

**RISK FACTORS ASSOCIATED WITH CANINE UTI OF BACTERIAL ORIGIN**PRIYANKA SAHARAN, ANAND PRAKASH, DINESH MITTAL\*, TARUN KUMAR<sup>1</sup>, KUSHAL GRAKH,  
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**ABSTRACT**

The present study was performed to evaluate the relationship between prevalence and risk factors like age, sex, breed, water intake and feeding habits associated with canine urinary tract infection (UTI) of bacterial origin. Urine samples from a total of 51 dogs presented to the VCC, LUVAS, Hisar, showing clinical signs suggestive of UTI were included. The present study indicated the prevalence of bacterial UTI as 90.2% (46/51). The highest number of dogs affected was found in the age group of 4-8 years (63.04%) and prevalence of bacterial UTI was found to be higher in female dogs (25; 54.34%) as compared to male dogs (21; 45.65%). Highest breed-wise prevalence was shown by dogs of German shepherd breed (26.08%). Out of 46 affected dogs, 41 (89.13%) had a history of inadequate water intake from variable period of time and 34 (73.91%) dogs were fed non-specific, home-cooked, food and which might have contributed toward increased prevalence of bacterial UTI in dogs.

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Urinary tract infection (UTI) refers to the microbial colonization of the urinary tract or of any urinary tract organ, except the distal urethra, which has a normal bacterial flora. Out of all infectious disease affecting dogs, the incidence of urinary tract infections, including cystitis and pyelonephritis are highest (Farshad *et al.*, 2012; Xia *et al.*, 2011). Also, on an average 14% of dogs contract UTI at some point of time in their life (Thompson *et al.*, 2011). Among infectious causes, bacterial pathogens are commonest cause and *E. coli* remained the most frequently isolated bacteria. Although, *Staphylococcus* spp., *Enterococcus* spp., *Proteus* spp. and *Klebsiella* spp. were also isolated commonly (Hilbert *et al.*, 2008). Various studies had established relationship between certain factors like age, sex, breed, clinical signs and feeding habits with occurrence of UTI in dogs (Cohn *et al.*, 2003; Seguin *et al.*, 2003), but observations of other studies were found to be contrasting and thus even after various studies, a huge knowledge gap is still present in establishing proper relationship between risk factors and occurrence of bacterial UTI in dogs. Thus, the present study was envisaged to establish the relationship between prevalence of bacterial UTI in dogs and different risk factors.

**MATERIALS AND METHODS**

A total of 51 dogs presented to the VCC, LUVAS, Hisar, showing clinical signs suggestive of UTI such as inappetence/anorexia, emaciation, emesis, hematuria, polyuria, polydipsia, depression, weight loss, weakness, dehydration, nausea, anuria, stranguria, and oliguria were included in the present study. All the UTI suspected dogs were examined clinically before taking urine samples. The

complete record of suspected dogs including age, breed, sex, details of current problem, history of any previous disease, feeding habits (non-specific, home-cooked, food or specific dog food) and water intake were recorded on a self-designed questionnaire. Urine samples were collected aseptically in a sterile container using ultrasound guided cystocentesis. The urine samples were immediately streaked on 5% sheep blood agar (BA) and MacConkey lactose agar (MLA) plates with the help of a 4 mm diameter platinum loop. The plates were incubated aerobically at 37°C for 24-48 h and observed for the presence of growth.

**RESULTS AND DISCUSSION****Prevalence of bacterial UTI**

Bacteriological culture examination revealed that out of 51 samples, 46 urine samples were found positive for bacterial isolation. Thus, in present study prevalence of bacterial UTI was 90.2%. In total, 6 out of 46 (13.0%) samples showed mixed growth. While colonies of single bacteria were obtained from rest 40 samples (87%). The prevalence obtained in the present study was higher (62.8%) as compared to findings reported by Punia *et al.*, 2018. Similarly, less prevalence (65%) was also reported by Windahl *et al.*, 2014. Selection of animals for sample collection was based on clinical signs suggestive of UTI in present study, which may be a reason for higher prevalence. Also, the effect of season may also have influenced the positivity rate.

**Association of prevalence of bacterial UTI with different risk factors**

**Age:** The highest number of dogs affected were found in the age group of 4-8 years (63.04%), followed by dogs of

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0-4 years of age group (21.73%) (Table 1). Different workers had also reported increased incidence of UTI in older dogs (Cohn *et al.*, 2003; Hall *et al.*, 2013). Such higher trend for UTI in older dogs could be attributed to the fact that older dogs live longer and thus have more chances of suffering from UTI. Also, chronic diseases and other conditions like immunosuppressive states, endocrinopathy or paraparesis (Dierikx *et al.*, 2012; Hutchins *et al.*, 2014; Burton *et al.*, 2017) in older dogs predispose them to UTI.

**Table 1. Age-wise prevalence of bacterial UTI in dogs**

S.No.	Age group (in years)	No. of urine samples examined (n=51)	No. of positive isolates (%) (n=46)
1.	0-4	14	10 (21.73%)
2.	4-8	30	29 (63.04%)
3.	8-12	6	6 (13.04%)
4.	>12	1	1 (2.17%)

**Sex:** In present study, out of 51 urine samples, 27 urine samples from female dogs and 24 urine samples from male dogs were examined and prevalence of bacterial UTI was found to be higher in female dogs 25 (54.34%) as compared to male dogs 21 (45.65%). Barsanti, (2012), Hall *et al.* (2013) and Wong *et al.* (2015) also reported higher incidence of UTI in female dogs. Anatomical differences, i.e., short urethra of female dogs as compared to male dogs (risk factors for female dogs as fecal pathogens would easily ascend into the urinary bladder) explain disparity of occurrence of UTI in two sexes (Burton *et al.*, 2017). Moreover, Punia *et al.*, 2018 obtained higher incidence in male dogs while Burton *et al.*, 2017 reported no significant sex variations.

**Breed:** Breed-wise prevalence of dogs suffering from bacterial UTI is depicted in Table 2 and highest prevalence was found in dogs of German shepherd breed (26.08%) followed by Pug (17.30%) and mixed breed (15.21%). Norris *et al.*, 2000 and Seguin *et al.*, 2003 reported predisposition of German shepherd, Labrador, mixed breed and Golden Retriever for canine UTI of bacterial origin and can be associated with various factors such as breed variation in biology, anatomy or difference in susceptibility to diseases which may further predispose the breed to UTI. Results in present study were in accordance to the above observations. Also, Mustapha *et al.*, 2020 reported highest frequency of UTI in German Shepherd breed followed by Labrador. Punia *et al.* (2018) in their study found the maximum number of UTI cases from Pug (36.36%) followed by Labrador retriever (22.72%). High prevalence of bacterial UTI in Pug breed during present study and study of Punia *et al.*, 2018 could be attributed to certain physiological and anatomical features of pug breed

which predispose them towards occurrence of UTI.

**Table 2. Breed wise distribution of dogs suffering from UTI**

S.No.	Breeds	No. of urine samples examined (n=51)	No. of Positive isolates (%) (n=46)
1.	German Shepherd	14	12 (26.08%)
2.	Pug	9	8 (17.30%)
3.	Mixed breed	8	7 (15.21%)
4.	Labrador	6	6 (13.04%)
5.	Pit Bull	3	3 (6.52%)
6.	Spitz	3	3 (6.52%)
7.	Golden Retriever	3	3 (6.52%)
8.	Rottweiler	3	2 (4.34%)
9.	St. Bernard	1	1 (2.17%)
10.	Beagle	1	1 (2.17%)

**Water intake:** In the present study, 41 (89.13%) dogs suffering from bacterial UTI were having a history of inadequate water intake from variable period of time before onset of sign and symptoms related to UTI. The bulk flow of the urine through the bladder and micturition can work to rinse away non-attached or weakly adherent microbes from bladder surface (Sobel, 1997) but dogs having decreased amount of water intake could not pass that much urine which can flush microbes which resulted into increased risk of UTI.

**Feeding:** Proportion of dogs suffering from canine UTI which were feed dog non-specific, home-cooked, food was higher (34; 73.91%) as compared with dogs fed dog specific commercial feed (12; 26.08%). Balanced diet remains the key for the health of dog but due to lack of knowledge pet parents feed their dogs with diet intended for human use which is not a balanced diet for a carnivore and lacking in various components necessary for optimum nutrition of dog. While, commercial dog feeds are generally balanced and are specific for dog nutrition. Thus, the normal physiology like pH of urine is altered which resulted in increased incidence of UTI in dogs fed with unbalanced feed. Also, immunosuppression due to lack of proper nutrition aids in pathogenesis of UTI in dogs.

## CONCLUSION

The present study indicated a high prevalence of UTI of bacterial origin in dogs and certain factors like breed, sex and age, were found to be associated with high prevalence of bacteria associated UTI in dogs. Inadequate water intake and unbalanced feed were also found to act as potential risk factors for occurrence of bacterial UTI in

dogs but further studies involving high number of cases are imperative to establish relationship between different factors and occurrence of bacterial UTI in dogs.

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