

SCIENTIFIC HORIZONS

Journal homepage: <https://sciencehorizon.com.ua>

Scientific Horizons, 26(11), 29-38



UDC 636.7:616-006.612.6

DOI: 10.48077/scihor11.2023.29

Influence of age and breed of dogs on tumour development

Almazbek Irgashev*

Doctor of Veterinary Sciences, Professor
Kyrgyz National Agrarian University named after K.I. Skryabin
720005, 68 Mederov Str., Bishkek, Kyrgyz Republic
<https://orcid.org/0000-0002-4789-5628>

Svetlana Ishenbaeva

PhD in Veterinary Sciences, Associate Professor
Kyrgyz National Agrarian University named after K.I. Skryabin
720005, 68 Mederov Str., Bishkek, Kyrgyz Republic
<https://orcid.org/0000-0002-0056-9366>

Rysbek Nurgaziev

Doctor of Veterinary Sciences, Rector, Professor
Kyrgyz National Agrarian University named after K.I. Skryabin
720005, 68 Mederov Str., Bishkek, Kyrgyz Republic
<https://orcid.org/0000-0003-1376-6921>

Lyudmila Lykhina

PhD in Veterinary Sciences, Associate Professor
Kyrgyz National Agrarian University named after K.I. Skryabin
720005, 68 Mederov Str., Bishkek, Kyrgyz Republic
<https://orcid.org/0000-0002-9371-8278>

Article's History:

Received: 20.06.2023

Revised: 15.09.2023

Accepted: 25.10.2023

Abstract. The increase in the number of dogs as pets poses the challenge for veterinary specialists to find new approaches to prevent their morbidity and early mortality. Age and breed are considered to be the main risk criteria for the formation of tumours in dogs, so the aim of this study was to investigate the impact of these and a number of other factors on the susceptibility to cancer in this species. The research was based on the analysis of a single database of veterinary clinics in Bishkek, which includes 328 confirmed cases of cancer in dogs. The most common breeds were German (n=48) and Central Asian Shepherds (n=23), Rottweilers (n=18), Dachshunds (n=18), Poodles (n=17), Shar Pei (n=14), Pekingese (n=14), and a group of outbred dogs (n=70). Benign neoplasms were recorded in 140 cases, accounting for 54.3% of the total number of tumours in pure-bred dogs. Benign tumours predominated in large breed dogs (n=75), or 53.6% of the total number of benign tumours, and the highest growth of malignant tumours was detected in small breed dogs (59%) (n=29). Dogs, regardless of breed, were more vulnerable to tumour formation between the ages of 6 and 12 years. The

Suggested Citation:

Irgashev, A., Ishenbaeva, S., Nurgaziev, R., & Lykhina, L. (2023). Influence of age and breed of dogs on tumour development. *Scientific Horizons*, 26(11), 29-38. doi: 10.48077/scihor11.2023.29.



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*Corresponding author

database analysis revealed that females were more likely to develop cancer than males, with mammary tumours being the main diagnosis in females (36.3%). Small dog breeds had a higher risk of developing mammary tumours than large dogs. The obtained results revealed breed-specific features of the manifestation of morphological types of tumours in dogs and made it possible to determine the critical periods of their formation

Keywords: new formations; oncological pathology; predisposition; database; statistical analysis

INTRODUCTION

The domestication of dogs and their use for human benefit as part of animal husbandry was one of the first to develop, so today there is a considerable variety of dog breeds, which are divided into service, hunting, indoor and decorative. Other classifications have seven to ten groups of dog breeds depending on their origin, size, or use. According to other classifications, there are seven to ten groups of dog breeds depending on their origin, size, or direction of use (Lehari, 2022). But despite this diversity of dogs, their main purpose in the animal world is as a companion for humans. In the work of J. Benz-Schwarzburg *et al.* (2020), it is indicated that human relationships with domestic dogs are very common and often result in a strong shared attachment and in treating these dogs as family members or even children. Such relationships are biopsychosocial in nature indicates that dogs are able to sense their owner's emotional state and respond to their owner's social gestures, and this allows them to form complex attachment relationships with humans. This is confirmed in the studies of A.M. Chira *et al.* (2023) conducted with dogs of different breeds and in different countries. Therefore, when a person gets a dog, he/she assumes the responsibility to take care of it, to monitor its health, to protect it from dangers.

One of the most dangerous and difficult-to-treat diseases of pets is cancer. In the Kyrgyz Republic, according to A.Sh. Irgashev *et al.* (2016), oncological diseases in animals are poorly studied from a scientific point of view, while veterinary clinics have established diagnosis and treatment of sick animals. Modern knowledge of physiology, feeding, and treatment of dogs has allowed increasing the life expectancy of these pets for a significant period of time. But, the flip side of this phenomenon, has been an increase in the incidence of cancer diagnosis in adult dogs, as confirmed by the findings of D.H. Thamm (2019), who indicates that 30% of dog mortality is caused by different types of tumours diagnosed mainly in older animals. Histological studies confirm the similarity of cancerous masses in dogs to human tumours. The most common tumours are lymphoma, melanoma, osteosarcoma, bladder carcinoma and multiple types of brain cancer. Considering the similarities between cancers in dogs and humans, makes these pets, according to T.G. Guimarães *et al.* (2022), the best biological subjects to study the therapeutic effects of different treatments on the body for their subsequent application in human therapy.

Studies of oncological diseases in dogs in Kyrgyzstan, despite their relevance, are rather limited. The main directions over the last few years have been the study of skin tumours and mammary gland tumours by S.N. Ishenbaeva and A.Sh. Irgashev (2022). A difference of these studies is the small number of control animals. Although in the robot D. Steven (2020) points out that a high inbreeding coefficient in most dog breeds, may be responsible for the development of tumours, and such results can only be obtained on a larger number of animals with known heritability. Such works will allow studying and carrying out mapping of separate loci of genes responsible for the development of tumours of different types in the organism of not only dogs, but also humans. Moreover, the similarity and adequacy of the immune system response, at spontaneous development of oncology in dogs, allows studying the mechanisms of cytological response at the early stage of the disease and analysing the immunogenetic influence of drugs and physical approaches in treatment on the human organism.

Based on the insufficient study of canine oncological diseases in Kyrgyzstan, as well as taking into account the social aspects of companion relationships between dogs and humans, and physiological and immunological similarity of oncological processes in the organism of these species, makes the study of genetic and paratypical factors of tumour development in dogs an actual direction of scientific work. Therefore, the aim of this article was to study the prevalence of cancer pathology in dogs depending on their breed and age in Bishkek city.

LITERATURE REVIEW

Recently, the number of cancers in dogs has increased; this trend in companion animals is related to their accumulation of significant fatty tissue stores. According to the observations of P.H. Marchi *et al.* (2022), overweight is one of the reasons for the increase in cancers in dogs. Mostly cancerous neoplasms are diagnosed in epithelial and lymphoid tissues. Thus, in the work by J.S. Munday *et al.* (2019), tumours were detected in the tissues of the outer skin, B. do Nascimento Borges (2022) and H.Y. Lim *et al.* (2022) in the mammary gland, B. Clerc-Renaud *et al.* (2021) and Q. Gao *et al.* (2019) – in the urogenital tract, K. Kliczkowska-Klarowicz and R. Sapieryński (2019) and M. Cray *et al.* (2020) in oral soft tissues, and K.M. Makielski *et al.* (2019), D.G. O'Neill *et al.* (2023), J. Beck *et al.* (2022), G.L. Edmunds *et al.*

(2021), and L. Leonardi *et al.* (2021) significant numbers of tumours have been found in bone tissue.

The growth of tumours occurs as a consequence of genetic or other changes in the cells of animals, which, according to P.H. Marchi *et al.* (2022) is a consequence of DNA damage due to various gene mutations. The causes of genome damage can also be chemical, physical and biological agents such as viruses, hormones, carcinogens and other factors. In the studies of M.I. Crescio *et al.* (2022) in dogs, the main disposing factors for the development of oncology are breed, age, sex, as well as various surgical interventions in the body of animals that lead to hormonal shifts (castration).

According to A.M. Oberbauer *et al.* (2019), the predisposition to oncological diseases in dogs of different breeds depends on their heredity. This is primarily due to a rather close inbreeding in the breed to some prominent progenitor. But, sometimes, a high genetic predisposition, even in unrelated groups of dogs within the same breed, may depend on genetic selection used to meet breed standards. Castration of males and females reduces the risks of mammary and genitourinary cancers, but increases the likelihood of osteosarcoma, lymphosarcoma, haemangiosarcoma and mast tumours. C. Kraus *et al.* (2023) confirm the breed dependence of cancer mortality in dogs. In studies on 118 breeds and more than 40 thousand dogs, reliable results were obtained that in small breed animals, the development of cancerous tumours was observed less frequently in comparison with large breeds, and at this time the life expectancy in old age decreased with increasing body size of the animals. The life expectancy of dogs dying of cancer showed the same trend. J. da Silva and B.J. Cross (2023) in their work also conclude that the main cause of mortality in dogs is cancer pathology. Which may be related to the accelerated increase in body size of the animal at an early age. Also in the work of K. Pinello *et al.* (2022), it is indicated that statistical information based on a sample of 16272 oncology records shows that the formation of malignant tumours in dogs and cats occurs 8-9 months later than benign tumours. Females had a higher risk of developing cancer than males. In addition, the place of residence of animals did not affect the frequency of pathology, but the risk of malignant neoplasms increased by about 20% every three years of life.

MATERIALS AND METHODS

The source of materials for the study was a joint database of veterinary clinics in Bishkek, which included 328 diagnostic records of oncologically ill dogs with tumours of various localizations. Oncological material for the study was provided by the veterinary clinics "Samson", "Gauhar" and "Animal Planet", as well as by Faculty of Veterinary Medicine at the Kyrgyz National Agrarian University named after K.I. Skryabin. Histological samples of dog tumours obtained by different methods of investigation: autopsies and biopsies were subjected to

further histopathological examination in the histology laboratory of the Department of Veterinary and Sanitary Expertise, Histology and Pathology at the Kyrgyz National Agrarian University named after K.I. Skryabin. All canine cases were classified according to the International Histological Classification of Tumours of the World Health Organization (WHO) (Roccabianca *et al.*, 2021).

In each case of confirmed oncological pathology, a complete animal history was collected whenever possible. It was mandatory to record information about the dog's breed, age, sex, sterilization status and other factors that could influence the predisposition to the disease. Depending on the age of the animals were divided into five groups: the first was 0-3 years, the second 3-6 years, the third 6-9 years, the fourth 9-12 years and the fifth included dogs that were 12 years of age or older at the time of diagnosis. The age of the animals was established by subtracting the date of birth from the date of diagnosis. The breed of the dogs was determined by the records in the animal's passport, or in case of its absence – by the relevant breed traits. Unbred animals were singled out in a separate group. When studying the influence of body size on tumour development, animals were divided into three groups: small, medium and large. Animals of small dog breeds (weighing up to 12 kg and growing up to 28 cm) were automatically included into the small group. Such breeds included Terriers, French Bulldogs, Bolognese, Chihuahua, Yorkshire Terriers, Russian Toy, Spitzes. The medium-sized animals – breeds, whose average weight of representatives was 12-25 kg, and the height at the withers was within 28-60 cm – dachshunds, poodles, Shar Pei, boxer, cocker spaniels were included. The group of large dogs included breeds with the weight of adult animals exceeding 25 kg and having a height above 60 cm – German Shepherd, Rottweiler, Doberman, Labrador, Central Asian Shepherd. In cases with mongrel dogs, they were assigned to a certain group depending on the weight and height established at the diagnosis of the disease.

According to the results of external signs and histological studies of tumours, all cases were grouped according to the new WHO classification adapted for small animals in the work of M.A.M Sharif (2006), and for convenience of further analysis they were divided into benign and malignant tumours. The obtained results of the studies were subjected to mathematical processing using TIBCO Statistica v 14.0.0.15 software (USA). Statistical analysis was performed by genetic-mathematical and biometric methods using descriptive statistics tool and analysis of variance. Sample averages and the strengths of influence of individual indicators on the propensity of dogs to cancer were calculated.

RESULTS

The main focus of the research work was to conduct a statistical analysis of records from an information database of cancer in cats and dogs compiled by veterinary clinics

that practice the diagnosis and treatment of neoplasms in pets. The information database included records of 328 dogs that belonged to up to 46 different breeds and were diagnosed with neoplasms between 2017 and 2022. A prerequisite for entering animals into the database was confirmation of the cancer diagnosis by the results of histological diagnosis of tumours. The majority of information entries in the database referred to female cases – 63%, indicating a significant difference ($P < 0.05$) in the susceptibility to oncology specifically in females.

This situation could be caused by a significant number of dogs with mammary gland pathology, which appears only in females and accounted for 36.3% of all tumours in animals. At the same time, the mean age of animals of both sexes at the time of cancer diagnosis was approximately the same and was about 8 years. The database contained records of pets and shelter dogs treated or autopsied at these institutions. The breed composition of the animals whose information was used in the study is presented in Figure 1.

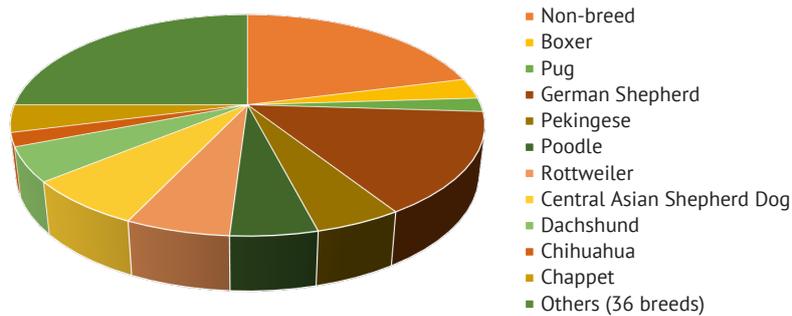


Figure 1. Breed composition of oncologically ill dogs in Bishkek for the period 2017-2022

Source: compiled by the authors

The proportion of dogs from other breeds with cancer, the number of which was more than 1%, belonged to the breeds Basset Hound – 1.2%, Cane Corso – 1.2%, Kurtshaar – 1.2%, Jack Russell Terrier – 1.5% and Husky – 1.5%, while representatives of the other 32 breeds that were present in the database were less than 1%. This distribution of animals may have been due not so much to the genetic predisposition of animals to cancer, but to the significant number of animals of these breeds in Bishkek. Due to the lack of reliable information on the number of animals of each breed in the service area of veterinary clinics, it is possible to consider the results obtained only as an established trend that needs further confirmation. But the number of animals in separate breeds allows studying the influence of separate genetic and paratypical factors on oncological predisposition of animals. Therefore, further

research work was conducted mainly on breeds with significant number of records in the database, namely German Shepherd Dog ($n=48$), Central Asian Shepherd Dog ($n=23$), Rottweiler ($n=18$), Dachshund ($n=18$), Poodle ($n=17$), Shar Pei ($n=14$) and Pekingese ($n=14$), and also in statistical processing were included mongrel dogs ($n=70$), the number of which prevailed in the sample.

One of the main parameters that the researchers believe has a predisposition to the occurrence of cancer is the size of the animals. The study distributed and analysed the incidence of disease in both pure-bred and mongrel animals according to their size. While in the case of pure-bred animals, the distribution of animals was based on breed classification, in the case of mongrel dogs they were assigned to one group or another according to their height and body weight at the time of diagnosis. The results of this distribution are presented in Figure 2.

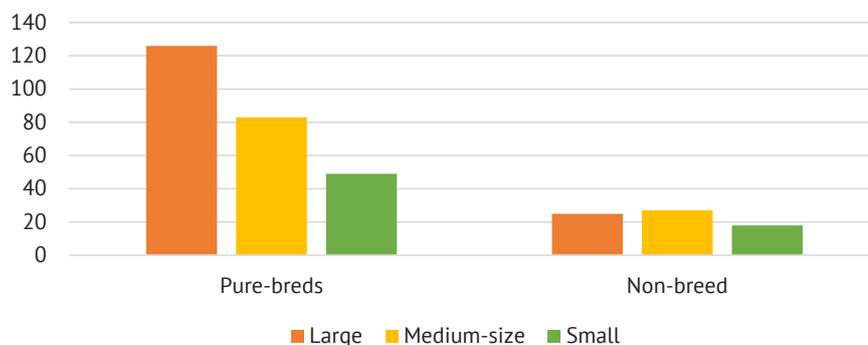


Figure 2. Distribution of dogs with oncology depending on the size of the breed

Source: compiled by the authors

In controlled pure-bred animals, the highest number of patients was among large-sized dogs – 48.9% ($P < 0.05$) of the whole population, which is significantly higher compared to medium and small animals, while no significant difference between animals of different sizes with oncological diagnosis was observed among pure-bred dogs.

Further analysis of the prevalence of tumours of different types showed that in pure-bred dogs the incidence of malignant and benign tumours was almost at

the same level, with a slight increase in the incidence of benign neoplasms. Whereas in mongrel dogs, the incidences were at a lower level, with higher incidences of malignant pathology. Benign neoplasms were recorded in 140 cases out of the total number of tumours in pure-bred dogs, accounting for 54.3%, while malignant tumours were detected in 118 pure-bred animals, accounting for 45.7%. The incidence of oncological diseases in dogs of different breeds is presented in Figure 3.

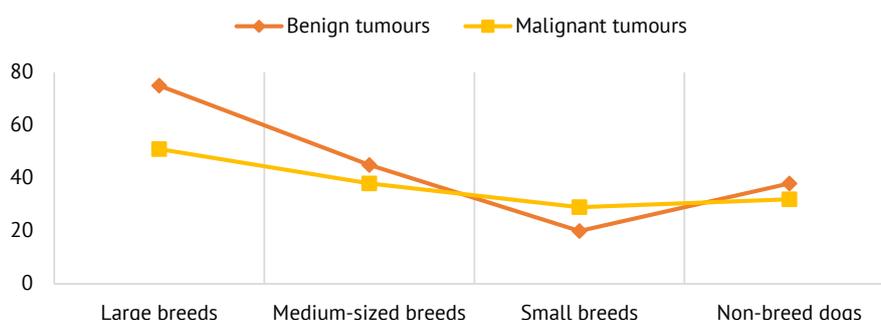


Figure 3. Oncology incidence in dogs depending on breed size

Source: compiled by the authors

In the pure-bred population, there was a prevalence of animals with a confirmed diagnosis of benign tumours. Among large and medium breeds of dogs, the difference between different types of neoplasms was 19% and 8%, respectively, in favour of benign pathology. The highest increase of malignant tumours was found in small breed dogs, 59% ($n=29$). In the case of mongrel animals, the incidence of malignant tumours was higher than benign tumours. This may be a consequence of owners' failure to refer tumour problems of animals to clinics in a timely manner, as, in most cases, diagnoses of cancer were made shortly before the animals themselves died. This may suggest that the owners of such dogs do not pay proper attention to these pathologies until they affect the general condition of the dog. And considering that the majority of mongrel animals came to clinics from shelters for homeless animals – it confirms this assumption. The small number of animals with benign tumours in the group of mongrel animals can also be argued by this

approach, as their impact on the animal's body is minimal. Another probable explanation for the increase in the number of dogs with malignant cancer in the group of pedigree animals is the increase in the proportion of small and medium-sized dogs, in which, similarly to pure-bred animals, this type of tumour predominates. The strength of influence of the indicator of the size of animals in the breed on the probability of benign or malignant tumour development in pure-bred animals was 18% ($P < 0.01$), while in the population of mongrel dogs the insignificant number of animals in the groups did not allow obtaining a reliable result.

The next factor whose influence was analysed on the predisposition to tumour development in dogs was their age. For this purpose, only pure-bred animals whose exact age was documented were included in the study group, in order to reduce the statistical error of using possible or approximate age in mongrel dogs. The results of grouping dogs, according to the two factors investigated, age and body size, are shown in Figure 4.

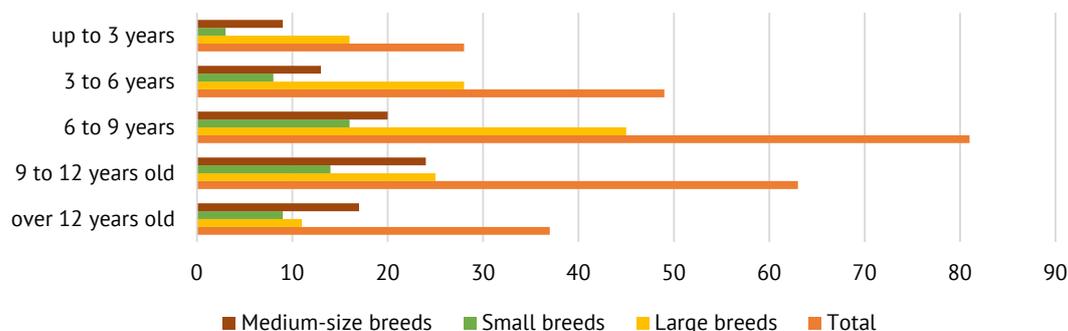


Figure 4. Distribution of oncologically ill pure-bred dogs by age criterion at the time of diagnosis

Source: compiled by the authors

The incidence of oncology in dogs, depending on age, falls under a normal distribution with maximum manifestation of pathology in the interval from 6 to 9 years. It is during this period that the maximum number of diseased animals of both large and small breeds manifests itself. In dogs of medium breeds, the peak of morbidity is slightly shifted to a later period – from 9 to 12 years. Depending on the age, animals from 6 to 12 years of age have a much higher probability of developing malignant tumours during this period than young dogs. Thus, malignant tumours were diagnosed in young animals up to 3 years of age only in 10 cases (36%), whereas in later periods this diagnosis only increased, so at the age of 3 to 6 years they were detected in 21 dogs (43%), from 6 to 9 years in 49 (60%), from 9 to 12 years in 36 (57%), and in animals over 12 years of age only in 11 cases (28%). Whereas benign tumours were mostly manifested in older animals. This tendency can only be explained by the increased probability of tumour formation, including malignant tumours, during the period of intensive growth of animals. Only malignant tumours, due to more active metastasis, are able to manifest in the organism much earlier than benign ones. Therefore, diagnosis of such neoplasms occurs at a later age, which was observed in the conducted studies.

Large breed dogs were more vulnerable at the age of 6 to 9 years, during this period, tumours were diagnosed in 45 animals, which was 55.5% of the total number of cases in this age group. Whereas in the same animals, only at the age of over 12 years, the incidence of cancer is almost halved. In young dogs of small breeds up to 3 years of age, tumours were found very rarely, and mostly they were malignant neoplasms. With increasing age, the number of neoplasms only increased, but the ratio of different types of tumours was on the side of malignant pathology. The strength of the effect of the dog's age on oncological susceptibility, calculated by single factor analysis of variance, was found to be 21% ($P < 0.05$). The analysis of breed dependence of oncological pathology manifestation revealed that no neoplasms were detected in poodles under 3 years of age, but the main number of tumours was diagnosed in animals over 9 years of age – 82% of cases. In dogs of the Shar Pei breed, epithelial skin lesions were most often observed in 57% of cases. In Boxers, tumours were localized in the head region – 40% and were predominantly benign neoplasms in up to 80% of cases and were diagnosed before the age of 8 years. In Pekingese dogs, the main diagnosis was malignant mammary tumours in 71% of cases.

When analysing the manifestation of oncological pathology depending on the sex of animals, it was revealed that in males the most frequent neoplasms were skin tumours up to 25% and genital organs 3.9%, and in females the main site of localization was the mammary gland – 36.3%, at that the most frequent epithelial neoplasms of the mammary gland were

diagnosed in German shepherd dogs – 22 cases, which made 8.5% of all cases of oncology in this breed. No such pathology was detected in female Shar Pei and Labrador breeds. Due to the small number of sterilized animals, mostly from the number of mongrels, the results of the analysis for this indicator were not reliable and will be investigated in detail in subsequent works. Also, if possible, it is planned to carry out genetic and selection analysis of the influence of paternal breeds on the manifestation of diseases in mongrel animals and correlation analysis of the manifestation of cancer pathology in different generations.

DISCUSSION

Veterinary oncology, especially in the context of small, domestic animals, is becoming a major focus of most clinical facilities that practice animal medicine. The significant use of dogs for business purposes in pure-bred breeding or their use as human companions brings a new level of veterinary care to these animals. And with current knowledge and diagnostic capabilities, the real causes of disease and death in dogs are coming to the fore. Therefore, the results obtained need revision and more in-depth knowledge. Such a direction, which is developing at a very fast pace, is veterinary oncology. Research in this direction is carried out both to improve the treatment of different types of neoplasms and to investigate predisposition factors in the development of such pathology. The results of genetic and statistical analysis, which are presented in this paper, are also one of the directions of accumulation of knowledge base in veterinary oncology. The results obtained should help dog owners to identify critical moments in the life of their pets in order to ensure their long and healthy existence.

In the study conducted, the main focus of the research work was to investigate the influence of breed and age of dogs on their predisposition to develop cancer pathology. At the same time, the breed aspect was studied with the involvement of additional factors: body size and gender identity. The obtained results of predisposition to tumour formation in the controlled animals allowed ranking the breeds of dogs by intensity of the disease in the following descending order: German and Central Asian shepherd dogs, Rottweiler, Dachshund, Poodle, Shar Pei and Pekingese. In contrast, breeds such as Bulldogs, Dalmatians, Taigans, St Bernards, Yorkshire Terriers, Jack Russell Terriers and Riesenschauzers showed a lower risk of developing tumours. In studies conducted by N.R. Senthil *et al.* (2020) observed quite different incidence rates among animals of individual breeds. Thus, the incidence of German Shepherd dogs was minimal – 3.9%, and the highest incidence of tumours was found in mongrel dogs, which is confirmed by the results of studies by A.L. Martins *et al.* (2022). The difference in results obtained between different researchers could be due to the difference in the population size of a particular breed in the area where the

experiments were conducted. The probability of an increase in the number of animals with cancer was found to be directly proportional to the population size. But, despite the number of breeds in all studies, the breeds that are more susceptible to cancer have fallen into the risk group. These include the Golden Retriever and the Rottweiler. In addition to the previous authors, information about the high predisposition to the disease in such animals is also given in their studies by M. Cray *et al.* (2020).

The age dynamics of oncological diseases in dogs of different breeds indicates that the maximum manifestation of pathology occurs between 6 and 9 years of life. At the same time, the number of diseased animals in the conducted studies fall under the normal distribution, which indicates its natural nature, which is not influenced by any side or unnatural conditions. On this basis, it can be stated that similar results can be expected in other studies where there was no artificial selection of control animals. This was confirmed by the results of cancer screening presented in the work by J. Rafalko *et al.* (2023) on a group of dogs numbering 3452 animals diagnosed with cancer. In this work, the average age of dogs at initial diagnosis was 8.8 years, which corresponds to the results obtained when analysing the database of oncologically diseased animals in Bishkek. In the work of these authors, it is also indicated that in pure-bred dogs, oncological diseases were diagnosed at a much earlier age in comparison with non-breed animals. In this case, the weight of animals was inversely proportional to their age at the time of diagnosis of the disease. In the studies referenced in this paper, large breed dogs were also diagnosed with tumours at an earlier age than small breeds.

Similar results were obtained in the work of A. Doherty *et al.* (2020), in which, when analysing information on genotypic and phenotypic characteristics of more than 72,000 dogs, it was concluded that breeds with high average body weight had higher mortality rates from cancer problems and shorter life expectancy. Although the work of A.M. Oberbauer *et al.* (2019) makes some distinction on the propensity to develop tumours between the natural body weight of an animal that meets breed traits and overweight that is a consequence of spaying or overfeeding animals. Initially, when carrying out the work, it was also planned to analyse materials on the influence of castration of males and females on the morbidity of animals. But in the process of its implementation, it turned out that among the sterilized animals there were only mongrel animals, and in insignificant quantity. Such a sample did not allow obtaining representative results, so this research was postponed until the next work.

Analysis of the information database of veterinary clinics in Bishkek on oncological problems of dogs showed that neoplasms were more often registered in large breeds of dogs. Moreover, the ratio of different

types of tumours changed with age. In older dogs, the probability of diagnosing a malignant neoplasm decreased and the frequency of benign tumours increased. The logical explanation for this trend is the lack of early diagnosis of neoplasms in dogs in Kyrgyzstan, and the diagnosis of oncology is made already at physiological disorders in animals, when clinical signs appear. Preventive screening of animals for early diagnosis of oncological problems, even in pure-bred animals, which are used in breeding for profit, is not carried out, and the detection of tumours occurs as a result of the manifestation of dysfunction of the body, or with obvious clinical signs. Since malignant neoplasms in the organism progress much faster than benign ones, they are detected at an earlier age. This can explain the current dynamics of the detection of neoplasms in dogs in Bishkek.

The analysis of the influence of sex on the predisposition to oncological problems indicated a significantly higher probability of tumour development in female dogs compared to males. The difference between the sexes in the studies was 26%. The studies of A.M. Koterbay *et al.* (2020) on Chow Chow animals and of K. Pinello *et al.* (2022) on a population of 13006 dogs of different breeds indicate that there is a greater likelihood of tumours being found in female individuals. In the case of the animals from Bishkek, this significant preponderance in the incidence in females was associated with the prevalence of tumours in the mammary gland, which accounted for more than 36% of all tumours in this sex.

The analyses conducted support the hypothesis that age and breed factors both separately and in combination influence the susceptibility of dogs to oncological pathology. These observations allowed identifying the peculiarities of the manifestation of some morphological types of tumours in dogs of different breeds and to determine the critical periods of their formation. The results obtained confirm the importance of annual examinations in dogs for the prevention of oncology, as well as the need to register cases of cancer in animals, which will facilitate the development of new approaches for the prevention of diseases in dogs, as well as increase their life expectancy.

CONCLUSIONS

Based on the materials of the unified information database of veterinary clinics of Bishkek on cases of dogs with oncological diseases, as well as on the results obtained during its statistical analysis, the following conclusions and suggestions for future scientific work can be made. In pure-bred dogs, the ratio of morphological types of tumours was approximately at the same level, with a slight increase of benign neoplasms 54%. The influence of sex on the predisposition to tumour formation in dogs, in the studies carried out, revealed a significant increase in this pathology in females – 63%, the reason for this was the high level of neoplasms

in the mammary gland, the proportion of which was 36.3% of all tumours in this sex. The most predisposed breeds to oncological pathology were dogs of large breeds, namely German (n=48; 14.6%) and Central Asian shepherd dogs (n=23; 7%). In representatives of these breeds, benign tumours prevailed (n=75), or 54% of the total number of benign masses. Whereas malignant tumours were predominantly detected in small breed dogs, 59% (n=29). The maximum manifestation of oncological pathology in dogs, regardless of breed, was observed between 6 and 12 years of age. At the same time, with increasing age, the probability of diagnosing malignant neoplasm decreased.

To reduce the negative effect of oncological pathology on dogs, it is recommended to carry out annual screening of dogs from the age of 6 years. This will facilitate timely diagnosis of neoplasms in the body and

increase the effectiveness of treatment procedures. Firstly, such screening is recommended for dogs used for pure-bred breeding and service companion dogs. In order to accumulate knowledge about the manifestation and predisposition of dogs to oncological pathology in future studies it is planned to conduct research on the influence of sterilization of animals of both sexes on the development of tumour neoplasms in them, and to conduct genetic and selection analysis on the manifestation of oncology in related animals in different generations.

ACKNOWLEDGEMENTS

None.

CONFLICT OF INTEREST

None.

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Вплив віку та породи собак на розвиток пухлини

Алмазбек Шукурбаєвич Іргашев

Доктор ветеринарних наук, професор
Киргизький національний аграрний університет імені К.І. Скрябіна
720005, вул. Медерова, 68, м. Бішкек, Киргизька Республіка
<https://orcid.org/0000-0002-4789-5628>

Світлана Наринбеківна Ішенбаєва

Кандидат ветеринарних наук, доцент
Киргизький національний аграрний університет імені К.І. Скрябіна
720005, вул. Мадерова, 68, м. Бішкек, Киргизька Республіка
<https://orcid.org/0000-0002-0056-9366>

Рисбек Зарилдикович Нургазієв

Доктор ветеринарних наук, ректор
Киргизький національний аграрний університет імені К.І. Скрябіна
720005, вул. Мадерова, 68, м. Бішкек, Киргизька Республіка
<https://orcid.org/0000-0003-1376-6921>

Людмила Юріївна Лихіна

Кандидат ветеринарних наук, доцент
Киргизький національний аграрний університет імені К.І. Скрябіна
720005, вул. Мадерова, 68, м. Бішкек, Киргизька Республіка
<https://orcid.org/0000-0002-9371-8278>

Анотація. Збільшення чисельності собак як домашніх тварин ставить перед ветеринарними фахівцями завдання пошуку нових підходів для профілактики їх захворюваності та ранньої смертності. Вік і породу вважають основними критеріями ризику утворення пухлин у собак, тому метою цього дослідження було вивчення впливу цих і низки інших чинників на схильність розвитку онкологічної патології в цього виду тварин. Дослідження ґрунтувалися на аналізі єдиної бази даних ветеринарних клінік міста Бішкек, що включає 328 підтверджених випадків онкологічної патології у собак. Найпоширенішими породами були німецькі (n=48) і середньоазіатські вівчарки (n=23), ротвейлери (n=18), такси (n=18), пуделі (n=17), шарпеї (n=14), пекінеси (n=14), а також група безпородних собак (n=70). Доброякісні новоутворення були зафіксовані в 140 випадках, що становило 54,3 % від загальної кількості пухлин чистопородних собак. Доброякісні пухлини переважали у собак великих порід (n=75), або 53,6 % від загальної кількості доброякісних утворень, а найбільший ріст злоякісних пухлин виявили в собак маленьких порід 59 % (n=29). Собаки, незалежно від породної приналежності, виявилися більш уразливими до утворення пухлин у віці від 6 до 12 років. Під час аналізу бази даних виявилось, що у самок ймовірність онкологічної патології була вищою, ніж у самців, при цьому основним діагнозом у самок були пухлини молочної залози – 36,3 %. У дрібних порід собак ризик розвитку пухлин молочних залоз був вищим, ніж у великих собак. Отримані результати виявили породні особливості прояву морфологічних типів пухлин у собак і дали змогу визначити критичні періоди їх утворення

Ключові слова: новоутворення; онкологічна патологія; схильність; база даних; статистичний аналіз
