

## Canine von Willebrand's disease – knowledge and awareness among dog breeders and owners in Poland

AGNIESZKA ŁOBODZIŃSKA, JOANNA GRUSZCZYŃSKA

Department of Genetics and Animal Breeding, Warsaw University of Life Sciences – SGGW

**Abstract:** *Canine von Willebrand's disease – knowledge and awareness among dog breeders and owners in Poland.* Von Willebrand's disease (vWD), one of the most common congenital bleeding diatheses caused by a deficient or defective von Willebrand's factor (vWF), is found in different breeds of dogs. The objective of the study was to perform a preliminary analysis of the knowledge and awareness of von Willebrand's disease among dog breeders and owners in Poland. The online survey was addressed to dog breeders and owners, comprised 25 questions and was voluntary and anonymous. It was placed on 12 thematic Internet forums dedicated to different breeds of dogs. The respondents provided 231 answers, 76 of which were complete. The results of the survey indicate that the dog breeders and owners are highly interested in genetic tests and want more general access to scientific information. By their own admission, the dog owners and breeders have partly insufficient knowledge about vWD. Considerable gaps in their knowledge about other issues (including breeding work) were also evidenced. Being a contribution to the discussion about canine vWD, this article highlighted the need to improve the education of dog breeders and owners, and to make them aware of their role in canine health care.

*Key words:* von Willebrand's disease, coagulation disorders, *Canis lupus familiaris*

### INTRODUCTION

Von Willebrand's disease (vWD) is one of the most common haemorrhagic diatheses in dogs (Denis and Wagner 1999). It has been identified in over 50 canine

breeds (Latimer 2011), with a high prevalence (from 15 to 60%) in 10 breeds, e.g. Dobermann and Airedale Terrier, (Ginsburg and Bowie 1992), whereas mixed breed dogs are rarely affected (Brooks 1999).

This blood coagulation disorder is associated with hereditary platelet dysfunction caused by presence of defected von Willebrand's factor (vWF) in plasma, which is necessary for platelet adhesion. This leads to defects of primary haemostasis (Mischke 2012). Three types of the disease with different space of mutations and different modes of inheritance are distinguished depending on whether vWF deficiency is qualitative or quantitative (Mischke 2012). vWD variants differ in inheritance pattern, heterogeneity of gene defects, and variation in expression of the mutated gene, thus resulting in different levels of vWF : Ag concentration (Brooks et al. 2001) and heterogeneity in the clinical signs of the disease (Brooks et al. 1992). Furthermore, the heterogeneity of the disease forms can also be influenced by a number of factors that regulate vWF levels, e.g. the level of thyroid hormones and adrenaline (Meyers et al. 1990). Antithrombotic drugs or the age of puppies have little effect on vWF concentrations (Moser et al. 1996).

Reduced vWF levels increase the tendency towards spontaneous and prolonged bleeding from mucous membranes during the exchange of teeth, injury or surgery (Stokol 2012). In animals affected with vWD there is bleeding on the surface of the skin and mucous membranes. The duration of bleeding due to tissue trauma is prolonged and out of proportion to the type of injury sustained (Brooks 1992). Owners should be aware that some diseases concomitant with vWD, as well as certain drugs, infections and endocrinological disorders may aggravate the bleeding (Brassard and Meyers 1991, Latimer 2011).

Especially dog owners and breeders should have a knowledge about vWD, because it is essential not only to eliminate affected animals and vWD carriers, but also to mate animals properly based on genetic tests, after determining possible risk of the disease in puppies. However, access to relevant information is insufficient and there are no reports about the knowledge and awareness of dog breeders and owners about vWD. Moreover, in Poland the literature regarding vWD disease is scarce (Wessely-Szponder 1999, 2001 and 2003, Wessely-Szponder and Szponder 2001). Therefore, the aim of this study was to determine the level of knowledge and awareness about canine vWD among dog breeders and owners in Poland.

## MATERIAL AND METHODS

### Respondents

The survey was addressed to dog owners and breeders, interested in von Willebrand's disease as well as to the owners

of affected dogs. It was open to active members and occasional users of Internet forums. The survey was anonymous and completely voluntary.

### Survey design

The respondents were asked to complete a survey containing 25 questions. Eight of them were general questions that focused on the respondents' dogs (e.g. breed and origin) and tested their knowledge of breeding. Thirteen questions pertained to various aspects of von Willebrand's disease (vWD) in dogs: predispositions to disease, knowledge about genetic background, diagnostic methods and treatments. Four questions concerned the respondents' subjective assessment of their knowledge and awareness regarding vWD and dog breeding methods in their broadest sense. The study was performed online and was generated and conducted through website [www.moje-ankiety.pl](http://www.moje-ankiety.pl). The survey was made available, between May and October 2012, at 12 internet forums for breeders of dog breeds in which the disease was detected and at forums dedicated to the breeding of purebred dogs, in thematic sections on canine health. Once the web survey was accessible (<http://moje-ankiety.pl/respond-24155.html>), the respondents were able to complete it and their answers were automatically sent to the platform, while the authors could monitor, correct and gather the data for later processing. Most questions were closed-ended (18) and the participants were allowed to choose one of the suggested answers, most of which were Yes or No. Open questions were in the minority (7 out of 25). Some semi-open questions provided space to allow participants to choose their own answers

or to justify their choice. Some questions were of the multiple-choice type and allowed the respondents to select several answers they felt were appropriate. The respondents were also permitted to give no answer to a question. In case the survey question was unclear, the respondents could leave a comment or note in the designated area. All participants were asked the same questions.

In the survey the names of the breeds followed the FCI Nomenclature of Dog Breeds, taking into account Polish nomenclature of breeds ([http://www.zkwp.pl/zg/regulaminy/Systematyka\\_ras\\_FCI.pdf](http://www.zkwp.pl/zg/regulaminy/Systematyka_ras_FCI.pdf), 2012).

#### Data analysis

Data were analysed based on the respondents' answers. Surveys sent to the designated area on the platform were taken into account, even if they were incomplete. Because all the answers from all the surveys were analysed, a percentage result for the total number of answers obtained was given for some of the questions. The results of the survey were used not only to estimate the knowledge and awareness levels, but also to gather maximum information based on the individual experiences of the respondents. Basic statistical parameters, the proportion of particular answers and figures were prepared using Microsoft Office Excel 2007.

## RESULTS AND DISCUSSION

A total of 231 respondents (breeders and dog owners) filled in the survey. Unfortunately, only 76 people (33%) returned completely filled surveys. Dog owners

and breeders were less willing to answer open and semi-open questions, which required more of their time and effort, especially with regard to the questions concerning vWD. However, many more respondents answered multiple-choice and closed-ended questions.

Below we present a summary of the survey results, paying special attention to the answers concerning vWD. The answers obtained from the questionnaire survey show that it is not possible to determine the incidence of canine vWD in Poland or to make definitive conclusions about the attitudes of dog owners and breeders.

Out of 94 respondents, 11% had Shetland Sheepdogs while the others owned other breeds (82%) or mixed breed dogs (7%). Seventy-three percent out of 107 respondents had dogs from breeders.

Ninety-three percent of the respondents (out of 71 people) agreed that information obtained from molecular diagnostic tests and provided in the pedigree can be of benefit to dog breeders or owners. According to the International Breeding Rules of the FCI, a stud book can be published by the Polish Kennel Club or another national kennel club recognized by the FCI, and although it does not guarantee the quality of the dog, it states its origin (provides information about the dog's ancestors), which prevents buying a dog from a puppy mill. By buying a puppy with a pedigree certificate, we know that it meets the breed standard. What is more, litter information sheet contains all notes about possible defects and imperfections.

All the respondents knew that dogs are afflicted with genetic diseases, but almost half of them considered

their knowledge on that subject to be insufficient, especially with regard to vWD. The available literature provides information about the dog breeds in which a given disease was noted (Latimer 2011) and which breeds of dogs are predisposed to certain types of vWD and which breeds are sporadically affected (Ackerman 2011). The majority of respondents knew that some breeds of dogs are predisposed to particular genetic conditions. Sixty-one percent of the respondents (out of 76 people) heard that genetic molecular tests (DNA analyses) for canine genetic diseases can be performed in Poland, 13% of which concerned vWD analyses. The respondents were aware of the benefits that breeders have using genetic test in breeding practice as well as their increasing popularity and usefulness in diagnosing many serious conditions, and in identifying the carriers and affected dogs early in life. However, they pointed out that the tests are expensive, there are no accredited laboratories that perform these tests, and some veterinary doctors have incomplete knowledge about the disease. Furthermore, unlike in Great Britain, for example, dog owners and breeders in Poland are not obliged to perform genetic profiling of particular animals. Unfortunately, the respondents mistakenly believe that genetic tests are universal regardless of species or breed. The respondents' answers demonstrate the need to prepare training programmes for breeders and veterinary doctors, and to make available regularly updated information to the public for educational purposes.

It follows from the questions concerning vWD that most respondents (70% out of 76 people) would not de-

cide to buy or intentionally mate dogs affected with vWD or dogs carrying the vWD gene. The fear of genetic defects (including von Willebrand's disease), which eliminate potential sires from breeding, discourages buying and mating a dog carrying the vWD gene.

The results obtained showed that knowledge in this area is insufficient and suggested that more attention should be devoted to these issues, because half the respondents had no knowledge of the frequency of vWD in certain breeds of dogs. Yet, the respondents were correct in indicating the most vulnerable breeds (Fig. 1). The largest percentage of answers pointed to Dobermann as the breed genetically predisposed to vWD. Johnstone and Crane (1981), Ginsburg and Bowie (1992), Riehl et al. (2000) and Mattoso et al. (2010) estimated the incidence of vWD in this breed to exceed 60%. Bell (2011) showed that inbreeding affects more than 60% of the Dobermann population due to deliberate increase in homozygosity. Most of the 76 respondents (86.84%) knew that inbred mating, which increases homozygosity (inbreeding) in offspring, can be a deliberate breeding practice, while 92.11% of the 76 respondents realized that this carries the risk of genetic defects. In fact, the genetic tests and the screening programme developed for Dobermann dogs make it possible to identify affected dogs and carriers so as to replace these dogs with healthy individuals through proper selection of offspring for further breeding. The incidence of vWD in Dobermann dogs in Poland was found to be similar to that in other countries (Wesely-Szponder and Szponder 2001). The diagnostic tests used in Dobermann dogs

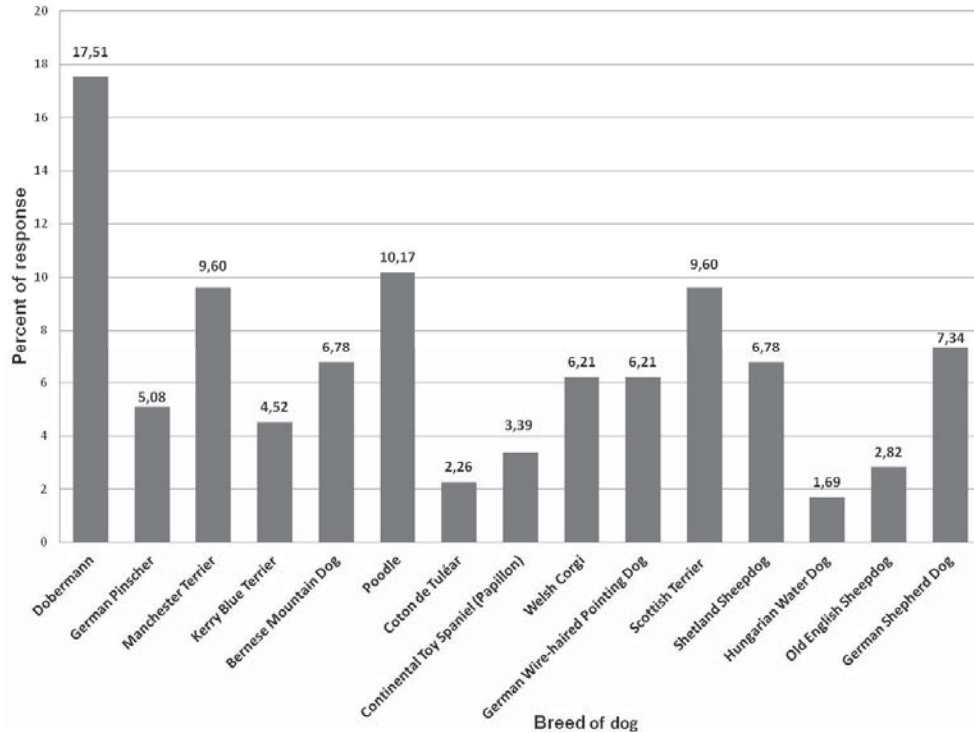


FIGURE 1. Percentage of answers to the question “Do you know that some breeds are genetically more/less predisposed to vWD?” (a total of 177 respondents)

enabled the identical mutations to be detected in Poodle and Manchester Terrier dogs (Venta et al. 2004, Boudreaux 2012). Along with Scottish Terrier, German Shepherd Dog, Shetland Sheepdog and Bernese Mountain Dog, these breeds were indicated by the respondents to be particularly predisposed to vWD (Fig. 1). This is in agreement with the results of Johnstone et al. (1993) for Scottish Terrier, Raymond et al. (1990) and Pathak (2004) for Shetland Sheepdog, Arnold et al. (1997) for Bernese Mountain Dog, and <http://fallingbranch.com/library/vonwill.htm> for German Shepherd Dog.

The answers sent by the 76 respondents show that the disease was diagnosed in 6 dogs, which included three cases of

type 1 (the mildest and most common form of the disease; depending on mutation type, it may have either recessive or dominant inheritance), one case of type 2 (bleeding is much more serious; associated with an autosomal recessive gene) and two cases of type 3 vWD (the most acute and life-threatening form; associated with an autosomal recessive gene). Most respondents admitted that no vWD was diagnosed in their dogs, but the possible reason was that the dogs were not tested for these conditions. This was probably due to the fact that the respondents were unaware of vWD, and did not need and had no possibility of conducting such tests in their breeding practice. Only one person performed tests at

a commercial laboratory, and the more active group of breeders declared that they only choose properly tested animals for breeding and refuse to mate dogs if they have no test results.

Most out of the 76 respondents (72%) admitted that their current knowledge of vWD is inadequate (Fig. 2). In addition, 39% of them have difficult access to information of interest and 71% of respondents would be interested in expanding their knowledge of vWD. Therefore, the respondents' answers show that dog owners and breeders realize that access to information about vWD is difficult.

The results of the present survey show that the dog owners and breeders have, by their own admission, little knowledge about vWD. Considerable gaps in their knowledge about other issues (includ-

ing breeding work) were also revealed. The Internet definitely serves as one of the main sources of information about the possible symptoms of vWD, the diagnostic methods and curative therapies, but it is not always the appropriate route to reach potential dog owners and breeders. Because the level of respondents' knowledge is low, it might be necessary to use other methods of disseminating the knowledge of vWD. Perhaps the introduction of mandatory routine tests identifying different types of vWD and distinguishing this syndrome from other bleeding diseases, especially in the representatives of genetically predisposed breeds, would make the breeders aware of the scale of the problem (Wessely-Szponder 2001).

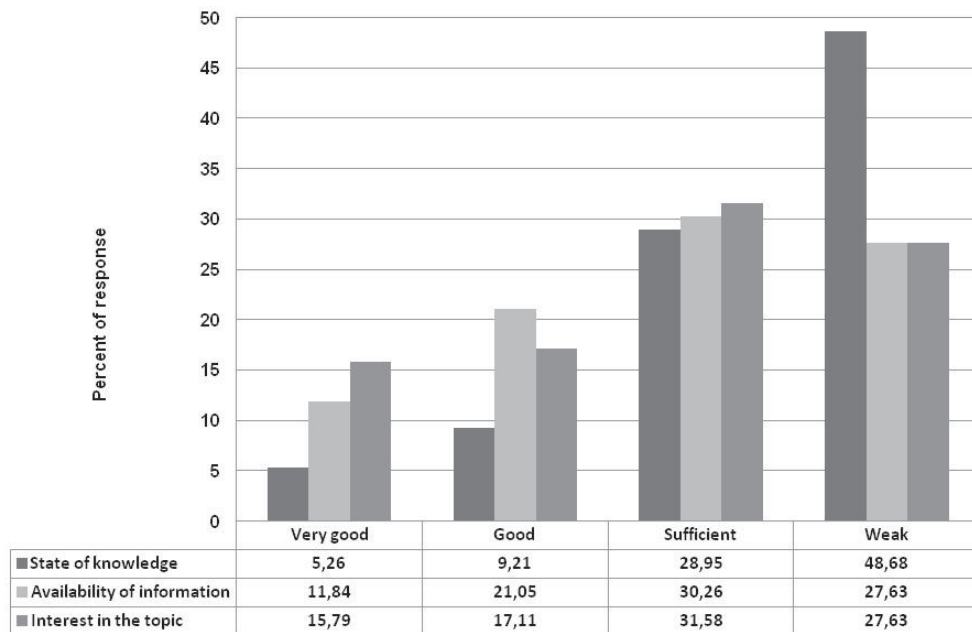


FIGURE 2. Percentage of answers to the question “Please summarize your observations and determine the degree that reflects your opinion on this subject. Use space under the table for possible comments” (a total of 76 respondents = 100%; percentages do not add up to 100 because respondents were allowed to select 4 answers)

To date, studies on canine vWD in Poland have been very rare (Wessely-Szponder and Szponder 2001). If conducted, they usually covered a small group of patients and failed to approach the problem comprehensively, often disregarding the key aspects of the disease. In contrast, international studies are conducted on a much greater scale and represent higher standards. Tightness of funds is only one of the factors limiting the development of scientific research and new technologies in Poland. Many laboratories are very well equipped and can perform such genetic tests provided that there is demand and interest from breeders. The results of studies conducted in foreign centres are used to create databases, which are valuable sources of information for breeders. Being a contribution to the discussion about canine vWD, the present article highlighted the need to improve the education of dog breeders and owners, and to make them aware of their role in canine health care.

## CONCLUSIONS

Analysis of the results enabled us to make the following conclusions:

1. The respondents stated that pedigree certificate is considered an important document which guarantees the dog's origin, while the results of molecular tests included in the certificate provide valuable information for dog breeders and owners.
2. The respondents mistakenly believe that genetic tests are universal regardless of species or breed.
3. In the analysed group, the respondents with low knowledge and awareness regarding vWD showed their willingness to expand their knowledge in this area.
4. It was considered necessary to create a platform for exchanging data and observations between dog owners, dog breeders and veterinary doctors, and for researchers to provide updated information about the availability of diagnostic tests.

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**Streszczenie:** *Choroba von Willebranda u psów – stan wiedzy i poziom świadomości hodowców i właścicieli psów w Polsce.* Choroba von Willebranda (vWD) jest jedną z najczęściej występujących wrodzonych skaz krwotocznych, spowodowaną niedoborem bądź zaburzeniem czynnościowym czynnika von Willebranda, odnotowaną wśród psów różnych ras. Celem pracy była wstępna analiza stanu wiedzy i poziomu świadomości na temat choroby von Willebranda wśród hodowców i właścicieli psów w Polsce. Dlatego też w jej realizacji przeprowadzono ankietę skierowaną do hodowców i właścicieli psów. Ankieta on-line zawierała 25 pytań, wypełnienie jej było dobrowolne i anonimowe. Została ona umiesz-

czona na 12 wybranych tematycznych forach internetowych, dotyczących różnych ras psów. Od respondentów otrzymano 231 odpowiedzi, z czego 76 pełnych. Wyniki ankiety wskazują, iż hodowcy oraz właściciele psów są niezwykle zainteresowani problematyką testów genetycznych, pragną bardziej powszechnego dostępu do informacji naukowej. W pewnym stopniu właściciele i hodowcy psów posiadają niewystarczający zasób wiedzy dotyczący vWD, co sami przyznali w ankiecie. Także w zakresie innych zagadnień (m.in. pracy hodowlanej) stwierdzić można znaczne jej braki. Niniejszy artykuł jest głosem w dyskusji na temat vWD u psów, który jednocześnie ujawnił potrzebę szerszej edukacji hodowców i właścicieli psów, a także konieczność uświadomienia im roli, jaką pełnią w ochronie zdrowia psów.

*MS. received in November 2013*

**Authors' address:**

Joanna Gruszczyńska  
Wydział Nauk o Zwierzętach SGGW  
Katedra Genetyki i Ogólnej Hodowli Zwierząt  
ul. Ciszewskiego 8, 02-786 Warszawa, Poland  
e-mail: joanna\_gruszczyńska@sggw.pl