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## EPIDEMIOLOGICAL SURVEILLANCE OF ANISAKIASIS IN THE STATE OF FALCON, VENEZUELA

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**Abstract:** Anisakiasis is a zoonotic disease of worldwide importance, caused by parasites of the *Anisakidae* family, and is unknown in Falcón and Venezuela. This research was developed with the purpose of establishing an epidemiological surveillance system for anisakiasis in the state of Falcón, by means of a descriptive and transversal observational study, through the documentary analysis of periodical publications, epidemiological yearbooks and continuous statistics of official organisms; within the regional research lines: Health promotion and disease prevention. The information collected was systematized by searching, selecting, organizing and arranging the sources of information, integrated for analysis and establishment of central ideas, where it was demonstrated that the genus *Contracaecum* sp parasitizes 100% of the fish of the families *Mugilidae* and *Gerreidae* and 6% of the genus *Pseudoterranova* sp parasitizes the family *Gerreidae*, in the Médano Blanco fishing zone, Falcón state. Parasites located in the digestive cavity migrating to muscles represent a parasite load of 16 to 21 parasites per specimen, where 64% of fishermen and consumers were unaware of the parasite and its hygienic control measures. Imminent risk was detected and an epidemiological surveillance program was designed to address the threat. This research generated surveillance schemes, health promotion and protection guidelines, applicable through health education, in order to provide knowledge of the health risks derived from the capture, marketing and consumption of parasitized seafood products, in order to guarantee safe food for the population.

**Key words:** Gastric anisakiasis, Zoonosis, epidemiological surveillance, health promotion.

## VIGILANCIA EPIDEMIOLÓGICA DE LA ANISAKIASIS EN EL ESTADO FALCÓN, VENEZUELA

**Resumen:** La anisakiasis es una enfermedad zoonótica de importancia mundial, causada por parásitos de la familia *Anisakidae*, es desconocida en Falcón y en Venezuela. Se desarrolló esta investigación con el propósito de establecer un sistema de vigilancia epidemiológica para la anisakiasis en el estado Falcón, mediante la realización de un estudio observacional descriptivo y transversal, a través del análisis documental de publicaciones periódicas, anuarios epidemiológicos y estadísticas continuas de organismos oficiales; dentro de las líneas de investigación regionales: Promoción de salud y Prevención de enfermedades. La información recopilada fue sistematizada a *MLS Health&NutritionResearch*

partir de la búsqueda, selección, organización y disposición de las fuentes de información, integradas para su análisis y establecimiento de ideas centrales, donde se demostró que el género *Contracaecum* sp parasita en un 100% al pescado de la familias *Mugilidae* y *Gerreidae* y el 6% de género *Pseudoterranova* sp a la familia *Gerreidae*, en la zona pesquera Médano Blanco, estado Falcón. Los parásitos ubicados en la cavidad digestiva migrando a músculos, representan una carga parasitaria de 16 a 21 parásitos por espécimen, donde el 64% de pescadores y consumidores desconocía el parásito y sus medidas higiénicas de control. Se detectó riesgo inminente y se diseñó un programa de vigilancia epidemiológica para hacer frente a la amenaza. Esta investigación generó esquemas de vigilancia, lineamientos de promoción y protección de la salud, aplicables mediante educación sanitaria, con el fin de aportar conocimientos de los riesgos sanitarios derivados de la captura, comercialización y consumo de productos marinos parasitados, en función de garantizar a la población alimentos seguros.

**Palabras clave:** Anisakiasis gástrica, Zoonosis, vigilancia epidemiológica, promoción de salud.

## Introduction

Anisakiasis is a zoonotic disease transmitted to humans through the ingestion of raw or undercooked fish containing L3 larvae (infective stage) of the parasites of the *Anisakidae* family, species: *Anisakis simplex*, *contracaecum* and *pseudoterranova*. This ichthyozoonosis is unknown in Falcón state and in Venezuela (1- 4). In a study carried out with the purpose of evaluating the knowledge of fishermen in the Médano Blanco fishing zone, Falcón state, about *Anisakidae* parasites and the manifestation of gastric or respiratory symptoms related to anisakiasis, it was found that fishermen had never received courses on hygienic handling of fish, health agencies do not inspect the work, fish are marketed without a sanitary permit, fish are eviscerated and the remains are discarded into the environment, fish are not refrigerated, they do not know details of the parasite even when they have seen it, and they also pointed out that gastric and respiratory symptoms are common in children and adults (2,4,5).

The nematode parasites of the *Anisakidae* family in fresh fish sold for human consumption in Caracas were studied, concluding that they were located mainly in the mesentery and viscera; the prevalence and intensity of parasitization were high in all samples, with no relation to geographic origin, which allows concluding that the intermediate and definitive hosts of this parasitosis are permanently present along the Venezuelan coast, where the identification of several species of *Anisakidae* parasites has been reported, as well as their presence in the fishing areas of the eastern and western states of the country (6-9).

Diagnostic methods have been evaluated interdisciplinary with emphasis on the use of the endoscope as medical equipment for the diagnosis and treatment of digestive anisakiasis, the researchers conclude that it is necessary to establish alliances with biomedical engineering, to promote innovations and necessary steps with the endoscope and its implements, as a diagnostic resource and for the extraction of parasite larvae from the organism of patients; considering necessary the organization and development of networks of interdisciplinary professionals in favor of health, leading to materialize solutions to anisakiasis in the Venezuelan and Latin American context (5,10,11).

The high prevalence of the parasite demonstrated in previous studies, constitutes a risk for public health, of generating gastric or gastro-allergic anisakiasis; on the other hand, underlying absence of diagnosis and, lack of association of the specific symptoms characteristic of the disease, enabling silent diseases in consumers of parasitized fish, which consequently made them accidental hosts of the parasite, affected by its detritus, when the fish is marketed in presentations of: wheels, fillets, shredded or salted; which consequence, brings importance

to consider anisakiasis an increasing disease, both in the Venezuelan and Colombian Caribbean, where there are no known reported cases; even so, epidemiological alarms should be activated (12-15).

On the western coast of the Isthmus of Medanos, Miranda and Falcon municipalities, Falcon state in Venezuela and on the Atlantic coast (Bay of Cartagena) in Colombia, there persist predisposing factors typical of the evolutionary cycle of the parasite, which guarantee its presence, coupled with a high parasite load per specimen, circumstances that argue and conceptualize the problem. The high prevalence of *Anisakidae* parasites, detected in the Médano Blanco fishing zone, as well as in the coasts of the eastern states of the country, reveal the imminent high risk for the population to suffer from the disease transmitted by the ingestion of parasitized fish, which justifies proposing a system of epidemiological surveillance of anisakiasis, to guarantee the protection of public health through health promotion mechanisms (16-18).

Large aquatic mammals, which move long distances between oceans and seas, lead the evolutionary cycle of the *Anisakis* parasite and are responsible for the arrival of this parasite, discovered in Japan in approximately 1950, in South America; its presence is located in the Venezuelan and Colombian Caribbean; in the same way, it has been found in fishing areas of the Pacific Ocean: Peru, Chile and Argentina, where the problem can be aggravated due to poor sanitary handling of the contents of the digestive cavity when fish and marine products are eviscerated, which strengthens the existence of an endemic parasitic condition caused by *Anisakidae* nematodes in populations consuming parasitized fish, crustaceans and cephalopods (19 -22).

The lack of official notification and the absence of diagnostic mechanisms reflect a precarious health condition in the face of an emerging zoonotic pathology, of which there would be no record in the annals of local, regional and national epidemiology; without specific treatment, other than the supportive treatment to overcome symptoms similar to an infection or food poisoning, whose natural history is not identified. These tangible shortcomings in the lack of systematized and well-argued information on anisakiasis in Venezuela, which can be extrapolated to South America, constitute a threat to any progress that may have been made in the field of public health (23-26).

Establishing an epidemiological surveillance model of anisakiasis in Falcón state, as a health promotion strategy, is considered an essential function of public health, under the guidelines or methodologies proposed by the Pan American Health Organization and the World Health Organization, systematizing and documenting these research experiences on the risks of anisakiasis in the population, providing valuable information that can contribute to improving local conditions and relations between fishermen's families and consumers, promoting the modification of their practices in the capture of fish, handling on board or on the shore, evisceration, and sanitization of fish in the marketing mechanisms that lead to improving the health and quality of life of the population (27-31).

The parasites of the *Anisakidae* family are whitish, round, unsegmented worms, known as nematodes, with specific organs such as cuticular teeth, excretory pores and esophagus, which help in their identification. In general when the fisherman markets fish without the proper sanitary permit, in areas near his home, becoming part of a last link in the epidemiological chain, to place in circulation *Anisakis* parasites, responsible for a large number of people (children, adolescents and adults), present symptoms associated with anisakiasis such as: diarrhea, nausea vomiting, epigastralgia and respiratory problems of allergic type, which bulge

the casuistry of the health dispensing center in the marsh down sector of the city of Santa Ana de Coro (13,14,30-32).

It has been argued that the prevalence of the parasite is influenced by factors such as: fishing areas located to the west, which may represent a greater or lesser infestation of fish; local culinary customs, such as the way of cooking fish, which may vary from a moderate heat grill, to a high temperature and longer frying; also marinating, smoking and salting without subsequent cooking (14,33). It is considered a parasitosis of increasing incidence in the world (4 cases/100,000 inhabitants/year) and in Japan, due to social and behavioral factors, i.e., eating habits of consuming raw fish, a very high prevalence (2000 cases/year) is recorded, accounting for 95% of the world's cases. In European countries such as: Spain, France, Holland and Germany, anisakiasis has been found to be only 3.5% prevalent on average (33,34).

There is little knowledge of the mechanisms for health promotion, supported by epidemiological surveillance systems, in terms of fishermen and consumers, providing knowledge of the priorities to be taken into account for action, forming the human and institutional capacity required to develop, implement, monitor and evaluate health promotion activities at local and national level, identifying and selecting the mechanisms to control anisakiasis, as well as good fish handling and marketing practices to protect health. Theoretically, epidemiological surveillance has been understood as the systematic and continuous collection of data about a specific health problem, such as anisakiasis, its analysis, interpretation and use in the planning, implementation and evaluation of a health program aimed at addressing the threat (35,36).

It should be differentiated that the term epidemiological surveillance encompasses a series of different techniques and methodological strategies such as: health surveys; where we find individual and collective purposes. The former are related to the person under surveillance and the latter to the social group to which they refer. In practical terms, they can be attributed the same importance; however, the impact of each of them in the field of prevention can be considered different (36). For this reason, three main actions of epidemiological surveillance are known, when related to the individual: Health impacts detected at an early stage. Identification of sensitive groups at risk for the disease. The adaptation of individuals according to the activity they perform, when we relate it to the collectivity (36,37).

Knowledge of the health situation regarding anisakiasis will make it possible to plan preventive action in accordance with the priorities for action and the actions to be taken, always evaluating preventive measures and the difficulties encountered that serve as a warning, which is why it is necessary to assume that the conception of epidemiological surveillance is mediated by two dimensions: one strategic and the other tactical. The strategic dimension is focused on the continuous observation of trends in the medium and long term of the objectives, purposes and guidelines, aimed at increasing the health of the population, in their immediate and medium terms, aimed at characterizing the state of health, since it is nourished by the different subsystems of registration and notification of health problems and related conditions, events or factors (33,34,38,39).

The tactical dimension has to do with the alertness responsible for detecting sudden changes in health conditions and related events or factors. It should include new and specific data, issues not foreseen or, on the contrary, subject to a very close observation; also, potential damages or information on absent or empty phenomena, but of great importance for health, should be contemplated. The action-alert subsystems and the direct information system should be the mechanisms for carrying out epidemiological surveillance integrated into the global

prevention plan. In Venezuela, the presence of *Anisakidae* parasites in fish products should be controlled with prophylaxis, hygienic measures in the handling of fish on board and at the shore, as well as guiding the population to consume cooked fish or fish previously frozen at -20°C for 48 to 72 hours (34,38,39).

In the sanitary legislation of some countries, preventive measures have been established in order to reduce the incidence of anisakiasis. When the focus is directed towards prospective sanitary control measures or preventive control considerations, the establishment of a plan for safe food requirements based on hazard analysis and critical control points (HACCP), which is well established in food quality management, is considered. This plan will always consist of a package of written documents based on food safety principles, containing: risk analysis; preventive controls; programs to be implemented in the supply chain; delineation of procedures to be followed for monitoring, corrective actions and verification procedures (35 - 37).

Obligations must be established under regulatory jurisdiction (standards and decrees) for fish, in terms of fishing, handling on board or on shore, and conservation mechanisms until sale; a strategy that generally gives rise to a manual of good manufacturing practices, with risk analysis and preventive controls based on the regulation of seafood for human consumption, based on a Manual of Safe Manufacture, processing, packaging and storage of seafood products for human consumption, taking as an example the guidelines established in the document Health in the Americas. Establishing these regulations requires that the activities be deployed within a qualified control program (with trained personnel) who will subsequently receive comprehensive training in the development and application of preventive controls in accordance with current food law (36,37).

The aforementioned organizations point out that HACCP can be applied throughout the food chain from the production or capture zone, handling and storage on board or on shore in the case of artisanal fishing, evisceration, refrigerated/frozen transport to table service; with the objective of producing safe food that will not cause harm or damage to the consuming public. Potential hazards, whether biological (parasites) or chemical (allergic), and methods to eliminate, control or reduce them to an acceptable level should be identified (8,13,36)

This research was developed with the following general objectives of: Establish an epidemiological surveillance program for anisakiasis in the state of Falcón. Specific: 1. Describe the status of parasites of the family *Anisakidae* and anisakiasis through a systematic search for information. 2. Identify the elements of the epidemiological surveillance program through specific activities to be carried out and promotion actions. 3. Design an epidemiological surveillance program for anisakiasis by establishing the structures that integrate it, its attributes and evaluation measures.

## **Method**

A descriptive and cross-sectional observational study was carried out through the documentary analysis of periodical publications, epidemiological yearbooks and continuous statistics from official organizations, which was submitted for evaluation and approved by the Bioethics Committee of the Health Sciences Area of the UNEFM (40). This doctoral research project adhered to the lines of research: Health Promotion and Disease Prevention (41). The information gathered was systematized from the search, selection, organization and disposition of the information sources, integrated for its analysis corresponding to the hermeneutic dimension, which allowed building ideas and consolidating knowledge of what has been done

or needs to be done in order to meet the guidelines and requirements of an epidemiological surveillance program for anisakiasis in the state of Falcón (36-39).

## Results

The presence of Anisakidae parasite genera identified in fish from the Médano Blanco fishing zone, Falcón state, can be seen in Table 1, the number and percentage of parasites found in fish of the *Mugilidae* and *Gerreidae* families belonged to the genera *Contracaecum* sp and *Pseudoterranova* sp; it is also evident that the number of parasites of the *Contracaecum* sp genus behaves in a similar way in the *Mugilidae* and *Gerreidae* families, i.e., very high. The genus *Pseudoterranova* sp, is considered low, being present only in the family *Gerreidae*

**Table 1**

*Number and percentage of parasites of the family Anisakidae, identified in fish of the families Mugilidae and Gerreidae, in the Médano Blanco fishing zone, Falcón state, belonging to the genera Contracaecum and Pseudoterranova.*

Family/Fish	<i>Anisakidae</i> Genus	Number of parasites	% of parasites
<i>Mugilidae</i>	<i>Contracaecum</i> sp	414	100%
<i>Gerreidae</i>	<i>Contracaecum</i> sp	336	94%
<i>Gerreidae</i>	<i>Pseudoterranova</i> sp	21	6%

Taken from (4, 11, 13).

Table 2 shows the anatomical location of the parasites of the family *Anisakidae*, identified in fish of the families *Mugilidae* and *Gerreidae*. In the family *Mugilidae* (*Mugil lisa* and *Mugil curema*) the prevalence of parasites in the liver and hemal canal is high, and they were not detected migrating to the muscle; however, in the genus *Eugerres* sp, the prevalence of parasites is very high in the liver and hemal canal and they were already present in the muscle.

**Table 2**

*Anatomical localization of parasites of the family Anisakidae found in the digestive cavity, muscles and hemal canal of fish of the species Mugil lisa or Mugil curema and Eugerres sp, in the Médano Blanco fishing zone, Falcón state, Venezuela.*

Species/fish	Liver	Liver	Muscle	Hemal canal
<i>Mugil lisa</i> or <i>Mugil curema</i>	119	0	295	
<i>Eugerres</i> sp	106	38	213	

Total 225 38 508

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Taken from (4, 11, 13).

The parasite load or parasitization index by fish species is presented in Table 3, which also shows the maximum, minimum and average parasite load for the species *Mugil lisa* or *Mugil curema* and *Eugerres* sp. In the species *Mugil lisa* and *Mugil curema* the average parasitization index is higher than in the genus *Eugerres* sp.

**Table 3**

*Parasite load per specimen of parasites of the family Anisakidae in species: Mugil lisa or Mugil curema and Eugerres sp in the fishing area of Médano Blanco, Falcón state, Venezuela*

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Species/fish	Maximum	Minimum	Average	Average Parasite load
<i>Mugil lisa</i> or <i>Mugil curema</i>	21	0	9,2	21+- 9,2 p/u
<i>Eugerres</i> sp	16	1	7,9	16+- 7,9 p/u

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Taken from (4, 11, 13).

Legend: p/u: Parasites per unit or specimen.

Fish for consumption, product of the slaughter in Médano Blanco, Falcón state, constitute the vehicle for the arrival of the parasite to humans, highlighting that the fish correspond to the *Mugilidae* family (*Mugil lisa* or *Mugil curema*: lisa, taina and candilete) in 30%, to the *Gerreidae* family (*Eugerres* sp, known as mojarra) 26%. Among the others we find: snapper, carite, corocoro, shrimp and prawns, 44% (5, 11). The situation of danger for the consumer of suffering from anisakiasis is represented by the fact that 64% of fishermen and consumers do not know hygienic practices applicable to fishery products, only 36% know and follow hygienic habits (12, 13, 15).

The progress of mankind and the improvement of the quality of life have seen in epidemiological surveillance programs a basic function of public health that has as elements: Entry of data collected on the prevalence of the *Anisakidae* parasite and the characteristic symptoms of anisakiasis. Data processing for analysis and interpretation. Output of the proposal and execution of actions understood as dissemination and communication. Feedback: evaluation of the results and of the system. Follow the steps to design the surveillance system. Definition and importance of anisakiasis as a disease to be monitored (31-33).

Consideration of the elements of the system for the collection of information on the disease and the analysis and interpretation of the data. Verify the actions that will be developed to maintain anisakiasis surveillance and finally evaluate the surveillance system and the program (31-33).

In the design of the characteristics of the epidemiological surveillance program for anisakiasis in the state of Falcon, it was proposed to use as a source of data for surveillance, the routine and mandatory notification of events of interest collected by the health dispensing centers, dependent on the Secretariat of Health of the state of Falcon, as well as the Venezuelan Institute of Social Security (IVSS) and the Institute of Social Welfare and Assistance for the Ministry of Education Personnel (IPASME), in order to establish the necessary connections with the trained personnel working in the agencies of the National Health System in an integrated manner (32-35).

The proposed surveillance system consisted of: The general subsystem, where the information received weekly, quarterly or yearly is consolidated, related to the component of diagnosis and clinical surveillance on anisakiasis, as well as the parasites of the *Anisakidaefamily*, prevalent in the Médano Blanco fishing zone in Falcón state. The specific subsystem, where information on the diagnosis of anisakiasis will be registered, according to the symptoms of the disease, studies by endoscopy, laboratory surveillance by serology. Each subsystem will have its own objectives and will require specific information, statistical data processing and epidemiological surveillance strategies (34,37).

The modeled surveillance system has the following attributes: Sensitivity: ability to correctly detect cases of anisakiasis or the determined risk factor, with predictive-positive value to the condition under surveillance. Specificity: ability to correctly identify individuals who are not sick with anisakiasis or the risk factor under surveillance (31-34). The ability to detect false positives or inaccuracies in detection. Flexibility: ability to accommodate new requirements within the system itself. Acceptability: Level of acceptance of the activity by the people who manage and coordinate the system, as well as by those who generate the information. Simplicity: Degree of simplicity of a system to interact in an agile and efficient way with the environment, without losing quality in its actions. Representativeness: to describe as accurately as possible the occurrence of a health event in the community, according to its distribution in time, place and person. Timeliness: which reflects the speed in time that elapses between the different steps of the surveillance system (occurrence-detection-notification-action (31,34).

Levels of organization of the surveillance system will be: Local Level: constituted by the health team in contact with the population. They generate the data and the epidemiological record. There may be a departmental level. Epidemiological surveillance is triggered: Observation, Alert, Alarm and Control. Local level responsibilities: Perform the control and analysis of primary data. Timely detection of the occurrence of the disease in the community. Immediately initiate control actions according to specific regulations. Request support from the higher level if necessary. Report cases to the next higher level. Report on the control actions carried out to the next higher level. Participate in training programs related to surveillance. Promote and execute social communication strategies. Preparation of the Epidemiological Bulletin (34,36,37).

Provincial level: integrated by the Directorate of Epidemiology. Receives the information generated by the local or departmental level, where it is analyzed and consolidated to be sent to the higher level. They can collaborate with the local and departmental level in different training actions or interventions when events occur (36,39).

Responsibilities of the Provincial Level: Program, coordinate and supervise Epidemiological Surveillance activities in their area. Promote the training of the human resources of the Epidemiological Surveillance System under its control (36,39).

Conduct appropriate epidemiological investigations. Receive, consolidate, process, analyze and continuously disseminate the jurisdiction's information. To prepare and disseminate epidemiological information at the provincial level. Promote the use of different data sources to identify risk factors. Actively participate in the design of social communication strategies. Coordinate activities with national and jurisdictional reference institutions. Raise the alert and coordinate the necessary intervention actions when the event exceeds the possibilities of action at the local and/or regional level. Participate in the formulation of health plans and programs. Participate in the organization of the provision of health services in their area. Refer the information, according to standards, to the higher level (34,36,37).

National level: Defined in the Organizational Chart of the Ministry of the People's Power for Health (MPPPS), as the Epidemiology Directorate. They receive information from the preceding levels, consolidate, analyze and send it to international organizations. Its function is mainly normative and according to its levels and responsibilities. Activities: All levels will carry out their epidemiological surveillance activities such as: monitoring, evaluating and consolidating information from the levels, formulating recommendations for disseminating information based on indicators and attributes (35-37).

### Discussion

When contrasting the results presented and described with the different authors cited, we find that they fully agree (1,11-13,15) that the situation of danger for the consumer of suffering from anisakiasis is represented by the high prevalence detected in the fishing zone; added to the fact that 64% of fishermen and consumers do not know hygienic practices applicable to fish products, only 36% know and follow hygienic habits (1,11-13,15).

There was also agreement among authors, who identified that the safety of the fish that will reach the consumer depends on the handling on board or at the shore, because the time it takes for the preventive measures or hygienic practices of evisceration and washing allow the *Anisakidae* parasite to migrate from the digestive cavity or mesentery to the muscle and hemal canal, making its removal difficult and the greater amount of detritus (1 - 5,11,12,15,18,19).

The genus *Contracaecum*spp predominates in the parasitization of fish of the family *Mugilidae*, while the genus *Pseudoterranovas*spp predominates for the family *Gerreidae*, in percentages above those found on the coasts of the eastern states of Venezuela, as reported by (4,6-11,13). Epidemiological research carried out in the Médano Blanco fishing zone provides information that indicates that the prevalence of *Anisakidae* parasites in fish has been increasing and in the last report reached 97% for the genus *Contracaecum*spp and 3% for *Pseudoterranovas*p(4,5,11,13,14,15,19-22).

The studies carried out in the Médano Blanco fishing zone showed that 64% of the fishermen involved in the fishing operation do not know about hygienic habits that could affect fish safety; even worse, they do not have any knowledge about parasitosis, nor do they have, nor have they ever processed the sanitary permit, where it is mandatory to comply with the course for food handlers, given by the competent sanitary authority in Falcón state, which trains them for the hygienic handling of food, specifically fish and marine products, which allows the commercialization of fish in better conditions of safety and healthiness. It is important to highlight that only 36% knew and followed hygienic habits (1, 2, 9, 21, 36, 37, 39).

#### *Elements of the anisakiasis epidemiological surveillance program*

The management of frequent parasites and their evolution, within a safe food plan, has been analyzed by the authors (22-27), who understand that the knowledge of the prioritized actions should be selected to act, forming the human and institutional capacity required to develop, implement, monitor and evaluate the health promotion activities established at the local and national level, within the anisakiasis surveillance program. It should identify and select control mechanisms, as well as good fish handling and marketing practices to protect health (22-27).

The health situation on anisakiasis, according to the interpretation of (28-32), based on new data on the hosts, in relation to the diagnosis and control of anisakiasis, will guide the planning of preventive actions, always verifying the difficulties encountered that serve as an alert; to highlight the sudden changes that could occur with cases of anisakiasis and the events or factors related to it, where we would be applying the tactical dimension of epidemiological surveillance. The strategic dimension will be implemented through continuous observation of trends in the medium and long term according to objectives, purposes and guidelines, aimed at increasing the health of the population, in the immediate and medium terms, aimed at characterizing the state of health (28-32).

The alert-action subsystems and the direct information system will execute the epidemiological surveillance integrated to the global prevention plan, to help maintain the surveillance of anisakiasis and the evaluation of the surveillance program, in the Venezuelan health system, opinion consubstantiated by (33-35). The role that civil society should play in the presence of *Anisakidae* parasites in fishery products should not be discarded and, consequently, their control with prophylaxis, hygienic measures in the handling of fish on board and at the shore; as well as orienting the population with consumption habits of cooked fish, or fish previously frozen at -20°C for 48 to 72 hours (33-35,37,38).

### Conclusions

The situation currently detected in this research shows that there are no changes or improvements that allow us to argue that the risk to public health represented by the *Anisakidae* parasites in the fishing zone in question is decreasing, justifying the need for action by the competent health agencies, the epidemiological surveillance measures, involving the fisherman, attributing to him the responsibility that also assists him in this problem

Risk analysis and control of critical points in food processing, as in this case seafood, constitute a technology applicable from the production area, acting with monitoring and verification actions throughout the production chain, up to the consumer's table, including environmental management of the contents of the digestive cavity during evisceration, which requires its disposal in a safer place, ensuring that it will not be food again for plankton organisms or other fish, where it would be favoring the colonization of the parasite in the fishing area.

The lack of knowledge of the parasite by fishermen and fisherwomen, as well as of habits or hygienic practices in the handling of fish, merit health education activities to overcome this risk and engage in the process of contribution and generation of continuous learning about the *Aniskidae* parasites and the parasitic disease they trigger, as a basis for collective action, where the community assumes participation in the epidemiological surveillance program of anisakiasis

The importance of Falcon State in the western axis, as the first productive state among the main fishing areas of Venezuela, warns of the need for greater concern for the safety of the fish that is marketed, in order to guarantee safe food to the population, based on the legal strengths attributed to it by the existing sanitary legislation on food sovereignty and safety in Venezuela.

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