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RESEARCH ARTICLE

Evaluation of Veterinarians' Diagnostic and Therapeutic Approaches to Otitis Externa: A Survey Research

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Abstract

Otitis externa (OE) is one of the most common ear diseases encountered in small animal clinical practice. Despite its high prevalence, the diagnostic and therapeutic approaches used by veterinarians may vary depending on clinical experience, available resources, and access to advanced diagnostic tools. This study aimed to evaluate veterinarians' clinical approaches to the diagnosis and treatment of otitis externa and to identify potential differences in diagnostic and therapeutic practices. A cross-sectional questionnaire-based survey was conducted between July 1 and September 1, 2025, among veterinarians working in clinical practices in Istanbul. A total of 330 veterinarians voluntarily participated in the study by completing an online survey distributed through social media and professional communication groups. The questionnaire consisted of two sections and 21 statements evaluating clinicians' approaches to OE diagnosis and treatment using a five-point Likert scale. Descriptive statistics were used to summarize demographic characteristics and survey responses, and Chi-square tests were performed to evaluate associations between demographic variables and responses. Most participants reported routinely performing ear examinations and otoscopic evaluations in patients presented with ear complaints. Awareness of breed predisposition and owner education regarding OE were also high among respondents. However, variations were observed in practices related to ear cleaning, microbiological sampling, and the use of imaging techniques. Acute OE was reported to be frequently encountered and generally manageable within a short period, whereas chronic OE was considered more difficult to treat. Significant associations were identified between several survey statements and demographic variables such as age, gender, and professional title. These findings indicate that veterinarians generally adopt current clinical approaches in the diagnosis and management of OE; however, variability in certain diagnostic and therapeutic practices suggests that more standardized clinical protocols and increased access to advanced diagnostic tools may improve the clinical management of otitis externa.

Key Words: Clinical management, ear examination, otitis externa, otoscopy, survey, veterinary clinicians

Veteriner Hekimlerin Otitis Eksterna Tanı ve Tedavi Yaklaşımlarının Değerlendirilmesi: Anket Çalışması

Öz

Otitis eksterna (OE), küçük hayvan klinik pratiğinde en sık karşılaşılan kulak hastalıklarından biridir. Hastalığın yüksek görülme sıklığına rağmen veteriner hekimlerin tanı ve tedavi yaklaşımları klinik deneyim, mevcut imkânlar ve ileri tanı yöntemlerine erişim gibi faktörlere bağlı olarak farklılık gösterebilmektedir. Bu çalışmada veteriner hekimlerin otitis eksterna tanı ve tedavisine yönelik klinik yaklaşımlarının değerlendirilmesi ve tanısal ile terapötik uygulamalardaki olası farklılıkların belirlenmesi amaçlanmıştır. Çalışma, 1 Temmuz–1 Eylül 2025 tarihleri arasında İstanbul'da kliniklerde çalışan veteriner hekimler arasında gerçekleştirilen kesitsel ve anket temelli bir araştırma olarak tasarlanmıştır. Sosyal medya ve mesleki iletişim grupları aracılığıyla paylaşılan çevrim içi ankete toplam 330 veteriner hekim gönüllü olarak katılmıştır. Anket iki bölüm ve otitis eksterna tanı ve tedavi yaklaşımlarını değerlendirmeye yönelik 21 ifadeden oluşmuş ve beşli Likert ölçeği kullanılmıştır. Verilerin analizinde tanımlayıcı istatistikler kullanılmış, demografik değişkenler ile anket yanıtları arasındaki ilişkiler Ki-kare testi ile değerlendirilmiştir. Katılımcıların büyük çoğunluğunun kulak muayenesi ve otoskopik değerlendirmeyi rutin olarak uyguladığı belirlenmiştir. Ayrıca ırk predispozisyonu konusunda farkındalığın ve hasta sahiplerinin bilgilendirilmesinin yüksek olduğu görülmüştür. Bununla birlikte kulak temizliği uygulamaları, mikrobiyolojik örnekleme ve görüntüleme yöntemlerinin kullanımında farklılıklar olduğu saptanmıştır. Akut OE olgularının klinik pratikte sık karşılaşıldığı ve genellikle kısa sürede tedavi edilebildiği, buna karşın kronik OE olgularının daha zor yönetildiği bildirilmiştir. Bazı anket ifadeleri ile yaş, cinsiyet ve mesleki unvan gibi demografik değişkenler arasında anlamlı ilişkiler tespit edilmiştir. Bu bulgular veteriner hekimlerin OE tanı ve tedavisinde güncel klinik yaklaşımları genel olarak benimsediğini göstermektedir. Bununla birlikte bazı tanısal ve terapötik basamaklarda gözlenen farklılıklar, daha standardize klinik protokollerin geliştirilmesi ve ileri tanı yöntemlerine erişimin artırılmasının OE'nin klinik yönetimini iyileştirebileceğini düşündürmektedir.

Anahtar Kelimeler: Klinik yönetim, kulak muayenesi, otitis eksterna, otoskopi, anket, veteriner hekimler

INTRODUCTION

Otitis externa (OE) is defined as inflammation of the horizontal and vertical ear canal and the surrounding tissues (1–5). It represents one of the most common ear diseases in dogs and cats and accounts for approximately 10–20% of consultations in small animal veterinary practice (6–9).

Clinical presentations of OE range from acute inflammatory conditions to chronic and complicated infections. In advanced cases, the condition may also be associated with hyperplastic or neoplastic changes within the ear canal (10,11). The etiology of OE is typically multifactorial and is commonly classified into primary, secondary, predisposing, and perpetuating factors (10,12–14).

Primary factors are the underlying causes that initiate inflammation in a previously normal ear canal and can independently lead to the development of OE. The most common primary factors include atopic dermatitis, food hypersensitivity, keratinization disorders, and endocrine diseases such as hypothyroidism (1,7,12–14).

Predisposing factors do not directly cause OE but increase the risk of disease development by facilitating bacterial and yeast colonization in the ear canal. These factors include anatomical conformation, environmental and climatic conditions, excessive hair within the ear canal, stenotic ear canals, excessive cerumen production, and neoplasia of the ear canal (2,3,7,9).

Perpetuating factors do not initiate otitis but contribute to the persistence or worsening of inflammation even after the primary causes have been addressed. These include bacterial, yeast, and fungal infections, proliferative tissue changes, and otitis media (13,15). Clinical signs commonly associated with OE include head shaking, ear scratching, pain in the ear and head region, aggression related to pain, licking of the affected ear by other animals, and hearing loss (2,5).

Recurrent OE episodes throughout an animal's lifetime may increase infection severity and promote the development of antimicrobial resistance among microorganisms (15,16). Acute and uncomplicated cases of OE can generally be treated successfully (1); however, chronic and recurrent cases remain challenging to manage (1,15).

Treatment strategies primarily focus on controlling active inflammation and subsequently eliminating predisposing and perpetuating factors (2,4,15). Systemic therapy is indicated in cases of epithelial ulceration, positive bacteriological culture, tympanic membrane rupture, otitis media, systemic illness, or when topical treatment is not feasible (2,15,17). Surgical intervention may be required in cases that fail to respond to medical therapy or in recurrent disease (18,19).

This study aimed to evaluate veterinarians' clinical approaches, diagnostic methods, and treatment preferences in the management of otitis externa. Furthermore, it sought to assess the extent to which current clinical practices align with evidence-based diagnostic and therapeutic recommendations reported in the literature. The primary hypothesis of this study was that significant variations exist among veterinarians regarding diagnostic approaches and treatment strategies for otitis externa, and that certain clinical practices may not fully conform to current evidence-based guidelines.

MATERIAL AND METHODS

Study Design and Participants

This study was designed as a cross-sectional, questionnaire-based survey conducted between July 1 and September 1, 2025, among veterinarians working in veterinary clinics in Istanbul. To reach potential participants, an online questionnaire was created and distributed through social media platforms and professional communication groups.

A total of 330 veterinarians were invited to participate in the study, and participation was based on voluntary completion of the questionnaire. The survey was conducted anonymously, and no personally identifiable information was collected from the participants.

Structure of the Questionnaire

The questionnaire used in this study consisted of two sections and a total of 26 questions.

The first section included demographic and professional characteristics of the participating veterinarians. Questions in this section addressed age, gender, professional experience, academic title, and area of specialization (if applicable).

The second section included statements designed to evaluate veterinarians' clinical approaches, diagnostic preferences, and treatment strategies for otitis externa (OE). This section consisted of 21 statements prepared using a five-point Likert scale.

Likert Scale

Participants' responses to each statement were scored using the following five-point Likert scale:

1–Stronglydisagree
2–Disagree
3–Neutral
4–Agree
5–Strongly agree

This scale was used to assess veterinarians' clinical approaches and treatment preferences regarding OE cases.

Survey Statements

The statements included in the second section of the questionnaire were as follows:

I perform an ear examination on every patient presented to the clinic for routine visits.

I provide detailed information to owners of breeds predisposed to OE.

3. I use cotton swabs or cotton-tipped applicators for ear cleaning.

4. I recommend that owners perform periodic ear cleaning for their pets.

5. Ear cleaning solution is always available in the examination room for use in patients when necessary.

6. I perform otoscopic examination on every patient presented with a complaint of ear problems.

7. I administer sedative or general anesthetic drugs to facilitate otoscopic examination.

8. When encountering ear discharge, I perform microbiological diagnostic tests.

9. Radiography is a frequently used auxiliary diagnostic method for ear problems.

10. I use advanced imaging methods for the diagnosis of OE.

11. Acute OE is a condition that I frequently encounter in clinical practice.

12. I can treat acute OE within a short period of time.

13. Chronic OE is a condition that I frequently encounter in clinical practice.

14. I can treat chronic OE within a short period of time.

15. I may use surgical methods in the treatment of OE.

16. I use only topical preparations in the treatment of OE.

17. In addition to topical preparations, I initiate systemic therapy in OE cases.

18. In aggressive animals, I avoid topical applications and prefer systemic medications.

19. I refer patients that I cannot treat to referral centers.

20. The medications available in our country are sufficient for the treatment of OE.

21. I follow educational resources related to the topic and apply current treatment approaches.

Statistical Analysis

All responses marked by participants, as well as unanswered questions, were included in the statistical evaluation. Descriptive statistics (frequency and percentage) were used to summarize the demographic characteristics of the participants and their responses to the survey statements.

Associations between the statements related to otitis externa (OE) and demographic variables, as well as relationships among the statements themselves, were analyzed using the Chi-square (χ^2) test. When significant associations were identified, post-hoc analyses were conducted using adjusted standardized residuals to determine which categories contributed to the observed differences.

Statistical analyses were performed using an appropriate statistical software package. The level of statistical significance was set at $P<0.05$ for all analyses.

The sample size of the study was calculated using G*Power 3.1 software for the Chi-square test. Based on a medium effect size (w=0.3), a 95% confidence level, and a statistical power of 80% ($1 - \beta=0.80$), the minimum required sample size was determined to be 330 participants.

This methodological approach enabled a systematic evaluation of veterinarians' clinical experiences, perceptions, and practices regarding OE in relation to their demographic characteristics and professional attitudes.

RESULTS

The study was completed on a total of 330 voluntary participants. Analysis of the age distribution showed that the largest group consisted of veterinarians aged 30–39 years (n=121; 36.67%), followed by those aged 20–29 years (n=110; 33.33%). Smaller proportions of participants were in the 40–49 age group (n=66; 20.00%) and 50 years and older (n=33; 10.00%).

Regarding gender distribution, 178 participants were male (53.94%) and 152 were female (46.06%).

Evaluation of the participants' academic and professional titles revealed that the majority were practicing veterinarians (n=264; 80.00%). In addition, the sample included PhD students (n=21; 6.36%), veterinarians holding a doctoral degree (n=18; 5.45%), specialist veterinarians (n=16; 4.85%), and master's students (n=10; 3.03%). Only one participant had the academic rank of professor (n=1; 0.30%) (Table 1).

Analysis of specialization areas indicated that the vast majority of participants did not have a formal specialization (n=282; 85.45%). Among those with a specialization, surgery represented the largest group (n=18; 5.45%), followed by internal medicine (n=13; 3.94%), biochemistry (n=3; 0.91%), and obstetrics and gynecology (n=3; 0.91%). Other areas accounted for 11 participants (3.33%).

Table 1. Distribution of Demographic Characteristics of the Participants

Variable	Category	n (%)
Age	20–29	110 (33.33)
	30–39	121 (36.67)
	40–49	66 (20.00)
	≥50	33 (10.00)
Sex	Female	152 (46.06)
	Male	178 (53.94)
Title	Veterinarian	264 (80.00)
	PhD	19 (5.76)
	PhD student	21 (6.36)
	MSc student	10 (3.03)
	Specialist veterinarian	16 (4.85)
Field of specialization	Surgery	18 (5.45)
	Internal medicine	13 (3.94)
	Other	17 (5.15)
	None	282 (85.45)

The "other" category included a heterogeneous range of disciplines such as pharmacology and toxicology, histology and embryology, pathology, reproduction and artificial insemination, microbiology, cardiology, anatomy, virology, and parasitology. Additionally, two participants reported statements that could not be considered a field of specialization and instead described their areas as dog breeds and stray animals (Table 1).

Following the evaluation of demographic data, responses to the statements designed to assess veterinarians' approaches to otitis externa (OE) were analyzed.

A large majority of participants agreed with Statement 1, with 89.09% reporting that they agreed or strongly agreed, 4.85% disagreed or strongly disagreed, and 6.06% remaining neutral.

Similarly, for Statement 2, 86.67% of participants agreed or strongly agreed, whereas 4.24% disagreed or strongly disagreed and 9.09% reported neutral responses.

Responses to Statement 3 showed a more heterogeneous distribution. While 43.33% of participants disagreed or strongly disagreed with the statement, 43.93% agreed or strongly agreed, and 12.73% remained neutral.

For Statement 4, 58.18% of participants agreed or strongly agreed, 26.97% disagreed or strongly disagreed, and 14.85% reported neutral responses.

Regarding Statement 5, 77.27% of participants agreed or strongly agreed, 17.88% disagreed or strongly disagreed, and 4.85% remained neutral.

When diagnostic approaches were evaluated, 85.15% of participants agreed or strongly agreed with Statement 6, whereas 8.79% disagreed or strongly disagreed and 6.06% remained neutral.

In contrast, responses to Statement 7 indicated that 56.66% of participants disagreed or strongly disagreed, 10.61% agreed or strongly agreed, and 32.73% reported neutral responses.

For Statement 8, 67.27% of participants agreed or strongly agreed that they collect swab samples in cases of ear discharge, while 9.39% disagreed or strongly disagreed and 23.33% remained neutral.

Regarding imaging techniques, Statement 9 showed that 24.24% of participants agreed or strongly agreed that radiography is frequently used, while 47.88% disagreed or strongly disagreed and 27.88% remained neutral.

Similarly, for Statement 10, 33.94% of participants agreed or strongly agreed that they use advanced imaging techniques (CT/MRI) for OE diagnosis, whereas 40.30% disagreed or strongly disagreed and 25.76% remained neutral.

In terms of disease frequency, 76.36% of participants agreed or strongly agreed with Statement 11, indicating that acute OE is frequently encountered in clinical practice. For Statement 12, 70.00% reported that they are able to treat acute OE within a short period of time, while 6.67% disagreed or strongly disagreed and 23.33% remained neutral.

For Statement 13, 59.09% of participants agreed or strongly agreed that chronic OE is frequently encountered in clinical practice. However, responses to Statement 14 indicated that only 12.12% agreed or strongly agreed that chronic OE can be treated within a short period of time, whereas 57.58% disagreed or strongly disagreed and 30.30% remained neutral.

Regarding treatment approaches, Statement 15 showed that 29.39% of participants agreed or strongly agreed that they may use surgical methods for OE treatment, while 38.79% disagreed or strongly disagreed and 31.82% remained neutral.

For Statement 16, 17.88% of participants agreed or strongly agreed that they use only topical treatments, whereas 60.00% disagreed or strongly disagreed and 22.12% remained neutral.

In contrast, responses to Statement 17 showed that 60.30% of participants agreed or strongly agreed that they initiate systemic therapy in OE cases, while 9.70% disagreed or strongly disagreed and 30.00% remained neutral.

Regarding behavioral management, responses to Statement 18 indicated that 11.82% of participants agreed or strongly agreed that they avoid topical treatment in aggressive animals, whereas 73.94% disagreed or strongly disagreed and 14.24% remained neutral.

For Statement 19, the vast majority of participants (90.91%) agreed or strongly agreed that they refer patients they cannot treat to referral centers, while 4.85% disagreed or strongly disagreed and 4.24% remained neutral.

Responses to Statement 20 revealed heterogeneous opinions regarding the adequacy of available medications for OE treatment, with 24.24% agreeing or strongly agreeing, 46.06% disagreeing or strongly disagreeing, and 29.70% remaining neutral.

Finally, for Statement 21, 81.51% of participants agreed or strongly agreed that they follow educational resources and apply current treatment approaches, while 2.73% disagreed or strongly disagreed and 15.76% reported neutral responses (Figure 1).

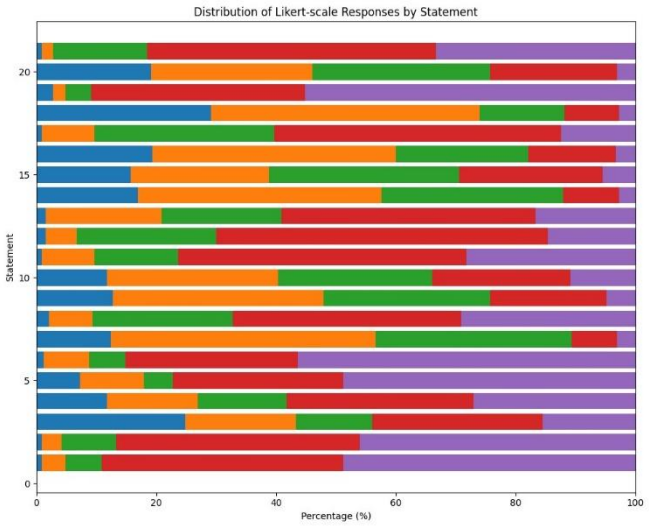


Figure 1. Distribution of Responses to Questions on the Approach to and Treatment Options for Otitis Externa. Distribution of responses to the Likert-scale statements. Horizontal stacked bars represent the percentage of respondents selecting each response category.

The relationships between the OE-related statements and demographic variables (age, gender, professional title, and specialization) were evaluated using the Chi-square test. Significant associations were identified between several statements and demographic variables (P<0.05). Age was significantly associated with Statements 1, 2, 4, 9, 15, 17, and 19. Gender showed significant associations with Statements 11 and 19. Professional title was significantly associated with Statements 3, 11, and 13, whereas specialization was associated only with Statement 20 (Figure 2).

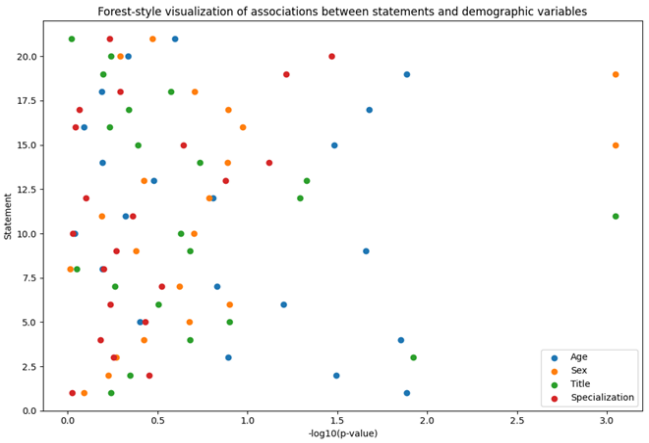


Figure 2. Association Between Responses to Otitis Externa Management and Treatment Questions and Demographic Variables (p-values). The x-axis represents −log10(p-values) obtained from chi-square tests. Larger values indicate stronger statistical evidence for an association.

In addition, relationships among selected statements were analyzed using Chi-square tests. Significant associations were identified between Statements 1–5 (P=0.003), 6–7 (P=0.027), 11–12 (P<0.001), 13–14 (P<0.001), 16–18 (P=0.040), and 14–19–20 (P<0.001) (Figure 3).

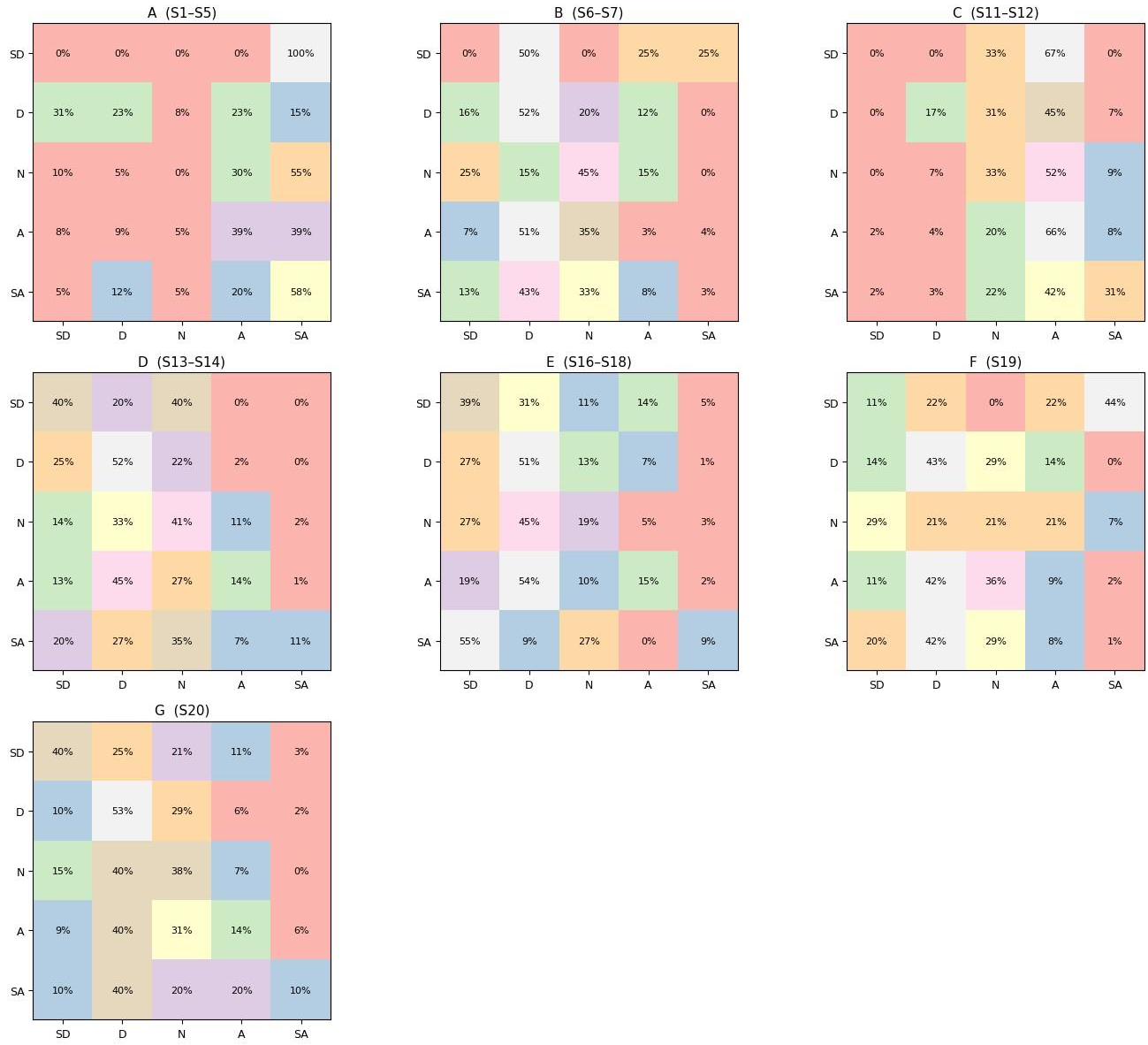


Figure 3. Multi-panel heatmaps showing the distribution of Likert-scale responses between selected survey statements. Panels represent the percentage distribution of responses between statement pairs: (A) S1–S5, (B) S6–S7, (C) S11–S12, (D) S13–S14, (E) S16–S18, (F) S19, and (G) S20. Cell values indicate percentages within each response category

DISCUSSION AND CONCLUSION

Although veterinary medicine has historically been considered a male-dominated profession, recent reports indicate a marked increase in the proportion of women both studying in veterinary faculties and actively working in clinical practice (20,21). In fact, in the United States, 63% of veterinary professionals were reported to be women in 2019 (21). In Türkiye, according to Turkish Statistical Institute data from November 2025, labor force participation rates among the working-age population were 36.2% for women and 71.8% for men (22). Although the proportion of female clinicians in the present study was lower than that reported in the United States, the proportion of female veterinarians was markedly higher than the overall female labor force participation rate in the country. This finding can be interpreted as being consistent with the global trend toward increasing female representation within the veterinary profession.

The age distribution of practicing veterinarians varies across populations; however, the 30–39 age group has frequently been reported as the predominant group (23). Similarly, in the present study, veterinarians aged 30–39 constituted the largest proportion of participants, which is consistent with previous findings. Nevertheless, the relatively higher proportion of participants under 30 years of age may be explained by a sampling effect, as online surveys are generally more accessible and appealing to younger veterinarians.

The majority of participants in the present study were general practitioners without a specific specialty area. This is particularly relevant in reflecting the real-world management of OE in field conditions. In settings where access to specialized veterinarians may be limited, the initial assessment and management of commonly encountered diseases such as OE are primarily performed by general practitioners.

Routine ear examination as a systematic component of physical examination is valuable for early diagnosis, detection of subclinical findings, and prevention of potential complications (24). In the present study, the high level of agreement with Statement 1 indicates that ear examination is widely adopted in routine clinical practice. Similarly, the high

awareness of breed predisposition and the communication of this information to pet owners suggest that preventive veterinary medicine is considered an important component of OE management (11,25,26).

In contrast, ear cleaning practices showed a more heterogeneous pattern. The use of cotton swabs or similar materials has been associated with complications such as cerumen impaction, trauma to the ear canal wall, contact dermatitis, and tympanic membrane perforation (27,28). In this study, the responses regarding ear cleaning practices were distributed almost evenly, suggesting that despite awareness of potential risks, this practice may still be common in clinical settings. Considering that cerumen serves as a physiological barrier and possesses antimicrobial properties, unnecessary manipulation may pose a risk to ear health (29).

When performed with appropriate indications and techniques, ear cleaning constitutes an important component of treatment; however, excessive or improper cleaning may increase susceptibility to infection by causing moisture accumulation and epithelial maceration in the ear canal (29,30). In the present study, a considerable proportion of participants reported recommending periodic ear cleaning and keeping ear-cleaning solutions available in the examination room, indicating that ear cleaning occupies an important place in routine clinical practice. Nevertheless, these practices should be guided by clear clinical indications, and routine cleaning in animals without clinical signs should be carefully evaluated.

Otoscopy is considered one of the most important diagnostic methods for otitis externa and a fundamental component of physical examination (31,32). In the present study, the high rate of otoscopic examination in animals presented with ear complaints indicates that diagnostic steps are widely implemented in clinical practice. However, in cases involving foreign body suspicion, excessive otorrhea, marked pain, or the need for deep examination and ear cleaning, performing otoscopy under sedation or general anesthesia may be more appropriate in terms of both patient safety and examination efficiency (33).

Microbiological evaluation plays a critical role in determining appropriate treatment, particularly in chronic and treatment-resistant OE cases (34). However, initiating antimicrobial therapy without microbiological evaluation in chronic cases may contribute to antimicrobial resistance and biofilm formation (16,35).

Regarding imaging methods, the relatively limited use of radiography and the moderate utilization of advanced imaging techniques suggest that diagnostic strategies vary depending on institutional facilities and available resources. While radiography may be useful for evaluating proliferative changes, calcification, or neoplasia (36,37), computed tomography has increasingly replaced radiography for the evaluation of middle and inner ear diseases (3,37).

The clinical course and treatment difficulty differ between acute and chronic forms of OE. In the present study, participants frequently encountered acute OE and reported being able to treat it within a short period, suggesting that acute cases can be effectively managed in routine clinical practice. In contrast, chronic OE cases were reported to be more difficult to treat, which is consistent with previous reports indicating that structural changes, persistent underlying factors, and complex infection dynamics complicate treatment (1,15,16).

Surgical treatment is considered an important option in the management of chronic and treatment-resistant OE cases (18). In the present study, the relatively limited inclination toward surgical intervention may be associated with the predominance of general practitioners among participants and differences in surgical experience or infrastructure.

Although topical therapy represents the cornerstone of OE treatment, systemic therapy may also be indicated in certain cases (1,17). The relatively high inclination toward systemic treatment observed in this study may reflect the presence of otorrhea or difficulties in administering topical medications in clinical settings.

The fact that the vast majority of participants reported referring cases they could not treat to referral centers can be considered consistent with patient safety and professional ethical principles (38).

Treatment failure in chronic OE may not only be related to drug availability but also to antimicrobial resistance, biofilm formation, and the persistence of underlying primary or perpetuating factors (1,16,26,35). Finally, the high level of agreement indicating that participants follow current educational developments suggests that clinicians demonstrate a strong motivation to keep their knowledge and clinical practices up to date in the management of OE.

This study provides field-based insights into veterinarians' clinical approaches to the diagnosis and management of otitis externa (OE). The findings indicate that ear examination and otoscopic evaluation are widely performed in routine clinical practice, reflecting a generally high level of awareness regarding the importance of early diagnosis. Nevertheless, the results also suggest that more standardized approaches may be needed in certain diagnostic and therapeutic steps. In this context, supporting continuing professional education, promoting evidence-based clinical protocols, and improving access to advanced diagnostic methods may contribute to enhancing the clinical management of OE. Furthermore, future studies including larger sample sizes from different regions may help identify potential regional variations in veterinary clinical practices and support the development of more standardized management strategies for OE.

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CONFLICT OF INTEREST

There is no conflict of interest to be declared by the authors.

AUTHOR CONTRIBUTIONS

EBB and AD designed the study. Data collection was carried out by EBB, EMP and ESA. Statistical analyses were performed by EBB, YA and BEK. The manuscript was written by EBB with contributions from all authors. Final revisions and approval of the manuscript were carried out by all authors.

ETHICAL STATEMENT

Ethical approval for this study was obtained from the Istanbul University-Cerrahpaşa Social and Human Sciences Research Ethics Committee (Approval No: 2024/628). Participation in the survey was voluntary and anonymous, and informed consent was obtained from all participants.

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