1-1.9
Coughing	-	-	8 (1.8)	0.7-3.5
Dermatitis	26 (5.9)	3.9-8.6	11 (2.5)	1.2-4.3
Diarrhoea (non-specific)	50 (11.5)	8.6-14.8	53 (11.8)	9.0-15.2
Food and Mouth Disease (FMD)	16 (3.6)	2.1-5.9	-	-
Non-specific fever	33 (7.6)	5.3-10.4	86 (19.3)	15.7-23.2
Foot rot	6 (1.4)	0.5-2.9	-	-
Mastitis	7 (1.6)	0.6-3.2	10 (2.2)	1.0-4.0
Laminitis	28 (6.4)	4.3-9.1	11 (2.5)	1.2-4.3
Pneumonia	28 (6.4)	4.3-9.1	22 (4.9)	3.1-7.3
Tetanus	-	-	3 (0.6)	0.1-1.9
Ectoparasite	35 (8.0)	5.6-11.0	21 (4.7)	2.9-7.1
Endoparasite	104 (23.9)	19.9-28.2	35 (7.8)	5.5-10.7
Fracture	5 (1.1)	0.3-2.6	12 (2.7)	1.3-4.6
Hernia	2 (0.4)	0.05-1.6	-	-
Gid Disease	-	-	4 (0.9)	0.2-2.2
Urolithiasis	-	-	1 (0.2)	0.001-1.2
Atresia ani	2 (0.4)	0.05-1.6	1 (0.2)	0.001-1.2
Castration	-	-	24 (5.3)	3.4-7.9
Wound	1 (0.2)	0.01-1.2	3 (0.6)	0.1-1.9
Navel ill	8 (1.8)	0.7-3.6	-	-
Dystocia	3 (0.7)	0.1-2.0	18 (4.0)	2.4-6.3
Pyometra	-	-	1 (0.2)	0.001-1.2
Uterine prolapse	-	-	2 (0.4)	0.05-1.6
Retained placenta	2 (0.4)	0.05-1.6	4 (0.9)	0.2-2.2
Anoestrous	2 (0.4)	0.05-1.6	-	-
Infertility	4 (0.9)	0.2-2.3	-	-

Table 3: Frequency distributions of pharmaceutical categories prescribed for cattle and goats.

Species	No of Animals (%)	Antibiotics (%)	Anthelmintic (%)	Vitamins and Minerals (%)	Others* (%)
Cattle	435 (49.4)	197 (39.8)	173 (73.9)	31 (65.9)	175 (39.5)
Goat	446(50.6)	298 (60.2)	61 (26.1)	16 (34.0)	268 (60.5)

*Others: Anti-pyretic, anti-emetic, antihistaminic, saline and digestive stimulants

Non-specific diarrhoeal cases were nearly equal in percentages in cattle and goat (11.5% and 11.8%). This findings almost relates to the earlier study where the author reported 6.94% of non-specific diarrhoea in dairy cows and 12.23% in goats (Rahman et al., 2012) in Barisal. Again these findings are in line with the study conducted by Karim et al. (2014) in Magura reported 11.5% of non-specific diarrhoea in cattle whereas Hoque and Samad (1997)

Table 4: Frequency distributions of antimicrobials prescribed for cattle and goats.

Species	N	Aminogl-ycosides (%)	Sulpho-namide (%)	Oxytetracycline (%)	β-Lactamase (%)	Combined (β-Lactamase and Aminoglycosides) (%)	Quino-lones (%)
Cattle	197	4(2.0)	60(30.5)	54(27.4)	40(20.3)	32(16.2)	7(3.6)
Goat	298	43(14.4)	85(28.5)	40(13.4)	34(11.4)	83(27.9)	13(4.4)

reported 12.23% prevalence of non-specific diarrhoea in goat in Dhaka.

The proportionate prevalence of FMD in cattle was 3.6% which is much lower than the study conducted by (Lucky et al., 2016) in Sylhet. However, comparatively higher prevalence has been reported by Sarker and Islam (2011) as 8.58% in Rajshahi and 5.78% in Patuakhali district of Bangladesh (Rahman et al., 2012). The proportionate prevalence of Mastitis was 2.2% and 1.6% in doe and cow respectively. These findings are quite higher than the earlier study findings where the three different authors revealed 0.71%, 0.9% and 0.37% prevalence of clinical mastitis in cattle (Samad, 2001; Rahman et al., 2012; Karim et al., 2014). This discrepancy may be due to different management system practised by the farmers in different areas. Overall, the gid disease was 0.9% prevalent in goat which is much lower than the study conducted by Samad (2001) and Rahman et al. (2012) reported the prevalence of gid disease was 5.38% and 2.5% in Mymensingh and Barisal, respectively. This variation is due to the difference in the parasite management strategy in different regions of Bangladesh.

Present study revealed proportionate prevalence of pneumonia in cattle was 6.4% which is comparatively higher than the earlier study led by Samad et al. (2002) who reported 1.24% prevalence of pneumonia in cattle in Mymensingh. Again, the estimated proportionate prevalence of tetanus was 0.6% in goats which is in line with the study conducted by Samad (2001) reported 1.1% but differed with the study conducted by Rahman et al. (2012) reported 5.2% prevalence of tetanus in goat.

The proportionate prevalence of dystocia was higher in goat (4.0%) than in cattle (0.7%). Again, the retained placenta was the most prevalent among goat (0.9%) species rather than cattle (0.46%) which is in line with the study conducted by Samad (2001) but lower than the study conducted by Lucky et al. (2016) who reported the prevalence of dystocia was 4.71% in cattle and 6.25% in goats.

Anoestrous was estimated 0.4% in cattle which is lower than the study findings by Samad (2001) and Lucky et al. (2016) who reported 0.86% and 23.52% prevalence of anoestrus in cattle in Mymensingh and Sylhet, respectively.

ANTIMICROBIALS USE
This study documented that the frequency of sulpha drugs (29.3%), oxytetracyclines (18.9%), β-lactamase (14.9%), combined preparation of β-lactamase and aminoglycosides (23.2%) and quinolones (4.0%) constituted the majority of antimicrobials used in livestock (cattle and goats) production in Jhenaidah, Bangladesh. The study is relatively consistent with a previous study conducted by (Adesokan et al., 2013) in Nigeria revealed that tetracyclines (33.6%), fluoroquinolones (26.5%) and beta-lactams/ aminoglycosides (20.4%) constituted the majority of antimicrobials used in livestock animal production but the variation in percentage may be due to difference in the geographical location of the study sites. Again, Oliver et al. (2011) reported the use of tetracycline was 42.0% followed by 27.2% cephalosporin, and 19.5% β-lactamase antibiotics. Another study conducted by Regula et al. (2009) reported penicillin and cephalosporins were the most frequently prescribed antibiotics (37%), followed by aminoglycosides (18%), tetracycline (14%), and sulphonamides (11%) in veterinary practice in Switzerland (Regula et al., 2009) this results is in favour of this study outcome. A study was conducted in South Africa to determine antibiotic usage in food animals showed that tetracyclines and beta-lactams were amongst the first four leading antibiotics commonly used in the country which is truly identified in this study (Eagar et al., 2012).

Since antibiotic-resistant bacteria are becoming an increasing concern with livestock, it is prudent to use antibiotics only when necessary (AVMA, 2020). Veterinarians play an important role in preventing the overuse of antibiotics in food animals as previously in the Netherlands it is reported a reduction of 56% antimicrobial use for farm animals from 2007 to 2012 through building up inter-relationship amongst veterinarians, farmers and other stakeholders (Speksnijder et al., 2015). So, this study findings may be supportive to the veterinarian to know the present scenario on the bunch of antimicrobial use which will lead them of being judicious on the prescription of antimicrobials along with planning on preventive care (Dall et al., 2013).

LIMITATIONS

There were some constraints noticed during the study pe-

riod as follows:

i) Information bias due to unstructured questioning to animal owners
ii) Many of the farmers rely on para-vets who are not capable to treat the patient efficiently

CONCLUSION

The present study revealed that, medicinal cases were more prevalent than other cases during the study period so the vet should be much judicious to prescribe medicine. Prescription patterns could be improved through accurate diagnosis of diseases organism using appropriate culture sensitivity testing. Integration of nutritional supplement as well as vaccination will potentially reduce the use of antimicrobials. Altogether this study will be useful to guide the practitioner to pay head on proper medicine prescribing plan against animal diseases.

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CONFLICT OF INTEREST

The authors declare that this work has not been influenced by any financial or personal factors.

AUTHOR'S CONTRIBUTION

All authors contributed equally to produce the final manuscript.

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