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Diseases Prevalent in Equids in India: A Survey of Veterinary Practitioners

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Abstract: There are about 20 million equids in India and might be harbouring numerous diseases at any time, however there is little information on prevalence of most of the diseases. A survey of equine practitioners was undertaken to understand the diseases scenario in equids in India. A total of 2000 survey questionnaires were sent to equine practitioners in 64 districts in 14 states, plus 30 private equine farms and four government farms. A total of 532 (26.6%) equine practitioners responded to the questionnaire. On an average each vet treated >1000 animals and >50 equids per year. Out of the 72 health problems of equids identified by the equine practitioners, colic was the commonest followed by trypanosomiasis (surra), lameness, respiratory tract infections including pneumonia and bronchitis and abscess/wounds/injuries group. The information may help in prioritizing future research and resources to improve equine health and welfare.

Key words: Survey, diseases, equids, India

INTRODUCTION

India holds about 20 million equids under different farming systems and for various purposes. The equine population is unevenly distributed all over the country (17th Livestock Census, 2003 available on line at http://dms.nic.in/ani/livestock_total.aspx). Many laboratory test based surveys have been undertaken to assess the prevalence of equine diseases of trade importance including glanders, Equine Infectious Anemia (EIA), Equine Influenza (EIV), Equine Herpes Viruses (EHV-1, 4), trypanosomiasis (surra), salmonellosis, brucellosis and babesiosis (Malhotra *et al.*, 1978; Gupta *et al.*, 1996; Uppal and Yadav, 1987; Virmani *et al.*, 2008), but little is known about other general equine health problems in India. Besides development of several tools for some trade linked diseases (Malhotra *et al.*, 1978; Gupta *et al.*, 1996; Richa *et al.*, 1993; Dhar *et al.*, 1997; Kumar *et al.*, 1997, 2003; Manuja *et al.*, 2001), surveys have been conducted to determine molecular diversity of some pathogens of horses in India (Gupta *et al.*, 2005). Some isolated studies on sero-epidemiology of specific diseases have also been undertaken by foreign agencies (Letchworth *et al.*, 1999). The importance of serological and molecular surveys in determining epidemiology of any disease

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cannot be undermined; however, there may be misclassification of disease status when disease diagnosis relies on imperfect diagnostic tests. As information on the in-field equine disease situation in India is not available researchers have targeted work on the problems either perceived important either by themselves, or on the basis of published literature, or research has been aimed at trade linked diseases. Consequently problems of equids and equine practitioners mostly remained unresolved.

In some developed countries and in a few of the developing countries surveys involving practicing veterinarians have been conducted to form the research strategies and to address professional problems (Traub-Dargatz *et al.*, 1991; Seahorn *et al.*, 2006; Gall and Pfister, 2006). Some surveys on vets revealed use of specific medicines as diclofenec in Tanzania (WOAH, 2008), efficacy of polysulphated glycosamine-O-glycan in treatment of degenerative joint diseases of equids (Caron *et al.*, 1996), the best options for control of equine affections as colic (Mair and White, 2008) and helminth control practices adopted in Ireland (O-Meara and Mulcahy, 2002) and South Africa (Mathee *et al.*, 2002). Besides, surveys are conducted to find out the ailments of horses needing maximum research (AAEP, 2004). This present survey study on equine practitioners of India was undertaken to understand the diseases scenario in equids as understood by equine practitioners.

MATERIALS AND METHODS

The study was planned at Hissar, Haryana but it was conducted in 14 major states of India covering 64 districts during year 2006-2007. The questionnaire for the study was designed (Table 1) with the aim to gather information about type of practice (Singh *et al.*, 2007), area of practice, clientele and common diseases of equids (horse, donkey and mules) in India. At least 20 questionnaires were sent to each selected district's chief veterinary officer or secretary of veterinary association at district level, the questionnaires were distributed in monthly meeting of the veterinarians and collected in the next meeting. Each district having equine population more than 3000 (as per 17th Livestock Census, 2003 available on line at http://dms.nic.in/ami/livestock_total.aspx) was selected and a total of 64 districts in 14 states including Andhra Pradesh, Delhi, Gujrat, Haryana, Himachal Pradesh, Jharkhand, Karnataka, Maharashtra, Manipur, Punjab, Rajasthan, Utrakhand, Uttar Pradesh (UP) and West Bengal were included. Questionnaires were also sent to all 30 private organized farms and four government equine breeding/stud farms listed in the registry of the Institute.

Table 1: Response of vets (532) from different parts of India to questionnaire about equine practice

Q. No.	Questions	Haryana, n = 277		Uttar Pradesh, n = 126		Punjab, n = 61		Other states, n = 68		Total, n = 532	
		Grade Mean	SD	Grade Mean	SD	Grade Mean	SD	Grade Mean	SD	Grade Mean	SD
1	How many Animals you treat in a years? Grade, 1=<100, 2=100-200, 3=200-500, 4=500-1000, 5=>1000 animals	4.44	1.17	4.29	1.18	3.95	1.59	4.21	.32	4.32	1.25
2	How many equine patients you treat in a year? Grade, 1=<50, 2=51-100, 3=100-200, 4=200-500, 5=>500 patients	1.44	0.91	1.39	0.82	1.57	0.94	2.09	1.53	1.52	1.02
3	Who are your customers for equine patients? 1= Peasants, 2= Organized farmers, 3= Both types	1.22	0.6	1.25	0.69	1.30	0.68	1.54	0.74	1.28	0.66
4	What are the common diseases you encountered during your equine practice in last two years, list in order of frequency?*	4.06 (58)	1.96	4.26 (41)	2.09	4.26 (32)	1.33	4.32 (43)	2.50	4.17 (72)	1.98

Values in parentheses indicate *total of number of diseases listed by the equine practitioners

In Haryana, Uttar Pradesh, Punjab and Rajasthan, veterinary training centers for refresher courses were also visited and 100 questionnaires were given to each of the training incharges of the centre. The questionnaires were distributed to trainee veterinarians to be filled in and collected before completion of training. A total of 2000 questionnaires were sent to veterinarians either through post or in person.

Statistical Analysis

Information provided in survey questionnaires by equine practitioners was put into Microsoft Excel[®] spread sheet. Data was analyzed using general tools as sorting, filtering, percentile etc. To evaluate responses for determining the effect of practice size and type, clientele and geographic area of practice Pearson's correlation; χ^2 goodness-of-fit test and Z-test were used. Each group response was individually compared with results of other groups of equine practitioners.

RESULTS AND DISCUSSION

Of the 2000 questionnaires sent to equine practitioners only 532 (26.6%) from 14 states of India including Andhra Pradesh (1), Delhi (4), Gujrat (7), Haryana (277), Himachal Pradesh (20), Jharkhand (3), Karnataka (1), Maharashtra (5), Manipur (1), Punjab (61), Rajasthan (20), Uttarakhand (3), Uttar Pradesh (126) and West Bengal (3) were received back with best response from Haryana (55.4%), Uttar Pradesh (42%) and Punjab (20.3%). The poorest response was from Karnatak (2.5%) and West Bengal (3%) states.

The responses of 532 Indian equine veterinary practitioners were received, from 64 equids rich districts (17th Live stock Census 2003, http://dms.nic.in/ami/livestock_total.aspx) including 19 districts of Haryana, 15 of Uttar Pradesh, 9 of Punjab and 21 of other states and 8 (26.67%) of the 30 private and all four (100%) government stud farms.

On an average each veterinary clinician (vet) in India treated more than one thousand animals (Table 1) per year however in Punjab number of patients treated by each vet was less than one thousand. However, average vet treated only about 50 equids (including horses, mules and donkeys) per year. A total of 463 were treating <100 equids per year (general vets, GVs) and 68 treated >100 equids per year (large vets, LVs). Of the 532 vets, 44 were working on equine farms (LFVs), 57 vets used to treat equids both at large farms and also of small equine owners i.e., peasants (LFSVs) and 422 vets were treating equids at state veterinary hospitals i.e., peasants' vets (PsVs).

A total of 72 identified diseases/ailments in equids included abdominal hernia, abortions, abscess, wounds, injuries, surgical problems, allergy, anemia, Equine Infectious Anemia (EIA), aspergilloses, babesiosis, bone spavin, bronchitis, canker, capped knee, cellulitis, cold stroke, colic, congenital deformities, corneal opacity, dog bite, dystokia, ectoparasitic infestation, endoparasitic infection, enteritis and diarrhea, equine influenza, nasal-catarrh, eye infection, eye worms, foot rot, fractures, accidents, glanders, guttural pouch infection, heat stroke, hebronema infestation, Equine Herpes Virus (EHV) infection, hoof problems, hypersensitivity, impaction, infertility, intussusceptions, jaundice, joint ill, polyarthritis, lameness, laminitis, lung worms, maggot wounds, mastitis, melanoma or skin carcinoma, metabolic disorders including jaundice, anorexia and Monday morning sickness, mineral deficiency, mycotic maxillary sinusitis, nasal granuloma, naval ill, nervous disorder, oral problems including teeth irregularities, otorrhea, pica, pneumonia and other Respiratory Tract Infections (RTI), poisoning, poll evil, proud flesh, Pyrexia of Unknown Origin (PUO), pyometra, endometritis, retention of placenta, rheumatism, muscular atrophy, salmonellosis,

skin infections including barsati and mange, sprain, squamous cell carcinoma/eye carcinoma, stomatitis, strangles, surra (trypanosomiasis), tetanus, Theileriasis, thrush, urine retention (mainly in mules), urolithiasis and Urinary Tract Infections (UTI). On an average each equine practitioner reported 4.17 ± 1.98 health problems in equids in his/her area but significantly more numbers of equine problems were encountered by LVs, LFVs and LFSVs (z , 0.01), however there was no significant difference in observations of vets working in different states of India.

The colic, (>80%) was the commonest equine ailment irrespective of geographic area (Table 2, 3). The next four common ailments of equids graded at 2nd through 5th were trypanosomiasis (surra), lameness, respiratory tract infections including pneumonia and bronchitis and abscess/wounds/injuries group. However, practitioners in Punjab put Pyrexia of Unknown Origin (PUO) at rank 4 instead of respiratory tract infections and in UP endoparasitic infestation at rank 5th replaced the wounds/abscess/injuries group (Table 2).

Some ailments were area specific or encountered by specific group of equine practitioners in significantly ($\chi^2 < 0.1$) high frequency. Urolithiasis (~4%), respiratory tract infections (~43%), influenza (~9%) and endoparasitic infestation (~36%) were significantly more common in UP ($\chi^2 < 0.05$). Allergy (~8%), anemia (~8%) and nasal granuloma (~8%) were significantly more common in Punjab ($\chi^2 < 0.05$). Impaction (>20%) and infertility (>8%) were more often encountered in Haryana ($\chi^2 < 0.05$). Eye worms (>8%), strangles (>8%) and surra (>45%) were more commonly reported ailments by UP and Punjab vets ($\chi^2 < 0.05$). Pyometra in Haryana (6.9%) and UP (3.9%) and UTI (13.2%) and thrush (4.4%) in other states were more commonly identified ailments ($\chi^2 < 0.05$).

Lameness (54.5%), thrush (4.6%), anemia (6.8), foot rot (2.3%), hebronemiasis (barsati), hypersensitivity to light and abdominal hernia were significantly more commonly observed by LFVs ($\pm^2 < 0.07$). Infertility, nasal granuloma, pyometra, metabolic disorders (>13%), UTI (>9%), thelariasis, fractures and accidents (>8.8%), babesiosis (>14%), dystokia (<4%), canker (>6.8%), diarrhoea and enteritis (>22%) abortions (>3.5%) and cellulitis (>1.5%), eye worms (>6.8%) and corneal opacity (>1.5%) were significantly ($\chi^2 < 0.07$) more commonly encountered by vets treating large number of equids and on organized farms. Although, PUO was identified as major problem in equids, significantly (χ^2 , 0.01) low number of LFVs (9.1%) identified it as an important problem.

Abortions, dystokia, infertility and reproductive tract infections (metritis, endometritis and pyometra) were more important to vets working on large farms or vets associated with treatment of large number of equids and these medical problems of equids were ranked between 7th through 10th common (Table 3) while other vets graded these as of low importance.

Although, laboratory test based surveys may be less biased in estimating disease prevalence they cannot be used at large scale without massive economic and human resource components for all different types of diseases/health problems of equids (Traub-Dargatz *et al.*, 1991; AAEP, 2004; Seahorn *et al.*, 2006). Moreover, laboratory based surveys cannot be undertaken for all different kinds of health problems of equids or of other animals because of the non-availability of good diagnostic tests for many of the common diseases. The specificity and sensitivity of diagnostic tests are some further problem. In contrast, questionnaire survey of veterinary practitioners is less labour and cost intensive and quick. This survey of qualified equine practitioners of India was undertaken to estimate the prevalence of different health problems of equids in different states and under different sectors during the year 2006-2007.

Table 2: Ranking of common diseases/ ailments of equids reported to be common in India by different classes of vets

Names of diseases/ complications/ ailments equine clinicians/practitioners in India	Ranking of Diseases/ ailments in equids									
	Classification of vets on the basis of number of equine cases treated			Classification of the vets based on type of clients			Classification of vets based on locality of their practice			
	All Vets	GVs	LVs	LFVs	LFSVs	PsVs	HVs	UPVs	PVs	OVs
n	532	463	68	44	57	422	277	126	61	68
Average number of diseases identified by each vet treating equids \pm STDV	4.17 \pm 1.98	3.94 \pm 1.87	5.69 \pm 2.29	4.86 \pm 1.81	4.96 \pm 2.37	4.06 \pm 1.88	4.06 \pm 1.96	4.26 \pm 2.09	4.26 \pm 1.33	4.32 \pm 2.50
Total number of diseases identified	72	67	49	38	44	64	58	41	32	43
Top five diseases / ailments of equids identified by the veterinary clinicians	1. Colic 2. Surra 3. Lameness/laminitis 4. Abscess/wound/ injury surgical problems 5. Pneumonia and other RTI	1. Colic and Surra 2. Infertility 3. Lameness/laminitis 4. Abscess/wound/ injury surgical problems 5. Pneumonia and other RTI	1. Colic 2. Lameness/laminitis 3. Abscess/wound/ injury surgical problems 4. Strangles 5. Pneumonia and other RTI	1. Colic 2. Lameness/laminitis 3. Abscess/wound/ injury surgical problems 4. Pneumonia and other RTI 5. Surra	1. Colic 2. Surra and Lameness/laminitis 3. Abscess/wound/ injury surgical problems 4. Pneumonia and other RTI 5. Endoparasitic infection 5. Skin infections including Barsati and mange	1. Colic 2. Surra 3. Lameness/laminitis 4. Abscess/wound/ injury surgical problems 5. Pneumonia and other RTI	1. Colic 2. Lameness/laminitis 3. Surra 4. Abscess/wound/ injury surgical problems 5. Pneumonia and other RTI	1. Colic 2. Surra 3. Pneumonia and other RTI 4. Endoparasitic infection 5. Lameness/laminitis	1. Colic 2. Surra 3. Lameness/laminitis 4. Abscess/wound/ injury surgical problems 5. PUO	1. Colic 2. Lameness/laminitis 3. Abscess/wound/ injury surgical problems 4. Pneumonia 5. Endoparasitic infection and Impaction

PUO: Pyrexia of unknown origin, RTI: Respiratory tract infections, GV: Vets treating <100 equines per year, LV: Vets treating large number of equines (>100/year), LFV: Vets working on organized farms, LFSV: Vets treating equids of both, peasants and at organized farms, PsV: Vets treating animals of peasants (owners having a few animals only) only, HV: Haryana state Vets, UPV: Uttar Pradesh state Vets, PV: Punjab state Vets, OV: Vets in other states

Table 3: Diseases which were reported as common in equids by more than 10% of Vets belonging to one or other class

Names of diseases/ complications/ailments reported by equine clinicians/ practitioners	Percentage of vets listing the disease of equids encountered in last two years of their practice									
	All	GVs	LVs	LFVs	LFSVs	PsVs	HVs	UPVs	PVs	OVs
n	532.00	463.00	68.00	44.00	57.00	422.00	277.00	126.00	61.00	68.00
Abscess/wound/injury/ surgical problems	32.89	31.32	44.12	34.09	31.58	33.65	34.66	27.78	34.43	33.82
Babesiosis	7.33	6.05	16.18	4.55	14.04	6.87	5.42	8.73	8.20	11.76
Colic	80.08	79.48	85.29	84.09	87.72	80.33	92.42	76.19	88.52	75.00
Ectoparasitic infestation	3.38	2.38	10.29	6.82	7.02	2.61	4.33	1.59	4.92	1.47
Endoparasitic infestation	24.81	24.84	25.00	13.64	26.32	26.30	20.58	35.71	24.59	22.06
Enteritis+diarrhoea	10.90	9.29	22.06	25.00	10.53	9.72	9.75	10.32	11.48	16.18
Eye worms	3.57	3.02	7.35	6.82	5.26	3.08	0.36	10.32	8.20	0.00
Fractures/accidents	4.51	3.89	8.82	2.27	8.77	3.32	3.61	3.17	4.92	10.29
Glanders	0.19	0.22	0.00	11.36	0.00	0.24	0.36	0.00	0.00	0.00
Impaction	17.29	17.93	13.24	18.18	15.79	17.77	20.22	9.52	14.75	22.06
Infertility	6.77	3.24	30.88	13.64	19.30	4.50	8.30	2.38	3.28	11.76
Lameness/laminitis	37.03	35.21	50.00	54.55	43.86	35.07	74.37	30.95	42.62	38.24
Metabolic disorder/jaundice/ anorexia, Monday morning sickness	6.77	5.83	13.24	13.64	3.51	6.64	9.03	2.38	3.28	8.82
Pneumonia and other RTI	30.26	30.02	32.35	34.09	31.58	30.33	27.80	42.86	29.51	23.53
Pyrexia of unknown origin (PUO)	25.00	23.97	20.59	9.09	12.28	27.01	25.27	17.46	31.15	20.59
Pyometra/Endometritis/ retention of placenta	4.70	4.10	20.59	22.73	14.04	3.55	6.86	3.97	0.00	13.24
Skin infections including Barsati and mange	9.96	9.50	13.24	11.36	21.05	8.53	11.55	7.94	3.28	13.24
Stomatitis	0.19	0.00	11.76	0.00	1.75	0.00	0.36	0.00	0.00	0.00
Strangles	5.45	4.54	42.65	6.82	8.77	4.98	2.53	10.32	8.20	5.88
Surra (trypanosomiasis)	40.41	40.17	7.35	27.27	43.86	42.18	37.55	57.14	45.90	16.18
Tetanus	7.71	7.78	0.00	2.27	10.53	8.06	5.05	11.11	8.20	11.76
Thrush	0.94	0.65	14.71	4.55	0.00	0.71	0.72	0.00	0.00	4.41
Urine retention (mainly in mules)	12.78	12.53	0.00	9.09	15.79	13.03	15.88	11.11	6.56	8.82
UTI and cystitis	4.14	3.67	7.35	9.09	10.53	2.84	3.97	1.59	0.00	13.24

PUO: Pyrexia of unknown origin; RTI: Respiratory tract infections; GV: Vets treating <100 equines per year; LV: Vets treating large number of equines (>100/year); LFV: Vets working on organized farms; LFSV: Vets treating equids of both, peasants and at organized farms; PsV: Vets treating animals of peasants (owners having a few animals only) only; HV: Haryana state Vets; UPV: Uttar Pradesh state Vets; PV: Punjab state Vets; OV: Vets in other states

The overall response of veterinarians to the survey (26.6%) was satisfactory and was comparable to responses in earlier surveys (Traub-Dargatz *et al.*, 1991; Matthee *et al.*, 2002; Seahorn *et al.*, 2006; Singh *et al.*, 2007). However, this number of respondents might be a good source of biasness because those clinicians that treated more horses were more likely to respond. The higher response rate of vets to the survey in Haryana and Uttar Pradesh (UP) might be due to personal visits to veterinary training centers where veterinarians come for refresher courses and filled the questionnaires there itself.

Comparing the size of livestock population and number of equids treated by vets in a year, it was evident that either only few animals fell sick or, more likely, only a fraction of sick animals were brought for treatment to veterinarians. Moreover in Punjab, lower numbers of treated animals per vet might be due to comparatively more vets to serve the defined population, or might be because of healthier climate. However, major reason behind low number of equine patients with veterinarians might be cost of the veterinary care to equids. Except the organized farms, owners of equids in India are often poor and always hand to mouth, unable to afford costly treatment. It is a normal assumption that equine treatment in veterinary hospitals is very costly thus general people preferentially go for conventional house hold remedies rather than to veterinary help.

Similar to the observations in the present survey, colic, respiratory tract infections and endoparasitic infestations have also been reported to be among the five most common equine ailments in USA and colic remained always at the top among all vets irrespective of their type of practice and geographical location (Traub-Dargatz *et al.*, 1991). However, scanty information from Indian literature makes it difficult to compare with previous reports. Several risk factors have been associated with occurrence of colic in horses in different regions of the world (Baverud *et al.*, 1998; Gocalves *et al.*, 2002; Archer and Proudman, 2006), but no such information is available in India for management of the problem, either to the equine owners or to the clinicians, probably because of the little attention paid to this most common health problems of equids by the equine health research scientists.

Other top ranked ailments in equids in India including trypanosomiasis (surra), lameness, abscess/wounds and injuries are neither considered important in other countries nor in India. Our observations of high prevalence of lameness and injuries in horses are in concurrence to findings in other developing countries (Broster *et al.*, 2009). Although, equine practitioners in US expressed the maximum need of research for control of lameness and laminitis (AAEP, 2004), little have been done in India. Trypanosomiasis ranked at 2nd position after colic by most of the equine practitioners (Table 2, 3) except those working on large farms or in other than North West (Haryana, Punjab, Himachal Pradesh, UP) India. The disease being a vector-borne infection might be affected with local environmental and managerial practices and the disease has also been reported common in earlier laboratory based studies in different states of North India (Jithendran, 2000, 2008).

Infestation of equids with endo-parasites was ranked at 4th through 9th over the most common medical problems of Indian equids might have remained common since long (Katoch *et al.*, 1998) but little could be done due to one or other environmental and management factors; non-availability of cheaper anthelmintics might be one of the important factors for persistence of the problem.

Although, Letchworth *et al.* (1999) reported that stomatitis is endemic in India, it was ranked at 24th among most common ailments of horses by vets indicating that either the disease go un-noticed or other health problems are much more common and apparent in equids in India.

Through perusal of the published data and annual reports of the Institute (NRCE), it was evident that most of the research and diagnostic work has been conducted either on salmonellosis, brucellosis, glanders, babesiosis, Equine Infectious Anemia (EIA), Equine Herpes Virus (EHV) infections and equine influenza (Malhotra *et al.*, 1978; Gupta *et al.*, 1996; Uppal and Yadav, 1987; Virmani *et al.*, 2008; Richa *et al.*, 1993; Dhar *et al.*, 1997; Kumar *et al.*, 1997, 2003; Manuja *et al.*, 2001) but none of these diseases except babesiosis and glanders was in top 25 common health problems of equids in opinion of equine practitioners. Babesiosis in equids was ranked at 8th through 15th by various groups of equine practitioners (Table 3), received a good response in research scientists since long (Malhotra *et al.*, 1978; Gautam and Dwivedi, 1976). Babesiosis might be more common earlier (Sharma *et al.*, 1998; Kumar *et al.*, 2002a, b; Ambawat *et al.*, 1994, 1999), but due to commendable work for its diagnosis, treatment and control (Dhar *et al.*, 1997; Kumar *et al.*, 1997; Manuja *et al.*, 2001; Kumar *et al.*, 2002a, b; Singh *et al.*, 1980, 2001; Sengupta *et al.*, 1999; Phogat *et al.*, 2001) or because of some other factor it might have come to lower ranked disease of equids now a days.

Theileriasis, a disease ranked at 18th through 35th by different group of equine practitioners, is primarily a disease of crossbred and exotic cattle in India (Jithendran, 2000, 2008; Nichani *et al.*, 1997; Kumar *et al.*, 2008). How it spreaded to equids? And its exact prevalence in equids can be revealed with the use of a good diagnostic laboratory test only.

Although, retention of urine either due to urolithiasis (Holt and Pearson, 1984), or due to urinary tract polyps (Ricketts *et al.*, 1983), is reported rare in India (Pazhanivel *et al.*, 2005), might be due to some other reasons. It was ranked 9th most common medical problem of equids in India and those practitioners looking after both organized and unorganized sector equids ranked it 7th. Thus it needs an urgent intervention to find out the causes and management of the problem. The local climatic conditions or genetic make up of the equine population might be responsible for high frequency of urolithiasis and urinary retention in Uttar Pradesh (UP). Urolithiasis has been reported commonly in UP in humans too and it is suspected to be of genetic origin having salinity of water and soil as predisposing factors (Mittal *et al.*, 2008).

Comparatively high humidity for high rate of endoparasitic infestation and chilling winter for influenza might be important factors for high prevalence of these problems in UP. Earlier studies indicated that most of the equine influenza outbreaks in India started from UP (Uppal and Yadav, 1987; Virmani *et al.*, 2008), which might be either due to local weather conditions or due to sharing of long international border with Nepal.

Eye worms appeared as an important cause of corneal opacity in North West India particularly in UP (9th) and Punjab (10th). Ocular parasitism in equids in India is usually caused by *Setaria digitata*, *S. equina* and *Thelazia lacrymalis* (Sathu, 1974; Ladoucer and Kazacos, 1981; Panchbai and Kulkarni, 1986; Pawde and Gupta, 1994; Parrah *et al.*, 2004; Yadav *et al.*, 2006).

Reporting of reproductive disorders at comparatively higher frequency by LVs and LFBVs might be due to the fact that most of the breeding problems can be encountered on breeding farms. In countries where equine breeding is mostly at organized farms, surveys indicated reproductive problems to be common in equids (Traub-Dargatz *et al.*, 1991).

Similar to other surveys using veterinary medical practitioners, this study relied on diagnosis by the individual veterinary surgeon. This may introduce error due to differences in perception, diagnostic ability and interest of the target people in survey; however, to the authors' knowledge it represents the first ever record of diseases and other health problems of equids in India and might be an important in directing Indian equine veterinary research. The study revealed prevalence of 72 health problems with varying frequency in different regions of India and according to the priority of the region equine clinicians and researchers now may plan the control strategies using this information.

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