



Prescription of medicinal ozone in small animals' veterinary practice in southern Brazil

Prescrição de ozônio medicinal na prática veterinária de pequenos animais no sul do Brasil

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ABSTRACT: Veterinary medicine is constantly looking for alternatives capable of helping to resolve animal diseases, especially when conventional treatments are ineffective or adverse effects and microbial resistance occur. The objective of this work was to verify the main treatment prescriptions using medicinal ozone in the small animal clinic, as well as the professional profile who prescribe it. Veterinarians from Brazil responded to the electronic questionnaire. Among the 213 survey participants, 98.1% claimed to use at least one integrative therapy in clinical practice. Among these, 72.0% claimed to apply or recommend ozone therapy. Regarding the results of ozone therapy, 90.0% reported good or excellent results. The main diseases treated were healing of open wounds (91.1%), dermatitis (63.7%), assepsis of contaminated wounds (46.6%) and post-surgical healing (49.7%). Among all participants who use or recommend ozone therapy, 31.5% reported having already indicated therapy in cases of resistance to antibacterials; among these, 73.9% said they had good or excellent results. It was found that female professionals use a greater number of integrative therapies than men. In addition, the older the professionals, and the longer they work, the longer they use ozone therapy. It is concluded that ozone therapy has significant expansion potential and requires scientific evidence for effective and safe clinical application.

Keywords: analgesia; antimicrobial effect; company animals; integrative treatment; ozone therapy.

RESUMO: A medicina veterinária busca constantemente alternativas capazes de auxiliar no tratamento de doenças animais, especialmente quando os tratamentos convencionais são ineficazes ou apresentam efeitos adversos e resistência microbiana. O objetivo deste trabalho foi verificar as principais prescrições de tratamentos com ozônio medicinal na clínica de pequenos animais, além de verificar o perfil do profissional que o prescreve. Veterinários do Brasil responderam ao questionário eletrônico. Entre os 213 participantes da pesquisa, 98,1% afirmaram utilizar pelo menos uma terapia integrativa na prática clínica. Dentre esses, 72,0% afirmaram aplicar ou recomendar ozonioterapia. Quanto aos resultados com o uso da ozonioterapia, 90,0% relataram resultados bons ou excelentes. As principais doenças tratadas foram cicatrização de feridas abertas (91,1%), dermatite (63,7%), assepsia de feridas contaminadas (46,6%) e cicatrização pós-cirúrgica (49,7%). Entre todos os participantes que utilizam ou recomendam ozonioterapia, 31,5% afirmaram já ter indicado a terapia em casos de resistência a antibióticos; e dentre esses, 73,9% afirmaram ter obtido resultados bons ou excelentes. Constatou-se que profissionais do sexo feminino utilizam um número maior de terapias integrativas do que os profissionais do sexo masculino. Além disso, quanto mais velhos os profissionais e quanto maior o tempo de trabalho, maior a frequência com que utilizam a ozonioterapia. Conclui-se que o uso do ozônio é uma terapia com alto potencial de expansão e que necessita de comprovação científica para sua eficácia e segurança clínica.

Palavras-chave: analgesia; efeito antimicrobiano; animais de companhia; tratamento integrativo; ozonioterapia.

INTRODUCTION

Increasingly, integrative or alternative therapies have been gaining ground as recommendations for the treatment of companion animals and as accepted by tutors; these therapies are resources for various diseases, especially when conventional treatment is ineffective or has excessive adverse effects (Shmalberg; Memon, 2015; Memon *et al.*, 2016). Many alternative therapies are not only comparatively inexpensive and readily available, but also offer owners the opportunity to contribute to their pets' health actively. There are several therapies already inserted in veterinary medicine, such as acupuncture, physiotherapy, homeopathy, phytotherapy, floral remedies, aromatherapy, and laser therapy, among others (Memon *et al.*, 2016; Shmalberg; Memon, 2015); however, many

are still awaiting regulation. Recently, ozone therapy in veterinary treatments was regulated in Brazil (CFMV, 2020a).

Oxygen-ozone (O₂-O₃) therapy is a non-invasive, easy-to-obtain, non-pharmacological and low-cost procedure based on the antioxidant-inducing capacity of O₃ (Anzolin *et al.*, 2020; Scassellati *et al.*, 2020). Reports of ozone therapy use in veterinary medicine are increasing, with already being reported in horses, ruminants and dogs (De Souza *et al.*, 2021; Murphy *et al.*, 2016; Rodríguez, 2017; Teixeira *et al.*, 2013). Some evidence points to mechanisms involving immunomodulation, antimicrobial, anti-inflammatory, analgesic and healing action (De Souza *et al.*, 2021; Smith *et al.*, 2017; Viebahn-Haensler; Fernández, 2021).

The hope surrounding alternative veterinary medicine is understandable, but for most modalities

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there is little evidence to support efficacy. Although the range of randomized scientific studies on medicinal ozone is, to date, scarce and superficial (Shmalberg; Memon, 2015), this paper aims to present veterinarians' prescriptions for ozone therapy for the treatment of dogs and cats, based on their reported clinical success. In addition, the profile of professionals who use ozone therapy will be verified throughout this survey.

MATERIAL AND METHODS

This survey was carried out in the three southern Brazilian states – Paraná (PR), Santa Catarina (SC) and Rio Grande do Sul (RS). Adherence to the survey was voluntary. The questionnaire was administered in April and May 2021 via the Google Forms online platform. To participate, veterinarians had to agree to the Free and Informed Consent Form previously. This survey was previously approved by the Ethics Committee for Human Beings, registered under protocol number 43992921.1.0000.5346.

The social networks Instagram and WhatsApp were used to disseminate the questionnaire to veterinarians working in clinics and hospitals, as well as self-employed veterinarians. In addition, the questionnaire was sent via e-mail to 80 teaching institutions that offer a Veterinary Medicine course and/or a Residency and Graduate Program in PR, SC, and RS, seeking wide dissemination to professors' areas and to students who graduated from the institutions.

Personal information was requested regarding age, gender, training time, registration number with the Veterinary Medical Class Council, and state and city of operation. As for integrative therapies, participants were asked to identify all those they recommend or apply to their patients. Specifically, regarding ozone therapy, participants were asked about their knowledge of it; whether they would recommend or apply it; and, if not, why.

Regarding the workplace, it was asked whether a qualified professional applies ozone therapy or whether a referral is made to an external professional, and for how many years the participant has applied or recommended the therapy. Veterinarians who claimed to apply medicinal ozone to their patients were asked whether they had participated in a training course to do so. It was asked which species professionals apply/recommend therapy, and which main diseases they recommend/apply ozone therapy for. Professionals were asked to evaluate the results of using medical ozone; as well as whether the therapy is recommended/applied in a prophylactic/preventive way. Those who stated to apply/recommend were also asked when they decided to use it (if as a last option, or first option exclusively, or associated with conventional treatment); if the professional has already applied or recommended antibacterial treatments and in cases of bacterial resistance to conventional drugs, and these cases, if the treatment was successful; and if you have already recommended/applied ozone therapy with an analgesic effect. Finally, it was asked whether veterinarians believe that ozone therapy will expand in the coming years. To those who said they did not recommend/apply the therapy, five responses were suggested to justify the decision.

Questionnaires in which participants claimed to be from other states, to be under 22 years of age, or to have graduated less than 6 months ago were excluded

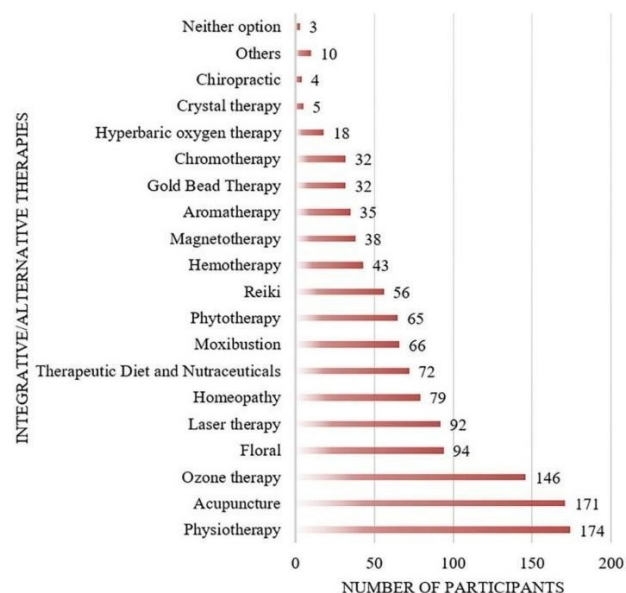
from the survey (since we considered they did not have sufficient experience to answer our questionnaire). Questionnaires answered more than once by the same participant were also excluded.

The questionnaire results were analyzed descriptively, and correlations between variables were tested using the Chi-square test of independence and Fisher's exact test. For the correlation tests, a significance level (α) of 5% was adopted. The data were tabulated in Microsoft Excel, and the performed tests were developed in the R environment (v-4.2.0).

RESULTS

A total of 218 participants signed the informed consent and responded to the questionnaire; however, 5 were excluded for meeting the exclusion criteria. The participants were from 80 cities across southern Brazilian states. The most used integrative therapies are shown in Figure 1. Table 1 presents the primary diseases treated with the therapy.

Figure 1 – Integrative therapies most applied/recommended by veterinarians from Brazil in an online questionnaire applied in April/May 2021, among 213 participants.



Source: author's own data.

When testing the association between sex and the number of integrative therapies used, a statistical difference was observed ($P = 0.001$), with females using and recommending more integrative therapies than males; similarly, women were the ones who most often applied/recommended medical ozone therapy ($P = 0.008$).

There was no statistical association between the age of the participants and whether or not they knew about ozone therapy ($P = 0.546$); between the age of the participants and recommending/applying the therapy in a prophylactic/preventive way to diseases in the animals ($P = 0.167$) and between the age and replacing or not the use of ozone with antibiotics ($P = 0.163$). However, it was found that the longer the duration of ozone therapy, the greater the recommendation of the technique for analgesic effect in patients ($P = 0.007$).

Table 1 – Main diseases of small animals (dogs and cats) treated with medicinal ozone by veterinarians from Brazil in a questionnaire applied in April/May 2021.

Diseases	Nº of participants who indicate or apply	% used for a specific purpose
Healing of open wounds	133	90.5
Dermatitis	93	63.3
Asepsis of contaminated wounds	68	46.3
Post-surgical healing	58	39.5
Arthritis	57	38.8
Discopathies	56	38.1
Otitis	54	36.7
Chronic Kidney Disease	48	32.7
Cystitis	41	27.9
Ophthalmopathies	27	18.4
Epilepsy/myoclonus	25	17.0
Diarrhea	23	15.6
Pyometra	11	7.5
Others*	10	6.8

The percentage % refers to the 146 participants who apply or recommend ozone therapy. Each participant responded to use for at least 1 disease, and at most 13 diseases. *Others: Neoplasms (4), inflammatory bowel disease (1), oral procedures (3), autoimmune diseases (1), diabetes (1).

There was no association between the time of training and the number of integrative therapies that are recommended by professionals ($P = 0.080$). There was also no association between time using ozone therapy and the number of illnesses treated with medical ozone ($P = 0.276$). Similarly, the duration of therapy use did not affect the results declared by the participants (fair, good, excellent) in use ($P > 0.842$); nor was it an association factor for success or failure in the antibacterial use of medicinal ozone ($P = 0.379$). The age range of professionals and the number of years using ozone therapy were associated ($P = 0.008$), and the older the professional, the longer the time of use of the technique; similarly, time in veterinary training and time using ozone therapy were associated ($P = 0.012$).

The performance status was not associated with the number of integrative therapies recommended by the professionals ($P = 0.607$), with the fact of knowing or not the therapy ($P = 0.583$), or even with the fact of applying/recommending/not applying and not recommending therapy ($P = 0.506$). There was also no association between the performance status and the time of use of ozone therapy ($P = 0.549$). However, there was an association between the state of work and the reason stated by professionals who do not apply or recommend ozone therapy, and professionals from RS declared the lack of scientific evidence as the main reason, while professionals from PR and SC claimed not to have the technical knowledge (course/specialization) to work in this area ($P = 0.038$). All questions applied, and answers are shown in Table 2.

DISCUSSION

This is the first time a survey has been conducted to obtain a profile of veterinary medical professionals profile of who use and prescribe ozone therapy. Studies such as this are of paramount importance as an indicator of therapy success. Most publications about this therapy are case reports and in vitro tests. Randomized studies using a significant sample of animals, are rare.

Despite being old, it has been successfully used for antimicrobial treatment and wound healing in soldiers during the First World War (Stoker, 1916); medical ozone therapy was long forgotten. In Brazil, only in 2018 was ozone therapy included on the list of integrative therapies for use in human medicine (Brasil, 2018). Already, the release for use in animals occurred in 2020 (CFMV, 2020a). Although it is relatively new, this research found that ozone therapy is only behind the most renowned and ancient therapies, such as physiotherapy and acupuncture. This fact suggests that the therapy has been gaining ground, possibly due to the positive results reported in clinical practice (Orlandin *et al.*, 2021; Sciorsci *et al.*, 2020).

The vast majority of participants declared knowing or having heard of ozone therapy. In addition, knowledge of ozone therapy was not age-dependent, indicating that both older and younger professionals know, apply, or similarly recommend this therapy. That is, they knew of it a long time ago (since it is quite old), and since then, they possibly persisted using it due to the results, even if not yet regulated by the Profession Council (CFMV, 2020b).

The fact that almost two-thirds of the veterinary professionals in this survey recommend ozone therapy to another professional who does it reveals a market opportunity for professionals interested in specializing in the area. This idea is reinforced by the fact that half of the establishments lack a professional who applies the technique, requiring them to seek external professionals. Fortunately, most professionals who claim to apply ozone therapy are properly qualified after completing courses or specializations. Use by a non-qualified professional poses a risk to the patient, as they lack control over concentrations, application times, routes, and knowledge of contraindicated diseases and situations (Di Mauro *et al.*, 2019; Viebahn-Haensler; Fernández, 2021). As demonstrated for other medical gases used in clinical practice (O₂, NO, and CO), ozone can be toxic or safe depending on its dosage, exposure time, and antioxidant capacity of the exposed tissue (Di Mauro *et al.*, 2019; Kowaltowski *et al.*, 2009).

In this survey, most veterinarians reported using ozone therapy in both pet species, while a second group used it only in dogs. Cats are more susceptible to damage from oxidative stress, especially when administered systemically, due to the complexity of their erythrocyte sulfhydryl groups (Webb *et al.*, 2003), which are easily oxidized and damaged. The professionals in this survey (the vast majority of whom are qualified by courses/specialization in the area) may have such knowledge, using it predominantly in dogs and with caution in cats. In addition, dogs may be more prevalent in their care routine, as seen in small-animal clinic care (Bergmann *et al.*, 2019; Xavier, 2012).

In the present survey, the primary therapeutic purposes of medicinal ozone were: first, the healing of

Table 2 – Results of the questionnaire carried out to veterinarians on the use of integrative therapies in small animals, especially the ozone therapy, in southern Brazil in the year 2021 with 213 participants.

Question	Alternative	Responses number	%
Participants' gender (213):	Male	46	21.60%
	Female	167	78.40%
Age groups they fall into (213):	Into 23-29 years	69	32.39%
	Into 30-39 years	100	46.95%
	Into 40-49 years	32	15.02%
	Into 50-59 years	9	4.23%
	Into 60-69 years	3	1.41%
Training time – Medicine Veterinary course (213):	Graduated less than 10 years ago	146	68.54%
	Graduated ago 11-20 years	48	22.54%
	Graduated ago 21-30 years	14	6.57%
	Graduated ago 31-45 years	5	2.35%
About the use of integrative therapies* (213):	Apply/recommend at least one	210	98.59%
	Do not apply/recommend any of them	3	1.41%
Know the ozone therapy or at least having heard about it (213):	Know or heard about it	203	95.31%
	No know or heard about it	10	4.69%
Among the who know or have heard of it (203):	Apply to their patients	28	13.79%
	Do not apply it but recommend a professional who does it	118	58.13%
	Do not apply and do not recommend ozone therapy	57	28.08%
Reasons why the participants do not apply and do not recommend medical ozone therapy (57):	Lack of efficacy evidence	22	38.60%
	Doesn't have technical knowledge	20	35.09%
	Lack of interest in this area	8	14.04%
	There is no good acceptance of the tutors for the practice	5	8.77%
	Doesn't have the necessary equipment	2	3.51%
About conducting a preparatory course among professionals who apply ozone therapy (28):	Took a preparatory course	23	82.14%
	Don't have a course, but I intend to do it	3	10.71%
	Did not take course for that	2	7.14%
Among the who recommend ozone therapy to be performed by another professional (118):	Do not have a trained person in the establishment where they work and recommend an external professional	61	51.69%
	Do not have it in the establishment yet but intend to invest in the specialization of some collaborator to perform the therapy	23	19.49%
	Already have a qualified professional to apply the therapy in the establishment itself	34	28.81%
Species in which ozone therapy is applied/recommended (146):	Use on dogs and cats	118	80.82%
	Use only on dogs	27	18.49%
	Use only on cats	1	0.68%
Results with ozone therapy among those who apply or recommend it (146):	Excellent	57	39.04%
	Good	75	51.37%
	Reasonable	14	9.59%
	Bad	0	0.00%
About the prophylactic/preventive use of ozone therapy (146):	Apply/recommend	26	17.81%
	Do not apply/recommend	93	63.70%
	Sometimes apply/recommend	27	18.49%

Continues...

Continuation of Table 2

Questions	Alternative	Responses number	%
About the moment of choice of ozone therapy in the treatment (146):	Use it in combination with conventional treatment	127	86.99%
	Use it as a last option, when the patient does not improve with conventional treatment	17	11.64%
	Use it as a first option	2	1.37%
About the use of medicinal ozone seeking antibacterial/antifungal action instead of conventional treatments (146):	Doesn't recommend replacing	87	59.59%
	Sometimes recommend replacing	46	31.51%
	Recommended replacement	13	8.90%
On the recommendation of ozone therapy in cases of resistance to conventional antibacterials (146):	Never recommend	100	68.49%
	Already recommended	46	31.51%
Among the professionals who already indicated it for antimicrobial treatment with resistance to antibacterials (46):	Had good results	34	73.91%
	Sometimes had good results	9	19.57%
	Not had good results	3	6.52%
On the indication of ozone therapy aiming at analgesic effect (146):	Do not use it for that	65	44.52%
	Sometimes use for this	27	18.49%
	Use for this	54	36.99%
About the fact that ozone therapy will have a strong expansion in the coming years (203):	Believe that yes	180	88.67%
	Believe that no	23	11.33%

*Integrative therapies represented in Figure 1.

open wounds; second, the treatment of dermatitis; third, the treatment of contaminated wounds with difficult healing; and fourth, the promotion of post-surgical healing. Several studies and reports have demonstrated the effectiveness of medicinal ozone in curing skin disorders (Anzolin *et al.*, 2020; Smith *et al.*, 2017; Xiao *et al.*, 2017). The use on the skin takes the form of 'baggins', washes with ozonized water or ozonized saline solution, or the application of ozonized vegetable oils (Viebahn-Haensler; Fernández, 2021; Xiao *et al.*, 2017). Ozonated oil has been shown to significantly reduce the area of skin lesions and accelerate healing by increasing fibroblast migration and decreasing inflammation (Xiao *et al.*, 2017). The effects include reducing microbial infection, promoting debridement, modulating the inflammatory phase, stimulating angiogenesis, and altering biological and enzymatic reactions that favor oxygen metabolism, thereby improving wound healing (Anzolin *et al.*, 2020). It is well known that skin diseases are highly prevalent in small-animal clinics, being the most frequent reason for animals to be taken to the veterinarian (Scott *et al.*, 1996). This fact may also contribute to the predominant use in these situations.

The decision of most professionals not to recommend replacing antibiotics/antifungals with ozone therapy is pertinent due to the lack of *in vivo* studies. However, based on what is already known, medicinal ozone appears to have an effective antibacterial action. Ozone therapy has been validated in the alternative antiseptic treatment against most

microorganisms involved in skin infections and contaminated wounds (Borges *et al.*, 2019; Marchegiani *et al.*, 2019; Roth *et al.*, 2020). The bactericidal effect of O₃ is based on the direct attack on microorganisms by oxidizing their biological membranes, followed by damage to DNA or intracellular proteins, resulting in cell lysis or death (Rangel *et al.*, 2021; Patil *et al.*, 2011; Thanomsub *et al.*, 2002). Unlike antibiotics, bacteria cannot develop resistance to the ozone mode of action (Rowen, 2018), thus preventing the formation of resistance genes and the spread of antibiotic-resistant bacteria (Sciorsci *et al.*, 2020; Song *et al.*, 2018). Additionally, ozone therapy can synergize with traditional antibiotic treatments when used in combination with therapy. By oxidizing the outer layer of bacteria, ozone can eliminate this barrier and allow antibiotics to enter the bacterial cell, making it effective (Roth *et al.*, 2020). In addition to damaging and inactivating pathogens, activating the local immune system can contribute to a positive outcome of infection (Smith *et al.*, 2017).

Antimicrobial resistance and the decline in the pipeline of drugs to treat resistant strains are considered by the World Health Organization among the ten global threats to public health (WHO, 2021). Resistance situations are frequently faced in human and animal medicine and are seen in difficult-to-resolve wounds. In the present survey, one-third of the professionals who recommend or apply ozone therapy used it for antimicrobial resistance; of these, most reported efficacy, which suggests that the antibacterial

effect of ozone is antiseptic.

Although only a third of veterinarians use ozone therapy for patient analgesia, it was possible to statistically verify that the longer they use it, the more they recommend it for this effect. This fact may be due to the positive effects observed for this purpose as the duration of therapy use increases. Some studies describe the analgesic effect of medicinal ozone in veterinary medicine (Teixeira *et al.*, 2013; Viebahn-Haensler; Fernández, 2021). The decision to use it for analgesia may be associated with its use in joint diseases, as already described in humans (De Sire *et al.*, 2021; Manoto *et al.*, 2018), or even for the relief of skin burns (Viebahn-Haensler; Fernández, 2021). After skin diseases, the most commonly treated with medical ozone were discographies and arthritis (Figure 1). Most musculoskeletal disorders share these pathophysiological processes, and the therapy appears to reduce pain and improve functionality in osteoarthritis (De Sire *et al.*, 2021). The topical use of oxygen-ozone gas for pain relief can be associated with the acupuncture technique, known as application in 'acupoints' (Teixeira *et al.*, 2013).

Statistically, as years of experience with ozone therapy increase, its use increases. That is, it seems to be a reaffirmation of the proven beneficial effects in the clinical routine of patients, even though we do not have a large number of baseline studies to date. However, time using ozone therapy was not able to statistically change the opinion about the results of this, or be a factor that increases or decreases the indication for antibacterial treatments. The graduation time also did not influence the degree of aptitude for integrative therapies or ozone therapy, or the number of diseases treated in clinical practice.

The legislation that regulated the use of ozone therapy in veterinary practice in Brazil (CFMV, 2020a) defined its use as isolated, adjuvant, or complementary. It is prudent that therapy, as stated by the vast majority of veterinarians in this survey, be used in conjunction with conventional treatment, despite its efficacy being credited to use alone (as reported in the literature). The decision of most professionals not to recommend or apply it prophylactically seems quite plausible, given that there are practically no studies demonstrating benefits in this setting.

The lack of proof of efficacy was the main reason professionals did not recommend or apply ozone therapy (which was statistically identified as the main cause among professionals in RS), followed by a lack of technical knowledge about it (the main cause alleged by professionals from PR and SC). This can be seen as an appeal by professionals to scientific studies in the area. The professionals are increasingly seeking treatments and evidence that support their technical conduct. Another need expressed by professionals is the lack of serious courses in the area for the safe and effective use of the therapy. Once again, the existence of this is reserved from randomized studies. According to the Resolution that approves the use of ozone therapy in Veterinary Medicine, it is mandatory that this professional has technical support demonstrating safety and efficacy for the treatment of the specific disease or condition (CFMV, 2020a).

It is evident that integrative and alternative therapies require substantial research, and there is often little interest in promoting them, especially when they do not generate profits for large pharmaceutical

companies. Thus, studies providing technical support in ozone therapy are limited to non-profit research groups, further delaying discoveries and research in the field.

The belief among almost all professionals that there will be a strong expansion in the use of medicinal ozone in the coming years is most likely linked to positive reports on its clinical use. This result is quite optimistic. A 1997 survey found that 42% of pet owners used alternative therapies. This same study states that as customers research and use alternative therapies, veterinary medical professionals tend to want to know these modalities to instruct and be able to apply such therapies also to the pets (AVMA, 2000). Additionally, the very ineffectiveness of conventional treatments may be motivating the use of these therapies (Memon *et al.*, 2016; Shmalberg; Memon, 2015).

The authors of this work believe that knowledge of integrative therapies and ozone therapy does not come from disciplines during graduation. A survey sent to the deans of institutions with a veterinary medicine course revealed that only 1/3 offered the subject during graduation (rehabilitation and acupuncture topics were predominantly offered); however, more than 2/3 provided clinical care with integrative practices in university veterinary hospitals (Memon *et al.*, 2021). That is, a particular controversy is perceived by educational institutions, which, on the one hand, value the administration solely of 'evidence-based medicine' (Memon *et al.*, 2016), and, on the other hand, in clinical practice, they promote its use. In these cases, the protection of the professional, obtained through the tutor's informed consent, is of paramount importance.

Finally, found that women indicate more integrative therapies and ozone therapy than men, regardless of whether they were in greater numbers in the study. According to the latest census of the Profession Council of this country (CFMV, 2020a), women predominate among professionals.

CONCLUSIONS

Only in the last four years the use of ozone therapy in veterinary medicine been regulated in Brazil, and even before that, veterinarians had already been recommending and verifying positive results. It is admirable that this therapy is among the most widely used integrative therapies, reflecting professionals' confidence in its results. Based on reports from professionals, the future use of ozone in antimicrobial therapies against resistant strains is promising. For the time being, empirically, its use in clinical routine seems to benefit patients who need analgesia. It is worth noting that the use of medical ozone requires qualification, even as required by the class council, since little is known about its potential adverse effects. The fact that women professionals use more integrative therapies and ozone therapy than men demonstrates the profile of professionals, as well as the greater openness of this group to innovative possibilities; however, the user must be careful, seeking, whenever existent, a scientific foundation to do so.

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