Impact of Ovine Parasitic Zoonoses on Human Health and Food Safety

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Abstract

One of the main problems facing sheep production worldwide are the losses associated with the high prevalence of zoonotic diseases. Nearly 70% of the diseases that affect human health come from animal sources. In sheep, after bacterial diseases, parasitosis is the most important. Of the total for this species, 65.5% are zoonoses, associated as risk factors to the diversity of parasites that cause them. In humans, contact with infected animals or waste, as well as the consumption of fruits, vegetables and vegetables fertilized with manure, meat products and contaminated milk, are the main transmission routes. The degree of affection varies depending on the disease. In animals, parasitosis (mainly those caused by gastrointestinal nematodes) is the result of the consumption of feed and forage, water and contaminated soil. The effects on health and production are significant, with the consequent economic losses. The confiscation of organs, the slaughter of sick animals, the poor performance in growth, development and reproductive potential, as well as the premature death of sick animals, constantly threatening global food security. These zoonoses generate significant impacts on the availability, safety and stability of food, key factors for the development of populations.

Keywords: Parasitic zoonoses, Sheep, Food safety, Human health, Animal health

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Introduction

Sheep farming is currently a highly important activity worldwide. Despite its limited development compared to other livestock productions, its contributions to the economy and food availability are making important contributions. In 2022, global sheep meat production was 9.9 million tons. Recent estimates predict that by 2030, the availability of sheep protein will grow more (15.7%) than that of bovine (5.9%) and porcine (13.1%). Likewise, at a global level, the largest contributions to sheep meat production will come from Asia, mainly from China, Pakistan and India (OECD/FAO, 2021).

However, this livestock activity faces serious challenges due to the increase in diseases, especially those of bacterial and parasitic origin. The implications of this, in addition to affecting animal and human health, because a high proportion are zoonotic in nature, have potential effects on food security. With this, it is essential to address the control and timely prevention of diseases, especially since nearly 70% of those that affect human health come from animal sources. Likewise, the health and safety of food, through production processes that minimize these impacts (WHO, 2023).

Sheep are animals with a high propensity to suffer from diseases caused by a variety of pathogens. After bacterial diseases, the most significant are parasitic diseases caused by trematodes, cestodes and mainly by gastrointestinal nematodes. A large majority of ovine parasitosis affect human health, of the total identified for this species, 65.5% are zoonoses, largely relating the risk factors to the diversity of parasites that cause them. The high prolificacy, resilience and resistance of parasites are determinants of the high prevalence of ovine parasitosis, constituting one of the most relevant global health problems today (Ojeda et al., 2022). In addition to the natural susceptibility of sheep, due to their own biological characteristics, there are anthropogenic factors. The global movement of people, the increase in interactions with wild animals, the international trade of animals and their products, as well as consumption and food hygiene habits, among other aspects, increase the incidence of zoonoses in humans. In sheep, the limitation of growth and development in young sheep and the effects on productivity in adults, due to low weight gain, malnutrition, anemia and low reproductive efficiency, among other aspects, generate negative effects on food security (FAO, 2019; López-Rodríguez et al., 2023; Ojeda-Carrasco et al., 2023).

Parasitic Zoonoses in Sheep

The categorization of ovine parasitic zoonoses depends on the associated parasites and the organs they affect. The most diverse and important are the gastrointestinal ones (Figure 1). The negative effects on production come from the effects on the growth and development of the animals, as well as the decrease in productive potential (meat, milk and wool) and reproductive efficiency (Ojeda et al., 2022).

The incidence and density of parasites varies depending on the breeding systems, environmental conditions, breed, physical condition, age of the animals and the health surveillance of the flock, mainly. In a study carried out in Mexico with doper sheep, Pérez-Bautista et al. (2021) determined differences in parasitic loads associated with age. For sheep older than 12 months, (4,742.8 parasites), sheep younger than

6 months (3,800) and 6-11 months (2,561.1). Zapata et al. (2016) compared the frequency of infection by sex in three breeding systems with different breeds in Colombia. The semi-confined system reported the highest frequency (81.4%), the confined system 74.1% and the grazing system, 66.7%. Males had a higher frequency of infection (85.4%) than females (74.2%). Finally, Villavicencio et al. (2023) evaluated the efficiency of health surveillance in Ecuador. From 205 coproparasitoscopic samples taken directly from the rectum of sheep, they determined a prevalence of 82.44%. The highest prevalence was for *Haemonchus contortus* (73.66%), *Oesophagostomum columbianum*, (17.07%) and *Nematodirus* spp. (16.59%), all zoonotic. Table 1 compiles information on parasitic ovine zoonoses.



Fig. 1: Classification and parasitic zoonoses in sheep **Source**: Prepared by the authors

Table 1: Ovine parasitic zoonoses

	Parasite	Main Characteristics of Parasitosis	References
LIVER AND PANCR	EATIC		
DICROCELIOSIS	TREMATODES:	TO: Liver. IH land snails and ants that ingest cercariae. DH sheep. Dissemination	(Khan et al.,
	Dicrocoelium	through feces, infection by consumption of contaminated food. Chronic, animals	2021)
	dendriticum	show signs depending on age, physical condition and parasite load. Young animals	(Chai & Jung,
	D. hospe	may show developmental alterations and reduced performance. In adults, anemia,	2022)
		malnutrition and immobility. In advanced stages, apathy, loss of reflexes, inability to	
		follow the herd, hepatitis, poor digestion, weight loss, emaciation and death.	
EQUINOCOCCUSIS	CESTODE:	TO: Liver. DH in canids, IH in sheep (the most important) and other mammals.	(Pezeshki et
OR HYDATIDOSIS	Equinococcus	Infection by consumption of food or water contaminated with dog feces containing	al., 2018)
	granulosus (Hydatid	eggs. Eggs deposited directly in pastures or crop areas. Dissemination by wind or	(Bosco et al.,
	cyst)	water runoff during the rainy season. Re-infection in canids by consumption of sheep	2021)
		viscera with fertile cysts. Slow-evolving, asymptomatic tissue parasitosis. The age of	
		sheep increases the propensity to infection. Most cases are detected <i>post-mortem</i> .	
PANCREATIC	TREMATODES:	TO: Pancreas. IH land snails and grasshoppers infested with eggs in sheep feces. DH	(Leite et al.,
EURYTHREMATO	Eurytrema	sheep. Infection due to consumption of contaminated feed. Chronic debilitating	2020)
SIS	pancreaticum	parasitosis causes damage to the walls of the pancreas and sometimes to the bile	(Ribeiro et al.,
	E. coelomaticum	ducts, affecting digestion. It produces anorexia, lethargy, weakness, necrosis of	2021)
	E. ovis	abdominal fat, marked weight loss, emaciation, decreased performance and quality	
		of animals.	67 I I
FASCIOLASIS OR	TREMATODES:	TO: Liver. Most frequent parasitosis by trematodes. IH freshwater snails (<i>Limmaea</i>)	(Valderrama
DISTOMATOSIS	Fasciola hepatica	and DH, sheep and cattle. In sheep, death is more frequent. Transmission by	et al., 2019)
	F. gigantica	consumption of pastures contaminated with metacercariae. Clinical signs associated	(Stuen &
	F. magna	with the number and stage of the parasites. Asymptomatic acute form, evident by	Ersdal, 2022)
		anemia or sudden death due to profuse nemorrhage. In subacute, ascites and weight	
		ioss. Moreover, in chronic, anorexia, anemia, cachexia, hypoalounnienna,	
		submanulbulai euema, anu in the neck, chest anu abuomen, asches, ularmea anu	
CASTROINTESTIN	ΛŢ	weight loss.	
COCCIDIOSIS	PROTOZOANS:	TO: Small and large intestine. Occutes sporulate in the external environment. The	(Mohamaden
COCCIDIOSIS	Fimeria ovina F	cycle begins with the ingestion of water or food contaminated with occysts present	(Molialiauchi et al. 2018)
	narva	in the feces Lambs under one month of age are more affected. Dark diarrhea is a	(Oliveira et
	E nallida E absata	visible sign Reproduction in the small intestine and release of merozoites in the large	al 2020)
	2. panau, 2. aroutu,	intestine. Absorption deficiencies, due to the production of lamellar fibrin deposited	, 2020)

	E. marsicata, E. ovinodalis, E.	on the intestinal microvilli, affect the growth of lambs. Also, denudation of the intestinal mucosa, loss of electrolytes, intestinal hemorrhage, weight loss, foul-	
	intrincata, E. macusanensis, E.	smelling and often bloody diarrhea. In severe cases, weight loss leads to emaciation, dehydration and death of the animals.	
	ninakohlyakimuvae, E. webridgensis, E.		
	granulosa, E.		
	condrallis, E faurai E arlaingi		
CRYPTOSPORIDIO	PROTOZOANS:	TO: Small intestine. Second main cause of diarrhea. Infection by direct contact with	(Mi et al.,
SIS	Cryptosporidium	sick animals, oral-fecal route, and mainly, by the consumption of contaminated water	2018)
	parvum C faueri	and food. Fomites, the birth of an infected animal, keeping the offspring together and the inadequate management of manure especially in the rainy season can	(Zhao et al., 2024)
	C. andersoni	accentuate the spread by runoff into the corrals or pens. Sheep, most important	2024)
	C. ubiquitum	hosts. Greater susceptibility in neonatal and post-weaned lambs. It causes diarrhea,	
	C. nominus	asymptomatic ones, are reservoirs that contribute to the spread by the excretion of oocysts in the feces.	
TOXOPLASMOSIS	PROTOZOAN:	TO: In the small intestine. DH cats and other felines, IH most aquatic and terrestrial	(Van den
	Toxoplasma gondu	nonoeothermic animals. Infection by the consumption of water and food with oocysts from DH feces (acquired toxoplasmosis, usually asymptomatic). The	Brom et al., 2020)
		multiplication of the parasite in the mesenteric ganglia causes lymph node	(Condoleo et
		hypertrophy and, in some cases, focal necrosis. Also, via the trans placental route (congenital toyoplasmosis). The effects vary with the degree of advancement of the	al., 2023)
		gestation. They include serious lesions, reabsorption, fetal death, abortion, stillbirth	
		or weak lambs. Vertical transmission generates the birth of weak lambs, clinically	
PARAMPHISTOMI	TREMATODES:	TO: Rumen in adults, small intestines in lambs. IH aquatic snails infected by	(Kajugu et al.,
ASIS OR RUMINAL	Paramphistomum microbothrium	ingesting miracidium deposited in sheep feces (DH). Infection by consumption of contaminated feed. Juvenile excyst and lodge in the small intestine. Adult	2015) (Rickard,
DISTOMATOSIS	P. ichikawai P. carvi	development in the rumen, where they produce eggs. It produces sporadic epizootics of aguta gastroanteritie with high markidity. In infected animals, gaves diarrhea	2021)
	P. daubneyi P. leudeni	hemorrhagic enteritis, anorexia, anemia and weight loss. Severe cases cause the death of sheep	
BUNOSTOMOSIS	NEMATODE:	TO: Small intestine. DH mainly in small ruminants. Young sheep (5-8 months) are	(Wang et al.,
	Bunostomum trigonocephalum	more susceptible. Infection by consumption of contaminated feed and eventually by the entry of infective larvae through the skin. The larvae migrate from different organs to the mouth to reach the intestine. When the La enters through the skin.	2012) (Kumar et al., 2018)
		they present urticarial and dermatitis. In the intestine, the lesions on the walls	
		damage the blood vessels, producing hemorrhages that cause mucous-bloody	
		Other visible signs are anorexia, submandibular edema and weight loss.	
STRONGYLOIDOSI	NEMATODE:	TO: Small intestine. Alternation of parasitic/free cycles. Distinction from other	(Boyco et al.,
S	Strongyloides papillosus	parasites, because once lodged in the intestine, the females produce parthenogenetic eggs that begin their development before reaching the feces. In the feces, the Las	2019) (Ojeda et al., 2022)
	T T	hatch directly from the egg to restart the cycle. Infection via the skin or the ingestion	····, · ,
		of contaminated water and food. In the body, they cause damage to the intestinal	
		death in animals with severe infestations. Sheep develop dermatitis in the portions	
		of the skin where the larvae entered, mainly in the legs, causing itching.	<i></i>
OESOPHAGOSTO MIASIS	NEMATODE: Oesophagostomum	TO: Large intestine. Infection by consumption of feed contaminated with L ₃ . The larvae cause lesions forming nodules (a distinctive feature). These interfere with	(Satish et al., 2018)
	columbianum	intestinal physiology, affecting the absorption of liquids, generating diarrheal	(Shohana et
	O. venulosum	processes. The parasites abandon these nodules to continue their development and	al., 2024)
	0. asperum	mild diarrhea to acute diarrhea with large amounts of mucus. The animal presents	
		loss of appetite and weight. If the disease progresses, the sheep dies from	
HAFMONCHOSIS	NEMATODES	dehydration or emaciation.	(Spoto et al
	TILINIATODEO.	L3 reaches the abomasum, they continue to develop until L5. Greater susceptibility	2021)

	TT 1		(0 / p 1:
	Haemonchus contortus H. similis H. placei	in lambs, juveniles and pregnant females, due to immune deficiencies. High pathogenicity is associated with their hematophagous habits. The release of anticoagulants causes profuse bleeding. Digestion, nutrient absorption and energy metabolism are affected. The animals show weakness, hypoproteinemia, anemia (perceptible in the color of the ocular conjunctiva), anorexia, low weight gain, delayed growth, occasional diarrhea, submandibular edema, emaciation and sudden death in severe cases.	(Garcia-Rubio and Ojeda- Carrasco, 2024)
NEMATODIROSIS	NEMATODES: Nematodirus spathiger N. oiratianus N. abnormalis N. filicollis N. battus N. helvetianus	TO: Small intestine. DH in ruminants. Unlike other parasitosis, L3 develops inside the egg instead of in pastures. Infection caused by consumption of contaminated feed. Although they are not hematophagous, the damage caused by erosion and eventual perforations in the intestinal mucosa is severe. Main cause of diarrhea and death in lambs. Parasitized sheep have problems gaining weight and reduced growth. They develop anemia, enteritis, hypoproteinemia, diarrhea (black or dark green), peripheral edema and anorexia.	(Rodríguez- Vivas et al., 2017) (Liu et al., 2023)
TRICHOSTRONGY LIASIS	NEMATODE: Trichostrongylus axei	TO: Abomasum. Generally present in a mixed form with other parasitosis causing verminous gastroenteritis. Sheep acquire it by consuming pastures contaminated with L ₃ , which emerged from eggs deposited in the feces. The disease is evident by "black diarrhea". In severe infestations, emaciation, muscle loss and loss of omental (greater omentum) and renal fat occur, weight loss and increased conversion rates. In young and weak animals, it can cause death.	(Bhat et al., 2023) (VanHoy, 2023)
INTESTINAL TRICHOSTRONGY LIDIOSIS	NEMATODES: Trichostrongylus colubriformis T. vitrinus	TO: Small intestine. Infection caused by the consumption of feed contaminated with L ₃ . The damage caused to the microvilli affects the absorption of nutrients, mainly phosphorus, essential element for the metabolism, growth and maintenance of the ruminal microbiota. It causes weight loss, enteritis and anemia. In severe infections, presence of profuse liquid diarrhea (blackish or dark green), anorexia, dehydration. In advanced stages, it causes sudden death of the animal.	(Dias-Silva et al., 2021) (Fernandes et al., 2022)
TRICHURIASIS	NEMATODE: Trichuris ovis	TO: Large intestine. Greater severity in young lambs. Infection by consumption of feed contaminated with L1 inside eggs. The larvae (histiophagous) burrow into the intestinal walls, beginning their maturation in the crypts. They cause epithelial desquamation, mucoid dystrophy, hyperemia and eosinophilic infiltration. In the large intestine, development and reproduction of adults (hematophagous), causing desquamation and mild hemorrhages. Signs: loss of appetite, dehydration, abundant gas emission, catarrhal diarrhea, edema and congestion. The thickening of the intestinal wall decreases intestinal absorption, causing diarrhea. In severe cases, ulcers, enteritis and profuse petechial hemorrhages. Death due to anemia and emaciation.	(Bulbul et al., 2020) (Wang et al., 2022)
PULMONARY SYNGAMIASIS OR MAMMOMONOGA MIASIS	R NEMATODES: Mammomonogamus (Syngamus) laryngeus M. nasicola	TO: Lungs. Parasite in the larynx, trachea and nasal cavities. It is characteristic that adults are in constant copulation, giving the appearance of a "Y". Infection by contaminated water and food. They affect the upper respiratory tract, causing damage to blood vessels and small lesions, which are generally not serious. Because the parasitic load is usually low, infections are mild and unnoticeable. Some animals develop petechiae, irritation and inflammation and/or laryngeal congestion.	(Lopes-Torres et al., 2020)
MESENTERIC AND CYSTICERCOSIS	MUSCULAR CESTODES: <i>Cysticercus ovis</i> (metacestode or larval phase of <i>Taenia ovis</i>) <i>C. tenuicollis</i> (metacestode de <i>T.</i> <i>hydatigena</i>)	TO: Heart, masticatory and skeletal muscles (<i>C. ovis</i>) and abdominal mesentery, surface of abdominal organs (<i>C. tenuicollis</i>). DH canids, IH ruminants (generally). Infection by consumption of food contaminated with dog feces. In the case of <i>C. ovis</i> , the larvae hatch in the small intestine, which they pass through to migrate via the bloodstream to the muscles to encyst. In adults, cysticerci can remain encysted for a long time without the sheep showing signs. In lambs, after a few days, they present excessive salivation, fever, weakness, frequent diuresis, slow breathing, anemia and jaundice, signs that they manage to overcome unless the infestation is massive, in which case death may occur. In contrast, <i>C. tenuicollis</i> causes hemorrhages when migrating. Sheep develop hepatitis (by traumatic action), fever, anorexia, anemia and weight loss. As the parasitosis worsens, the animal tends to weaken and even die.	(Cora et al., 2020) (Yensi et al, 2024)
CEREBRAL			

CESTODE:	TO: Central nervous system. DH, domestic and wild canids; IH mainly sheep and (Amer et al.,
Coenurus cerebra	lis goats, other domestic and wild species. Infection by water and food contaminated 2017) (Vargas
(metacestode	of with <i>T. multiceps</i> eggs. More frequent in grazing systems. Reinfection in dogs by et al., 2021)
Taenia multiceps)	consumption of viscera of infected animals. Parasitized lambs show depression and
	episodes of excitement (they run suddenly for moments and then suddenly fall) and
	tremors. It can present from mild neurological dysfunction to death, depending on
	the location, number and size of the coenuri in the CNS. Sheep are isolated from the
	flock and their reactivity to stimuli decreases. Subsequently, depression, inappetence,
	ataxia, head deviation, circling movements, blindness and coma. Lodging in the
	spinal cord causes progressive paresis.
	CESTODE: Coenurus cerebra (metacestode Taenia multiceps)

OB=Target organ; IH=Intermediate host(s); DH=Definitive host(s) **Source**: Prepared by the authors based on the cited references

Human Health and Zoonotic Parasites of Sheep

The degree of impact of zoonotic parasitosis on health depends on factors associated with the host and of the biological characteristics of the parasite and its forms of transmission (Figure 2). In humans, infection occurs through direct contact with sick animals or fomites, particles of fecal matter dispersed by the wind, cutaneous infestation or congenitally (Toxoplasmosis). However, most correspond to Foodborne Diseases (FBD). Contaminated food products (from sick sheep) have an important contribution, associated with preparation and consumption habits. The consumption of raw or poorly cooked meat, viscera, raw milk and by-products (yogurt and cheese) are the main causes. Additionally, the use of sheep manure as fertilizer for the cultivation of fruits and vegetables widens the spectrum of infection. Inadequate disinfection, and the preparation of juices, nectars or the consumption of raw vegetables, also contribute to the development of these diseases (Valderrama et al., 2019; Van den Brom, 2020).



Fig. 2: Transmission modes of ovine parasitic zoonoses. Source: Prepared by the authors

(Gholamietal, 2015; Shapiroetal, 2019; Valderrama et al, 2019; Bulbuletal, 2020; Lopes-Torres et al, 2020; Van de Brom et al, 2020; Bhat et al, 2023; BIAH, 2023; Ojeda-Carrasco et al, 2023; Shohana et al, 2024)

Health damage varies depending on the pathogenicity of the parasite and the organs affected. Age, physical condition and state of the immune system are also determining factors. Immunocompetent people may remain asymptomatic and self-limit the effects of the infection. Vulnerable groups (children, pregnant women, older adults) have the highest incidence and effects. Signs vary from mild to severe, most of them related to digestive disorders and, to a lesser extent, respiratory and skin disorders (Figure 3) (Chai & Jung, 2022; WHO, 2023).

For these diseases, official epidemiological surveillance bodies tend to weigh the data of those with the highest prevalence and importance. They include Cryptosporidiosis (the fifth cause of severe diarrhea in children under 5 years of age), Echinococcosis, Trichostrongylosis and Toxoplasmosis (Chai & Jung, 2022). These records prevent having elements to adequately monitor the evolution of the epidemiological behavior of these diseases. In the case of the European Union, it has a specialized agency for the annual reporting of cases of zoonoses. In the 2021 report, of parasitic zoonoses, it only includes figures for echinococcosis with 529 cases (28.7% in Germany) and Toxoplasmosis with 133 (82.7% in France) (EFSA/CDC, 2022). For 2022, the only record corresponds to echinococcosis, with 722 cases and an increase of 13.8% compared to 2021 (EFSA/ECDC, 2023).

Recently, the WHO recognizes that there are significant number of neglected diseases, especially prevalent in tropical climates. Among the ovine parasitosis, they include Echinococcosis, ETAs associated with trematodes (Fascioliasis, Dicroceliosis, and Eurytrematosis), Schistosomiasis, Trichuriasis and Cysticercosis. For reference, raw milk consumption causes 4% of foodborne illnesses. Echinococcosis is associated with the cause of 19.3 thousand deaths worldwide and 871 thousand disability-adjusted life years. Although the average annual care of 2016-2019 was 1,000 million people, control and eradication remain a pending task. Based on their estimates, in 2021 about 1,650 million people were affected by these diseases, 30.6% of this total in underdeveloped countries (WHO, 2023).

Research carried out on these diseases allows us to measure their impact on the health of populations. For example, Trichostrongylosis, a very common zoonosis in pastoral communities and rural populations, dedicated to extensive livestock farming, and the use of sheep manure

for growing vegetables for self-consumption. Some of the reported prevalence rates are 86% in Iran, 36.4% in Indonesia and 3.13% in Australia. These reference data allow us to infer the magnitude of the problem faced (Bhat, 2023).



Fig. 3: Clinical signs associated with ovine zoonoses **Source**: Prepared by the authors

Impact on Food Security

In addition to the health consequences, parasitic zoonoses have a negative effect on production processes. Economic losses are often significant, not only due to the death of animals and the confiscation of organs, but also due to the investments that producers must make to pay for antiparasitic treatments. One of the serious problems in controlling these diseases is associated with the growing anthelmintic resistance developed by many parasites (Liu et al., 2023). The vulnerability of the productive capacities of herds due to diseases extends its effects to two fundamental aspects of food security: food availability and safety (PAHO, 2020; El-Aziz et al., 2021).

Regarding availability, related to a production that allows the supply of food (meat and milk), necessary to meet the needs of the population (PAHO, 2020), these diseases cause affectation, mainly due to:

- Decrease in meat and milk production, due to:
- o Delayed growth and body weight gain
- Slaughter of sick animals as a control measure
- Premature death of severely infected animals
- Abortions, stillbirths and loss of weak offspring (Toxoplasmosis)
- Impacts on reproductive efficiency
- o Reduction in milk production volumes
- Organ confiscation:
- o Liver (Fascioliasis, Echinococcosis and Cysticercosis)
- o Hearts (Cysticercosis)
- Loss of carcass quality
- Drug residues that make the carcass unfit for human consumption
- o Reduction in muscle mass in the carcass
- (Zolfaghari et al., 2017; Shapiro et al., 2019; Ribeiro et al., 2021; Bhat et al., 2023).

Regarding food safety, it seeks to ensure that the food consumed does not cause harm to the health of consumers (PAHO, 2020). The development of zoonotic diseases in herds affects this safety, through the transmission of infectious forms of parasites present in meat, milk and its derivatives (mainly those prepared from raw milk).

The use of sheep manure as organic fertilizer usually aggravates the problem. The pathogens present can contaminate food and cause illness due to inadequate disinfection before consumption (WOAH, 2021).

The incidence of parasitic zoonoses tends to increase in rural populations whose main means of livelihood is extensive sheep farming. As they are one of the few sources of animal protein consumption, both meat and milk, there are no sanitary and hygiene controls necessary to guarantee that these foods will not harm their health. This is undoubtedly part of the reality of many vulnerable communities in the world (Scortichini et al., 2016).

Conclusions

Parasitic zoonoses represent a serious threat to public health and animal health worldwide. The frequent exposure of sheep to a variety of parasites, together with the different forms of infection and transmission, outlines a complex panorama. The consequences of these diseases, in addition to the welfare of the animals, generate important impacts on the productive potential of the flocks, with direct effects on the availability and safety of meat and milk intended for human consumption. In addition, direct contact with infected animals, the use of manure

as organic fertilizer, deficiencies in sanitary surveillance in slaughterhouses, as well as the forms of preparation and consumption are determining factors in the development of diseases in humans. Given this situation, from the *One Health* perspective, given the clear interdependence between human and animal health, as well as the impacts on food safety, it is essential to control zoonoses, which implies environmental care, whose conditions are determining factors in the evolution of diseases.

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