

Zoonoses and traumatic injuries among practicing veterinarians from Southern Chile

Luciano Herrera Rosales^a, Lucía Azócar-Aedo^{a*}, Javier Cabello Stomb^b

ABSTRACT. This research addresses the occurrence of clinical signs and related symptoms of zoonotic diseases, traumatic injuries, and the frequency of healthcare seeking among practicing veterinarians, whose job was performed in the Los Lagos Region, Southern Chile. An online standardized survey collected from 140 practicing veterinarians was conducted between March and July 2020. The surveyed participants reported the occurrence of brucellosis, ringworm, scabies, cat scratch disease, anthrax, toxocaríasis, salmonellosis, pediculosis, and flea infestation among veterinarians. The clinical signs and symptoms related to these events include diarrhea, allergies, and muscle pain. Mild and severe traumatic injuries were also declared by the participants, in which the frequency of severe trauma increased as the time of professional practice increased. Nevertheless, the use of professional healthcare was low among the surveyed veterinarians. This study emphasizes the need to consider veterinarians' health-related occupational risks using the "One Health" approach.

Keywords: veterinarians, zoonoses, traumatic injuries, healthcare seeking, Chile.

INTRODUCTION

Zoonoses are diseases transmitted from animals to humans (Hugh-Jones *et al.*, 1995). Some of these pathogens have little or no chance for subsequent human-to-human transmission, as occurs with rabies (Karesh *et al.*, 2012; Medline, 2021). The occurrence of zoonoses among veterinarians depends on their prevalence in the animal population, morbidity, use of personal protection equipment, and the quality of education obtained in veterinary schools (Baker & Gray, 2009). A study of Canadian veterinarians demonstrated a high potential for occupational risk in relation to events involving zoonotic diseases, exposure to rabies, traumatic injuries caused by bites or scratches from animals, and allergies (Epp & Waldner, 2012). These occupational events have been associated with a higher probability of zoonotic infection, along with the fact that veterinarians commonly do not use adequate protection equipment, such as gloves, masks, or protective clothing (Baker & Gray, 2009).

Veterinarians are often exposed to injuries while performing clinical practice on animals, the most common of which are bites by domestic dogs and cats, scratches, and blows or compressions in the body by large animals (Jeyaretnam & Jones, 2000). The odds of having severe injuries resulting from occupational accidents are nine times higher than those of other professions in the healthcare sector (Norwood *et al.*, 2000). This risk increases among professionals who handle wild animals, especially those

of the order Carnivora (Echarte & Vasallo, 2016). These types of injuries represent a considerable proportion of veterinarians' occupational risks. Multiple activities in the field and work environments lead to various potential risks because of trauma as well as biological, chemical, and physical elements (Samadi *et al.*, 2013).

In the Los Lagos Region, Southern Chile, there are approximately 774.321 cattle, 227.798 sheep, 9.082 goats, 42.429 pigs, 9.749 horses, 390.138 hens/chickens, 12.893 turkeys, and 52.368 poultry, including ducks, geese, emus, quail, pheasants, partridges, and ostriches (INE, 2021). Regarding the number of pets, there are estimates of domestic dogs that amount to approximately 115.414 dogs with owners in Puerto Montt¹. However, it is difficult to determine the exact number of veterinarians in the Los Lagos Region. A total of 198 professionals are registered in the "Servicio Agrícola y Ganadero" (SAG), of whom 189 are members of the "Colegio Médico Veterinario" (COLMEVET). However, these rosters were not freely available. Moreover, some veterinarians are not part of these associations. This study aimed to conduct a cross-sectional investigation of zoonoses and traumatic injuries among practicing veterinarians in the Los Lagos Region, Chile.

MATERIAL AND METHODS

STUDY DESIGN

The study design was observational, cross-sectional, quantitative, and descriptive (Hernández *et al.*, 2010). An unknown population size was considered despite the SAG and COLMEVET registries, as there are veterinarians not included in these records, and some are even registered in both. A sample size of 139 people was selected following Fernández (1996) with a confidence level of 95%, a precision of 5%, and an expected proportion of 10% (Epp & Waldner, 2012). The questionnaire was created

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^aFacultad de Ciencias de la Naturaleza, Escuela de Medicina Veterinaria, Universidad San Sebastián, Sede de la Patagonia, Puerto Montt, Chile.

^bCentro de Conservación de la Diversidad Chiloé Silvestre. Reserva Marina Pullinque, Nal Bajo, Ancud Chile.

*Corresponding author: lucia.azocara@uss.cl

on the Google Forms platform and shared via email with veterinarians with professional practice in the Los Lagos Region (these were veterinarians accredited by the SAG, whose data is freely available, and members of COLMEVET) between March and July 2020. The participants were contacted *via* email to inform them of the study objectives. Private veterinary clinics in the cities of Puerto Montt, Puerto Varas, and Osorno in the Los Lagos Region were contacted by phone. Emails were also sent to veterinarians graduated from the San Sebastián University, Patagonia campus, Puerto Montt, Los Lagos Region. In total, 140 individuals met the requirements to answer the survey. The inclusion criteria were 1) those practicing veterinary medicine and 2) those with professional work in the Los Lagos Region. The questionnaire is detailed and described in Supplementary Material 1.

DETERMINATION OF ZOOSES

To better identify the respondents, their area (or areas) of activity or expertise was assessed using the following options: 1) companion animals, 2) farm animals, 3) wild animals, 4) equines, 5) public health, 6) research, and 7) laboratory. To determine exposure to zoonoses, veterinarians were asked about the diagnoses of these types of diseases by human health professionals, with medical certainty that such diseases were contracted within the region. This question was answered in writing by the respondent to avoid omitting any disease that could go unnoticed.

FREQUENCY OF INJURIES AND COMMON CLINICAL MANIFESTATION(S) RELATED TO A ZOOSE DISEASE AMONG VETERINARIANS

- 1) From a selection of injuries described in other studies (Epp & Waldner, 2012; Navarrete & Tarabla, 2018), exposure to traumatic injuries was determined as “minor” or “severe,” considering the different nature of the animal species treated and the different areas of professional activity. Injuries were classified according to their severity as follow: a) “Minor injuries” included superficial cuts, superficial puncture wounds, abrasions, contusions, contractures, and sprains. The respondents indicated how often they suffered this type of injury in their professional practice, within the categories “never, rarely, sometimes, commonly, or always.”
- 2) “Serious injuries” included all injuries caused during work that, for the respondent, required medical, outpatient, or emergency assistance.

The respondents freely indicated (in an open question) how many times they had required this type of assistance when injured, excluding vehicular accidents and medical consultations due to problems for ergonomic reasons. The proportion of the total number of veterinarians affected by one of the each categories was calculated. The average number of injuries was calculated based on the total number

of respondents. Questions about the clinical manifestations caused by unknown agents that induced the respondents’ personal suspicion of contracting a zoonosis were asked, including diarrhea; allergy; and ocular, respiratory, skin, and vector infections (biological or mechanical). These criteria were selected using a different survey (Garland-Lewis *et al.*, 2017), naming other common symptoms and signs, such as vomiting, abdominal pain, joint pain, and muscle pain. The statistical tests used for the clinical manifestations was a chi-square test with a Yates correction using Epi Info™ version 6.0.4 (Centers for Disease Control and Prevention), considering a *P* value less than 0.05, as statistical significance. In addition, it was possible to evaluate the diseases that were more common according to the categories of responses “never”, “rarely”, “sometimes”, “commonly”, or “always” of a presumptive nature to a zoonotic disease. The existence of possible significant differences between the response categories mentioned for each clinical manifestation was determined using a chi-square test or Yates correction (*P* value less than 0.05).

FREQUENCY OF PRACTICING VETERINARIANS SEEKING MEDICAL ASSISTANCE

Respondents’ frequency of seeking medical assistance after suspecting a zoonosis was calculated considering the number of veterinarians who sought medical attention after suspicion of disease in the following categories: “never”, “rarely”, “sometimes”, “commonly”, or “always”. This was performed using the total number of respondents who answered the survey.

RESULTS

Approximately 250 questionnaires were sent and 140 responses were received. Of the 140 veterinarians surveyed, 27 reported being diagnosed with one or more zoonotic diseases. Out of 27, 24 specified which disease(s) they had suffered, registering a total of nine different reported zoonoses. The most frequent diagnoses were brucellosis and dermatophytosis, both having eight reports (30%), followed by scabies (22%). The area of activity or expertise with most reports was the category “farm animals” (67%), “companion animals” (44%), and finally equines (22%) (Table 1).

Regarding clinical manifestation and the frequency of the professionals suspecting a zoonosis, most of the answers were “never” and “rarely.” Some responses were recorded in the “sometimes” category for allergy, skin infection, and infection by vector (Table 2). The results of the chi-squared test indicated that “diarrhea,” “allergy,” and “muscle pain” have statistically significant differences in their presentation frequencies between the categories “never,” “rarely,” “sometimes,” “commonly,” and “always”.

Regarding the frequency of minor injuries, the category “sometimes” was the most frequent, followed by “rarely”

Table 1. Reports of suspected zoonotic diseases and professional specialty in veterinarians surveyed in Los Lagos Region, Southern Chile, 2020.

		N	Percentage among reports (n=27)	Percentage among the total (n=140)
<i>Suspected Disease</i>	Anthrax	1	3.70	0.71
	Bartonellosis	2	7.41	1.43
	Brucellosis	8	29.63	5.71
	Dermatophytosis	8	29.63	5.71
	Scabies	6	22.22	4.29
	Pediculosis	1	3.70	0.71
	Pulicosis	1	3.70	0.71
	Salmonellosis	1	3.70	0.71
	Toxocariasis	1	3.70	0.71
<i>Professional Specialty</i>	Companion animals	12	44.44	8.57
	Farm animals	18	66.67	12.86
	Wild animals	4	14.81	2.86
	Equines	6	22.22	4.29
	Public health	4	14.81	2.86
	Research	2	7.41	1.43
	Laboratory	2	7.41	1.43

Table 2. Survey answers (n=140) of veterinarians regarding a clinical manifestation and the frequency of a suspected zoonosis in Los Lagos Region, Southern Chile, 2020. The χ^2 and the P values are expressed.

Clinical manifestation	Never		Rarely		Sometimes		Commonly		Always		χ^2	P value
	N°	%	N°	%	N°	%	N°	%	N°	%		
Diarrhea	97	69.3	35	25.0	5	3.6	3	2.1	0	0	29.6	0.000002
Vomit	124	88.6	12	8.6	4	2.9	0	0.0	0	0	-	-
Allergy	73	52.1	45	32.1	15	11.0	7	5.0	0	0	15.0	0.001745
Ocular infection	105	75.0	30	21.4	4	2.9	1	0.7	0	0	-	-
Respiratory infection	116	82.9	16	11.4	6	4.3	2	1.4	0	0	-	-
Skin infection	70	50.0	46	32.9	19	14.0	3	2.1	2	1.4	-	-
Infection by vector	108	77.1	19	13.6	10	7.1	1	0.7	2	1.4	-	-
Abdominal pain	121	86.4	12	8.6	6	4.3	0	0.0	1	0.7	-	-
Join pain	121	86.4	10	7.1	6	4.3	3	2.1	0	0	-	-
Muscle pain	115	82.1	16	11.4	5	3.6	4	2.9	0	0	52.2	0.0

(Figure 1). For serious or severe injuries during professional practice, 139 respondents were considered because of the lack of clarity in the responses provided by one of them. The average score was calculated for each category of years of professional practice. In addition to the general average (n = 139) of 1.35 injuries, an increase in this average regarding years of professional practice was observed (Figure 2).

The frequency of the respondents visiting a healthcare center was calculated on a scale in which they considered that the clinical manifestations were attributable to the contagion of a zoonotic disease. A low frequency of seeking

medical assistance was observed (in 66 veterinarians, the response was “never”) (Figure 3).

DISCUSSION

This study demonstrated that veterinarians in the Los Lagos Region of Southern Chile are exposed to different zoonotic diseases, clinical manifestations related to zoonoses, and traumatic injuries of mild and severe degrees. This survey also showed the frequency of veterinarians seeking medical attention when suspecting a zoonosis. To the best

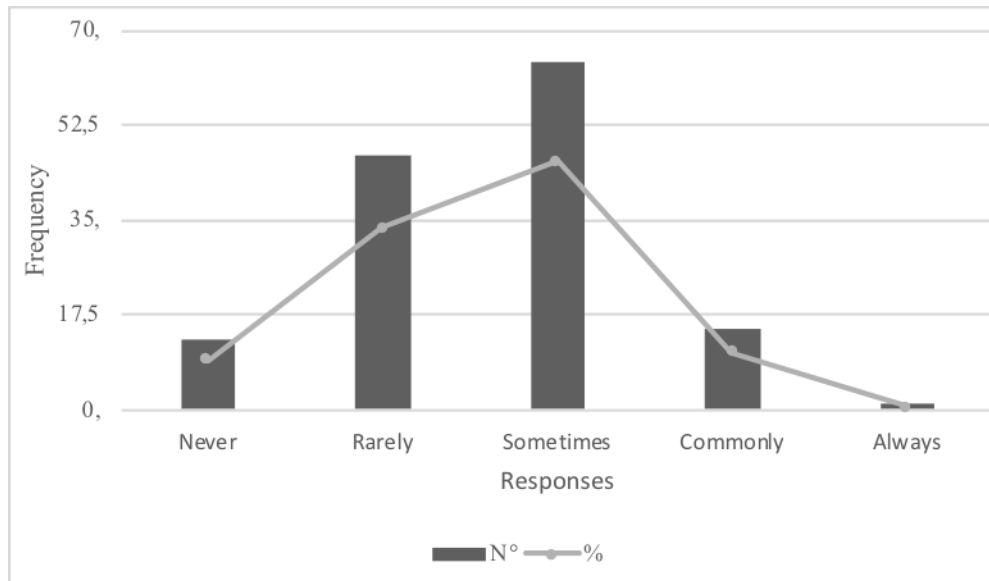


Figure 1. Frequency distribution of minor injuries during their professional practice among veterinarians surveyed in Los Lagos Region, Southern Chile, 2020.

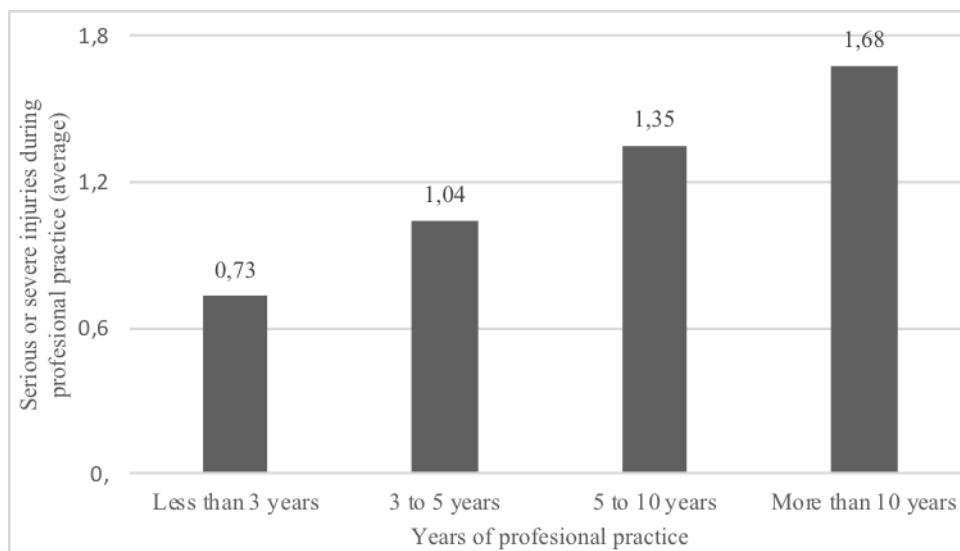


Figure 2. Average frequency of “serious” or “severe” injuries among veterinarians surveyed (n=139) along their professional practice in Los Lagos Region, Southern Chile, 2020.

of our knowledge, this is one of the first studies of this topic in Chile.

The most frequent zoonotic disease among the respondents was brucellosis, an infectious disease caused by bacteria of the genus *Brucella*. It affects a wide variety of mammals, including ruminants, swine, canids, rodents, and even marine mammals such as pinnipeds and cetaceans, causing acute or chronic symptoms (recurrent fever, chronic fatigue, orchitis, endocarditis, arthritis, and inflammation of the liver or spleen) (CDC, 2021). Owing to its prevalence, bovine brucellosis is of great importance in livestock, and

efforts to eradicate it have been made through an eradication program established in Chile in 1975 by SAG (MINSAL, 2015). The monitoring and control of this entity range from prevention and vaccination to the adoption of farming sanitary measures (SAG, 2022). Brucellosis transmission can occur through the consumption of unpasteurized dairy products and inhalation or contact with secretions from abortions through the mucous membranes or wounds. This transmission route is significant, as it presents a greater risk for veterinarians, laboratory technicians, and professionals working in the meat industry (CDC, 2021). The nonspecific

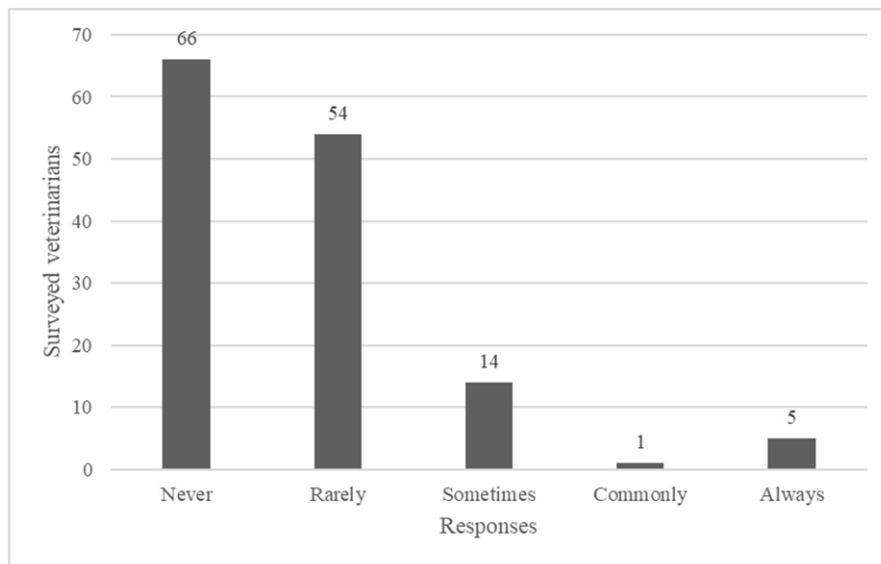


Figure 3. Responses of veterinarians regarding health care center assistance after a suspicion of a zoonotic disease in Los Lagos Region, Southern Chile, year 2020.

nature of the clinical signs of this disease and the lack of studies in humans in Chile have led to the suspicion of a high underdiagnosis (Olivares *et al.*, 2017). However, 67% of the zoonosis cases in the present study were suspected of brucellosis. It is important that people working with “farm animals” are categorized as a group at a high risk of infection, as previously described in Turkey (Kutlu *et al.*, 2014). Further, a higher probability of infection by *Brucella* was reported even among veterinary medicine students (Sánchez *et al.*, 2017).

Other important diseases reported in this study were scabies and dermatophytosis, both of which affect the skin and cause irritation and itching. These diseases are transmitted by direct contact with infected animals or humans. Scabies is caused by the mite *Sarcoptes scabiei*, and dermatophytosis (also known as “ringworm”) is caused by fungi of the genera *Trichophyton*, *Microsporum*, and *Epidermophyton* (CDC, 2010; CDC, 2020a). Epidemiological studies have found that the main species causing dermatophytosis in pets is *Microsporum canis* (in 81.8%–97% of the cases), and their incidence is higher among dogs, cats, and humans (60.0%) than in other species (Paryuni *et al.*, 2020). In Chile, scabies is more commonly present in canids than in felines (18.7% and 1.2% of cases, respectively), and dermatophytosis occurs more frequently in cats than in canines (10.6% and 6.4%, respectively); however, this frequency may vary due to the socioeconomic factors of pet owners (López *et al.*, 2009). One study (Pereira Olivares, 2017) conducted between 2001 and 2013, based on the records of a Teaching Veterinary Hospital, estimated a prevalence of dermatophytosis of 2.2% (n = 5.293) in dogs. Although dogs and cats play key roles in the transmission of dermatophytosis, it is important

to elucidate that these mycotic agents are ubiquitous, even in other domestic species (Cabañes *et al.*, 2000). Infection among veterinarians is quite possible because of frequent animal handling during clinical examinations (a fundamental action in clinical practice). It is also worth noting that both diseases depend on the host immune status (CDC, 2010; CDC, 2020a).

Bartonella henselae causes various symptoms, such as fever, enlarged lymph nodes, papules or pustules at the wound site, myalgia, or encephalitis, mainly in individuals below 15 years of age. It is transmitted through scratches in cats infested with fleas (CDC, 2020b). Different prevalence studies have been conducted on animals in Chile. In Valdivia (Los Ríos region), a study was conducted using 370 blood samples from cats, in which *Bartonella sp.* DNA was detected in 18.1% of samples (Muller *et al.*, 2016). In another study on stray dogs in Linares (El Maule Region), 72.7% (n = 66) of the canines were seropositive for the agent, whereas in Puerto Montt (Los Lagos Region), three dogs were positive for *Bartonella sp.* Although the disease is characterized in cats, these animals have a high ectoparasitic infection rate, which could facilitate the spread of the pathogen (Weinborn-Astudillo *et al.*, 2020). Animals with a high ectoparasitic load can be a source of pulicosis or pediculosis, the reports of which were also presented in the aforementioned study. Scratches and bites by animals are common in veterinary practice (Jeyaretnam & Jones, 2000; Bonini *et al.*, 2015; Gómez & Tarabla, 2015); therefore, bartonellosis is expected to be detected among veterinarians in the Los Lagos Region. In the BíoBío Region, a high presence of antibodies against *Bartonella* was detected by indirect immunofluorescence technique among veterinarians and individuals with occupational

contact with cats, which was equivalent to 60.5% (n = 76) (Troncoso *et al.*, 2016).

Anthrax is a bacterial disease caused by the agent *Bacillus anthracis*, the transmission of which is through spores that form upon contact with the air after infecting a wound (in herbivores) and remain suspended in the environment. Anthrax has different clinical manifestations, such as cutaneous, which occurs in 95% of cases, respiratory, and gastrointestinal, with the latter having high lethality (Acha & Szyfres, 2003). Control measures include vaccination and antibiotic treatment of animals, as well as environmental management (Laverde *et al.*, 2008). The latest reported anthrax cases in humans in Chile occurred in a rural sector of the Ñuble Region, all in their cutaneous presentation, due to the slaughter and consumption of an infected equine (Arellano *et al.*, 2018). Although this case occurred in individuals who were not veterinarians, the case shows that anthrax is present in the Chilean rural sectors and is closely related to herbivores. Therefore, it is not unusual for anthrax to be included in the survey reports. Among veterinarians, its presence could be associated with performance of necropsies on infected animals without the use of appropriate measures for personal protection. Carcasses suspected of anthrax should not be subjected to necropsy, but by mistake, this practice is not strictly followed, and veterinarians thus get infected (Laverde *et al.*, 2008).

Pediculosis and pulicosis were also reported among the surveyed veterinarians but at low frequencies. Regarding pediculosis, like other blood-sucking insects, lice bite and cause itching on the macules, papules, vesicles, or pustules due to the irritant effect of their saliva by allergic reactions and local inflammation. Scratching results in excoriations and microhemorrhages that form scabs and facilitate secondary infections (López-Valencia *et al.*, 2019). Fleas are important vectors of pathogens worldwide; they are rarely specific at the host species level, but some clades are associated with a particular host group. However, many fleas are associated with domesticated animals such as *Ctenocephalides felis* (cat flea) and *C. canis* (dog flea), which represent the majority of fleas in human homes and are vectors of the bacteria *Bartonella henselae*. (Desachy, 2018). In addition, *Xenopsylla cheopis* (Oriental rat flea) is common in many tropical and warm temperate environments worldwide and is the vector of *Yersinia pestis* involved in the transmission of murine (endemic) typhus, parasitic helminths, and *Bartonella* species (Bitam *et al.*, 2010).

According to Costa *et al.* (2012) and Wiedemann *et al.* (2015) another zoonosis reported was salmonellosis. *Salmonella typhi* and *Salmonella paratyphi* A, B, and C are pathogenic to humans; however, animals are asymptomatic. *Salmonella choleraesuis* is carried mostly by pigs, but it also causes salmonellosis in humans. Common serotypes, such as *Salmonella enteritidis* and *Salmonella typhimurium*, cause infections in the gastrointestinal tract. Serotypes causing typhoid fever are transmitted between people with no

mediation of an animal (McSorley, 2014), but salmonellosis non-typhoid is isolated from both humans and animals, including livestock. Serotypes Typhimurium, Enteritidis, Newport, and Heidelberg are most often responsible for food poisoning, but Choleraesuis and Dublin also cause diarrhea (Kurtz *et al.*, 2017). Generally, salmonellosis can be more severe in immunocompromised individuals, resulting in bacteremia or systemic and localized infections such as meningitis and osteomyelitis. Although many pet species have been implicated in human salmonellosis, amphibians, reptiles, exotic animals, rodents, and young poultry pose the greatest risks (Stull *et al.*, 2015).

Finally, toxocariasis was also reported affecting veterinarians. Although many *Toxocara canis* infections are subclinical, human toxocariasis can manifest as syndrome known as visceral *larva migrans*, ocular *larva migrans*, and neurotoxocariasis. People get infected through accidental ingestion of parasite eggs from contaminated soil, water, and food (raw vegetables and fruits), and contact with dogs and cats is described as an important risk factor (Ma *et al.*, 2018). Toxocariasis is a neglected disease with high prevalence in humans, pets, and stray companion animals worldwide (Rostamia *et al.*, 2019). In Slovakia, a cross-sectional study performed by Fecková *et al.* (2020) determined a low prevalence of anti-*Toxocara* antibodies among veterinarians, veterinary assistants, and veterinary medicine students (0.5%), however, a high seropositivity rate was observed in children and young people, as well as a high risk of professional exposure in hunters and farmers, highlighting the importance of taking preventive measures and enhancing knowledge of toxocariasis among both professionals and pet owners.

In this study, the relevant clinical manifestations among the surveyed veterinarians, supported by statistical significance, were “diarrhea,” “allergy,” and “muscle pain.” Among these, diarrhea and allergies are commonly perceived to be associated with work involving animal handling (Garland-Lewis *et al.*, 2017), although it is worth considering their presence in zoonotic diseases, such as bartonellosis (Vayssier-Taussat, 2016). However, it is noteworthy that the clinical manifestations of zoonoses vary, with septicemic, respiratory, digestive, nervous, and cutaneous signs with different evolution patterns and variable severity (Desachy, 2018). Studies conducted to understand the epidemiology of diarrhea have been limited to specific groups of individuals with certain comorbidities, such as children, the elderly, and people undergoing immunosuppression (Asenjo *et al.*, 2008). However, among the causative agents of diarrhea in adults, pathogens such as *Escherichia coli*, *Salmonella sp.*, *Campylobacter jejuni*, *Giardia sp.*, and *Cryptosporidium sp.* have been described (Lucero, 2014). These agents can be associated with a potential animal origin because are excreted in the fecal material, a common occupational exposure in veterinarians during clinical practice.

Regarding the “mild” or “severe” injuries reported here, the answers were not clear on how many injuries each participant experienced. The most common events were bites and scratches, which are not necessarily associated with clinical care. In addition to the difficulty of accurate quantification (Epp & Waldner, 2012), many veterinarians self-medicate these types of injuries (Jeyaretnam & Jones, 2000; Navarrete & Tarabla, 2022). However, this study demonstrated that mild injuries were present at different frequencies among the professionals. Serious injuries show a clear increase with more years of professional practice, as confirmed in some published studies (Mishra *et al.*, 2020). This study did not evaluate the differences between the areas of professional performance among respondents. However, studies have noted that a greater proportion of occupational accidents in veterinarians working in animal production are concentrated in groups specializing in large animal species, such as ruminants and equines (López *et al.*, 2014). This situation makes more sense considering the type of injuries that large animals can cause, for instance, physical trauma or cranial and facial trauma (Norwood *et al.*, 2000), which would require medical assistance. Within the different categories, it is noteworthy that most respondents answered that “never” (n = 66) or “rarely” (n = 54) sought medical care in case of suspicion of a zoonotic disease (Figure 3). This is consistent with other study that demonstrated that most of respondents (56.4%, 31/55) did not contact a physician to diagnose or treat their zoonotic infection (Jackson & Villarroel, 2012). One reason for this phenomenon may be the prominent level of self-medication among veterinarians in cases of occupational accidents (Navarrete & Tarabla, 2018; Gardland-Lewis *et al.*, 2017). One study showed that 77% of the participants resorted to self-treatment, including self-medication with antibiotics, wound suturing, and reduction of fractures or dislocations, which may explain the low attendance rate to healthcare centers (Landercaasper *et al.*, 1988).

One of the limitations of this study is the lack of knowledge of the number of veterinarians in the Los Lagos Region as there is no single entity that can group them all simultaneously in a mandatory manner. In addition, there was a great distribution between the performance areas; however, the difficulty was that many of the participants were dedicated to several areas simultaneously. Regarding the answers, only one question registered little clarity (presence of “serious” to “severe” traumatic injuries), with which, for this analysis, the sample size was reduced to 139 people, which may constitute a possible information bias. It is possible that some zoonoses go unnoticed because of the limited assistance of veterinarians to human healthcare centers, self-medication, and lack of consideration of these diseases in the human health system. Thus, the study of serum antibodies or the detection of zoonotic pathogens using direct diagnostic tests among veterinarians with a clinical suspicion of zoonoses as professional diseases is required in Southern Chile.

CONCLUSIONS

The most frequent zoonoses reported by veterinarians in the Los Lagos Region, Southern Chile, were brucellosis, dermatophytosis, and scabies, among other diseases such as bartonellosis, anthrax, external parasitosis, dermatophytosis, salmonellosis, and toxocariasis. Furthermore, reports of zoonotic diseases were higher among respondents working with farm animals. Based on the statistical results of association, the most common clinical manifestations of suspecting a zoonotic disease were diarrhea, allergy, and muscle pain. The frequency of minor injuries varied among the categories considered, and the average number of serious injuries increased according to the years of professional practice. Further, the veterinarian professionals do not frequently seek care from a medical professional after suspecting a zoonotic disease. It is important to recognize the occupational health problems of veterinarians and to increase their awareness of this health risk, as they are professionals with advanced knowledge about zoonotic diseases. Occupational safety must be improved and the risk factors that affect individuals, especially veterinarians, during diagnosis, which could be a zoonotic disease, must be publicized. This is a joint effort that must be carried out by Chile’s Healthcare System, veterinarians’ employers, and, of course, veterinarians themselves when considering and applying the “One Health” concept.

ETHICS STATEMENT

In this study, informed consent was not applied, as it was based on a questionnaire carried out online in those veterinarians who voluntarily participated, and no personal data were asked. The information collected was authorized for use for academic purposes and for the accomplishment of the statistical analyses (Dirección de Integridad, Seguridad y Ética de la Investigación, Vicerrectoría de Investigación y Doctorados, Universidad San Sebastián, Chile)

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