Nutritional consulting in regular veterinary practices in Belgium and the Netherlands

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Abstract

Background: Increased interest in nutrition by dog and cat owners stresses the importance of providing tailored nutritional guidance for each patient by veterinarians. The World Small Animal Veterinary Association (WSAVA) has provided guidelines to help veterinarians implement this in every-day patient care, by screening patients for the presence of nutritional risk factors, establishing tailored nutritional plans and providing adequate patient follow-up tools.

Objectives: This study aimed to assess the use of nutritional assessments in companion animal practices, and to investigate differences between Dutch and Belgian veterinarians.

Methods: A survey was conducted among Dutch and Belgian veterinarians. Of the 423 respondents, 53% were from Belgium, and 47% were from the Netherlands.

Results: Only 21% had prior knowledge of the WSAVA nutritional assessment guidelines. General trends in the usage of nutritional assessments were similar in the examined countries. Aside from weighing, diet evaluation by collecting dietary information and body condition or muscle condition scoring were used infrequently, mostly due to insufficient knowledge of the methods. Nutritional recommendations were often made as part of a treatment plan, and were mostly made by veterinarians, but in Dutch practices also by veterinary nurses.

Conclusion: Despite the fact that nutritional recommendations are a regular part of treatment plans, nutritional risk factors may be missed due to a lack of completely performed nutritional assessments. It remains important to promote the benefits of regular nutritional assessments to veterinarians, which will improve patients’ health.

KEYWORDS
body condition score, diet, muscle condition score, nutritional assessment

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1 | INTRODUCTION

Nutrition is an important topic in veterinary practice (Bergler et al., 2016; Vandendriessche et al., 2017). Increased awareness of nutrition-related diseases and popularity of alternative diets have made veterinarians indispensable for early detection of nutritional imbalances and risk factors (Dillitzer et al., 2011; Laflamme et al., 2008; Rajagopaul et al., 2016). Hence, it is essential for veterinarians to provide tailored nutritional guidance for each patient at every consultation to provide optimal patient care (Freeman et al., 2011).

To aid veterinarians in incorporating complete nutritional assessments in regular patient care, global nutritional assessment guidelines were developed by the World Small Animal Veterinary Association (WSAVA) (Freeman et al., 2011). These guidelines describe inclusion of nutritional assessment as the fifth vital assessment in regular patient care. This starts with identification of nutritional risk factors for disease through a complete dietary and lifestyle history, and bodyweight and body composition assessment through body condition and muscle condition scoring. Evaluation of these factors results in tailored nutritional recommendations, a feeding management strategy, and a follow-up plan with regular monitoring and compliance assessment.

Despite these efforts, routine implementation of nutritional consultations and assessments remains limited, and dietary recommendations are often provided after development of nutrition-related diseases (Bergler et al., 2016; MacMartin et al., 2015; Rolph et al., 2014; Siebert et al., 2016). For instance, routine assessment of body composition is uncommon; therefore, leaving development of sarcopenia or obesity to go unnoticed, impairing nutrition's preventive role. Despite these criteria for recommending a specific brand of food. The estimated frequency in which they measured and registered weight, body condition score (BCS) and muscle condition score (MCS) of their patients, the specifications on the used scoring system, and to specify reasons for infrequent use of these methods. Next, estimates on the use of specific dietary history questions, such as the type of food that is being fed to the patient and the food amount, and the use of nutritional surveys were obtained. The respondents were also asked whether they were familiar with the WSAVA nutritional assessment guidelines.

The third section contained 24 questions which concerned the role of nutrition in the respondents' practices. Information was obtained on the sale of maintenance and therapeutic or raw food diets in the respondents' practices. The respondents were then asked about their criteria for recommending a specific brand of food. The estimated frequency in which dietary change is recommended for life stages and as component of the management of diseases, as well as the use of homemade diets as part of a treatment were obtained. The next question gave information on the members of the veterinary health care team that recommended dietary change. Next, estimates of assumed owner compliance to nutritional recommendations were asked, as well as suggested reasons for non-compliance. These were followed by inquiries about the means of follow-up which the respondents used, and their methods to increase compliance with owners. Lastly, the respondents were asked for specific occasions in which owners were informed of nutritional necessities, such as obesity clinics and senior consultations, and whether the practice organised educational meetings for owners.

2 | MATERIALS AND METHODS

2.1 | Data collection

An anonymous web-based questionnaire (www.surveymonkey.com) was distributed to Belgian and Dutch veterinarians via dedicated social media groups and the newsletter of Utrecht University, the Netherlands. As the WSAVA nutritional assessment guidelines are mostly aimed towards dogs and cats veterinarians that treat animal species other than dogs and cats as the majority of their patients were excluded from this study. The survey was accessible between May and June 2016 in Belgium and between February and May 2018 in the Netherlands. Complete sections of incomplete questionnaires were included in the analysis.

2.2 | Survey

The survey consisted of three main sections, with a total of 66 multiple choice and open-ended questions. The first section of the survey consisted of 17 questions about practice demographics (Appendix). Estimates of the proportion of cats, dogs, and exotic animal species as percentage of the responding veterinarians' total number of patients on a yearly basis were obtained. These questions were followed by inquiries on the number of staff and their function in the respondent's practice, their years of experience since graduation, and whether any members of the veterinary health care team were specifically responsible for nutritional consultation. If applicable, the educational background of this team member was asked. Lastly, participation in nutrition-focused continuing education was explored.

The second section consisted of 25 questions about nutritional screening. The veterinarians were asked to provide estimates on the frequency in which they measured and registered weight, body condition score (BCS) and muscle condition score (MCS) of their patients, the specifications on the used scoring system, and to specify reasons for infrequent use of these methods. Next, estimates on the use of specific dietary history questions, such as the type of food that is being fed to the patient and the food amount, and the use of nutritional surveys were obtained. The respondents were also asked whether they were familiar with the WSAVA nutritional assessment guidelines.
2.3 | Statistical analyses

Data were exported to Microsoft Excel 2016 (version 1808, Microsoft Redmond, WA, USA) and statistical analyses were performed using IBM SPSS Statistics (version 25.0. IBM Corporation, Armonk, NY, USA). Numerical and categorical data were displayed as median (interquartile range) and percentage (number of observations), respectively. Due to the discrete nature of the data, differences between Belgian and Dutch respondents were assessed with Mann–Whitney U tests for numerical data and Chi-square analyses with continuity corrections for categorical data. Cramér’s V was calculated to assess the effect size of significant and trend results (Kim, 2017). Statistical significance was set at \( p < 0.05 \) and trend results as \( 0.05 < p < 0.10 \). Data were presented per country when a significant or trend difference between countries was found.

3 | RESULTS

3.1 | Respondent participation

A total of 423 questionnaires were submitted, 52.5% (222/423) from Belgian veterinarians and 47.5% (201/423) from Dutch veterinarians. Ten respondents indicated treating species other than dogs and cats as the majority of their patients and were excluded from further analysis. A total of 60.9% (252/413) veterinarians completed all questions of the survey, 66.3% (167/252) from Belgium and 33.7% (85/252) from the Netherlands.

3.2 | Respondent population

An overview of the participating respondents’ practices is presented in Table 1. Most responding veterinarians worked in practices with more than one veterinarian, and only 49.8% (110/221) of the Belgian and 15.9% (21/132) of the Dutch respondents worked in ’single-vet’ practices \( (p < 0.001, \phi = 0.339) \). A larger proportion of Belgian veterinary practitioners had more years of experience since graduation. The majority of veterinary employees in practices were female, but the proportion of male veterinarians was higher in Belgian practices compared to Dutch practices. Veterinary nurses were often available in Dutch practices, but were not common in Belgian practices.

Less than half of Belgian [23.4% (52/222)] and Dutch [45.0% (58/129)] practices had dedicated employees for nutritional consultation \( (p < 0.001, \phi = 0.224) \), which included team members trained by pet food companies (Figure 1). Continuing education in nutrition was attended by members of most practices [Belgian respondents (BE): 59.9% (133/222), Dutch respondents (NL): 80.6% (104/129), \( p < 0.001, \phi = 0.213 \)]. In Belgian practices, continuing education in nutrition was mostly attended by veterinarians, while veterinary nurses attended these courses more often in Dutch practices.

3.3 | Nutritional evaluation

Only 21.3% (67/314) of the respondents had prior knowledge of the WSAVA nutritional guidelines \( (p = 0.783) \). The proportion of consultations in which a nutritional evaluation was performed and documented is summarised in Tables 2 and 3. Belgian veterinarians tended to inquire about diet and feeding habits more often, while Dutch respondents were more likely to add nutritional information to the patient’s record. Only 7.9% (25/315, \( p = 0.786 \)) used dietary questionnaires.

All respondents \( (n = 351) \) had at least one scale in their practice, and 38.3% (85/222) of Belgian and 86.0% (111/129) of Dutch respondents had separate scales for weighing cats \( (p < 0.001, \phi = 0.464) \). Observed changes in weight were discussed with owners by almost all respondents [99.4% (342/344), \( p = 0.726 \)]. Additionally, 70.3% (242/344, \( p = 0.837 \)) used BCS in their consultations, albeit infrequently. Most Belgian respondents used a five-point scale [81.6% (124/152)], whereas most Dutch respondents used a nine-point scale [69.0% (60/87), \( p < 0.001, \phi = 0.504 \)]. A minority of the respondents used MCS during consultation [23.7% (79/334), \( p = 0.120 \)]. Reasons for non-use are listed in Table 4.

3.4 | Nutritional sales and recommendations

All respondents \( (n = 293) \) sold pet food at their practice. Therapeutic diets were sold most [99.7% (292/293), \( p = 1.000 \)], followed by maintenance diets [87.7% (257/293), \( p = 0.761 \)] and raw-meat diets [5.0% (12/293), \( p = 0.652 \)]. Practices sold approximately three (2–4) different brands of diets \( (p = 0.155) \). Evidence based veterinary medicine was considered the most important factor for dietary recommendations (Figure 2).

Dietary recommendations were often made for cats diagnosed with renal disease, lower urinary tract disease, or diabetes mellitus (Table 5), whereas dogs obtained most recommendations for renal and orthopaedic disease, and overweight/obesity (Table 6). Homemade diets were recommended by 75.7% (193/255) respondents.
TABLE 1  An overview of the practice demographics of the survey respondents and comparisons between Belgian and Dutch practices, displayed as number of employees or as percentages of the employees

| Practice information          | NL | Median | IQR   | BE  | Median | IQR   | p       |
|-------------------------------|----|--------|-------|-----|--------|-------|---------|
| Total number of veterinarians | 132| 3      | 2–4   | 221| 2      | 1–2   | <0.001a|
| Number of veterinary nurses   | 133| 4      | 3–6   | 221| 0      | 0–1   | <0.001a|
| Employment per proportion of veterinarians |       |        |       |     |        |       |         |
| Full-time                     | 133| 33%    | 0%–61%| 221| 100%   | 67%–100%| <0.001a|
| Part-time                     |    | 67%    | 39%–100%| 0% | 0%     | 0%–33%| <0.001a|
| Proportion of veterinarians of each gender |       |        |       |     |        |       |         |
| Female                        | 132| 80%    | 50%–100%| 220| 67%    | 27%–100%| 0.006a|
| Male                          |    | 20%    | 0%–40% | 220| 33%    | 0%–66%| 0.014a|
| Attendance of continuous education lectures in nutrition |       |        |       |     |        |       |         |
| Veterinarian                  | 129| 20%    | 0%–50%| 222| 100%   | 54%–100%| <0.001a|
| Veterinary technician         |    | 50%    | 0%–80%| 222| 0%     | 0%–0% | <0.001a|
| Years of experience as proportion of veterinarians |       |        |       |     |        |       |         |
| 0–5 years                     | 132| 14%    | 0%–38%| 221| 0%     | 0%–25%| <0.001a|
| 5–10 years                    |    | 0%     | 0%–33%| 221| 0%     | 0%–0% | <0.001a|
| 10–20 years                   |    | 27%    | 0%–50%| 221| 0%     | 0%–50%| 0.078b |
| >20 years                     |    | 0%     | 0%–50%| 221| 33%    | 0%–100%| 0.004a|
| Proportion of nutritional recommendations made by |       |        |       |     |        |       |         |
| Veterinarian                  | 98 | 80%    | 50%–85%| 178| 100%   | 80%–100%| <0.001a|
| Veterinary technician         |    | 20%    | 15%–50%| 178| 0%     | 0%–20%| <0.001a|

Abbreviations: BE, Belgian respondents; IQR, interquartile range; NL, Dutch respondents.  
aSignificant difference between both countries by Mann–Whitney U test (p < 0.05).  
bTrend difference between countries by Mann–Whitney U test (0.10 > p > 0.05).  

TABLE 2  Overview of the estimated percentages of consultations in which the respondents perform nutritional evaluations, and comparisons between Belgian and Dutch respondents

| Nutritional evaluations           | Frequency of use during consultations | NL | Median (%) | IQR (%) | BE  | Median (%) | IQR (%) | p       |
|----------------------------------|---------------------------------------|----|------------|---------|-----|------------|---------|---------|
| Nutritional examinations Weighing|                                       | 127| 95         | 90–99   | 217| 95         | 80–100  | 0.5     |
| BCS                              |                                       | 127| 20         | 0–70    | 217| 20         | 0–50    | 0.515   |
| MCS                              |                                       | 124| 0          | 0–0     | 210| 0          | 0–2     | 0.095b  |
| Diet history                     |                                       |    |            |         |     |            |         |         |
| Type of diet                     |                                       | 115| 50         | 25–75   | 199| 75         | 50–90   | <0.001a |
| Amount of food                   |                                       | 115| 40         | 20–60   | 199| 50         | 25–80   | <0.001a |
| Number of meals                  |                                       | 115| 30         | 10–60   | 199| 50         | 25–80   | <0.001a |
| Number of treats                 |                                       | 115| 30         | 20–65   | 199| 50         | 25–80   | <0.001a |
| Housing environments             |                                       | 115| 20         | 5–50    | 199| 40         | 15–80   | 0.82    |
| Activity                         |                                       | 115| 40         | 10–75   | 199| 50         | 20–80   | 0.037a  |

Abbreviations: BE, Belgian respondents; BCS, body condition score; IQR, interquartile range; MCS, muscle condition score; NL, Dutch respondents.  
aSignificant difference between countries by Mann–Whitney U test (p < 0.05).  
bTrend difference between countries by Mann–Whitney U test (0.10 > p > 0.05).  

(p = 0.11), but their recipes often lacked sources of essential fatty acids [BE: 80.0% (80.0%–100%), NL: 0.0% (0.0%–50.0%), p < 0.001] and essential vitamins [BE: 50.0% (0.0%–100%), NL: 0.0% (0.0%–7.5%)]. Knowledge about the composition of home-cooked diets (HCD) originated often from self-acquired knowledge [BE: 90.3% (131/145), NL: 73.9% (51/69)] rather than from board-certified diplomates in nutrition [BE: 9.7% (14/145), NL: 26.1% (18/69), p = 0.003, φ = 0.215], which were present in both countries at the time of the survey. Approximately half of the clients were estimated to initiate feeding according to the prescribed feeding plan, and approximately half of these clients completed the dietary regimen. Feeding costs were considered the main reason for non-compliance (Table 7). The respondents also suggested difficulty to maintain a strict diet, cheaper and more easily acquirable other foods, conflicting nutritional recommendations from others such as a breeder or friend, or a lack of long-term motivation, as common reasons for non-compliance.
### TABLE 3  Overview of the estimated percentages of consultations in which the respondents document nutritional evaluation methods in the patient’s record after assessment, and comparisons between Belgian and Dutch respondents

| Nutritional evaluations | Frequency of documentation in patient’s record when used | NL | Median (%) | IQR (%) | BE | Median (%) | IQR (%) | p    |
|-------------------------|---------------------------------------------------------|----|------------|---------|----|------------|---------|------|
|                         |                                                         | n  |           |         | n  |           |         |      |
| Nutritional examinations|                                                         |    | 127       | 95      | 217 | 95        | 78–100  | 0.08 |
| Weighing                |                                                         |    | 127       | 20      | 217 | 5         | 0–40    | 0.001a|
| BCS                     |                                                         |    | 124       | 0       | 210 | 0         | 0–0     | 0.043a|
| MCS                     |                                                         |    | 115       | 60      | 199 | 25        | 0–80    | <0.001a|
| Diet history            |                                                         |    | 115       | 50      | 199 | 10        | 0–50    | <0.001a|
| Type of diet            |                                                         |    | 115       | 40      | 199 | 10        | 0–50    | <0.001a|
| Amount of food          |                                                         |    | 115       | 30      | 199 | 1         | 0–50    | <0.001a|
| Number of meals         |                                                         |    | 115       | 25      | 199 | 1         | 0–50    | <0.001a|
| Housing environments    |                                                         |    | 115       | 20      | 199 | 5         | 0–50    | <0.001a|
| Activity                |                                                         |    | 115       | 10      | 199 | 10        | 0–50    | <0.001a|

Abbreviations: BE, Belgian respondents; BCS, body condition score; IQR, interquartile range; MCS, muscle condition score; NL, Dutch respondents.

aSignificant difference between countries by Mann–Whitney U test (p < 0.05).

bTrend difference between countries by Mann–Whitney U test (0.10 > p > 0.05).

### TABLE 4  Volunteered reasons for irregular use of body condition scoring and muscle condition scoring, given by responding veterinarians (n = 276)

| Reason                                                | BCS | Percentage | MCS | Percentage |
|-------------------------------------------------------|-----|------------|-----|------------|
| Insufficient experience or habit in performing the method | 71  | 27.2%      | 0   | 0.0%       |
| Insufficient knowledge of the performance or use of the method | 21  | 8.0%       | 141 | 60.0%      |
| Time constraints during consultation                   | 59  | 22.6%      | 20  | 8.5%       |
| Use only when relevant to clinical signs               | 53  | 20.3%      | 30  | 12.8%      |
| Methods are not in the interest of the owner and the animal | 28  | 10.7%      | 29  | 12.3%      |
| Use of other nutritional assessment is enough          | 29  | 11.1%      | 15  | 6.4%       |

Abbreviations: BCS, body condition score; MCS, muscle condition score.

The respondents commonly indicated differences in the amount of food that had to be fed, for example the ability to feed more kibble in weight loss diets while retaining the same caloric intake, and recommended gradual transition to the new diet to increase compliance (Table 8). Nutritional recommendations were commonly monitored by follow-up consultations and telephone calls (Table 9).

### 3.5 Client education

Many respondents educated their clients on the risks of becoming overweight after neutering and recommended adjustments to the animal’s diet, whereas growth-related nutritional risks were discussed less often (Table 10). Some respondents indicated organizing specific opportunities to educate clients, such as obesity clinics and senior consultations [BE: 46/122 (37.7%), NL: 46/85 (54.1%), p < 0.001, φ = 0.263].

### 4 DISCUSSION

Veterinarians play a key role in providing nutritional guidance for their patients, as the veterinary health care team is an important source of nutritional information for pet owners (AAHA, 2003; Schleicher et al., 2019). However, this study shows that nutritional assessment, as described by the WSAVA nutritional assessment guidelines (Freeman et al., 2011), is often omitted during consultation in veterinary practices in Belgium and the Netherlands. These trends tended to be similar in both countries, with differences mainly being present in practice demographics. Even though most data consisted of estimations by
FIGURE 2  The factors that influence the participating veterinarians in the selection of specific dietary brands or types. Abbreviations: BE, Belgian veterinarians; EBVM, Evidence-based veterinary medicine; NL, Dutch veterinarians.

TABLE 5  The estimated percentage of cats with specific indications in which dietary recommendations are given and difference between Belgian and Dutch respondents (NL: N = 105; BE: N = 189)

| Indication                  | NL Median (%) | IQR (%) | BE Median (%) | IQR (%) | p       |
|-----------------------------|---------------|---------|---------------|---------|---------|
| Disease                     |               |         |               |         |         |
| Lower urinary tract disease | 100           | 88–100  | 100           | 93–100  | 0.048a  |
| Overweight                  | 80            | 50–100  | 80            | 53–100  | 0.085b  |
| Diabetes mellitus           | 100           | 78–100  | 100           | 65–100  | 0.702   |
| Orthopaedic disease         | 75            | 50–90   | 50            | 20–80   | 0.004a  |
| Renal disease               | 100           | 100–100 | 100           | 100–100 | 0.023a  |
| Gastrointestinal disease    | 75            | 50–100  | 80            | 50–100  | 0.930   |
| Dermatologic disease        | 75            | 50–100  | 50            | 30–83   | 0.001a  |
| Liver disease               | 50            | 30–83   | 70            | 25–100  | 0.028a  |
| Cardiovascular disease      | 0             | 0–20    | 20            | 0–50    | 0.001a  |
| Dental disease              | 50            | 25–80   | 30            | 5–60    | <0.001a |
| Hyperthyroidism             | 25            | 5–50    | 40            | 0–80    | 0.833   |
| Life stage                  |               |         |               |         |         |
| Growth                      | 80            | 20–100  | 80            | 40–100  | 0.147   |
| Adult                       | 20            | 10–63   | 50            | 20–100  | 0.001a  |
| Senior                      | 50            | 20–80   | 70            | 50–100  | 0.004a  |
| Neuter                      | 75            | 28–100  | 80            | 50–100  | 0.091b  |

Abbreviations: BE, Belgian respondents; IQR, interquartile range; NL, Dutch respondents.

aSignificant difference between countries by Mann–Whitney U test (p < 0.05).

bTrend difference between countries by Mann–Whitney U test (0.10 > p > 0.05).

the responding veterinarians, the results give insights into the awareness and perceived use of nutritional assessments from the veterinarians’ point of view. Only 21% of the responding veterinarians had prior knowledge of the guidelines, demonstrating the need for more nutrition education and further promotion of these guidelines.

Tailored nutritional guidance can only be achieved by performing regular nutritional assessments (Freeman et al., 2011). For this purpose, a complete nutritional assessment encompasses thorough evaluations of dietary and lifestyle history, followed by patient bodyweight and body composition examinations, to identify nutritional risks. Only
### Table 6

The estimated percentage of dogs with specific indications in which dietary recommendations are given and difference between Belgian and Dutch respondents (NL: N = 98; BE: N = 177)

| Indication                     | NL Median (%) | IQR (%) | NL Median (%) | IQR (%) | p     |
|--------------------------------|---------------|---------|---------------|---------|-------|
| Disease Lower urinary tract disease | 70            | 48–100  | 100           | 70–100  | <0.001a |
| Overweight                     | 80            | 50–100  | 90            | 60–100  | 0.001a |
| Diabetes mellitus              | 75            | 20–100  | 100           | 50–100  | <0.001a |
| Orthopaedic disease            | 80            | 50–96   | 75            | 50–98   | 0.301  |
| Renal disease                  | 100           | 100–100 | 100           | 90–100  | 0.271  |
| Gastrointestinal disease       | 80            | 50–100  | 75            | 50–100  | 0.425  |
| Dermatologic disease           | 80            | 68–100  | 80            | 50–100  | 0.027a |
| Liver disease                  | 50            | 20–93   | 75            | 50–100  | 0.003a |
| Cardiovascular disease         | 4             | 0–30    | 25            | 0–63    | <0.001a |
| Dental disease                 | 50            | 20–80   | 50            | 10–70   | 0.04a  |

| Life stage                     | NL Median (%) | IQR (%) | NL Median (%) | IQR (%) | p     |
|--------------------------------|---------------|---------|---------------|---------|-------|
| Growth                         | 80            | 45–100  | 100           | 50–100  | 0.274  |
| Adult                          | 50            | 25–100  | 50            | 20–80   | <0.001a |
| Senior                         | 50            | 20–80   | 70            | 45–100  | <0.001a |
| Neuter                         | 50            | 19–96   | 80            | 30–100  | <0.001a |

Abbreviations: BE, Belgian respondents; IQR, interquartile range; NL, Dutch respondents.

*Significant difference between countries by Mann–Whitney U test (p < 0.05).

### Table 7

The percentage of owners that complies and adheres to nutritional recommendations as estimated by the responding veterinarians, and the frequency of commonly heard reasons of non-adherence with differences between Belgian and Dutch respondents (NL: N = 86; BE: N = 171)

| Compliance and adherence                     | NL Median (%) | IQR (%) | NL Median (%) | IQR (%) | p     |
|----------------------------------------------|---------------|---------|---------------|---------|-------|
| Percentage of owners who comply with nutritional advice | 50            | 30–60   | 50            | 35–75   | 0.117  |
| Percentage of owners who complete the prescribed dietary regimen | 50            | 19–70   | 50            | 30–75   | 0.001a |
| Percentage of reasons of owners who do not adhere to nutritional advice Prescribed diet is too expensive | 50            | 29–75   | 50            | 35–80   | 0.115  |
|                                               | 10            | 5–30    | 20            | 10–40   | 0.001a |
|                                               | 10            | 5–25    | 20            | 10–30   | 0.058b |
|                                               | 10            | 5–30    | 20            | 5–40    | 0.389  |
|                                               | 0             | 0–10    | 0             | 0–5     | 0.010a |

Abbreviations: BE, Belgian respondents; IQR, interquartile range; NL, Dutch respondents.

*aSignificant difference between countries by Mann–Whitney U test (p < 0.05).

*bTrend difference between countries by Mann–Whitney U test (0.10 > p > 0.05).

### Table 8

An overview on the methods of monitoring that are being used by the respondents to monitor the effects of dietary recommendations and difference between Belgian and Dutch respondents, with association with the factor ‘country’ (NL: N = 79; BE: N = 170)

| Follow-up method       | NL Number of veterinarians | Percentage | BE Number of veterinarians | Percentage | p     | Cramér’s V |
|------------------------|----------------------------|------------|----------------------------|------------|-------|------------|
| Subsequent consultation| 71                         | 89.9%      | 116                        | 68.2%      | <0.001a| 0.233     |
| Contact by telephone   | 75                         | 94.9%      | 91                         | 53.5%      | <0.001a| 0.409     |
| Written communication  | 34                         | 43.0%      | 31                         | 18.2%      | <0.001a| 0.263     |

Abbreviations: BE, Belgian respondents; NL, Dutch respondents.

*aSignificant difference between countries by chi-squared test (p < 0.05).
TABLE 9  An overview of the different methods that are used by the respondents to increase compliance of dietary recommendations and a comparison between Belgian and Dutch respondents, and the association with factor ‘country’ (NL: N = 86; BE: N = 171)

| Method of motivation                        | NL       |                  |                      | BE       |                  |                      | p      | Cramér’s V |
|---------------------------------------------|----------|-----------------|----------------------|----------|-----------------|----------------------|--------|------------|
| Indicating differences in food amount       | 76       | 88.4%           |                      | 143      | 83.6%           |                      | 0.312  | 0.063      |
| Use of gradual transition                   | 71       | 82.6%           |                      | 129      | 77.8%           |                      | 0.195  | 0.081      |
| Difference in the price of the products     | 35       | 34.9%           |                      | 77       | 45.0%           |                      | 0.120  | 0.097      |
| Calculations of the difference in price per kilogram food | 14       | 16.3%           |                      | 28       | 16.4%           |                      | 0.984  | 0.001      |
| Selling small sample packages<sup>a</sup>   | 55       | 64.0%           |                      | 67       | 39.2%           | <0.001<sup>a</sup>   | 0.234  |            |
| Use of free sample packages<sup>a</sup>     | 31       | 36.0%           |                      | 118      | 69.0%           | <0.001<sup>a</sup>   | 0.315  |            |

Abbreviations: BE, Belgian respondents; NL, Dutch respondents.
<sup>a</sup>Significant difference between countries by chi-squared test (p < 0.05).

TABLE 10  The percentage of clients in which the respondents inform of specific nutrition-related risks after neutering and during growth and comparisons between Belgian and Dutch respondents (NL: N = 85; BE: N = 168)

| Risk                                      | NL       |                  |                      | BE       |                  |                      | p      |
|-------------------------------------------|----------|-----------------|----------------------|----------|-----------------|----------------------|--------|
| Neutering                                 |          |                 |                      |          |                 |                      |        |
| The risk that the animal becomes overweight| 100      | 80–100          |                      | 100      | 90–100          |                      | 0.087<sup>b</sup> |
| Lowering the amount of food or using a low-calorie diet | 100      | 80–100          |                      | 100      | 90–100          |                      | 0.067<sup>b</sup> |
| Growth                                    |          |                 |                      |          |                 |                      |        |
| Necessity to use a diet specifically for a growing animal | 90       | 70–100          |                      | 100      | 80–100          | <0.001<sup>a</sup>   |        |
| The time in which nutrition can be switched to an adult diet | 60       | 50–85           |                      | 90       | 70–100          | <0.001<sup>a</sup>   |        |
| The risks of giving too many treats during growth | 50       | 20–80           |                      | 80       | 50–100          | <0.001<sup>a</sup>   |        |
| The risks of giving extra supplements during growth | 20       | 8–80            |                      | 70       | 25–100          | <0.001<sup>a</sup>   |        |

Abbreviations: BE, Belgian respondents; IQR, interquartile range; NL, Dutch respondents.
<sup>a</sup>Significant difference between countries by Mann–Whitney U test (p < 0.05).
<sup>b</sup>Trend difference between countries by Mann–Whitney U test (0.10 > p > 0.05).

then, appropriate nutritional recommendations can be made. Yet, complete nutritional assessments were seldom performed by the respondents, even though nutritional recommendations were given in a variety of diseases. To illustrate, dietary information was collected infrequently, and questions were often limited to the animal’s main source of food. Additionally, body composition assessment through BCS and MCS was infrequently performed by the respondents. These results match previous studies, which showed that complete nutritional assessments are seldom performed during consultation (Bergler et al., 2016; Bruckner & Handl, 2020; Lumbis & de Scally, 2020). As such, it has been suggested that veterinarians would assess nutrition only when it was relevant to the patients’ presenting complaint (Bruckner & Handl, 2020). The same situation applied to our respondents in the case of BCS assessment.

The irregularity in which complete nutritional assessments were performed might cause nutritional risk factors to go unnoticed, and has significant consequences for patient care (Bergler et al., 2016; Vandendriessche et al., 2017). For instance, failure to identify animals that are routinely fed unbalanced diets can lead to diet-induced disorders, thus impeding patient health (Dillitzer et al., 2011). On the other hand, unnoticed dietary risk factors limit opportunities of early dietary intervention. In fact, animals in specific life-stages and animals with cardiovascular disease obtained the least recommendations in the current study, even though these conditions are frequently associated with nutritional risk factors such as sarcopenia and cardiac cachexia, respectively (Freeman et al., 2003; Freeman, 2012; Gompf, 2005; Willems et al., 2017). Additionally, many respondents did not include supplementations of essential nutrients when recommending an HCD, raising the question whether long-term use of an incomplete HCD is recognised as a nutritional risk factor. Eventually, failure to recognise nutritional risk factors can directly affect a patient’s health and quality of life (Freeman et al., 2011), which is prevented by regular use of...
A lack of detailed nutritional knowledge and a feeling of incompetence in nutrition have been suggested to limit nutritional assessments and nutrition-related discussions with animal caretakers during consultations (Bergler et al., 2016; Siebert et al., 2016). Indeed, many respondents indicated having insufficient knowledge about body composition assessment methods, which might signal a lack of general nutritional knowledge. Aforementioned can result in a reactive instead of a pro-active attitude towards nutrition, as was found previously (Bergler et al., 2016). This attitude can have further consequences in owner compliance and adherence to nutritional recommendations, as it causes uncertainty in owners about the benefits of dietary change (Abood, 2008; MacMartin et al., 2018). Currently, compliance and adherence to dietary recommendations were estimated as being moderate, with costs as a common reason of non-compliance. As owners willingly endure costs of veterinary care if they perceive that their animals’ well-being or health is positively affected (Coe et al., 2007), a lack of concise and clear communication on the costs and the anticipated effects of nutritional recommendations may exist (Wayner & Heinke, 2006). Improving nutritional knowledge in veterinarians is therefore essential to increase confidence in nutrition-related skills and communication and will result in an increased detection of nutritional risk factors and in improved owner compliance to nutritional recommendations.

The WSAVA guidelines can aid veterinarians in the process of incorporating nutrition in regular patient care, as they provide a clear overview of complete nutritional assessments and their use (Freeman et al., 2011). Since their release, the guidelines have been expanded with the ‘Global Nutritional Toolkit’, which provides extensive supporting materials, such as videos on body composition assessment and dietary history forms (WSAVA, 2021). The nutritional assessment guidelines have been integrated in various nutrition-related continuous education courses since their release, and are widely propagated via the WSAVA. Still, the majority of the respondents were unfamiliar with the guidelines, and similar findings were reported previously (Lumbis & de Scally, 2020). Thus, it is essential to increase awareness on the guidelines. This may be achieved by continued inclusion of nutritional assessment as a fifth vital assessment in continuing education, including non-nutrition focused lectures and veterinary conferences, but also by expanding the role of nutrition in veterinary curricula (Becvarova et al., 2016; Lumbis & de Scally, 2020). Another way the WSAVA may improve its reach is by collaboration with practice management software companies, to incorporate nutritional assessment as a (mandatory) field in patient records to increase the frequency of performed nutritional assessments.

There was a little difference between Belgian and Dutch respondents when considering the usage of nutritional assessments. Some differences were found in the nutritional recommendations for disease, and the means of follow-up after recommending dietary change. These differences may be related to practice demographics, as Dutch practices tended to be larger and could allow for outsourcing of nutritional consultation to other employees. As such, Dutch veterinary nurses were responsible for approximately one-fifth of all nutritional recommendations, suggesting lower involvement of Dutch veterinarians in nutrition. The influence of other factors, such as disease prevalence, differences in the years of experience of veterinarians in the sampled populations, an altered approach to nutrition in curricula (Becvarova et al., 2016) and attitudes of owners and veterinarians towards nutrition (Abood, 2008), cannot be excluded. Between-country differences, however, were only moderately associated with the factor ‘country’, and it is to be expected that the cause of the differences is multifactorial. The current findings matched the results found previously in Germany (Bergler et al., 2016; Bruckner & Handl, 2020) and the United Kingdom (Lumbis & de Scally, 2020), and it is possible that the same factors apply for multiple countries, warranting further study.

A major limitation of the current study is the relatively small sample size, 222 Belgian and 201 Dutch respondents respectively, compared to the total amount of veterinarians in private practice, approximately 5700 in Belgium and 2400 in the Netherlands (FVE, 2015). Still, this sample size is comparable to previous similar studies (Bergler et al., 2016; Bruckner & Handl, 2020; Siebert et al., 2016). The demographics of the respondents were comparable to the general veterinary population of both countries, giving the possibility to extrapolate this data (FVE, 2015). The two-year interval between the accessibility of the survey in Belgium and the Netherlands may also have affected the results, as progression in the knowledge of nutritional assessments might have been made in the intervening years.

Selection bias may have been introduced due to the methods of recruitment and the voluntary nature of the survey. The low completion rate of the survey by Dutch respondents when compared to the Belgian respond could reinforce this bias in comparisons made on later questions, as it is expected that motivated veterinarians tend to complete the survey. Additionally, estimation bias may be present, as the survey often required estimated information by the respondents without addressing the underlying motivations and context of these estimations. For instance, the percentage of HCDs in which a board-certified nutritionist was involved was not determined, and the time for which these unbalanced diets were prescribed was not clear. Our findings may therefore differ from the actual situation. Finally, the current study did not address the specific factors that influence the use of nutritional consulting. As such, this may prove a direction for future studies in order to find specific solutions to increase the use of nutrition in everyday practice.

In conclusion, the current data showed that nutritional assessment as described by the WSAVA nutritional assessment guideline was scarcely integrated in clinical practice. Most notably, nutritional evaluation by discussing diet and assessment of the animal’s body composition were carried out irregularly, even though nutritional recommendations were often implemented in treatment plans. As a result, patients without clinical signs may be at risk of nutrition-related disease due to underdiagnosed nutritional risks. General trends in the usage of nutritional assessments were similar in the examined countries, offering the possibility that the use of nutritional consulting is affected by the same factors in different countries. This offers the possibility to identify potential barriers to implement nutritional
assessments in veterinary practices across countries. As veterinarians play a key role in identifying poor nutritional management or poor nutritional status, efforts to raise awareness on the importance of regular nutritional assessments should be continued. This includes additional education of students, but also extended post-graduate trainings.

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CONFLICT OF INTEREST
Philippe Picavet is an employee of Hill’s Pet Nutrition. Veerle Vanden driesche is an employee of Pavo. The other authors declare no conflict of interest.

ETHICS STATEMENT
The authors confirm that the ethical policies of the journal, as noted on the journal’s author guidelines page, have been adhered to. No ethical approval was required, as this study required no animal experiments.

AUTHOR CONTRIBUTIONS
Writing—original draft, investigation, and data curation: Niels R. Blees. Conceptualisation, investigation, and writing—review & editing: Veerle L. Vanden driessche. Methodology, supervision, and writing—review & editing: Ronald J. Corbee. Conceptualisation, visualisation, and writing—review & editing: Phillipe Picavet. Project administration, supervision, visualisation, and writing—review & editing: Myriam Hesta.

DATA AVAILABILITY STATEMENT
The data that support the findings of this study are available from the corresponding author upon reasonable request.

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### APPENDIX
Survey containing questions about nutritional consulting in veterinary practice

| Questions | Answers |
|-----------|---------|
| **Composition of the practice** | |
| 1. Do you treat dogs and cats in the practice? | Yes<br>No |
| 2. What percentage of your patients are dogs or cats (on a yearly basis)? | More than 50%<br>Less than 50% |
| 3. What percentage of all patients are dogs (on a yearly basis)? | Open answer |
| 4. What percentage of all patients are cats (on a yearly basis)? | Open answer |
| 5. What percentage of all patients are other small companion animals (birds, rodents, reptiles, etc.) on a yearly basis? | Open answer |
| 6. How many veterinarians work full-time at the practice? | Open answer |
| 7. How many veterinarians work part-time at the practice? | Open answer |
| 8. Please specify how many male and female veterinarians work at the practice. | Male<br>Female | Open answer |
| 9. How long have the veterinarians been graduated? | 0–5 years<br>5–10 years<br>10–15 years<br>15–20 years<br>20–30 years<br>30–40 years<br>Longer than 40 years | Open answer |
| 10. Which specialisation? | Small animals<br>Horses<br>Production animals<br>Research<br>General | Open answer |
| 11. How many veterinarians are associates/co-owner of the practice? | Open answer |
| 12. How many employees are supporting staff? | Open answer |
| 13. What function do these employees have? | Veterinary assistant<br>Accountancy<br>Maintenance<br>Other | Open answer |
| 14. Has any employee had specific training to answer questions concerning nutrition in the practice? | Yes<br>No |
| 15. What education did this person receive? | Open answer |
| 16. Are additional courses concerning nutrition being attended? | Yes<br>No |

(Continues)
| Questions                                                                 | Answers                           |
|--------------------------------------------------------------------------|-----------------------------------|
| 17  If yes, what percentage of these courses is being attended by:       |                                   |
|     Veterinarians                                                       | Open answer                       |
|     Supporting staff                                                     | Open answer                       |
| Nutritional                                                             |                                   |
| 18  Where has the scale been placed?                                     |                                   |
|     Waiting room                                                         |                                   |
|     Consulting room                                                      |                                   |
|     Other                                                                |                                   |
| 19  Does the practice dispose of a specific cat scale?                    |                                   |
|     Yes                                                                   |                                   |
|     No                                                                   |                                   |
| 20  Where is the cat scale located?                                      |                                   |
|     Open answer                                                          |                                   |
| 21  In what percentage of all cases is weight measured during each consultation? |                                   |
|     Open answer                                                          |                                   |
| 22  In what percentage of all cases is weight written down in the patient's file? |                                   |
|     Open answer                                                          |                                   |
| 23  Are changes in weight discussed with the owner?                      |                                   |
|     Yes                                                                   |                                   |
|     No                                                                   |                                   |
| 24  Is the body condition score assessed during every consultation?      |                                   |
|     Yes                                                                   |                                   |
|     No                                                                   |                                   |
| 25  In what percentage of all cases is the body condition score assessed?|                                   |
|     Open answer                                                          |                                   |
| 26  Is the BCS written down in the patient's file during each consultation? |                                   |
|     Yes                                                                   |                                   |
|     No                                                                   |                                   |
| 27  In what percentage of all cases is the body condition score written down in the patient's file? |                                   |
|     Open answer                                                          |                                   |
| 28  What scoring system is used in your practice?                        |                                   |
|     Five-point scale                                                     |                                   |
|     Nine-point scale                                                     |                                   |
| 29  What is the reason for not using the body condition score frequently?|                                   |
|     Open answer                                                          |                                   |
| 30  Is the muscle condition score assessed during every consultation?    |                                   |
|     Yes                                                                   |                                   |
|     No                                                                   |                                   |
| 31  In what percentage of all cases is the muscle condition score assessed? |                                   |
|     Open answer                                                          |                                   |
| 32  Is the muscle condition score written down in the patient’s file during each consultation? |                                   |
|     Yes                                                                   |                                   |
|     No                                                                   |                                   |
| 33  In what percentage of all cases is the muscle condition score written down in the patient’s file? |                                   |
|     Open answer                                                          |                                   |

(Continues)
| Questions                                                                 | Answers                                                        |
|--------------------------------------------------------------------------|----------------------------------------------------------------|
| 34  What scoring system is used in your practice?                        | Description, Scoring system                                    |
| 35  What is the reason for not using the muscle condition score frequently? | Open answer                                                    |
| 36  Does your practice use nutritional surveys?                           | Yes, No                                                        |
| 37  Who verifies the answers that were answered by the owner?             | Veterinarian, Assistant                                        |
| 38  Is the information of the survey written down in the patient’s file?  | Yes, No                                                        |
| 39  Who is responsible for writing down this information?                 | Open answer                                                    |
| 40  In case a nutritional survey is not used, in what percentage of all cases do you ask for: | Open answer                                                    |
|     Type of nutrition (brand, type, consistency)                          |                                                               |
|     Amount of food                                                        |                                                               |
|     Number of meals per day                                               |                                                               |
|     Snacks (type, amount per day)                                         |                                                               |
|     Housing of the animal                                                 |                                                               |
|     Activity of the animal                                                |                                                               |
| 41  In what percentage of all cases is this information written down in the patient’s file? | Open answer                                                    |
|     Type of nutrition (brand, type, consistency)                          |                                                               |
|     Amount of food                                                        |                                                               |
|     Number of meals per day                                               |                                                               |
|     Snacks (type, amount per day)                                         |                                                               |
|     Housing of the animal                                                 |                                                               |
|     Activity of the animal                                                |                                                               |
| 42  Are the World Small Animal Veterinary Association (WSAVA) Nutritional Guidelines known to your practice? | Yes, No                                                        |
| 43  What percentage of the veterinarians in your practice knows the WSAVA Nutritional Guidelines? | Open answer                                                    |
| 44  What type(s) of nutrition does the practice sell?                     | Maintenance nutrition, Therapeutic nutrition, Raw nutrition   |
| 45  Please specify what percentage of the total sales of nutritional sales is made by each category: | Maintenance nutrition, Therapeutic nutrition, Raw nutrition   |

(Continues)
| Questions                                                                                                                                                                                                 | Answers                      |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------|
| 46 In how many of the following diseases in the cat are therapeutical nutrition recommended?                                                                                                         | Open answer                  |
| Lower urinary tract disease                                                                                                                                                                             |                              |
| Overweight                                                                                                                                                                                              |                              |
| Diabetes mellitus                                                                                                                                                                                          |                              |
| Orthopaedic disease                                                                                                                                                                                        |                              |
| Kidney disease                                                                                                                                                                                             |                              |
| Acute or chronic gastrointestinal disease                                                                                                                                                                  |                              |
| Dermal disease                                                                                                                                                                                             |                              |
| Liver disease                                                                                                                                                                                               |                              |
| Heart disease                                                                                                                                                                                              |                              |
| Dental disease                                                                                                                                                                                              |                              |
| Hyperthyroidism                                                                                                                                                                                              |                              |
| 47 In how many cases is specialised nutrition recommended for the following life phases in healthy cats?                                                                                                 | Open answer                  |
| Growth                                                                                                                                                                                                   |                              |
| Adult                                                                                                                                                                                                    |                              |
| Senior                                                                                                                                                                                                   |                              |
| Neutering                                                                                                                                                                                                |                              |
| 48 In how many of the following diseases in the dog are prescription diets recommended?                                                                                                                 | Open answer                  |
| Overweight                                                                                                                                                                                                |                              |
| Orthopaedic disease                                                                                                                                                                                        |                              |
| Diabetes mellitus                                                                                                                                                                                           |                              |
| Kidney disease                                                                                                                                                                                             |                              |
| Heart disease                                                                                                                                                                                              |                              |
| Acute or chronic gastrointestinal disease                                                                                                                                                                  |                              |
| Dermal disease                                                                                                                                                                                              |                              |
| Lower urinary tract disease                                                                                                                                                                                 |                              |
| Liver disease                                                                                                                                                                                              |                              |
| Dental disease                                                                                                                                                                                              |                              |
| 49 In how many cases is specialised nutrition recommended for the following life phases in healthy dogs?                                                                                                 | Open answer                  |
| Growth                                                                                                                                                                                                   |                              |
| Adult                                                                                                                                                                                                    |                              |
| Senior                                                                                                                                                                                                   |                              |
| Neutering                                                                                                                                                                                                |                              |
| 50 What percentage of dietary changes is recommended by:                                                                                                                                                | Open answer                  |
| Veterinarian                                                                                                                                                                                              |                              |
| Assistant                                                                                                                                                                                                 |                              |
| 51 What percentage of owners applies the recommended diet?                                                                                                                                                 | Open answer                  |
| 52 In how many cases is the nutritional therapy applied until the recommended end?                                                                                                                         | Open answer                  |
| 53 Please specify the percentage of cases in which the following motivations are used to stop early with the diet:                                                                                           | Open answer                  |
| Too expensive according to the owner                                                                                                                                                                        |                              |
| Not tasty enough according to the owner                                                                                                                                                                     |                              |
| No improvement of clinical condition according to the owner                                                                                                                                                  |                              |
(Continues)
| Questions                                                                 | Answers                      |
|---------------------------------------------------------------------------|------------------------------|
| Healed according to the owner                                             | Open answer                  |
| Other reason                                                              | Open answer                  |
| **54** Please specify any other reason that is being used by the owner to stop the diet: | Open                         |
| **55** In how many cases is a home-made diet recommended as a (part of) a therapy? | Open                         |
| **56** When a home-made diet is recommended, how do you choose the composition of this diet? | After consultation with a diplomate in nutrition | Self-acquired knowledge (book, internet, post-graduate teaching, etc.) |
| **57** Without consultation with a diplomate in nutrition, in how many cases does the home-made contain a: | Source of essential fatty acids | Vitamin/mineral premix |
| **58** Please specify in how many cases, after a dietary change, the follow-up is performed by: | A follow-up consultation Open | Telephone Open | Written contact Open | Other Open |
| **59** Who performs the follow-up consultation?                            | Veterinarian Assistant       |
| **60** In how many cases is the follow-up written down in the patient’s file? | Open                         |
| **61** What methods are used for extra motivation/to inform an owner about nutritional recommendations? | Gradual change to the new diet | Mentioning the amount of food per day | Mentioning the price per day | Mentioning the price per kilogram nutrition | Use of samples | Use of small packages |
| **62** By choosing a specific brand/nutrition type, what criteria are of importance? Please order from high to low importance. | Evidenced-based medicine | Innovations | Price | Taste | Partnership with the profession | Contact with a representative of the practice | Other |

(Continues)
| Questions                                      | Answers                                      |
|------------------------------------------------|----------------------------------------------|
| 63 Which pet food brands does the practice sell? | Hill’s                                       |
|                                                | Royal Canin                                  |
|                                                | Purina ProPlan                               |
|                                                | Virbac                                       |
|                                                | Sanimed                                      |
|                                                | Specific                                     |
|                                                | Trovet                                       |
|                                                | Eukanuba/IAMS                                |
|                                                | Other                                        |
|                                                | None                                         |
| 64 Specific for neutered dogs and cats: how many owners are informed about: |                                             |
|                                                | The risk of the development of overweight    |
|                                                | The necessity to reduce the amount of food or changing to a diet with a lower energy density |
| 65 Specific for growing dogs and cats: how many owners are informed about: |                                             |
|                                                | Necessity to give nutrition that has been developed to support a growing animal |
|                                                | The correct time to switch to adult nutrition |
|                                                | The risks of giving too many snacks during growth |
|                                                | The risks of giving supplements during growth |
| 66 Which of the following information moments are organised by the practice? | Puppy and/or kitten parties |
|                                                | Obesity clinics                              |
|                                                | Behavioural clinics                          |
|                                                | Senior screenings                            |
|                                                | Other                                        |
|                                                | None                                         |