

TDK THESIS

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Unconventional feeding methods in dogs and cats

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List of abbreviations

AMR – antimicrobial resistance

BARF – biologically appropriate raw food

CDC - The Centers for Disease Control and Prevention

DHA - docosahexaenoic acid

EPA - eicosapentaenoic acid

EU – European Union

FEDIAF – Europe Pet Food Industry Federation

GHG – greenhouse gases

GI tract – gastrointestinal tract

MB – meat-based

MSM - methylsulfonylmethane

PB – plant-based

RAP – raw animal products

RMBD – raw meat-based diet

YOPI - younger, older, pregnant, immunosuppressed humans

Vet – veterinarian

WHO – World Health Organization

1. Introduction

In recent years it appears that pet owners' feeding management and trends have shifted. Previously dogs, especially, got parts of their diet from leftover human foods and table scraps, as in the present time they are getting more specialized diets, commercial pet foods, and home-cooked meals. [1] Families expand consecutively with pets in the modern world. [2] Dogs, cats, and other pets are considered family members rather than useful objects for humans' way of living, such as hunting for vital food and protection. Pets have been shown to be great company, not only for families but also in special cases for lonesome, anxious, and/or socially struggling children during teaching. [3] At the same time as the household expands, the market for pet foods has also expanded crucially in the last couple of years. Options are endless, and it can easily be overwhelming when it comes to food and diets for our companion animals. [4]

Understanding the pet owners' motivation behind their feeding method of choice and gaining knowledge about it might improve communication between the veterinarian and the owners. Knowledge of feeding management is important for veterinarians since many owners might need to consult them regarding their pets' nutritional requirements or given that the veterinarian might have to recommend dietary changes in the event of diseases such as obesity, urinary tract disorders, or organ failures where restriction or additional nutrients are required. [1] Keeping track of all the new feeding alternatives can be challenging with unlimited sources of information, especially on the internet. Understandingly this can be overwhelming for all parties, it's of big significance that veterinarians base their knowledge on published studies and facts, whereas many of the new diets on the market might not be founded by long-term trials and well-established results. [2]

Seeing as owner-pet relations has changed at the same time as feeding management, new questions and problems arise. Owners and their companion animals live closer together, and our bacteria flora and ecosystems are intertwined. "The Centres for disease Control and Prevention (CDC) indicates that six out of every ten known infectious diseases in humans derived from animals." [3] Some individuals are more susceptible to zoonotic diseases, for instance, those in the category of YOPI- younger, older, pregnant, immunosuppressed humans. The severity of zoonotic cases varies. For one thing, if affecting the above-mentioned group, the consequences can be dreadful, leading to isolated incidents of disease or even a fatal outcome. On the other hand, it can have tremendous and extensive

consequences as the world recently experienced with the covid-19 pandemic which allegedly came from an animal-human interference. [3]

The pathogenic connection between pets and owners are very important, and so are the animals' nutritional demands. Diets that are growing in popularity include raw-meat-based diets, vegetarian and vegan diets for both dogs and cats. [5] The foundation of some diets is built on the animals' ancient fundamental needs, however, evolution, the rapid breeding, and the contemporary lifestyle of dogs and cats are very different from what it once was.

This thesis will look further into some feeding methods; raw feeding, vegetarian and vegan diets of dogs and cats. Their advantages and disadvantages will be investigated further and so will the owners' motivation behind the decision of choosing these unconventional pet diets. Concerns and consequences related to meeting nutritional needs will be discussed in details and the effects these diets might have on owners' lives and our environment.

2. Literature review

2.1 Changing trends

The feeding of our companion animals is not an easy task. There are many factors to balance for a suitable feeding scheme, including the health of the animals, their nutritional requirements, sustainability in connection to the environment, and safety in relation to pathogens. The upcoming trend of homemade recipes for pets has a reputation of abounding health benefits, even though cases of malnutrition and deficiency syndromes can be seen. [2] One of the main diets in focus which has increasing popularity is the raw meat-based diets (RMBD) or also known as biologically appropriate raw food (BARF). It is based on uncooked ingredients of animal origin, either store-bought frozen or fresh ingredients or homemade. The other diets trending on the market are plant-based (PB) diets, either vegetarian or vegan. These can be both homemade or store-bought in form of kibbles. [3,6]

The human way of living has changed a lot in the last decades. Our relationship with animals has changed in addition, especially in developed countries. Our companion animals are living very close to us, some even share beds, food and are considered to be an important part of the family. This close relationship has been proven to give humans better lives, both social and psychological. [3] However, this relation has been shown to increase the transmission of zoonotic diseases. The Centers for Disease Control and Prevention (CDC) expresses that each year thousands of incidents are reported in regard to disease transmission between humans and their contact with animals in different sectors. It's especially important

that therapy animals who work with individuals in the risk groups are healthy and that the possibility of them infecting humans are limited. [3] The challenging aspects of cross-contamination developed *the One Health Approach*, focusing on human and animal health in one big picture, co-depending on each other. [3]

It requires clear communication between multiple organizations to monitor and develop proper strategies to reduce the hazard. The World Health Organization (WHO) also announced that there are large financial aspects related to this topic. [3] It is important to know how to encounter microbiological contamination concerns to reduce the risk, ergo the awareness of zoonotic diseases and legitimate informative sources are crucial. Not only is this a macroscopic dilemma, but individuals are also a part of this. In this case, especially owners dealing with BARF have a responsibility to handle it thereafter. The Advisory Committee on the Microbiological Safety of Food (ACMSF) has categorized RMBD as an emerging risk in the UK, and they are not alone in that perception of the matter. [5]

2.2 Nutritional needs and evolution

The numerous factors involved in the topic of pet feeding can be overwhelming and perhaps not the easiest task. Looking at them independently, however, might improve the understanding of the complexity of the case. Firstly, let's look at the nutritional requirement of dogs and cats. They need a relatively high protein amount and also their energy demand is high. The most convenient protein and energy sources are derived from animal origin. This is the main source in conventional kibbles and wet-food for both dogs and cats, but as mentioned earlier raw animal materials are becoming more popular. [7] Owners are often convinced that it is more natural and safer for their four-legged family members. Some are promised improvements in behaviour, stability in mood, weight loss or gain, change in stool whereas colour, odour and amount are more preferable for the owners. These advantages are generally based on owner feedback. [3] However, signs of better digestibility of crude proteins, decreased amount of feces and dental benefits have actually been seen in some cases. [8, 9]

A strong argument for RMBD and BARF type of diets is that our companion animals are natural carnivores and need animal products as their ancestors did. They were hunters with sharp teeth and claws made for meat-slicing and cutting. While on the contrary our pets today have changed a lot from their ancestors, not only visible but also internally. Dogs' gastrointestinal (GI) tract have been shown to be more omnivores like humans, which have fed them since domestication happened as wolves adjusted to human scraps given to them.

[3] It is proved that they are more omnivores as the biochemical adaptations facilitating this includes gene expression for pancreatic amylase, the conversion of maltose to glucose and its increased intestinal uptake of it. Evolution has also made it possible for them to digest carbohydrates and live on lower protein content. [6] Cats on the other hand are another story and still require amino acids derived from animal origin. Although their diet is mainly prey-dependent, their capability to consume plant-based foods has increased significantly compared to their ancestors. [3] Some cat foods which are only based on plants are available, however, it is not as common as PB dog food. [10]

A factor that is important to take into consideration when preparing a home-made diet is that a dog is not only “a dog”, meaning their nutritional requirements might be based on the same foundation, nonetheless, it is important to look at the different and changing nutritional profiles of the animals to prevent malnutrition and deficiencies. [6] From their extensive growth as puppies, their physical activity throughout life, pregnancy, lactation, aging, and also the breed differences have to be considered. There are huge differences in requirements throughout their entire life and “Preparing the appropriate diet needs specific knowledge.” [3] Not only proteins and energy are important, but also vitamins, minerals and trace elements. This can be a very difficult and maybe an impossible variable to take into consideration for owners, especially if they do not discuss it with their veterinarians, as many are shown not to. [1,4]

Nutritional balance and requirements are fluctuating. Imbalance can also be an issue in animals slaughtered for consumption. This can be excessive vitamin A intake which can cause hypervitaminosis, especially in pork liver diets, which is prohibited by EU regulations. Another vitamin that can cause problems are vitamin E, which plays a very important role in the antioxidant system. Fish-based diets too high in unsaturated fatty acids and too low in vitamin E can cause pancreatitis, also known as yellow fat disease. Minerals and trace elements like calcium insufficiency and excessive phosphorus can cause osteodystrophy in dogs and cats. Furthermore, other hormonal disturbances can also develop like dietary hyperthyroidism. [3]

Obesity and life-style diseases are becoming more evident in the western-world and our pets are influenced by this. Too much sugar, fat and salt play a significant role in this, excessive amounts of nutrients causing diabetes, cardiovascular diseases, growth problems and even cancer are increasing. Treats and extra food are often a sign of affection from owners, but in excess, it will cause harm. [1]

2.3 Raw feeding and pathogens

Special preparation is important when preparing raw food, thereby taking into consideration the pathogens. One of the pathogens posing a risk is Salmonella, which even with proper hygiene is not possible to get rid of. Human infection may lead to severe illness, especially in immune-suppressed individuals and in households with younger children, this is important to be aware of. [3, 11] The source of infection is indirect and direct contact. Raw chicken and lamb meat are often the sources, but even vegetables or herbs used in homemade meals can be the origin. Without any kind of heat treatment, pets can transmit it through their faeces. [12]

Other pathogens such as E. coli, clostridium and campylobacter can also be detected. The percentage found in stool samples of companion animals fed with RMBDs has shown to be significantly increased compared to those fed commercial dry food. An important concern to emphasize is that in a study where thirteen out of twenty-five faecal samples showed increased amounts of E. coli, where all of them were resistant to three or more antibiotic classes. [12] Antimicrobial resistance (AMR) is a big problem for the future, and raw meat diets can be one of the possible transmission routes of resistant bacteria or genomes. This shows us that the food safety perspective is of high importance and awareness should be raised. [11]

The risk of possible parasite infections are also increased, especially toxoplasmosis in cats. Shedding of bacteria and parasites are very difficult to control and can affect animals, owners and the environment. Even though the range of definitive hosts are very varied and might not infect the dog or cat itself, they can infect humans or further hosts. An example of this can be Sarcocystis species. [3]

2.4 Plant based diets and the environment

Trends have not only shifted in the way of raw feeding, whereas plant-based diets are also getting more forthcoming. In the last decade, PB products are increasing and more people are considered to be vegetarian, vegan or other categories in that genre. [10] This also leads us towards the topic of environment, sustainability, and ecological paw prints (EPP) of pet-keeping. The number of pets are continuously increasing according to FEDIAF. Raw diets have a large impact on the EPP because of the high energy and protein demand it requires. Plant-based options are more environmental-friendly, not only for humans but also in the pet-food industry. Plant-based diets require a lot less water and energy to be produced and the greenhouse gases (GHG) are reduced. [3] Vegetarian and vegan owners might be facing

a moral conflict when deciding the diets of their pets. Their own reasons for choosing this type of diet might not apply to their pets, as needs are different from species, but the awareness of this might be conflicting. It is believed that the consumption of animal products might increase the risk of heart disease, diabetes, obesity, cancer, and more in humans. This is a strong argument for eating plant-based, especially when including the large environmental impact the meat production has. [8,11] Even though there are many health benefits associated to humans, not much evidence has been published in regards pets yet. [10]

When comparing dogs and cats, their nutritional requirement and their GI tract are very different. Dogs becoming more omnivores and cats do not have the same selection pressure. Their nutritional profiles are quite different, and this is important for preventing diseases and malnutrition. Ingredients have different bioavailability in the intestines depending on the specie and in combinations with other ingredients. [6] Dogs have shown to tolerate and be in balance when eating all plant-based, but for cats on the other hand there is no such evidence yet, only owners' perception of the benefit of their cats. [13]

Intentions behind both raw diets and plant-based feeding schemes are caring, and the owner's aspiration for a long and healthy life for their hairy family members is strong. [1] Gathering and preparing the meals are a way of showing affection from the owners' angle. The consequences of the owners' preparations are often much bigger than they might imagine. Websites, books and recommendations from other people rarely inform or warn the owners about the disadvantages as the authors might be more biased. The knowledge of owners may be limited and the diets can cause a nutritional imbalance in most cases for the animals, especially in regards to Ca/P ratio, vitamins A, E and D. Studies both in the US and Europe show this. [3]

3. Aims

The goal of this thesis is to investigate owners' motivation behind their feeding regime. Mainly behind the decision of using meat-based (MB) or plant-based diets (PB). A hypothesis is that owners apply alternative diets out of love and care, and not based on scientific research. It is speculated that the source of information used by the owners are not from veterinarians, questioning the veterinarian-client-patient relationship. There are recognized risks and concerns in relation to these unconventional diets, this being the case,

the awareness of risks are investigated. Altogether the foundation of encouragement, source of information, relation to veterinarians, and awareness were investigated further.

4. Materials and methods

4.1 Data collection

An online questionnaire was created and published in three Facebook groups. One associated with raw feeding (“Raw food diets for dogs and cats” with 2500 members, another with plant-based diets (“vegan dog food” with 19 000 members), as well as a Norwegian hunting dog forum (“Beagle Norge” with 5200 members). As the groups had very strict rules, only the questionnaire in the Norwegian hunting dog forum was allowed to stay open in the group. Administrators of the two other groups did not approve of the questions involving options for both PB and MB diets. They believed it should be separated, and therefore taking the questionnaire down on the first day. The data were collected in the fall of 2021, from November to January 2022.

There were forty-two questions formed for each questionnaire. Two separate questionnaires were made, “feeding methods-dogs” and “feeding methods-cats”, these will be referred to as questionnaire one and two. Eighty-five responses were collected for questionnaire one, and eight for questionnaire two. The nature of the questions consisted of single-choice, multiple-choice and free-text formats where the participants could describe further if the set statements did not apply to them.

4.2 Participants

It was expected a larger audience and a wider range of participants. Since the survey was taken away from two out of three Facebook groups, the participants were mostly Norwegians with hunting dogs and the dominant feeding scheme was MB. Regarding the cat survey, eight people started the questionnaire, however, only six completed it, which does not give representative results and therefore will not be discussed in detail.

4.3 Questionnaire content

The questionnaire content was based on previous publications and split into sections.

Section one – information about the owner: sex, age, locality, geographical area, highest education, household, people at risk in the household, owner’s dietary preferences.

Section two – information about the dog: age, sex, breed, activity, number of dogs.

Section three – relation to veterinarians: “How often do you take the dog to a veterinarian?”, “How much do you trust the advice of veterinarians in general?”, “How often and under what circumstances do you discuss the dog's diet/nutrition with your veterinarian?”, “With respect to pet nutrition, to what extent do you trust veterinarians as a knowledgeable resource?”, “Does your veterinarian approve of your dog's diet?”,

Section four - owner's attitudes regarding feeding: Please indicate your level of agreement with the statements (Eating organic or all-natural foods are important to me; I am very conscious of what I eat and where it comes from; am very conscious of what my dog eats and where it comes from, I feel that I am knowledgeable about my pet's nutrition, Grains are a common source of health problems in animals), How important is the role of nutrition to the health of your pet?

Section five – current diet: Where do you get your pet's food from? Which feeding method do you use? What specifically made you choose that diet? Where did you first learn about alternative feeding methods for pets? How did you establish your dog's current diet? Do you regularly apply dietary supplements?

Section six and seven – alternative diets: Reasons for electing to feed raw/plant-based, What risks are you aware of associated with feeding a raw/plant-based diet ?, Since you have been applying raw/plant-based feeding have you noticed any symptoms in your dog?, Concerning the raw food handling practices which statement is true?, What precautions are taken to prevent disease transmission when preparing raw animal product meals for your pet?, What does your dog eat most of the time (their main diet)? Which raw animal product(s) do you use?

The same type of questions was also asked in questionnaire two.

5. Results of questionnaire one (dogs)

5.1 Section one - Information about the owner

There were eighty-five self-recruited participants in section one. There was a larger representation (n=58, 68.2%) of female responders. The most represented age group were between 25-34 (n=25, 29.4%), followed by 35-44 (n=22, 25.9%) and 45-55 (n=20, 23.5%). Thirty-five (41.7%) of the participants lived on the countryside, eighteen (21.43%) in villages, seventeen (20.24%) in cities and fourteen (16.67%) respondents lived in towns. The majority lived in bigger households, categorized as “family” (n=41, 48.2%), thirty (35.3%) lived in couples and thirteen (15.3%) lived alone, only one participant lived in a shared

apartment (1.2%). The level of educational segmentation showed that the majority (n=68, 80.9%) of the responders had completed higher education, whereas twelve (14.3%) completed secondary school, and four (4.8%) had primary school as their highest education.

Thirty-nine out of a total number of eighty-five participants had household members at risk. Four respondents reported having more than one category. As **Figure 1** shows, the main represented group was children from 3-10 years old (n=15). Ten respondents had children below 3 years, nine lived with chronically ill/immune suppressed individuals, five with pregnant women and four with elderly above 75 years old.

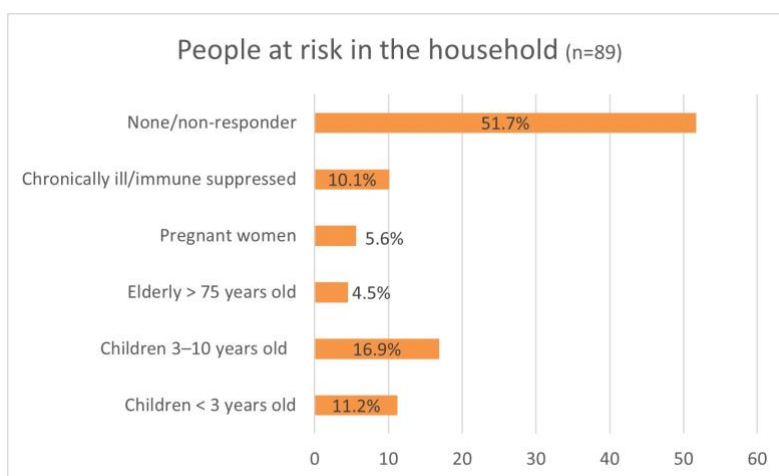


Figure 1

Participants' answers to if they lived in households with people at risk, multiple answers were allowed.

Further questions were asked about the owners' dietary preferences. A greater number of the respondents (n=76, 91.6%) selected omnivore as their own dietary choice. Only two individuals answered vegetarian (2.41%) and one pescatarian (1.2%). One individual followed a raw meat ("carnivore" diet).

5.2 Section two - Information about the dogs

After gathering facts about the participants, a few questions were asked to obtain information about their dogs, such as their age, sex, breed, and activity. The age of the dogs was widespread, twenty-three of the dogs were 3-5 years old (28.1%), nineteen were 1-3 years old (23.2%), eighteen were below 1 year of age (21.95%), fourteen were 5-7 years (17.1%). Fewer dogs were 9-11 years (n=4, 4.9%) and above 11 years (n=4, 4.9%).

Concerning the sex, it was established that forty of them (48.78%) were intact females and thirty-six (43.9%) were intact males. Seventy-four of a total of seventy-five answered that they were from Norway, considering that, it is natural that only four (4.9%) answered

“female, spayed” and two (2.5%) had a neutered male, as neutering dogs without a medical reason is not allowed in Norway.

The percentage of represented dog breeds are shown in **Figure 2** and was as follows: 59.3% (n=48) beagles, 37.0% (n=30) other breeds, mostly hunting dogs, and 3.7% (n=3) had mixed breeds.

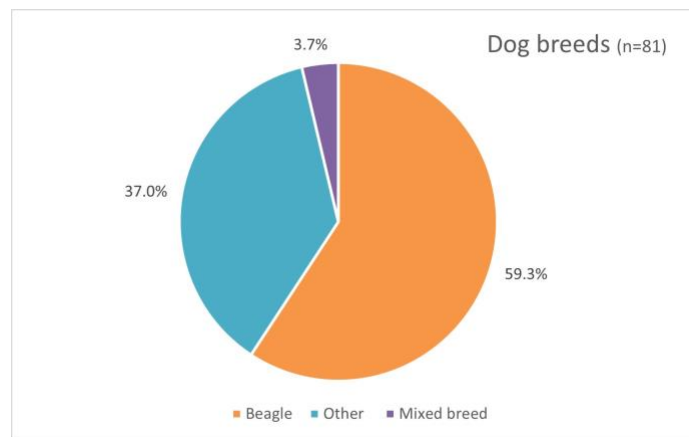


Figure 2

Dog breeds in percentage owned by the respondents, showing the majority having beagles.

The activity of the dogs was asked in a free-text format, thereby making the participants answer specifically what kind of activity they used their dogs for. The answers were categorized into six sections, shown in **Figure 3**. There were seventy-one respondents, and some of the participants reported more than one activity, giving a total of seventy-four reported cases. Hunting was the most common activity (n=40, 54.1%), followed by tracking (n=4, 5.4%), running (n=2, 2.7%), hiking (n=2, 2.7%), and other activities (n=8, 10.8%) including nose-work n= 2; search and rescue n=2; skiing, n=1; babysitting, n=1; dog shows, n=1; obedience, n=1). No specific activity was reported for 18 (24.3%) dogs.

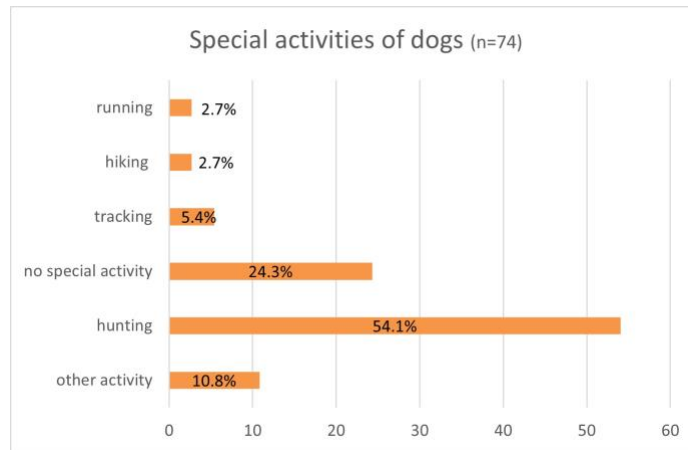


Figure 3

Special activities the participants used their dogs for, showing hunting as the main activity, multiple answers were allowed.

The last question in this category was if they had any other dogs. Fifty-one participants answered, and thirty-two skipped the question. Most of the respondents (n=39, 76.5%) specified that they had only one dog, and twelve (23.5%) had more.

5.3 Section three - Owners' attitudes regarding food

"How important is the role of nutrition to the health of your pet?" were asked. The majority (69.4%, n=50) answered "very much", twenty (27.8%) said "somewhat" and two (2.8%) did not know. Next, statements were given, in **Table 1** the claims, responses, and percentages can be seen. The participants answered in the level of agreeability. Twenty-four respondents answered that they "agreed somewhat" on the importance of eating organic or all-natural, twenty-two were "neutral", six "disagreed somewhat", six others "disagreed strongly", and two respondents "did not know". Forty-seven agreed "somewhat" to the claim of being conscious about their own food, twelve "agreed strongly" and ten considered themselves "neutral" to the claim, only two "disagreed somewhat". Thirty-two people "agreed somewhat" on them being conscious of what their dog ate and where it came from. Twenty-three "agreed strongly", nine were "neutral", four "disagreed somewhat", three "disagreed strongly" and one "did not know".

The statement "I feel that I am knowledgeable about my pets' nutrition" received thirty-six responses that "agreed somewhat" to the claim, twenty-five "agreed strongly", seven were "neutral", two "disagreed somewhat", one "strongly" and one "did not know". The last statement was the importance of grains being a common source of health problems in animals. Twenty-one answered "agreed somewhat", eighteen selected that they "did not know", thirteen were "neutral", ten "agreed strongly", six "disagreed somewhat" and four "disagreed strongly".

Table 1

Statements given related to eating habits and consciousness of the participants. The participants answered with level of agreement, they are viable in both number of responses and percentages.

	Agree strongly	Agree somewhat	Neutral	Disagree somewhat	Disagree strongly	I do not know
Eating organic or all-natural foods is important to me. (n=72)	16.7% (n=12)	33.3% (n=24)	30.5% (n=22)	8.3% (n=6)	8.3% (n=6)	2.8% (n=2)
I am very conscious of what I eat and where it comes from. (n=71)	16.9% (n=12)	66.2% (n=47)	14.1% (n=10)	2.8% (n=2)		
I am very conscious of what my dog eats and where it comes from. (n=72)	31.9% (n=23)	44.4% (n=32)	12.5% (n=9)	5.5% (n=4)	4.2% (n=3)	1.4% (n=1)
I feel that I am knowledgeable about my pet's nutrition. (n=72)	34.7% (n=25)	50.0% (n=36)	9.7% (n=7)	2.8% (n=2)	1.4% (n=1)	1.4% (n=1)
Grains are a common source of health problems in animals. N=72	13.9% (n=10)	29.2% (n=21)	18.1% (n=13)	8.3% (n=6)	5.5% (n=4)	25.0% (n=18)

5.4 Section four – Owners’ relation to veterinarians

A few of the questions were asked about the veterinarian-client-patient relationships. **Figure 4** displays the eighty-two responses to the question on how often they took their dog to the veterinarian, forty-six (56.1%) individuals chose “about once a year”, twenty-five (30.5%) selected “more than once a year” and eleven (13.4%) “less than once a year”.

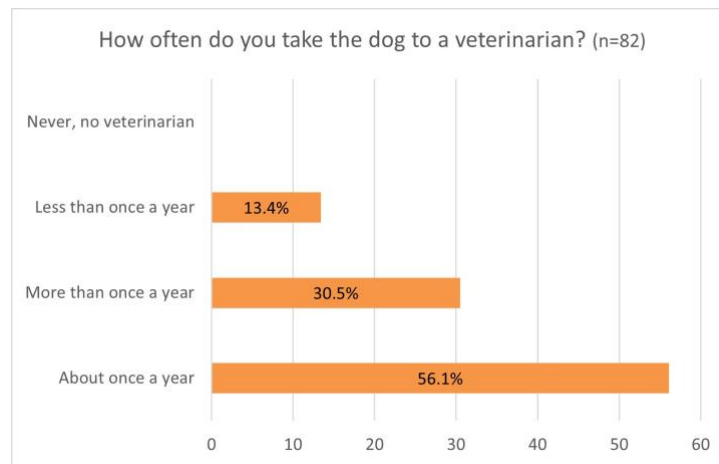


Figure 4

Answers showed in percentage in regard to how often owners take their dog to the veterinarian.

Continuing, the next question was about how much trust was put in veterinarians in general, as shown in **Figure 5**. Out of eighty-two answers, fifty-three (64.6%) selected “very much”, twenty-seven (32.9%) “somewhat” and two (2.4%) answered “not very much”. The trust owners put in the veterinarians as them being a knowledgeable resource with respect to nutrition are shown in **Figure 6**. Thirty-eight (46.9%) answered “very much”, thirty-one (38.3%) “somewhat”, furthermore “a little” and “not very much” both were chosen by six participants (7.4% - 7.4%).

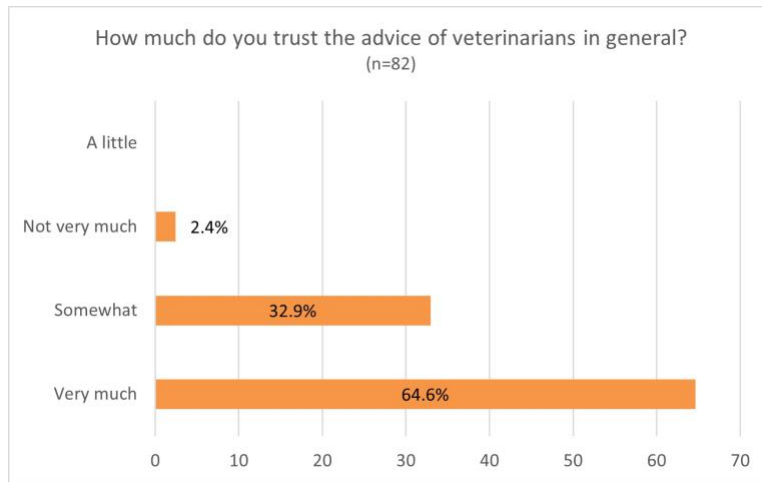


Figure 5
How much owners trust advice of veterinarians in general, displayed in percentages.

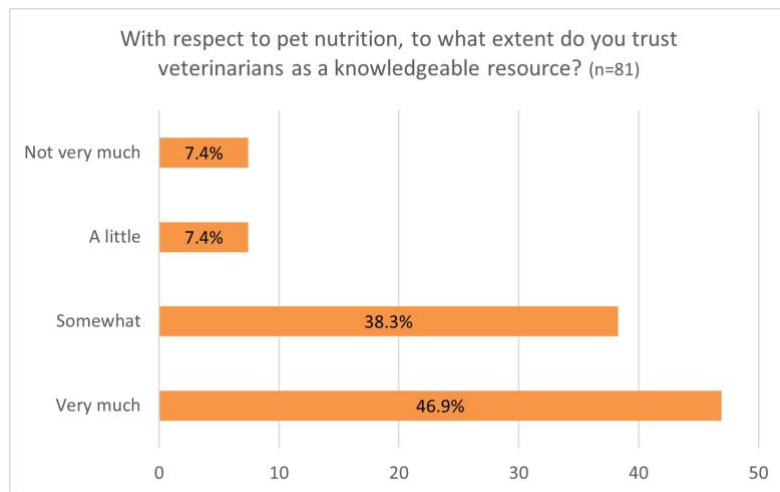


Figure 6
Owners trust in veterinarians in regards to being a knowledgeable source with respect to nutrition, displayed in percentages.

As regards to the correlation between nutrition and veterinary services, it was asked how often and under what circumstances the owners discussed their pets’ diet or nutritional needs with the veterinarian. The majority (41.5%, n=34) answered “only when my dog has health problems”, only six (7.3%) regularly asked their veterinarians for advice. This is visible in **Figure 7**.

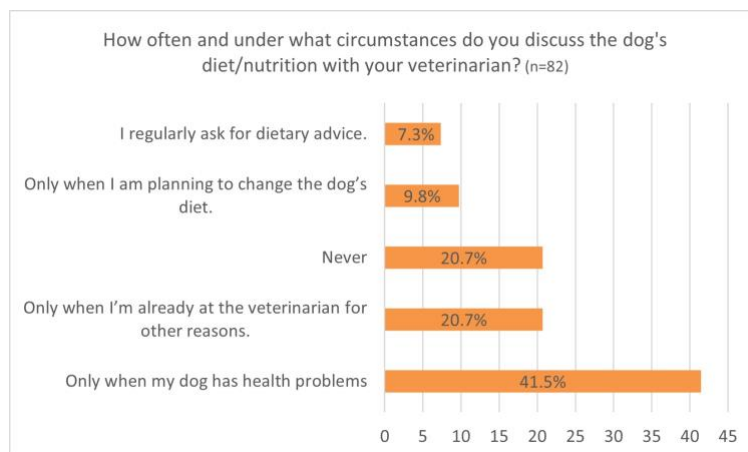


Figure 7

How often and under what circumstances respondents discussed diet or nutrition with their veterinarians, the answers are shown in percentages.

The next question was if the veterinarian approved of their diets. More than half of the respondents (59.8%, n=49) answered “yes”, thirty (36.6%) responded “I don’t know” and three (3.7%) said “no”. It was not asked to specify why the veterinarian did not approve, but two of them were feeding with RMBDs.

5.5 Section five – Current diet

Later, questions to assess the owners' decision in regard to the type of food they chose, where they purchased it, and where they gathered their knowledge were asked. **Figure 8** illustrates the first question on where they got the pet food from. Over half the participants (n=32, 55.2%) answered pet shops, nine (15.5%) selected online shops, a smaller number of individuals selected veterinary clinics (n=6, 10.3%), supermarket (n=5, 8.6%) and one chose homemade diets (1.7%). “Other” was selected by five (8.6%), they specified that they bought food from a mix of the above.

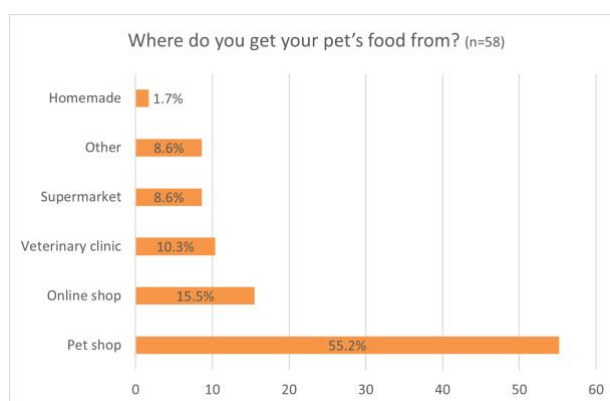


Figure 8

Where the owner purchases their food showed in percentages.

When asked which feeding method they applied, twenty-two (37.9%) answered “commercial dog food” twenty (34.5%) “mixed feeding”, veterinarian/prescription diets and alternative (raw, vegetarian, vegan) both got seven answers (12.1%-12.1%). Two participants selected “other” (3.4%), one specified it as raw and low-carb pellets and one specified it as raw. The owners who chose alternative feeding as their main method were asked to define which type they used. Thirty-four responded to the question. Twenty-nine (85.3%) selected raw feeding and five (14.7%) selected the alternative “other” and defined it as vegetarian and raw meat as treats or raw feeding in the hunting season (n=2).

Only twenty added dietary supplements, which was defined by ten owners. Six (10.3%) added fish oil, one antioxidants (1.7%), one omega 3 + B vitamins (1.7%), one glucosamine + MSM + collagen (1.7%), and one supplemented with apple cider vinegar + linseed + salmon oil (1.7%).

Figure 9 illustrates what specifically made owners choose their current applied diet. The participants were asked to rank criteria in order of importance, 1 (top) = most important, 8 = least important. Ingredients, the health of the dog, and nutrients were the top three answers, in the middle were how delightful the dog found the food, recommendations, and convenience. Cost and environmental factors were rated as least important.

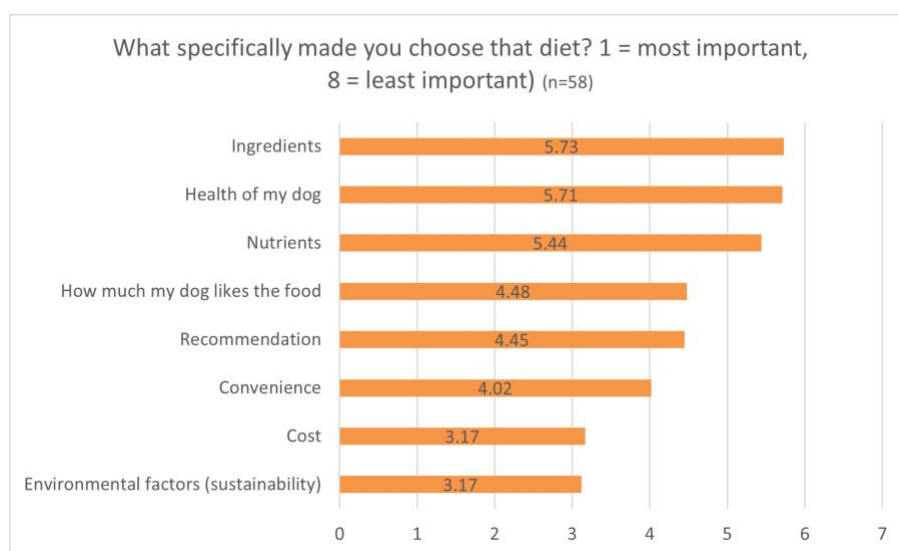


Figure 9
Important factors for the participants in regard to the current chosen diet (numbers are showing the mean scores)

After settling important factors, it was asked how they established the dog’s current diet (**Figure 10**). Recommendation of friends and family was chosen by eleven (19.3%) as were the recommendation of breeders (19.3%), followed by nine choosing tradition (15.8%), seven (14.0%) had gotten recommendations from vets, six (10.6%) used information

published online from a nonveterinary source, five (8.8%) used information published by a veterinarian or veterinary nutritionist and two (3.5%) got recommendations from breed specific literature. Seven respondents (8.8%) answered “other” and defined it as; mix from breeders and online sources (n=1), pet store (n=1), experience (n=4), and family member who is a veterinarian (n=1).

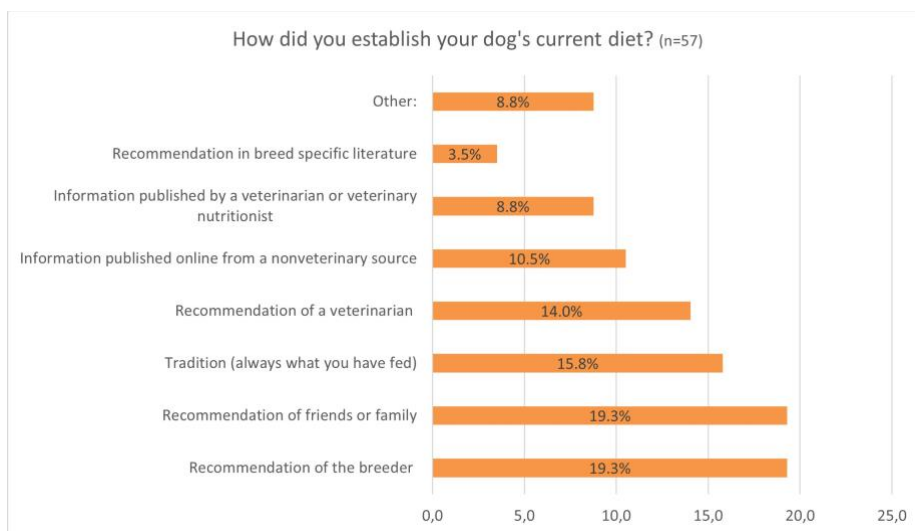


Figure 10

How the current diet chosen by owners was established, stating different alternatives, responses are shown in percentages.

5.6 Section six – Questions for owners feeding raw meat

5.6.1 Reasons for choosing to feed RAPs

Thirty-four owners out of eighty-five (40%) applied some form of raw feeding method. Based on the questions “Which feeding method do you use?” and “Which alternative feeding method do you apply?” thirteen out of thirty-four respondents used raw diet only. Others combined it with other feeding methods.

The majority of raw feeders first learned about the alternative feeding method on the internet (24.2%, n=8) followed by other pet owners (18.2%, n=6), family (15.2%, n=5) and friends (6.1%, n=2). Others such as books, pet store employees, social media, breeders, or a combination of these were less relevant (n=1/response). Five owners (15.2%) claimed that they had not learned about the alternative feeding method. The majority (n=19, 55.9%) of raw feeders had people at risk in the household and the largest groups were “Children 3–10 years old” (n=6) and “Chronically ill/immune suppressed” (n=6), followed by “Children < 3 years old” (n=4), “Elderly > 75 years old” (n=4) and “Pregnant women” (n=1). Two household had “Children < 3 years old + Children 3–10 years old” and “Children 3–10 years old + Elderly > 75 years old”.

Owners that were feeding RMBD were asked to answer: “Reasons for electing to feed raw animal products” twenty-seven participants responded. It was possible to select more than one statement. The percentages for the different alternatives are given in **Figure 11**. The most important was “to improve the skin or coat” (n=14, 14.0%) and the least important were “dogs’ body have not evolved to digest carbohydrates” and “dogs on a raw diet live longer” (n= 3, 2.8%). The participants who selected other defined it as; “dog really likes it as a treat” (n=1), “best for hard working dog” (n=1), and “Able to take up the nutrients effectively, fast digestion” (n=1).

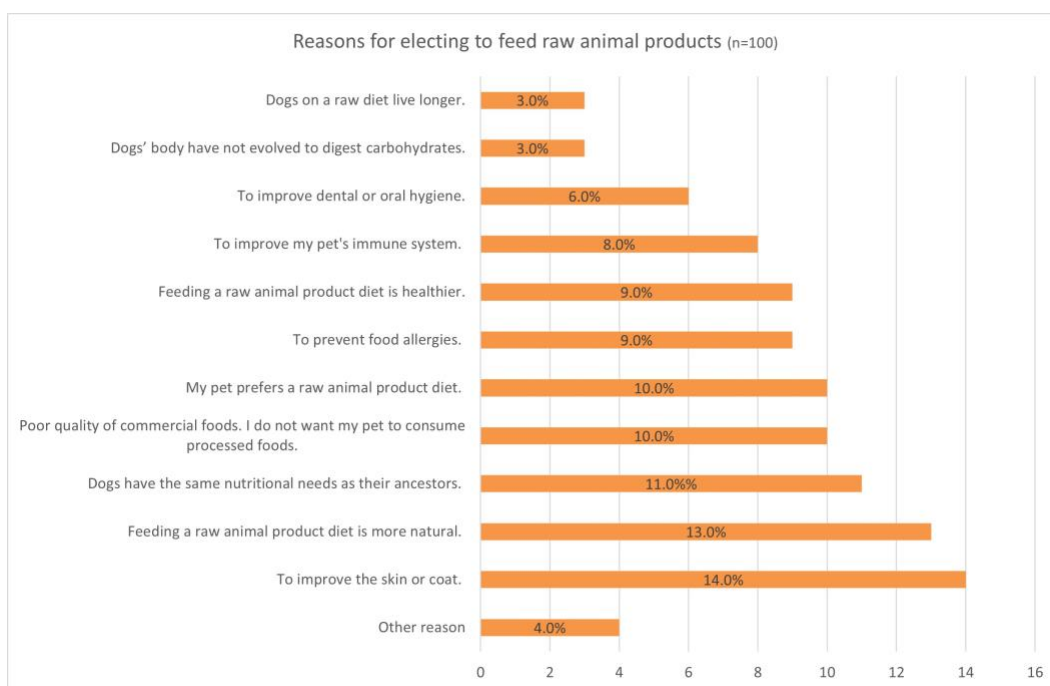


Figure 11

Owners’ reasons for choosing to raw feed their pets in percentage, multiple answers could be selected

5.6.2 Microbial contamination

Bacterial infections (e.g., Salmonella) were selected by fourteen (42.4%) responders as a known risk associated with a raw diet. The respondents could select more than one option. Nine chose GI problems (e.g.: diarrhoea; 27.3%), five knew about nutritional deficiency syndromes (protein, minerals, and vitamins; 15.2%) and four knew about dental problems (12.1%) Three respondents chose “other” (2.0%, n=3) and defined it as; no risk, see **Figure 12**.

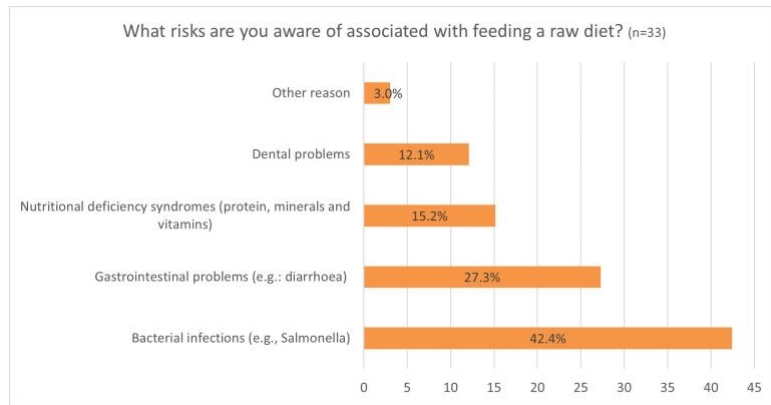


Figure 12

Potential risks that owners knew about in relation to raw feeding, respondents chose one or more answers.

“Since you have been applying raw feeding have you ever noticed any of the following symptoms in your dog?” got specified answers as; diarrhoea (n=4); vomiting (n=1), loose stool (n=1), oesophageal obstruction (n=1).

As **Figure 13** shows, out of twenty-four respondents, fourteen (58.3%) handled the dogs’ food in the same place, but with different instruments than human food. Only seven (29.2%) owners handled the dog’s food in a different place than human food. The technique “I handle the dog’s food in the same place with the same instruments as human food” was mentioned by three respondents (12.5%).



Figure 13

Where owners handle their dogs’ food and with what equipment, answered by 24 participants.

The participants were able to choose one or more statements that fit in regard to hygienic aspects (**Figure 14**). “Washing hands after preparing food or handling pet” and “cleaning and disinfecting all bowls and surfaces that have come into contact with the pet and its food daily” were equally important as twenty (40.4%) chose this. Two owners (4.3%) did not make any precautions and one (2.1%) responded “other” which meant “Cleaning and disinfecting dogs bowl, washing hands before handling dogs’ food. Strangers have to wash their hands before touching my dogs”.

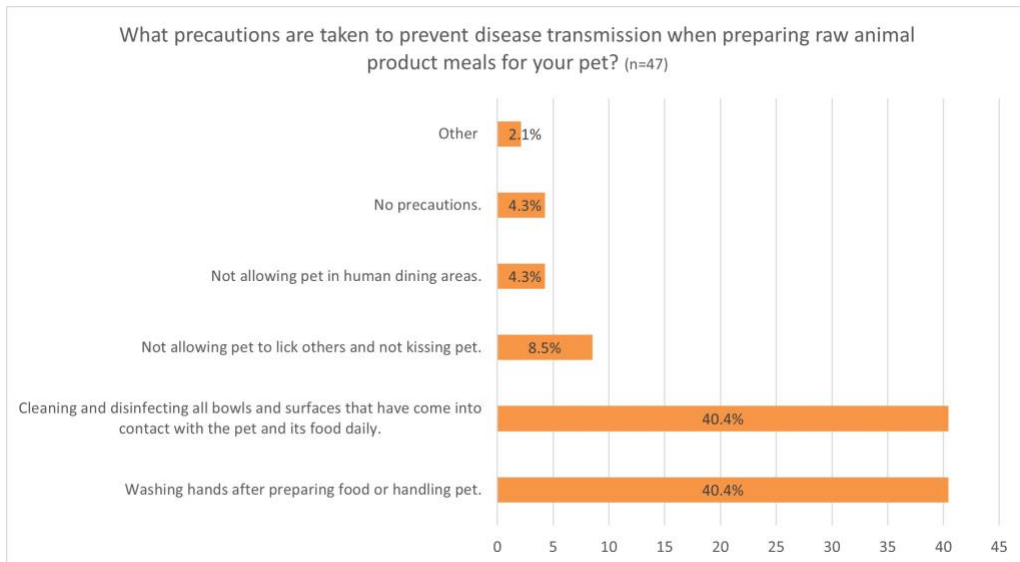


Figure 14
Precautions taken by owners when feeding RMBDs, participants could choose more than one statement, given in percentages.

Commercially prepared raw food was mostly used by the participants (70.8%, n=17) for their dogs' main diet, three (12.5%) used commercial and homemade raw food, one (4.2%) used homemade raw diet and three (12.5%) answered “other”, defined as a mix of the above. (Figure 15)

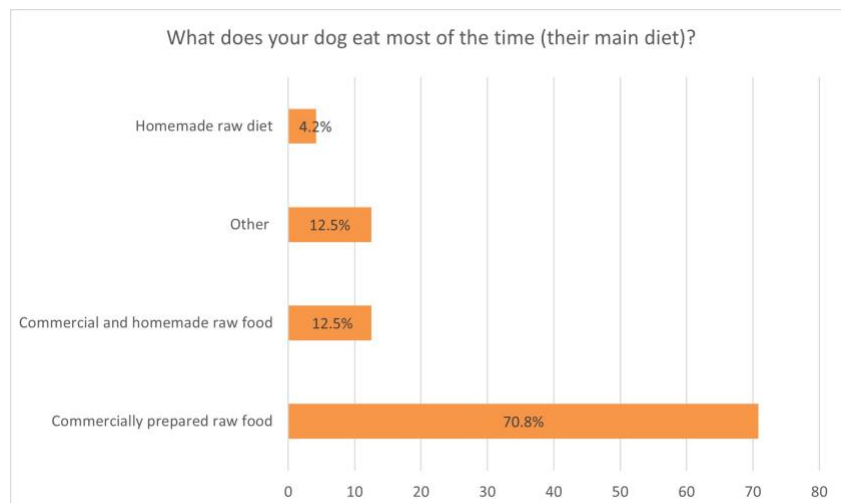


Figure 15 – Owners chose what their dog’s main diet was, given in percentages

The raw products mostly used by the participants were beef (25.9%, n=21), followed by chicken (18.5%, n=15). Poultry and fish were also popular. Wild meat was the least commonly fed (Figure 16). More than 60% (61.8%, n=21) of the owners did not use dietary supplement which was much higher than in the “non-raw” feeder group (n=2).

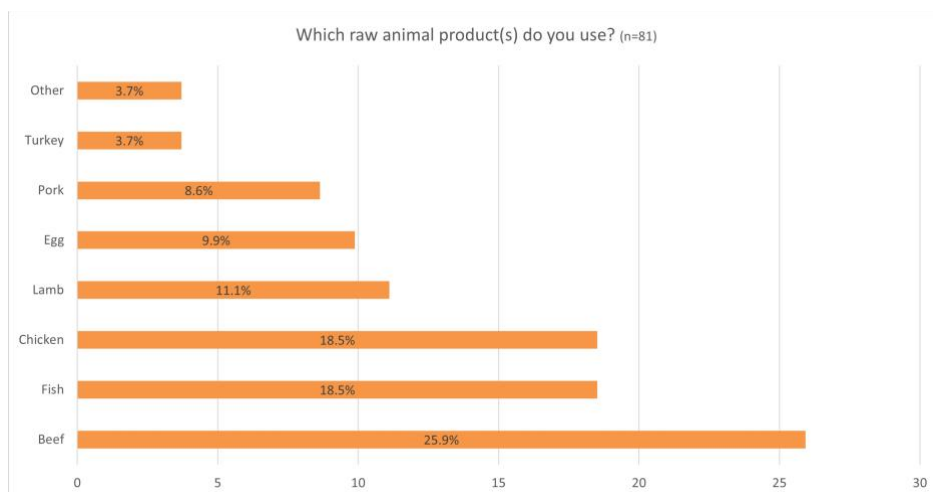


Figure 16

Which raw products are used in RMBDs, participants could choose all the options that applied for them

5.7 Section seven - Vegetarian and vegan diets

The questionnaire was filled out by two owners who applied a vegetarian or vegan diet as the dog's main diet. but not as an only diet. Interestingly none of them followed vegetarian or vegan diet. In both cases this diet was combined with raw feeding. One of the owners applied the latter only during hunting season. One response was received on why they choose the diet, which was "health benefits associated with plant-based diets". What risks they were aware of when feeding a plant-based diet only got one response; "there are no risks". When asked if they had noticed any symptoms after changing the diet the answers were "weight loss" (n=1), "none" (n=1).

Seven owners not applying PB diets also answered the question "What risks are you aware of when feeding a plant-based diet?". They could choose multiple answers. The responses were: "There are no risks (n=1)"; "Deficiencies (vitamins, minerals etc., n=3)", "Nutritional imbalance (n=4)", "Nutritional insufficiencies leading to more severe problems (n=3)"; "other: pesticide (n=1)".

6. Results of questionnaire two (cats)

For the questionnaire about feeding methods in cats, only eight responded. Five female (62.5%) and three male (37.5%) participants. Seven out of eight came from Norway, and most likely saw the questionnaire in the Norwegian hunting group. Their age was very widespread from 18- >65 years. Most of them lived a village (n=3, 37.5%), the remaining on the countryside (n=2, 25%), town (n=2, 25%) and one in the city (12.5%). All had higher education. Five of them (62.5%) lived in bigger families, two (25%) lived in couples and

one (12.5%) in a shared apartment. One (12.5%) of them was vegan and the rest (n=7, 87.5%) were omnivores.

The second section was only completed by seven participants. The age of the cats were 3-5 years (n=3), below 1 year (n=1), 1-3 years (n=1), 9-11 years (n=1), above 11 years (n=1). Four of the cats were “female, spayed”, two “male neutered” and one “female sexually intact”. In comparison to dogs, the neutering of cats in Norway is highly encouraged. Three cats were house cats and three mixed breed cats, a total of six responses were collected on this question. Three of the owners had more than one cat.

Three owners went to the veterinarian less than once a year, three went about once a year, and one, more than once a year. Five responders trusted their veterinarian “very much”, and two “somewhat”. The only time four of them discussed nutrition with the vet was when the cat had health problems, two of them answered when they already were there for another reason, and one answered “never”. Five trusted their veterinarians “very much” as a knowledgeable resource, one “somewhat” and one “a little”. Their vets mostly approved of their cats’ diets (n=4), and three owners did not know. The owners were asked to answer how important they thought the role of nutrition was to the health of their cats. Four answered “very much”, one “somewhat” and one “not very much”.

In section five a few participants did not answer all questions as they did not apply to them. Only one of the owners used alternative feeding methods which they specified as RMBD, however, three claimed to use “mixed feeding”. The reason behind the choice was information published by a veterinarian or veterinary nutritionist (n=3), tradition (n=2), and recommendation of a veterinarian (n=1). Three participants had knowledge about alternative feeding methods which they had gotten through a veterinarian (n=1), a pet store employee (n=1), and the last one was a veterinary nurse.

When asking the participants to rate motivational factors behind their feeding regime, “1” as most important, “8” as least important, the top three answers were “health of the cat”, “nutrients” and “ingredients”. Two owners added supplementations regularly. The raw product the owners used were: beef, pork, lamb, chicken, turkey, egg, and fish. None of the respondents had an all-vegetarian diet, so no answers were received on the questions specified for this. As some questions were only answered by 1 or 2 respondents these will not be discussed in the thesis.

7. Discussion

7.1 Information about owners and their dogs

The questionnaire was completed mainly by females which is typical in surveys. [4, 14–19] The age of respondents was similar to other surveys as mainly 25–34-year-old owners participated. [15, 18] Data regarding housing conditions, family and education were not always collected in previous studies. In the survey of Morgan (2017) participants also mainly lived in the countryside and had completed higher education. [14] This being the case might enhance one of the theories behind the increased use of alternative feeding methods, which is wealth and increased resources in developed countries and as stated earlier pets' changing role in families. [3]

Not only the last decade has changed trends, but also specifically the last 2-3 years have had many changes. The term “corona-dogs” has been a hot topic lately, referring to pets adopted during the covid-19 pandemic. In the survey, at least thirty-seven of the dogs were 3 years old or below, which indicates some were from this time period. This age group was also dominant in other surveys. [20, 21] The contact between vets and new owners might have decreased during this time, enhancing the relationship with breeders and experienced owners. This is only speculation as no questions were asked in relation to this. Strengthening this theory is the fact that many vets and veterinary organizations discourage owners from choosing raw animal products. One of the reasons is the possible risk of pathogenic bacteria, especially in households with individuals in the YOPI category. Regardless, multiple owners still proceed with it and its popularity increases. [14, 20] In this case 55.9% had YOPI household members, which is much higher than other studies. [15, 20, 21]

The close to 50-50% sex ratio of dogs was also seen by Morelli (2019, 2021) and Laflamme (2008). [18, 20, 21] Neutering rate was lower than in other surveys. [16,18, 20–23] This is not surprising as neutering of healthy dogs without a medical reason is not allowed in Norway. In previous studies mongrel dogs were more common [18,20] and beagle dogs were less popular than in this one [18, 20, 22, 23].

7.2 Veterinarian-client-patient relationship

Even though the cat survey of this thesis had few responses, all the participants had trust in their veterinarians. It is important to mention that 64.6% of dog owners in the current study trusted vets' advice “very much”, but with respect to nutrition, this rate decreased to 46.9%, and the rate of “a little” and “not very much” increased. As it was shown in this, and other

studies nutrition is not often discussed with veterinarians.[14] Both cat and dog, only discussed nutritional issues if they already were at the vet clinic or if the pet had health problems. Only a handful of dog owners went to the vet specifically for nutritional matters in this study. Similar to the results of Morgan (2017) nutrition is never discussed at veterinary visits for 20% of the surveyed pets [14]. Contrary to some prior studies including Conolly (2014) [25], owners considered veterinarians to be their most important source of information regarding nutrition, however, veterinarians only established a minority of their diets. [21, 24] On the other hand in this and other surveys veterinarians were not the most preferred information sources of owners [14, 18, 23]. This is despite that owners typically visit the veterinarian once a year or more than once a year [14, 16]. Owners thought to have a good knowledge of nutrition as it was also described by Embert-Gallegos. [15]

7.3 Owners' choice of diet

In Italy, a survey was developed to investigate which quality traits were most important for the owners when choosing food for their pets. [4] All together the mark “natural ingredients” were seen as very important for the owners, this was also seen in the questionnaire of this thesis. “Eating organic or all-natural foods” was highly ranked in this study. The place of production and “cruelty-free” was also important, even though “cruelty-free” lacks a specific definition. There was a difference between cat owners and dog owners, whereas cats are often more sensitive to the smell, structure, and taste of the food, their owners considered this more. Dog owners were more focused on nutritional values. [4] The health of the dog as well as grain-free feeds seemed to be relatively important for owners in the current study and other studies, even though this belief is mostly based on marketing and not facts. [4, 25]

The source of information on alternative diets is crucial. Owners' top three selected answers on where they got their knowledge from were; recommendations of friends and family members, breeders, and tradition. All of these were selected above recommendations from veterinarians. In the group of non-raw feeders mostly (>35%) veterinarians or online veterinary information sites helped to establish the diet. While among the raw feeders these were less relevant (<10%) and they mainly relied on non-professional sources such as the internet, other pet owners, friends and family members were more preferred by raw feeders similar to other surveys. [1, 14] The study of Morgan (2022) showed that 95% of RMBD feeders used pet food groups on social media as an information source. [23] In line with other surveys owners mostly purchased commercial food from pet shops and online shops, while other sources were less relevant [15, 18, 20].

7.4 Raw diets

7.4.1 Owners applying raw feeding methods

The 40% rate of raw feeders in this survey was similar to that of several other studies. [14, 23, 26] However, Anturaniemi et al. (2019) found a much higher (73.6%) prevalence. [19] Over half of the participants in the current study had dogs that were used as hunting dogs, which was no surprise since almost all the participants came from the Facebook groups of Norwegian hunting dogs. We might suspect their view on hunting is connected to them choosing a more MB diet.

The most common raw animal products were beef, fish, and chicken. Beef and poultry were also the two most popular RMBD ingredients in other surveys. [19–21] Fish was more relevant in this study most probably because of geographical location.

The advantages most owners based their choice on were: improved skin and coat, the diet is more natural, the needs like the dog's ancestors are met and the dog prefers it. Some participants also indicated that it was to prevent food allergies, assuming this is because of a mono source of protein, this is not an advantage only attainable with a raw diet.[8] Improvement of the pet's immune system, it is healthier and improves dental or oral hygiene were also some claims. Oral hygiene has been seen to improve with raw bones, but the risk of oesophageal or gastric foreign bodies increases. [9, 27] Interestingly sustainability received the highest score in the “What specifically made you choose that diet?” question, however environmental impact of PB diet is considered to be lower than that of RMBD. [16]

A survey developed in 2008 found a connection between owners who choose alternative diets and the lower trust they had in vets' advice. [1] Interestingly there was an unexpected difference between dog and cat owners. It demonstrated that dog owners using RMBDs were less likely to believe in their vets' advice, and their dogs were less likely to have been vaccinated. This can be discussed as contradictory to the owners' motivation behind their feeding scheme, which was health benefits, or questioning their perception of “health” compared to the veterinarians. Cat owners feeding with RAPs however, had more trust in their veterinarian. They had discussed nutrition with their vets and their cats were more likely to have been vaccinated. [1] This study also concluded the overall trust in veterinarians especially as a source of information on pet nutrition is much lower than that of the non-raw feeders [14, 15 16, 23, 26]. Owners who used RMBD rated veterinarians approximately on the same level of expertise as themselves, while other surveys has shown owners to mistrust their veterinarians and believe more in their own abilities [14, 23]. This

and other studies showed that health of pets plays the most important role in following RMBD [14, 17, 20, 23]. Interestingly 50% of raw diets in this study were approved by veterinarians. Both claims are paradoxical as these owners had relatively low trust in veterinarians.

7.4.2 Microbial contamination

In this thesis, the topic of microbial contamination has been mentioned multiple times and is considered to be one of the main issues in relation to raw feeding. [27–31] The bigger picture of one health and zoonotic diseases is important, but so are individuals' attitudes and awareness of this concern. Participants of the questionnaire were aware of bacterial contamination as a risk of RAPs. This was the most selected answer to the question of which risks the owners knew about, as sixteen of twenty-seven selected this. This is a good result compared to a survey created in 2019, which investigated owners' perceptions of safety and health risks associated with BARF/RMBD. Ninety-four percent of the respondents answered that they considered RMBDs safe, and 65% of them said the pets could not get ill by consuming raw meat, even though many had experienced GI issues. [20] This attitude has been shown to be typical among raw feeders. [1, 14, 15, 18–20, 23, 32]

The raw diet has not undergone any processes to eliminate potential microbial contamination. Bacteria that normally live in the intestinal flora will almost always be present in meat samples, but in smaller, acceptable doses. Some examples are the family of Enterobacteriaceae. These are controlled but sometimes found in excess. [29, 31] The importance of disinfection, separating instruments, and keeping the meat frozen until use cannot be emphasized enough. The risk of pathogens spreading to humans and other animals is increased and small interactions can boost the circulation of microorganisms. All from the juice of the raw meat splashing onto other parts of the kitchen to pets kissing humans after eating can engage bacteria and diseases to flourish. [8, 31] A worldwide reported that 0.2% of the surveyed households reported transmission of pathogens from the RMBN to family members. [19]

In this questionnaire it was asked how the owners prepared the raw diets, and a few different statements were given. It was established they most of them handled the dogs' food in the same place as human food, but with different equipment. This is not optimal as it should not be handled the same place. Other hygienic measures such as washing hands, and disinfecting equipment and surfaces were also applied. Only two participants had no such precautions. Preparing RMBD in the same place as human food increases the risk of

contamination. [5, 19] The conclusion drawn from these surveys suggests the relationship between veterinarians and their raw feeding clients should be stronger and more informative in relation to both pathogens and meeting nutritional needs.

7.4.3 Antimicrobial resistance

Concerning the topic of increased antimicrobial resistance which we are facing now and in the upcoming years, it would be foolish to undermine this matter. The awareness around the use of antibiotics when animals are fed on raw feed should be more discussed, as the risk of resistance is increased in this time period. Even though the use of BARF in pets is not a big threatening problem, the whole picture has to be seen. All places where AMR can be prevented should be important as we stand before a developing problem. With this in mind, both human doctors and veterinarians should consider this. [11, 20]

7.4.4 Nutritional requirements

Nutritional imbalance is also commonly seen in this type of diet, especially phosphorous, calcium, and vitamin D deficiencies. [15, 16, 28] It being the case, only a few responders in the survey made by Empert-Gallegos A (2020) [15], added vitamin and mineral supplementations in the meals. The time it took to make the meal seemed like a bigger issue than the possible imbalance. The biggest advantage for the owners where total control of what their pets ate. [14] If we compare this to the current survey it is shown that five participants agreed that deficiencies were a known fact and only thirteen people regularly applied supplementations to their dog's food. Fish oil, especially salmon oil was also preferred by other survey participants. [16, 20]

7.5 Plant based diets

7.5.1 PB diets of dogs

It was asked in section one of the questionnaires what kind of diet the owners used to see a correlation between plant-based owners and pets, but with too few participants this could not be established. Only two owners applied a PB-diet, one of the owners also applied raw meat during hunting seasons, so if this belongs in the category of an all-plant-based diet can be discussed. Weight loss was noticed by one owner after changing the diet and no risks were described. Interestingly enough a handful of owners, assuming they feed a MB or omnivorous diet, had some opinions about this diet. Deficiencies, nutritional imbalance and insufficiencies leading to severe problems were answered.

Macronutrients and micronutrients are often the biggest concern when approaching the topic of PB diets. Macronutrients (e.g. proteins, fat) are not the biggest issue, however, micronutrients (e.g. essential AA, vitamins, minerals) are of much bigger concern. But these essential nutrients are not only a concern of PB diets but also in MB diets. Both feeding regimens might require supplementations to balance the diets, which means there's not as big of a difference between the diets as many might assume. [33]

7.5.2 PB diets of cats

Concerning cats, their metabolic pathways are in need of higher protein and amino acids. In specific taurine, arginine, arachidonic acid and also the need of vitamin A, D, niacin and pyridoxine. [34] Cats' needs are not based on ingredients, but on nutrients, which might make the preparation of homemade diets for cats extra tricky. In the current study, the health of the cat, nutrients, and also ingredients were of bigger importance to the owners, they did not, however, consider themselves to be very confident in their own knowledge about their pet's nutrition.

Investigations on commercial PB cat food has been done, which showed that several nutrients (including vitamins and minerals) were below recommendations. [34] Studies on a representative amount of cats solely fed on plant-based diets are also limited. In the few studies done, many factors are missing which makes the evaluation difficult, but it seems that the cats do not show any major deficiencies or other issues. However, these cats were given supplementations, regular check-ups, and diets specially made. This will arguably not be the case in private homes feeding commercial diets. [6, 34]

Compared to other surveys about dog and cat owners, we see that the motivation of cat owners is different. They tend to base their dietary decisions more on avoiding specific diseases or deficiencies. Dog owners more often tend to focus on overall health benefits. The source of information is also very different, cat owners get most of their information from veterinarians, followed by the internet. [10, 13, 34] This was also the same for this questionnaire, even though it did not get many responses. In the study of Dodd (2021) PB diets have not been proven to increase nor decrease the cat's lifespan or health status. These cats had ideal body condition scores than cats fed a MB diet. Even though many risks are concerned about retinal atrophy, lower urinary tract infections and more, few cases has been seen on these issues. [13]

8. Conclusions

This study shows that many owners are choosing alternative diets, either as the main diet or with mixed feeding methods. Particularly RMBDs have increased in popularity. Unfortunately, with each of these diets follows valid concerns, complications, and questions in relation to nutritional requirements as well as potential zoonoses.

Owners, specifically dog owners tend to rely on information from multiple platforms mostly without a scientific background. With the uncontrollable amount of information from many different sources, the job of vets is difficult. Guidance from breeders, family members and other experienced dog owners has a strong influence on the participants' food-related decisions, which might have become stronger the last few years. Owners, both new and experienced, might eventually come across issues related to their pets' nutrition. It is important for veterinarians to hold the correct information in relation to these issues. Even though the questionnaire shows few owners schedule appointments for nutritional issues alone, many talk about nutrition regularly with their vets, which shows room for improvement. In this study owners applying RMBD were mostly aware of bacterial risks. The education of these owners is an important task of veterinarians, especially in households with individuals in the YOPI category.

The main motivator behind owners feeding regimes in this thesis and other surveys was the health of the animal. However, the term "healthy" could be discussed as it seems to might have different definitions. The plant-based diets have been shown to be based on the belief that all the benefits humans gain from a vegetarian diet are true for pets as well, which is yet to be proved. All in all, alternative diets both have advantages and disadvantages. These diets are yet not fully developed to reach appropriate results. The claimed advantages of better fur, better digestion, weight loss, sustainability, reduced EPP and owners' control over natural ingredients, do not overrule the possible outcomes of AMR, zoonotic diseases, and nutritional deficiencies syndromes, however small the probability may be. The advantageous results of these diets have not been studied enough and the responsible use of these diets in households without strict follow-ups nor previous nutritional experience will be difficult to achieve.

9. Summary in English

Unconventional feeding methods in dogs and cats.

The goal of this thesis was to investigate owners' motivation behind their current feeding regime, mainly the decision of using meat based or plant-based diets, as these diets are becoming more popular. Another important factor was to investigate which sources owners used to gain information about their current applied diet.

An online survey which consisted of 42 questions was made and published in multiple Facebook groups associated with raw feeding; ("Raw food diets for dogs and cats" with 2500 members), plant-based diets ("vegan dog food" with 19 000 members) and a Norwegian hunting dog group ("Beagle Norge" with 5200 members). The data were collected in the fall of 2021. Eighty-five responses were collected for the dog survey and only eight cat owners. The majority of respondent (69.4%) said that nutrition played a very important role in the dog's health. A statement was given to the owners to evaluate their own perception on how well informed they found themselves in relation to their pet's nutrition. Most of them (87.4%) agreed "somewhat" or "strongly". Owners trusted the advice of veterinarians "very much" (64.7%) and "somewhat" (32.9%) only few people said, "not very much" (2.4%). On the contrary, the trust with respect to the dog's nutrition decreased dramatically: "very much" (46.9%) and "somewhat" (38.3%), "not very much" (7.4%) and "a little" (7.4%).

Thirty-four owners applied some form of raw feeding method, three of them combined it with other diets (e.g.: raw feeding was used only during hunting season) and two used plant-based diets. Internet was the main source of information concerning the applied feeding method, followed by other pet owners, family, friends, and breeders. The dogs' current diet was mostly established with the help of breeders, friends, and family. The role of veterinarians was less relevant. The most important reason for choosing a raw diet was to "improve skin and coat" and it was considered to be a "more natural". Respondents were relatively aware of the risks of raw feeding such as bacterial infections. However, dental problems and nutritional deficiencies were only mentioned by the minority. Almost 60% of respondents handled the dog's food in the same place but with different instruments than human food.

It would be very important to increase the owners' trust in veterinarians regarding pets' nutrition. Education of owners in relation to the risk of alternative feeding methods should also be emphasized.

10. Summary in Hungarian

Alternatív módszerek a kutya és macska takarmányozásban

Az adatgyűjtés célja információszerzés volt arra vonatkozóan, hogy a tulajdonosokat mi motiválja az alkalmazott takarmányozási módszer választására, különös tekintettel a nyers- és növényi alapú diétákra. További cél volt annak megismerése, hogy az erre vonatkozó ismereteket honnan szerzik be. A 42 kérdésből álló online kérdőív a következő Facebook csoportokban lett megosztva: “Raw food diets for dogs and cats”, (2500 tag), “vegan dog food” (19 000 tag) és norvég vadászkutyákkal foglalkozó csoport (“Beagle Norge”, 5200 tag). Az adatgyűjtésre 2021 őszén került sor.

A kutyáknak szóló kérdőívet 85-en töltötték ki. A legtöbb (69.4%) résztvevő szerint a takarmányozás nagyon fontos szerepet játszik a kutya egészségében. A válaszadók többsége (87.4%) megfelelőnek gondolta a takarmányozásával kapcsolatos ismereteit. Általánosságban vizsgálva a tulajdonosok „nagyon” (64,7%), és „némileg” (32,9) megbíztak állatorvosukban, csupán 2,4% válaszolta, hogy „nem nagyon”. Ezzel szemben, takarmányozási kérdésekben jelentősen csökkent a bizalom szintje, a következők szerint: „nagyon” (46,9%), „némileg” (38,3%), „nem nagyon” (7,4%), és „kismértékben” (7,4%). Az esetek közel 60%-ában az állatorvos jóváhagyta az alkalmazott takarmányt. A nyersétel valamilyen formáját 34 tulajdonos alkalmazta, ebből hárman több módszert kombináltak (pl.: nyersétel csak vadászdényben). Senki sem etetett kizárólag vegetáriánus, illetve vegán tápot. Az internet volt a legfontosabb információforrás, amit más állattartók, családtagok és barátok követtek, az állatorvosok jelentősége kicsi volt. A nyersétetést a többég azért választotta, mert „szebbé teszi a szőrzetet” és „természetesebb takarmány”. A válaszadók jellemzően tisztában voltak azzal, hogy a nyersétel kockázatai közé tartozik a bakteriális fertőzés és az esetleges emésztőszervi tüneteket (pl.: hasmenés), de a fogászati problémákat és a hiánybetegségeket csak kevesen említették. Ezen válaszadók közel 60%-a kutya takarmányát a humán ételmiszerrel azonos helyen kezelte, de külön eszközöket használt. A macskákra vonatkozó kérdőívet csupán 8 ember töltötte ki és közülük egy tulajdonos alkalmazott nyersétetést.

Az eredmények alapján takarmányozási kérdésekben fontos lenne az állattartók bizalmának növelése az állatorvosok felé. Szintén figyelmet érdemel a tulajdonosok ismereteinek bővítése az alternatív takarmányozási módszerekkel összefüggésbe hozható egészségügyi kockázatokkal kapcsolatban.

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Approval

Supervisor counter-signature form

We hereby confirm that we are familiar with the content of the TDK thesis entitled **Unconventional feeding methods in dogs and cats** written by **Benedicte Maehlum** which I deem suitable for submission.

Date: Budapest, 2022.10.11.

Dr. Hetényi Nikolett

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DECLARATION

I hereby declare that the thesis entitled **Unconventional feeding methods in dogs and cats** is identical in terms of content and formal requirements to the TDK research paper submitted in 2022.

Date: Budapest, 15.11.2022

Benedicte Maehler
.....

name



Thesis progress report for veterinary students

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Name and title of the supervisor: Nikoletta Hetényi, research fellow

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Thesis title: Unconventional diets for dogs and cats

Consultation – 1st semester

Timing				Topic / Remarks of the supervisor	Signature of the supervisor
	year	month	day		
1.	2021	10	13	Online questionnaire	Dr. Hetényi Nikolett
2.	2022	02	23	Online consultation. Table of contents.	Dr. Hetényi Nikolett
3.	2022	02	27	Online consultation, results of questionnaire	Dr. Hetényi Nikolett
4.	2022	04	04	Online consultation, little progress has been made	Dr. Hetényi Nikolett
5.	2022	05	02	Online consultation, thesis progress (number of red articles, conclusions)	Dr. Hetényi Nikolett

Grade achieved at the end of the first semester: 3 (fair)

Consultation – 2nd semester

Timing				Topic / Remarks of the supervisor	Signature of the supervisor
	year	month	day		
1.	2022	09	05	First draft	Dr. Hetényi Nikolett
2.	2022	09	29	Review of second draft.	Dr. Hetényi Nikolett
3.	2022	10	06	Review of third draft	Dr. Hetényi Nikolett
4.	2022	10	9	Review of the last version of the manuscript	Dr. Hetényi Nikolett
5.	2022	10	11	Final approval	Dr. Hetényi Nikolett



Grade achieved at the end of the second semester: 5 (very good)

The thesis meets the requirements of the Study and Examination Rules of the University and the Guide to Thesis Writing.

I accept the thesis and find it suitable to defence,



Dr. Ully Nedeke

signature of the supervisor

Signature of the student:

Benedicte Maekhu

Signature of the secretary of the department:

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Date of handing the thesis in.....

2022.11.14