

ANALYSIS OF MORBIDITY AND MORTALITY RATE IN BOVINE UNDER VILLAGE CONDITIONS OF UTTAR PRADESH

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ABSTRACT

The present study was carried out to analyse the factors associated with morbidity and mortality rate in bovine under village conditions of Uttar Pradesh using suitable statistical techniques. A total of 480 bovine owners were randomly selected from Allahabad division of Uttar Pradesh, constitute the ultimate sample for the study. The sampling scheme followed in the present study was multistage random sampling with equal probability without replacement. Morbidity and mortality data were collected from all selected bovine owners for period of one year (January 2013 to December 2013). Overall morbidity rate was 32.46% in bovine, higher in buffalo 33.17% than 30.35% in cattle and overall mortality rate was 5.03% in bovine, higher in buffalo 5.21% than 4.49% in cattle. The diseases were classified into seven categories of which reproductive diseases were more prominent in incidence having highest morbidity rate 8.75% followed by specific diseases 5.59% and major causes of mortality in bovine were reproductive diseases 1.43% followed by digestive diseases 0.99%.

INTRODUCTION

Uttar Pradesh possesses 12.1% of the country's total livestock population. As per the 18th livestock census, the state of Uttar Pradesh had total 64.01 million livestock, out of which 19.09 million cattle, 26.44 million buffalo. Uttar Pradesh is highest milk producing state in India, producing about 21 million tonnes of milk and producing 845 thousand tonnes meat during 2010-11 (BAHS-2012). The increasing urbanisation, decreasing agricultural area, establishment of co-operative dairies, increasing level of income of population, changing food habits are becoming major factors in increasing livestock activities in Uttar Pradesh. Around 83% workforce of household in rural area of Uttar Pradesh is found to be involved directly and indirectly in animal husbandry and it practiced by landless, marginal and small farmer particularly (Iqbal, 2010). Reduction of morbidity and mortality rate are first and foremost targets of dairy farm management (Prasad *et al.*, 2004). But there are differences in livestock rearing in farm conditions and village conditions. Livestock rearing in village conditions faces many management challenges like proper housing facilities, conventional feed deficit (Sen *et al.*, 2014), veterinary expenses and ethno-veterinary practice (Mishra *et al.*, 2010) etc. The overall objective of this study was to analysis of morbidity and mortality rate in the bovine population according to their age, sex, breed, season, environmental condition, management practices under village condition by using suitable statistical techniques.

MATERIALS AND METHODS

Sampling design

The sampling scheme followed in the present study was multistage random sampling with equal probability without replacement. Multistage sampling makes fieldwork and supervision relatively easy (Okafor, 2002). In multistage sampling, researcher divides the population into clusters, samples the clusters, and then resample, repeating the process until the ultimate sampling units are selected at the last of the hierarchical levels (Goldstein, 1995). Firstly, Allahabad division selected purposively. The Allahabad Division consists of four districts Allahabad, Kaushambi, Fatehpur and Pratapgarh. Two districts selected by simple random sampling without replacement. And from each selected district, 25% blocks were selected by simple random sampling without replacement and from each selected block, two villages were selected by simple random sampling without replacement and the same were constitute in total eight blocks, so sixteen villages for the study.

The last stage of sampling involves selection of the respondents (bovine owners) from the selected villages. The SRSWOR was followed to select about 30 bovine owners/households from each selected village. About 480 bovine owners/households constituted the ultimate sample. The list of livestock owners, maintaining 2 or more bovine during last one year was constitute sampling frame for selecting the livestock owners. Morbidity and mortality data were collected from all selected bovine owners for period of one year (January 2013 to December 2013). The diseases observed during the study period were classified (Prasad *et al.*, 2004) as follows: 1- Digestive Diseases 2- Respiratory Diseases 3- Reproductive Diseases 4- Parasitic Diseases 5- Specific Diseases (FMD, Mastitis, HS) 6- Nutritional and Metabolic diseases 7- Other

Diseases (Injuries and accidents etc.).

Methodology

Morbidity/mortality rate

Among various diseases the morbidity/mortality rate due to each disease was calculated by the formula (Chaudhary *et al.*, 2013)

$$= \frac{\text{Number of cases (deaths) observed during period}}{\text{Population (mid-year)}} \times 100$$

Chi-square analysis

Association between bovine morbidity and mortality rate and different factors was calculated by χ^2 test. The chi square analysis done by using following formula (Gupta, S.C. and Kapoor, 11th edition)

$$\chi^2 = \sum \frac{(O - E)^2}{E}$$

O = Observed count and E = Expected count

Statistical analysis

The data were compiled and statistical SPSS program (version 20.0) was used to compare the result.

RESULTS AND DISCUSSION

The overall morbidity rate in bovine was found 32.46%. (Table 1). But these results show difference in study conducted by Singh *et al.* (2005) at the organized farms situated in two different ago-climatic conditions of Uttar Pradesh situated at Bareilly and Allahabad and found that the overall morbidity was 2.3% and 3.9% % per year respectively in bovine. This difference in results of morbidity rate may be due to difference

in village conditions and organized form conditions and so it clearly indicate that high morbidity rate in cattle and buffalo due to lack of management facilities in village condition.

The mortality rate among bovine in surveyed regions was found 5.03% (Table 2). The overall mortality rates are in agreement with Dana *et al* (2001), Kumar *et al* (2002), Sevansson *et al* (2006) and Palanivel *et al.* (2007).

Disease-wise analysis of morbidity rate and mortality rate

Further morbidity rate was analysed disease-wise to determine factors affecting various diseases (Tables 3 to 16).

Digestive diseases

The digestive disease in bovine was found significant among age groups while the remaining factors were found to be non-significant. Age-wise analysis of digestive diseases showed that occurrence of digestive diseases was high in adults (5.7%) followed by calf (3.81%), youngstocks (2.55%). The occurrence of digestive disease in male bovine was more (5.54%) than that of female bovine (4.4%). Feeding effect on morbidity due to digestive problems was not significantly differing with stall feeding regime of feeding in bovine. It was more in grazing (5.21%) than stall feeding (4.55%). while Madan *et al.* (2013) reported that most of the digestive disorder animals have history of off-feed and poor appetite. The digestive disease mortality rates in bovine was found insignificant ($p < 0.05$) among all factors. Shivahre *et al* (2014) reported the main causes of mortality in age group 3-6 m were general debility (1.57%) followed by respiratory and digestive problems (1.22%).

Respiratory diseases

Morbidity due to respiratory problems improper ventilation was higher (6.88%) than proper ventilation (2.46%). The respiratory disease was significantly ($p < 0.01$) affected by ventilation in bovine. The other factors did not have significant

Table 1: Morbidity rate in bovine

Disease Type	Cattle		Buffalo		total		χ^2_{cal}
	Diseased	%	Diseased	%	Diseased	%	
Digestive	16	3.98	58	4.8	74	4.59	0.460
Respiratory	15	3.73	33	2.73	48	2.98	1.048
Reproductive	33	8.21	108	8.93	141	8.75	0.198
Parasitic	17	4.23	61	5.05	78	4.84	0.437
Specific	19	4.73	71	5.87	90	5.59	0.752
Nutritional & Metabolic	13	3.23	44	3.64	57	3.54	0.145
Others	9	2.24	26	2.15	35	2.17	.011
Total	122	30.35	401	33.17	523	32.46	1.09
Total no. available	402		1209		1611		

Table 2: Mortality rate in bovine

Disease Type	Cattle		Buffalo		total		χ^2_{cal}
	Died	%		%			
Digestive	4	1	12	0.99	16	0.99	0.08
Respiratory	1	0.25	8	0.66	9	0.56	0.33
Reproductive	5	1.24	18	1.49	23	1.43	0.13
Parasitic	2	0.5	8	0.66	10	0.62	0.00
Specific	2	0.5	10	0.83	12	0.74	0.11
Nutritional and Metabolic	3	0.75	6	0.5	9	0.56	0.04
Other	1	0.25	1	0.08	2	0.12	0.00
Total	18	4.49	63	5.21	81	5.03	0.34
Total no. available	402		1209		1611		

Table 3: Age wise morbidity rate in bovine

Disease Type	Calf		Young stock		Adult		χ^2_{cal}
	No.	%	No.	%	No.	%	
Digestive	16	3.81	8	2.55	50	5.7	6.043*
Respiratory	14	3.33	5	1.59	29	3.31	2.59
Reproductive	0	0	0	0	141	16.08	
Parasitic	10	2.38	18	5.73	50	5.7	8.64**
Specific	5	1.19	19	6.05	66	7.53	21.76**
Nutritional & Metabolic	16	3.81	4	1.27	37	4.22	5.99*
Others	4	0.95	10	3.18	21	2.39	4.65
Total	65	15.47	64	20.37	394	44.93	138.31**
Total no. available	420		314		877		

* Significantly Different ($p < 0.05$), ** Significantly Different ($p < 0.01$)**Table 4: Sex wise morbidity rate in bovine**

Disease Type	Male		Female		χ^2_{cal}
	No.	%	No.	%	
Digestive	15	5.54	59	4.4	0.66
Respiratory	7	2.58	41	3.06	0.18
Reproductive	0	0	141	10.52	
Parasitic	9	3.32	69	5.15	1.64
Specific	4	1.48	86	6.42	10.44**
Nutritional & Metabolic	3	1.11	54	4.03	5.64*
Others	5	1.85	30	2.24	0.16
Total	43	15.88	480	35.82	40.93**
Total no. available	271		1340		

Table 5: Vaccination wise morbidity rate in buffalo

Disease Type	Yes		No		χ^2_{cal}
	No.	%	No.	%	
Specific	25	3.18	46	10.87	29.45**
Total	229	29.13	172	40.66	16.48**
Total no. available	786		423		

Table 6: Deworming wise morbidity rate in bovine

Disease Type	Yes		No		χ^2_{cal}
	No.	%	No.	%	
Digestive	24	4.14	50	4.85	0.43
Respiratory	12	2.07	36	3.49	2.60
Reproductive	50	8.62	91	8.83	0.02
Parasitic	24	4.14	54	5.24	0.97
Specific	32	5.52	58	5.63	0.01
Nutritional & Metabolic	4	0.69	53	5.14	21.55**
Others	15	2.59	20	1.94	0.73
Total	161	27.76	362	35.11	9.15**
Total no. available	580		1031		

Table 7: Feeding wise morbidity rate in bovine:

Disease Type	Grazing		Stall feeding		χ^2_{cal}
	No.	%	No.	%	
Digestive	5	5.21	69	4.55	0.09
Respiratory	2	2.08	46	3.04	0.28
Reproductive	4	4.17	137	9.04	2.69
Parasitic	10	10.42	68	4.49	6.89**
Specific	1	1.04	89	5.87	4.00*
Nutritional & Metabolic	4	4.17	53	3.50	0.12
Others	1	1.04	34	2.24	0.61
Total	27	100.00	496	32.74	0.88
Total no. available	96		1515		

Table 8: ventilation wise morbidity rate in bovine:

Disease Type	proper		Improper		χ^2_{cal}
	No.	%	No.	%	
Digestive	67	4.71	7	3.70	0.39
Respiratory	35	2.46	13	6.88	11.26**
Reproductive	124	8.72	17	8.99	0.02
Parasitic	70	4.92	8	4.23	0.17
Specific	78	5.49	12	6.35	0.24
Nutritional & Metabolic	51	3.59	6	3.17	0.08
Others	29	2.04	6	3.17	1.01
Total	454	31.93	69	36.51	1.60
Total no. available	1482		189		

Table 9: Floor wise morbidity rate in bovine

Disease Type	kuccha		pucca		χ^2_{cal}
	No.	%	No.	%	
Digestive	59	4.95	15	3.58	1.33
Respiratory	34	2.85	14	3.34	0.26
Reproductive	109	9.14	32	7.64	0.88
Parasitic	56	4.70	22	5.25	0.21
Specific	79	6.63	11	2.63	9.41*
Nutritional & Metabolic	43	3.61	14	3.34	0.06
Others	15	1.26	20	4.77	18.02*
Total	395	33.14	128	30.55	0.95
Total no. available	1192		419		

Table 10: Age wise mortality rate in bovine

Disease Type	Calf		Young stock		Adult		χ^2_{cal}
	No.	%	No.	%	No.	%	
Digestive	4	0.95	1	0.32	11	1.25	2.07
Respiratory	3	0.71	1	0.32	5	0.57	0.51
Reproductive	0	0	0	0	23	2.62	
Parasitic	2	0.48	1	0.32	7	0.8	1.05
Specific	0	0	3	0.96	9	1.03	
Nutritional & Metabolic	3	0.71	2	0.64	4	0.46	0.38
Others	0	0	0	0	2	0.23	
Total	12	2.85	8	2.56	61	6.96	15.01**
Total no. available	420		314		877		

Table 11: Sex wise mortality rate in bovine:

Disease Type	Male		Female		χ^2_{cal}
	No.	%	No.	%	
Digestive	3	1.11	13	0.97	0.01
Respiratory	2	0.74	7	0.52	0.0002
Reproductive	0	0.00	23	1.72	
Parasitic	1	0.37	9	0.67	0.023
Specific	0	0.00	12	0.90	
Nutritional & Metabolic	2	0.74	7	0.52	0.0001
Others	0	0.00	2	0.15	
Total	8	2.95	73	5.45	2.94
Total no. available	271		1340		

effect on morbidity rate due to respiratory disease. Proper ventilated bovine mortality rate (0.35%) lowers than improper ventilated bovine mortality rate (2.12%).

Reproductive diseases

Reproductive diseases were major causes of morbidity (8.75%) and mortality (1.43%) in bovine. Age-wise distribution of reproductive diseases occurrence was in only adults bovine

(16.08%). In a study, Ghuman and Singh (2009) found that several key challenges under the rural smallholder conditions were identified with regard to dairy farm reproductive management viz., disorganized record keeping, less use of heat abatement devices during summer season, high prevalence of reproductive issues like retention of placenta and repeat breeding, estrous detection errors and faulty

Table 12: Vaccination wise mortality rate in bovine:

Disease Type	Yes		No		χ^2_{cal}
	No.	%	No.	%	
Specific	4	0.40	8	1.31	3.03
Total	39	3.90	42	6.86	6.3*
Total no. available	999		612		

Table 13: Deworming wise mortality rate in bovine:

Disease Type	Yes		No		χ^2_{cal}
	No.	%	No.	%	
Digestive	6		10	0.97	0.02
Respiratory	1	0.0017	8	1.38	1.47
Reproductive	7	0.0138	16	2.76	0.08
Parasitic	1	0.0017	9	1.55	1.92
Specific	5	0.0103	7	1.21	0.226
Nutritional & Metabolic	1	0.0017	8	1.38	0.52
Others	1	0.0017	1	0.17	0.11
Total	22	0.0379	59	10.17	2.89
Total no. available	580		1031		

Table 14: Feeding wise mortality rate in bovine:

Disease Type	grazing		Stall feeding		χ^2_{cal}
	No.	%	No.	%	
Digestive	0	0.00	16	1.06	
Respiratory	0	0.00	9	0.59	
Reproductive	1	1.04	22	1.45	0.11
Parasitic	0	0.00	10	0.66	
Specific	0	0.00	12	0.79	
Nutritional & Metabolic	1	1.04	8	0.53	0.43
Others	1	1.04	1	0.07	1.29
Total	3	3.13	78	5.15	1.02
Total no. available	96		1515		

Table 15: Ventilation wise mortality rate in bovine:

Disease Type	proper		improper		χ^2_{cal}
	No.	%	No.	%	
Digestive	15	1.05	1	0.53	0.47
Respiratory	5	0.35	4	2.12	6.44*
Reproductive	20	1.41	3	1.59	0.04
Parasitic	10	0.70	0	0.00	1.34
Specific	11	0.77	1	0.53	0.13
Nutritional & Metabolic	9	0.63	0	0.00	0.333
Others	2	0.14	0	0.00	.34
Total	72	5.06	9	4.76	0.03
Total no. available	1422		189		

practices related to AI.

Parasitic diseases

Parasitic diseases were significantly ($p < 0.01$) affected with age and feeding pattern in bovine. Age-wise distribution showed that occurrence of parasitic diseases was high in Youngstock 5.73%, adults 5.7% followed by calf 2.38%. The occurrence of parasitic diseases in bovine which feed by grazing was high (10.42%) than stall feeding (4.49%). Khan *et al.* (2007) reported that only 8.1% buffalo calves were regularly dewormed and intestinal parasite were usually responsible for calf mortality.

Nutritional and Metabolic diseases

In bovine nutritional and Metabolic diseases had significant ($p < 0.01$) bearing of morbidity on age, deworming. It was more in adults (4.22%) than (3.81%) in calves and young stock (1.27%). Non dewormed bovine had more (5.14%) morbidity rates than dewormed bovine (0.69%). So it directly affects the milk production heavily. In a study, Singh *et al.* (2008) reported that the milk production of cattle was below the average milk yield of crossbred cattle of state as well as nation, where as it was higher than non-descript cattle of Uttar Pradesh and India. The average milk production of urban and peri-urban area buffalo was higher than the buffalo of Uttar Pradesh as well as India; but in rural area it was lower than the state and national average milk production. This may be

Table 16: Floor wise mortality rate in bovine

Disease Type	kuccha		Pucca		χ^2_{cal}
	No.	%	No.	%	
Digestive	15	1.26	1	0.08	2.32
Respiratory	6	0.50	3	0.25	0.01
Reproductive	13	1.09	10	0.84	3.70
Parasitic	7	0.59	3	0.25	0.08
Specific	11	0.92	1	0.08	1.14
Nutritional & Metabolic	6	0.50	3	0.25	0.01
Others	0	0.00	2	0.17	
Total	58	4.87	23	1.93	0.25
Total no. available	1192		419		

Table 17: Specific Disease morbidity and mortality rate in bovine:

Disease Type	morbidity		mortality	
	No.	%	No.	%
FMD	21	1.30	3	0.19
HS	23	1.43	9	0.56
MASTITIS	46	2.86	0	0.00
Total no available (1611)	90	5.59	12	0.74

**Figure 1: Allahabad division of Uttar Pradesh (survey region)**

attributed to superior genetic potential of animals with better feeding practices followed by farmers.

Other diseases (Injuries and accidents etc)

Other diseases were significantly ($p < 0.05$) affected by floor type in bovine. The occurrence of injuries and accidents in pucca floor type (4.77%) was higher than kutchha floor (1.26%) in bovine.

Specific disease

The specific disease in bovine was found significant among age groups, sex, vaccination, floor wise while the remaining factors were found to be non-significant. Presence of FMD in area indicates that FMD is not fully eradicated from Uttar Pradesh and it questioned government FMD vaccination policies (Table 17). Our result is supported by *OIE-wahid* interface reported that in Uttar Pradesh 12 outbreaks of FMD in 2012.

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