

Original Research Article

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Epidemiological Study of Canine hypothyroidism in Chhattisgarh state, India

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ABSTRACT

The present study was conducted to know the prevalence of canine hypothyroidism in Durg-Bhillai, Raipur and Rajnandgaon districts of Chhattisgarh state. The overall prevalence of hypothyroidism was found to be 1.28 % in Chhattisgarh state with highest prevalence in Raipur (1.73%) followed by Durg-Bhillai (1.25%) and Rajnandgaon (0.97%). Dogs between 6-8 years age (52.381%) were more susceptible to hypothyroidism. The prevalence of hypothyroidism was higher in male dogs (59.52%) as compared to females (40.48%). Hypothyroidism in dogs was found to be more prevalent in Labrador breed followed by Golden retriever, Spitz, German Shephard, Pug, Saint Bernard and Rottweiler respectively. Dogs having body weight above 40 kg were more susceptible for hypothyroidism accounting to a prevalence rate of 57.14%.

Keywords

canine,
hypothyroidism,
male, labrador,
Chhattisgarh

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Introduction

Hypothyroidism is the most frequently noticed clinical endocrinopathy in dogs resulting from a lowered production and release of T4 and T3 hormones by the thyroid gland (Ettinger and Feldman, 2000). It can be classified as primary, secondary and tertiary depending upon whether the cause resides in the thyroid gland, pituitary gland or hypothalamus, respectively. Certain breeds

namely Golden retrievers, Doberman pinschers and Spaniels are highly predisposed to hypothyroidism. Spayed and neutered dogs are at increased risk of developing hypothyroidism (Lathan, 2012).

The most common clinical characteristics are metabolic signs i.e. lethargy, obesity or weight gain, exercise intolerance, poor wound healing and dermatological abnormalities include alopecia, poor skin and hair coat, hair

loss/alopecia or abnormal hair turnover, dull and brittle haircoat, hyperpigmentation, oily or dry skin and thickened skin (“myxedema”). The other clinical signs includes behavioural changes, intolerance to cold (seeking of warm places), sad/tragic facial expression, odiferous skin that could be pruritic (itchy) due to secondary bacterial infection, and/or yeast infection, pyoderma (superficial infections) with or without concurrent demodicosis (Panciera, 2001 and Saara, 2011).The diagnosis of canine hypothyroidism is often challenging as clinical signs are slow to onset, vague, non-specific and identified in dogs with other non-thyroidal diseases. Detailed study in of canine hypothyroidism are lacking in India. Further, epidemiological study of hypothyroidism in dogs has not been explored in Chhattisgarh state till date, therefore, keeping in view the above issue the present study was undertaken to know the prevalence of hypothyroidism in dogs in and around Durg-Bhilai, Raipur and Rajnandgaon districts of Chhattisgarh state.

Materials and Methods

Prevalence study

The prevalence of hypothyroidism was calculated taking into account number of total dogs brought to the clinic for various health reasons from March 2018 to February 2020 to the Teaching Veterinary Clinical Complex, College of Veterinary Science & AH, Durg, District Veterinary hospitals of Durg-Bhillai, Raipur and Rajnandgaon districts of Chhattisgarh state. The prevalence was further analyzed in relation to age, breed sex and body weight.

Diagnosis

History

Relevant information was collected by adopting a standardized questionnaire, the

owners were enquired about age, signalment, gender, general health, estrous cycles in intact females, libido in male, medications administered during the past three months, exercise and cold intolerance. The information thus obtained was recorded and analyzed. Dogs of all ages, breeds and of either sex were included in the present study.

Clinical examination

Standardized physical examination of dogs was carried out with special reference to clinical signs of hypothyroidism i.e. dermatological (bilateral symmetrical alopecia, rat tailed appearance, hyper pigmentation, pruritus, pyoderma, seborrhea, erythema, thinning of hair coat), metabolic (lethargy, weight gain, exercise and cold intolerance) and reproductive disorders etc. was performed. The appearance of pelage(hair coat), occurrence of bad odour from the dog, the ease of hair removal from follicle (epilation) and the pattern of lesions on the skin were noted. On the basis of clinical signs and owner’s history, dogs with one or more clinical signs (alopecia being the most common) that are suggestive of hypothyroidism were selected and subjected to thyroid hormone estimation for confirmation.

Thyroid function tests

Collection of samples

Blood samples from hypothyroidism suspected dogs were collected either from cephalic or saphenous veins aseptically. After collection, blood was allowed to clot at room temperature, and then centrifuged at 1,500 rpm for 10 minutes. Serum was collected and stored at -20°C until further assay. Total triiodothyronine (tT3), total Thyroxine (tT4) and free Thyroxine (fT4) were estimated by Radio immuno assay kits (RIA)(Gnanasekar *et al.*, 2010).

Results and Discussion

Prevalence

Among 3269 dogs examined from March 2018 to February 2020, 42 dogs were found to be positive for hypothyroidism accounting for an overall prevalence rate of 1.28 per cent (42/3269) in Chhattisgarh state. Highest prevalence was recorded in Raipur (1.73%) followed by Durg-Bhillai (1.25%) and Rajnandgaon (0.97%) districts of Chhattisgarh (Fig.1).

Pancier (1994); Dixon *et al.*, (1999); Rani *et al.*, (2005); Borku and Aktas (2007); Saara (2011); Gulzar *et al.*, (2014); Ziener *et al.*, (2015) and Durga (2017) reported prevalence of hypothyroidism in dogs to be 0.8, 0.8, 1.14, 0.6, 1.68, 0.4, 2.7 and 0.98 per cent respectively. In the present study, the difference noted in the prevalence rate in various districts could be due to variation in the study sample size.

Age wise prevalence of canine hypothyroidism

The age wise prevalence of hypothyroidism is depicted in Fig.2. Prevalence of hypothyroidism was highest in dogs of 6-8 years age (52.381%, 22/42) followed by 4-6 years (26.19%, 12/42) (14.28% in Durg-Bhillai, 7.142% in Raipur and 7.142% in Rajnandgaon) age group, 2-4 years age (9.52%, 4/42) (4.762% in Durg-Bhillai whereas, 2.381% in Raipur and Rajnandgaon) further, dogs less than 2 years age group (2.381% in Durg-Bhillai and Rajnandgaon with 00 cases in Raipur) and above 8 years (2.381% in Durg-Bhillai, 01 in Raipur and nil in Rajn andgaon) age had 2 (4.76%) dogs positive for hypothyroidism in each group.

The findings of the present study were almost in concurrence with those of Lathan (2012);

Das *et al.*, (2013); Tappin (2014) and Durga (2017) who reported higher incidence of hypothyroidism in adult dogs. Ettinger and Feldman (2000) reported that the mean age at diagnosis of hypothyroidism was seven years.

The higher incidence of hypothyroidism in adult dogs might be due to higher concentrations of thyroid hormone during growth and development phase and they progressively declined with advancement of age, hence adult dogs had increased susceptibility for hypothyroidism (Kumar *et al.*, 2012).

Sex wise prevalence of canine hypothyroidism

The prevalence of hypothyroidism in dogs was highest in male dogs (59.52%, 25/42) (28.57% in Durg-Bhillai, 19.05% in Raipur and 11.904% in Rajnandgaon) as compared to females 40.48 per cent (17/42) (19.05% in Durg-Bhillai, 11.9% in Raipur and 9.52% in Rajnandgaon) (Fig. 3) which is in accordance with Durga (2017).

In contrary, Milne and Hayes (1981) and Gulzar *et al.*, (2014) and Durga (2017) recorded higher prevalence in female dogs. However, Vajner *et al.*, (1997); Dixon *et al.*, (1999) and Ghodasara *et al.*, (2013) documented that gender had no influence on the prevalence of hypothyroidism.

Breedwise prevalence of canine hypothyroidism

The highest prevalence of hypothyroidism was recorded in pure-bred dogs 88.1 per cent (42.857% in Durg-Bhillai, 26.19% in Raipur and 19.047 in Rajnandgaon) as compared to non-descript dogs 11.9 per cent (4.762% in Durg-Bhillai and Raipur whereas, 2.381% in Rajnandgaon respectively) (Fig. 4).

In the present study, the highest prevalence of canine hypothyroidism was noted in Labrador (50.00%, 21/42) (23.81% in Durg-Bhillai, 16.67% in Raipur and 9.523% in Rajnandgaon) (Fig. 5).

The prevalence in other breeds was as follows: Golden retriever (9.523% in Durg-Bhillai followed by 4.762% in Raipur and Rajnandgaon respectively) whereas, Spitz had prevalence rate of 9.523 per cent (4.762% in Durg-Bhillai with 2.381% in Raipur and Rajnandgaon) and German Shephard (9.523%) (4.762% in Durg-Bhillai and 2.381% in Raipur and Rajnandgaon) were diagnosed with canine hypothyroidism.

Three dogs of Pug breed (7.143%) (4.762% in Durg-Bhillai, nil in Raipur and 2.381% in Rajnandgaon) had hypothyroidism. Single dog (2.381%) each of Saint Bernard (2.381% in Raipur with nil cases in Durg-Bhillai and Rajnandgaon) and Rottweiler (2.381% in Raipur with 00 cases in Durg-Bhillai and

Rajnandgaon) showed canine hypothyroidism.

In the present study, Labrador were found to be highly prevalent to canine hypothyroidism which is in accordance with Gulzar *et al.*, (2014). High risk of hypothyroidism in Golden Retrievers, Doberman Pinschers, Great Danes, Pomeranians, Poodles, Boxers and Daschunds was previously reported by Panciera (1994); Dixon *et al.*, (1999) and Daminet *et al.*, (2003).

Van Geffen *et al.*, (2006) and Saara (2011) also documented the genetic predisposition of hypothyroidism and reported that the serum thyroxine concentrations varied between breeds. This variation could be probably due to habitation of different breeds in different geographical regions. However, as the number of dogs screened for hypothyroidism was limited in the present study, generalized conclusions could not be drawn with regards to breed predilection.

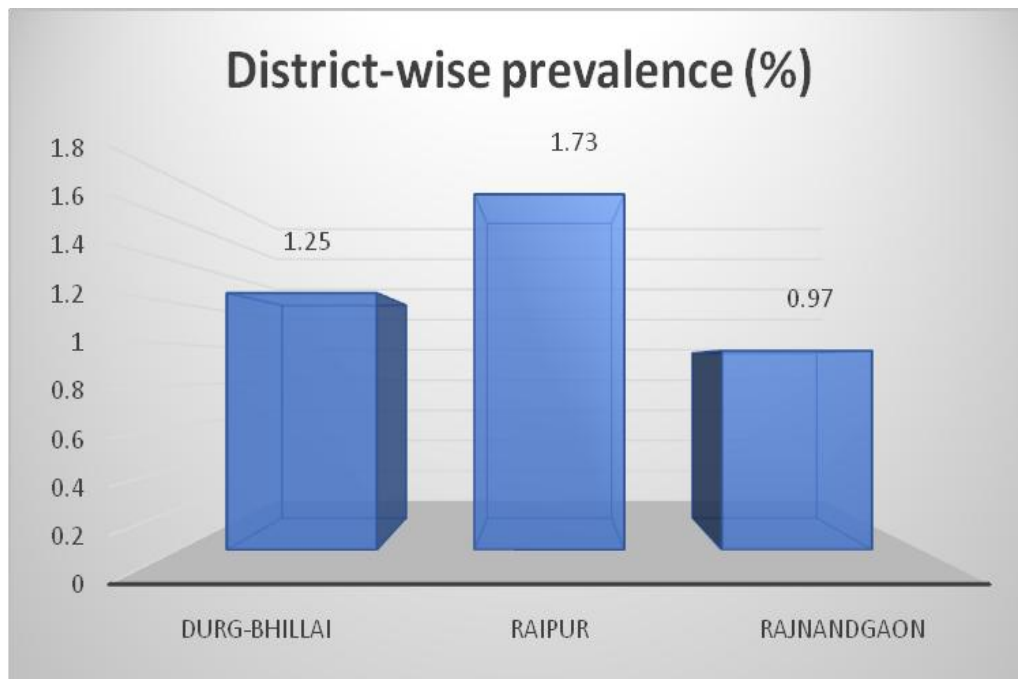


Fig.1 District wise prevalence of canine hypothyroidism

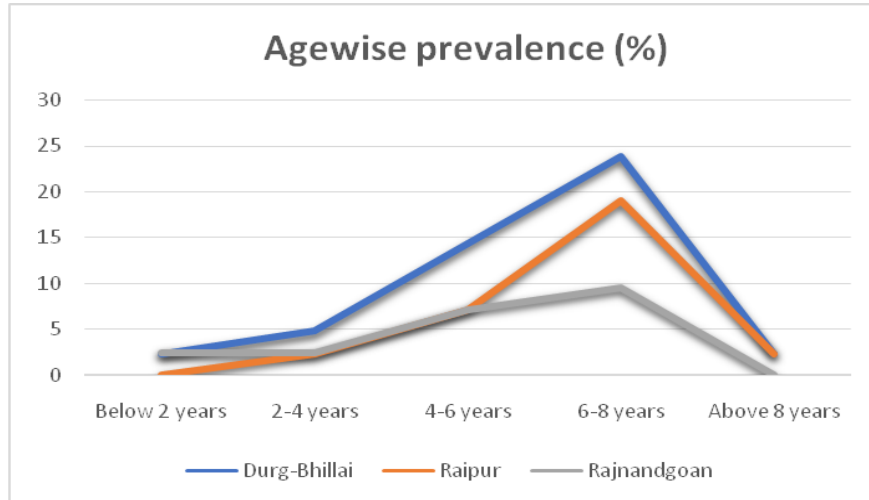


Fig.2 Agewise prevalence of canine hypothyroidism

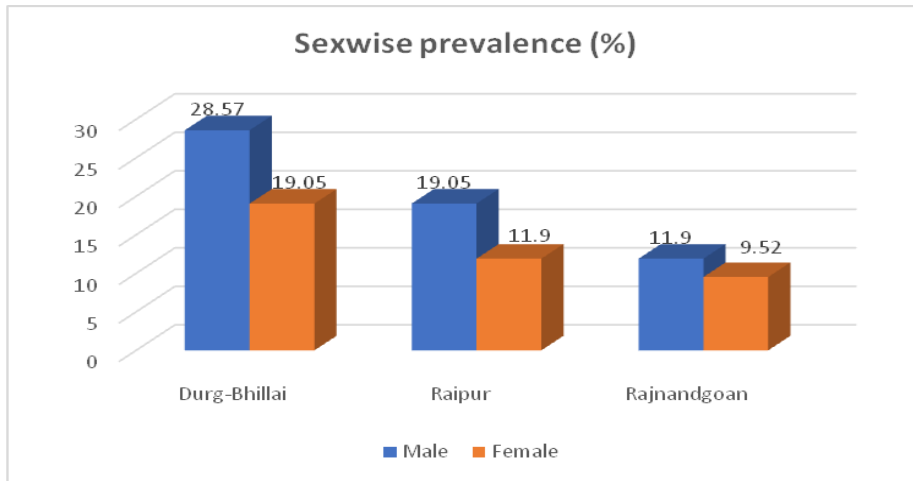


Fig.3 Sexwise prevalence of canine hypothyroidism

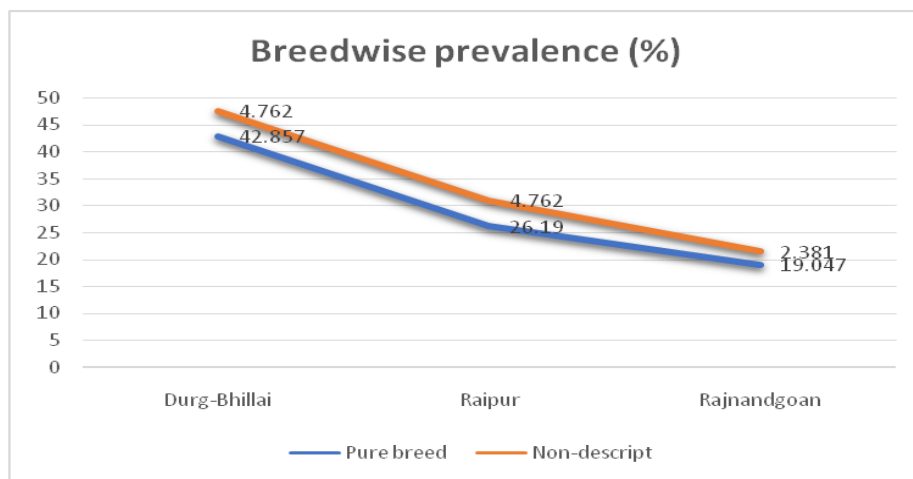


Fig.4 Breedwise prevalence of canine hypothyroidism

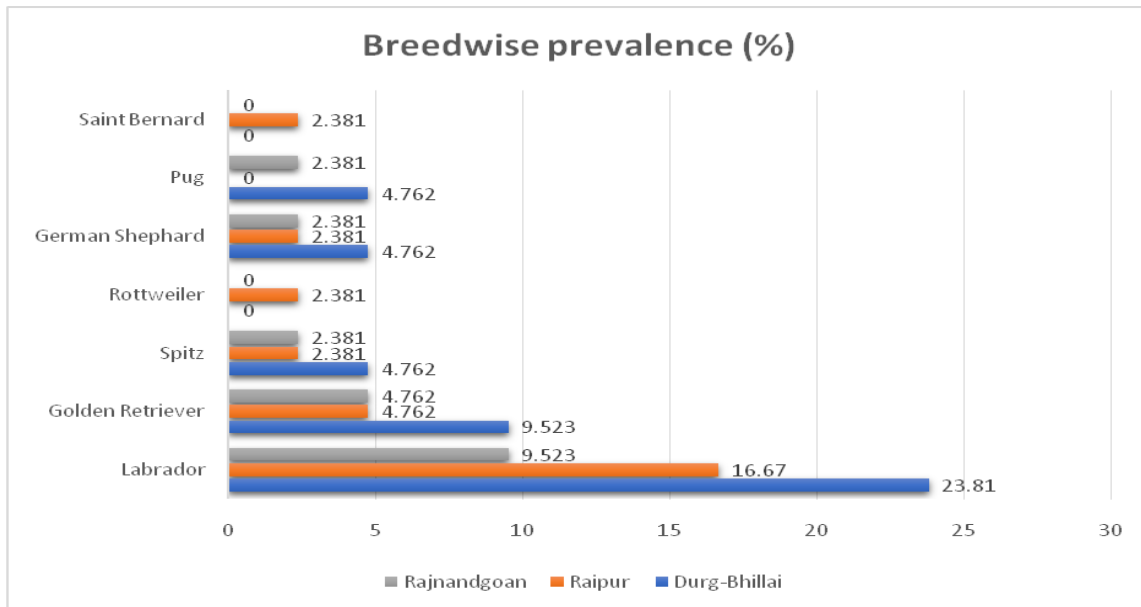


Fig.5 Breedwise prevalence of canine hypothyroidism

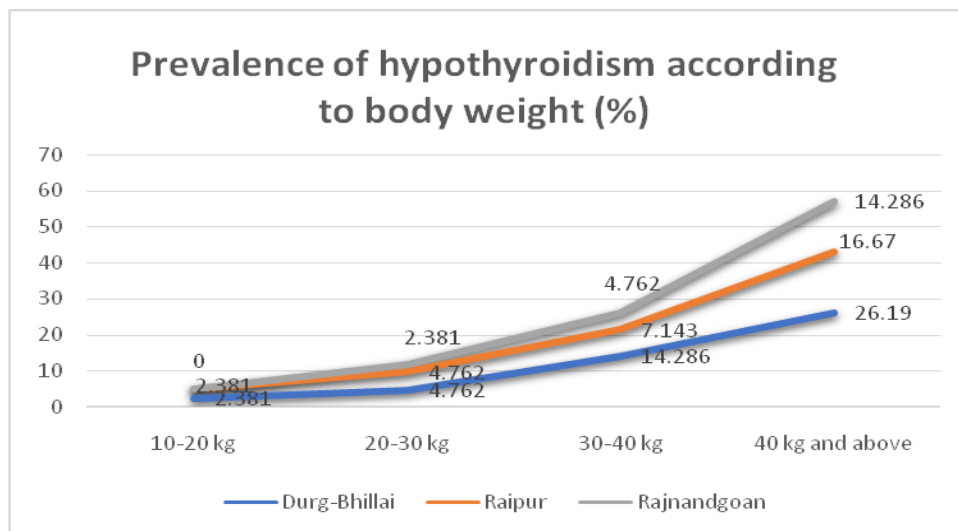


Fig.6 Prevalence of canine hypothyroidism according to body weight

Prevalence of hypothyroidism according to body weight

The occurrence of hypothyroidism in dogs with different body weights is depicted in Fig. 6. Dogs with body weight above 40 kg were found to be more susceptible for hypothyroidism as 24/42 (57.14%) (26.19% in Durg-Bhillai, 16.67% in Raipur and 14.286% in Rajnangaon). The numbers of positive cases were 11/42 (26.190%), 05/42 (11.904%) and two (4.76%) in dogs with

body weights of 30-40 kg (14.286% in Durg-Bhillai, 7.143% in Raipur and 4.762% in Rajnandgaon), 20-30 kg (4.76% in Durg-Bhillai and Raipur whereas, 2.381% in Rajnandgaon) and 10-20 kg (2.381% in Durg-Bhillai and Raipur with nil cases recorded in Rajnandgaon) respectively. The results are in corroboration with the findings of Dixon *et al.*, (1999) and Gulzar *et al.*, (2014). Dixon *et al.*, (1999) reported obesity in 41% to 48% hypothyroid dogs. Nachreiner *et al.*, (2002) observed a significant correlation between

body weight and hypothyroidism. This signifies the importance of examining thyroid function in obese dogs to avoid failure of any nutritional treatment. Obesity and hypothyroidism are two common clinical conditions that have been linked together closely. The link has become more relevant in the context of an unprecedented rise in the prevalence of obesity worldwide (Reimers, 1990 and Sanyal and Moutusi, 2016).

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