

Inequity In Rural Communities (Sanaguin-Molleturo) On the Proper Management of Pesticides and Its Consequences on Public Health

Angélica Geovanna Zea Cobos¹, Pablo Caballero²

¹Universidad Politécnica Salesiana, Cuenca, Ecuador, Dirección: C. Vieja 12-30 y, Cuenca 010105, E-mail: azea@ups.edu.ec

²Dpto. Enfermería Comunitaria, Medicina Preventiva y Salud Pública e Historia de la Ciencia, Universidad de Alicante Ap. de correos, 9903080, Alicante, España. E-mail: pablo.caballero@ua.es

Abstracts: Inequity in rural areas regarding the proper management of pesticides, especially in communities where their main economic activity is agriculture, it is important to prioritize environmental training issues that contribute to Public Health in the least favored sectors, so in this in the document, the community of Sanagüin, which has approximately 100 inhabitants, is selected. The economic activity is based mainly on the cultivation and production of the land, generally this work is carried out manually, and very little mechanized and technical; Products such as sugar cane are grown mostly in this community. As an alternative activity and that has gained strength in recent years are grass crops for livestock, especially in the highlands where the inhabitants have dedicated themselves to fattening cattle. In the community of Sanagüin, the indiscriminate use of pesticides results in a direct impact on the health of the population, in addition to environmental and soil contamination, so this work is based on the collection of primary and secondary data that shows mismanagement of pesticides in different crops. To support and quantify the inequity of knowledge of reference to the indiscriminate use of chemical products, such as a local one carried out at the level of the different communities at a rural level in the province of Azuay, blood tests were carried out that justify a level of mild long-term intoxication. term by means of Acetylcholinesterase; since the results found show levels that are outside the normal range.

Keywords: Inequality, Environmental Education, Public Health, Pesticides.

1. INTRODUCTION

The present project was executed with the purpose of carrying out a survey of information based on the use of pesticides in the community of Molleturo, as an example of our local reality at the level of rural parishes in Ecuador, where its main economic activity is the agriculture and demonstrate how the lack of knowledge on the subject of environmental education has a negative impact on handling chemical substances that are dangerous and harmful to health, and that are acquired with the purpose of guaranteeing good crops.

This work consists of three parts:

- The first will be to carry out surveys to carry out an analysis and determine the degree of knowledge of the inputs that are handling, in this case, chemical products (pesticides).
- The second will be based on the results obtained to plan an environmental education workshop to discuss the proper use of pesticides and publicize the main consequences on the health of your community.
- Carry out the determination of acetylcholinesterase in blood to determine if there is any level of intoxication in the people of the community dedicated to agriculture, because of the mishandling of chemicals.: homogeneous and heterogeneous [7]. In homogeneous membranes, the fixed functional groups are uniformly distributed throughout the polymer matrix, whereas in heterogeneous membranes, the fixed groups are not uniformly distributed and are separated by uncharged binding polymers, which increases the mechanical strength of the membrane [9]. Figure 1 shows a homogeneous membrane and a heterogeneous membrane [7].

1.1 Problem Statement

The Sanaguin community has approximately 100 inhabitants. The economic activity of the Community in the rural area is mainly based on the cultivation and production of the land, generally this work is carried out manually, and with very little mechanization and technology; Products such as sugar cane are grown mostly in this community. As an alternative activity and that has gained strength in recent years are product crops, such as pasture for livestock, especially in the highlands where the inhabitants have dedicated themselves to fattening cattle.

In the community of Sanagüin, the indiscriminate use of pesticides results in a direct impact on the health of the population, in addition to environmental and soil contamination. It is important to mention that there is inequity in terms of the knowledge of the different rural communities if we compare with more developed places where they have access to education, drinking water and health services, therefore it is important to highlight the importance of achieving environmental awareness in an equitable manner in all regions of the country and thus contribute to the public health of the community at large.

1.2 Critical Analysis

The production and distribution of food is a matter of great interest worldwide, for this reason it seeks to optimize crop protection to minimize losses. In this sense, the production of agro-foods is linked to the use of pesticides, widely used in fruits and vegetables due to their susceptibility to attack by insects and diseases. [1].

Pesticides are potentially toxic chemicals. They can produce contamination in soils and both superficial and underground waters, generating a risk of intoxication of living beings, from which man is not excluded. Then it is manifested that many of the pesticides are products that attack certain organisms considered harmful, damaging them and causing death [2] . This ability to cause damage to living beings is called toxicity. Therefore, the ideal pesticide would be one that would be very toxic for the pest that you want to combat and not at all toxic for the rest of the living beings, but this currently does not exist, most pesticides are toxic for almost all living beings, including man. The risk or possibility of harm to health depends on the degree of toxicity of the product and how exposed one is to it.[3]

The toxicity is different from one pesticide to another and depends on the type of substances that compose it, their concentrations, environmental factors, etc. The essential short-term action is usually a consequence of the mechanism of action of the active ingredient of the pesticide, which is similar for substances belonging to the same chemical group and different between substances of different chemical groups.[4].

1.3. Cause-Effect Relationship

The problems of resistance, resurgence and the appearance of new pests force the farmer to increase the application doses, reduce the intervals between applications, and resort to the mixture of insecticides. The resulting economic implications are serious, but, in addition, two important problems are created: the increased residues left in the plants and environmental contamination. Residue is understood as the number of insecticides or their toxic metabolites that remain on the surface or within the part of the plants that are harvested. [5].

Due to environmental contamination, the way in which the pesticide remains in the soil, is carried by air to neighboring areas, and reaches the waters of ditches, rivers and lagoons or percolates into groundwater levels; thus, threatening the health of man and animals, determining the misuse and mismanagement of pesticides.

Agriculture and the fight against pests have developed as a continuous and parallel process, which has marched according to the technological, economic, and social trends of different times. Agricultural models favor the development of pesticides and their application technology, which has been the predominant trend in plant health worldwide, which has taken root with such force that even today, despite the fact that they are known and various alternatives have been practiced, many farmers and agricultural professionals have the perception that to fight against pests it is necessary to use a pesticide product as the only option.[6]

The risk because of non-technical and professional attention will allow the conjunction of different variables such as:

- Toxicity.
- Exhibition time.
- Amount absorbed or concentration of the product.
- Route of entry of the toxic into the body.
- Individual susceptibility.
- Manipulation. (Carvalho, 1998)

According to the Food and Agriculture Organization of the United Nations (FAO), the misuse of pesticides can easily leave scars on food. In fact, he says, certain types of pesticides such as organophosphates can accumulate in the body. The fight to control insects, weeds or diseases in crops must be extended to food, since it depends on whether consumers have access to safe food. [7]

By virtue of the foregoing, it is urgent to carry out pertinent corrective measures on time due to what is happening in the field with the indiscriminate use of pesticides, contributing to the social, environmental, and community and population health component in general. [6]

1.3.1 Problem Formulation

Do the farmers of the community of Sanaguin, of the parish of Molleturo make an inappropriate use and management of pesticides in their agricultural lands; Is this due to inequity in terms of access to training on environmental education issues that have a direct impact on the Public Health of the Community?

1.3.2 Preguntas Directrices

- Do you think you are at risk when you are exposed to chemicals (pesticides)?
- Have you had any incidents related to the use of pesticides?
- What do you do with empty pesticide containers?
- Do you use any type of protective equipment during pesticide application activities?
- Are you satisfied with the protective equipment you use?
- Have you received any type of training related to the use of pesticides?
- Have you ever bought a pesticide without a label?
- How do you determine the danger of a pesticide?
- Have you felt spillage of liquid on the body?
- What symptoms have you experienced from pesticide poisoning?

1.3.4 Delimitation

- Field: Agricultural, environmental

- Area: Agriculture, health, education, environment
- Aspect: Community training
- Temporary: From October 12, 2018, to February 4, 2019
- Spatial: Community of Sanaguin, Parish of Molleturo in the province of Azuay

1.4 Justification

The pesticide active product is obtained by the chemical industry with a variable degree of purity, generally between 75 and 98%, depending on the case, the rest being impurities from its manufacture. This product, technically called pure, is almost never suitable for agricultural use, and must be packaged beforehand in a formulation. This contains the technically pure active material or product, diluted on a solid support or in a liquid solvent, and auxiliary substances that improve its action. These formulations can be applied directly or dispersed in water.

In the last 20 years, the use of pesticides in developing countries has increased, both at the agricultural level and in public health campaigns, an increase that is accompanied by inappropriate use, ignorance of damage to health and the lack of research on their effects. The economically active population in the agricultural sector has greater exposure since it uses 85% of these products. It has been shown that exposure to pesticides causes acute poisoning (API). Reporting for Asian countries between 1,500,000 and 2,000,000 cases. According to annual estimates by the World Health Organization (WHO) worldwide, in the eighties there were one million unintentional serious cases, of which 70% occurred due to occupational exposure. For the nineties, between two and five million poisonings were reported. In underdeveloped countries, there are 25 million cases of occupational IAP per year. The incidence of poisoning by pesticides, frequent in these countries, has doubled in the last 10 years and for each case of poisoning detected there are three or four unreported cases. For the smaller countries of Latin America, they refer to one thousand to two thousand poisonings per year; pointing out that more than 50% occur in less developed countries and 3% correspond to exposed agricultural workers [8].

The activity in which the consumption of pesticides is greatest is agriculture. Crops are affected by a wide variety of pests as well as competition from weeds. In addition, the introduction by the farmer of new, more productive species generates ecological imbalances that result in the proliferation of pests due to the disappearance of natural predators. The agricultural sector is considered the population group with the highest risk of exposure to these toxic contaminants, because of the high importance that the use of insecticides, molluscicides, bactericides, herbicides and fumigants has been acquiring in developed countries. Most of the pesticides on the world market are organophosphates [9].

In Ecuador and other developing countries, the use of pesticides is often based on "safe use" programs, which do not consider social and economic factors that make small-scale farmers more vulnerable to damage caused by pesticides. pesticides [6. These factors include difficult macroeconomic conditions, lack of infrastructure, including water and sanitation facilities, inadequate housing, and very limited agricultural extension programs [10].

Environmental problems are the result of concrete actions of contamination, overexploitation, inequitable or unsustainable use of natural resources, determined by the models of production and consumption; and, by the styles or ways of life, of society. In this context, when the degradation of the environment begins to be understood as a social problem, Environmental Education emerges as a response, as a strategy of critical attitude and committed to political decisions, actions and individual and collective daily practices aimed at the sustainability of development. This education should be focused on the "intelligent renovation of the art of living"[11-12-13-14]

The growing rural poverty, on the one hand, and the intensification of production, on the other, bring with them the degradation of ecosystems and serious ecological imbalances that accentuate the acute environmental problems inherited from the dependent and peripheral role of Latin America within world capitalism and the green

revolution which consisted of using varieties of corn, wheat and other grains fundamentally, cultivating a single species on a plot of land throughout the year (monoculture) and the application of large amounts of water, fertilizers and pesticides, which affected the soils, the air, human health, etc. Supported by a "set" of complementary improved practices addressing factors such as fertilizer use, pest control, and plant spacing, the new varieties were adopted in various developing regions" [15].

On a planetary scale, human beings are endangering their lives because of the way in which their relationships with the environment develop. Society is a world of great imbalances and injustices, in which wealth and luxury (of minorities) rub shoulders with the crudest poverty and misery (of majorities), the process of appropriation, production and consumption, and explosive population growth aggravate the situation of the biosphere itself, which is being degraded. Neoliberal globalization stimulates the polarization between rich and poor countries and sectors, and accentuates, even more, the gap (economic, technological, commercial, productive) in the national and international spheres. The complexity that globalization has given to relations between countries and people, between the rich North and the impoverished South, and the current ecological crisis make it urgent to explore new alternatives. The current ecological crisis –caused by the impact of human activities and the western model of life– join other destabilizing symptoms, such as economic fractures –with strong global inequalities in the living conditions of its inhabitants–, social –expressed in exclusions of different signs– and cultural ones –xenophobia linked to the dominant idea of some cultures over others–. Even in the spaces of the planet where there are no armed conflicts, multiple indicators of a certain type of war appear, a war of the human being against his environment and against himself [16].

1.5 Rationale

The present research work was carried out considering the propositae, dialectical critical paradigm, which takes as a reference the capacity and knowledge of the potato producers of the Hipolongo and Guangaló community of the Quero community, to have a better economic income and raise the standard of living of your family environment without putting your health at risk and being friendly to the environment. The understanding and identification of potentialities for change, emancipatory social action constitute the purpose of the research, its vision of reality being the intuition of multiple socially constructed realities. The cause-effect relationship is part of the transforming interaction. The development of values is established through committed research, its scientific generalization is based on contextual generalizations, its methodology validates hermeneutics - dialectic and its method-object of study relationship. It is constituted in a participatory, open, flexible, and unfinished process with qualitative emphasis.

In all Latin American countries there is a Political Constitution of the Republic that deals with the issue of environmental conservation. In Ecuador, in the 2008 Constitution, Article 14 of Chapter II, second section, textually says "The right of the population to live in a healthy and ecologically balanced environment is recognized, which guarantees sustainability and good living, Sumak Kawsay. The preservation of the environment, the conservation of ecosystems, biodiversity and the integrity of the country's genetic heritage, the prevention of environmental damage and the recovery of degraded natural spaces are declared of public interest.

Art. 15. Use of clean and non-polluting technologies. - The State will promote, in the public and private sector, the use of environmentally clean technologies and 23 alternative and low-impact energies. Energy sovereignty will not be achieved to the detriment of food sovereignty, nor will it affect the right to water. In addition, international treaties have been signed to guarantee the conservation of biodiversity and the maintenance of ecological services. The present investigation also faithfully observes other principles that are enunciated in the Constitution of Ecuador and that are detailed below.

Pesticide Regulations. - It is important to have an effective regulation for the use of substances such as pesticides, which, although they are very helpful in combating domestic and agricultural pests, can cause damage to the environment and to the health of the population if they are not used properly. safe way. For this reason, the integral management of pesticides is necessary at all levels (global, national, state, and local) from their production

to their final disposal to maintain control and avoid greater risks [17].

1.5.1 Pesticides

Pesticide is the generic name given to any substance or mixture of substances used to control pests that attack crops or insects that are disease vectors. Pesticides are the result of an industrial chemical synthesis process and have become the dominant form of pest control after World War II thanks to the development of the chemical industry and the type of agriculture dependent on these inputs. Most of the pesticides are used mainly in agriculture and horticulture; or, in public health programs to combat vectors, such as malaria, in forestry work and animal production. However, the use of pesticides is not only * Center for Research and Advanced Studies in Public Health, Faculty of Medicine, Autonomous University of the State of Mexico. Pesticides are the dominant form of pest control. Its use carries various risks, both for the environment and for the health of exposed workers and the general population. Acute health effects were previously the most considered; however, in the last two decades, chronic effects have become important, such as damage to the central nervous system, teratogenesis, mutations, cancer, among others. This article summarizes the main health effects reported in the world literature due to exposure to pesticides, particularly those of a chronic type in the occupationally exposed population, concluding with the research proposals made in the area. [18]

1.5.2 Health Damage.

Pesticides encounter humans through all possible routes of exposure: respiratory, digestive and dermal, since these can be found, depending on their characteristics, in inhaled air, water and food, among other means. environmental. Pesticides have acute and chronic health effects; Acute is understood to be those poisonings linked to short-term exposure with systemic or localized effects, and chronic are those manifestations or pathologies linked to long-term exposure to low doses. A given pesticide will have a negative effect on human health when the degree of exposure exceeds levels considered safe. There may be direct exposure to pesticides (in the case of workers in the industry that manufacture pesticides and the operators, in particular farmers, who apply them), or indirect exposure (in the case of consumers, residents and bystanders), in particular during or after the application of pesticides in agriculture, gardening or sports fields, or for the maintenance of public buildings, the control of weeds on the edges of roads and railways, and other activities.

There are two types of toxicity, acute and chronic, acute toxicity is when the effect is immediate, for example a person is applying the pesticide for the first time and it decomposes, this is an immediate effect. Chronic poisoning refers to when a worker has been repeatedly exposed to pesticides for some time, may appear with significant symptoms or discomfort that are caused by chronic poisoning. [19]

1.5.2 Classification Of Pesticides.

Pesticides are classified based on some of their main characteristics, such as acute toxicity, half-life, chemical structure, and use. In 1978, the World Health Organization (WHO) established a classification based on its danger or degree of acute toxicity, defined as the ability of the pesticide to cause acute damage to health through one or multiple exposures, in a period. relatively short period of time. Toxicity is measured by median lethal dose (LD50) * or median lethal concentration (LC50). Both parameters vary according to multiple factors such as the presentation of the product (solid, gel, liquid, gas, dust, etc.), the route of entry (oral, dermal, respiratory), temperature, diet, age, sex, etc. Being based on the observation of animal species, it is important to point out that these indicators do not provide information on the chronic effects, nor on the cytotoxicity of any compound. By their half-life, pesticides are classified as permanent, persistent, moderately persistent, and non-persistent. According to their chemical structure, pesticides are classified into various families, ranging from organochlorine and organophosphorus compounds to inorganic compounds. [20-21-22-23]

2. MATERIEL AND METHODS

2.1. Descriptive Research

Descriptive research is responsible for specifying the characteristics of the population that is being studied. This methodology focuses more on the “what”, rather than the “why” of the research subject. Its objective is to describe the nature of a demographic segment, without focusing on the reasons why a certain phenomenon occurs. That is, it “describes” the research topic, without covering “why” it occurs.

This project is focused on being able to know the levels of toxicity that are present in the people of the community because these people fumigate many times, for the reason of their own life support.

The objective of this project is to make people aware of using protective materials or using biological methods, to reduce pesticides, giving them better prevention for health and the environment.

Research areas and participant

The selection of the research areas and of the participants are small producers and agricultural workers (men and women), which is carried out with the help of the sector's directive.

The survey was adapted to local circumstances, such as the type of pesticide application. In addition to health-related symptoms (acute and chronic symptoms), exposure indicators were used, such as working conditions (pesticides used, protective measures, etc.). The questionnaire for the exposed group consisted of 29 questions, the survey was conducted in the form of direct interviews with people from the Salesian Polytechnic University of the study areas.

2.1.1. Plan For the Collection Of Information

This plan completes methodological strategies required by the research objectives and hypotheses, according to the chosen approach, considering the following elements. The survey format has 29 questions, they are presented in the annex, the surveys were directed to collect the following information:

- The community sustains itself through crops, using pesticides
- Surveys were carried out to find out who fumigated
- Then the blood test was carried out to establish their toxicity levels.

2.1.2. Processing And Analysis of Surveys

1. Have a list of all the people who are going to be analyzed
2. List each of the individuals
3. Visit the homes and properties of the subjects being investigated

2.1.3 Information Processing Plan

Information processing was used:

- Critical review of the information collected
- Repetition in the collection in certain cases of individuals

- Statistical studies for the presentation of results

2.1.4. Analysis And Interpretation of Results

- Analysis of statistical results.

- Interpretation of the results, with the support of the theoretical framework, in the pertinent aspect.

2.2. Determination Of Acetylcholinesteras in Blood Samples

To complement the study, the determination of cholinesterase (CHE) in serum and plasma is carried out in the population that uses pesticides in their crops, as laboratory data to obtain a relationship of the level of knowledge on the management of pesticides with their application in daily practical life, therefore these results will indicate whether the people who dedicate themselves to this activity are doing it adequately or not, as they are reflected in the laboratory results with low levels of acetylcholinesterase as an indicator test of intoxication. The Method uses butyryl thiocholine as a specific substrate for cholinesterase (CHE). Cholinesterase is an enzyme present in plasma and synthesized by the liver. Its true function is to hydrolyze choline in plasma. Cholinesterase activity is regulated by liver function, is a sensitive test for organophosphorus pesticide exposure and identification of patients with an atypical form of the enzyme who exhibits a high sensitivity to succinylcholine. The clinical diagnosis should be made considering all the clinical and laboratory data.

2.2.1 Material used for analysis

- Spectrophotometer or colorimeter for measurements at 405 nm.
- Thermostatic bath at 37 °C
- 1.0 cm light path cuvettes
- Usual laboratory equipment.
- Fresh whey
- Non-hemolyzed plasma

3. RESULTS AND DISCUSSIONS

3.1 Analysis and Interpretation of The Results

3.1.1 Survey Addressed to The Farmers of The Sanaguin Community, Molleturo Parish.

Within the survey, specific questions were asked that facilitate the determination of the degree of knowledge of the inhabitants of the town about the degree of incidence of the use of pesticides without the protection measures, in the most decisive questions we found the following results:

Personal Protective Equipment: We can observe that within the population, 35.71% do not use protective equipment when fumigating, data that is not highly credible due to the results obtained in the blood sample, the result of which will be shown later.

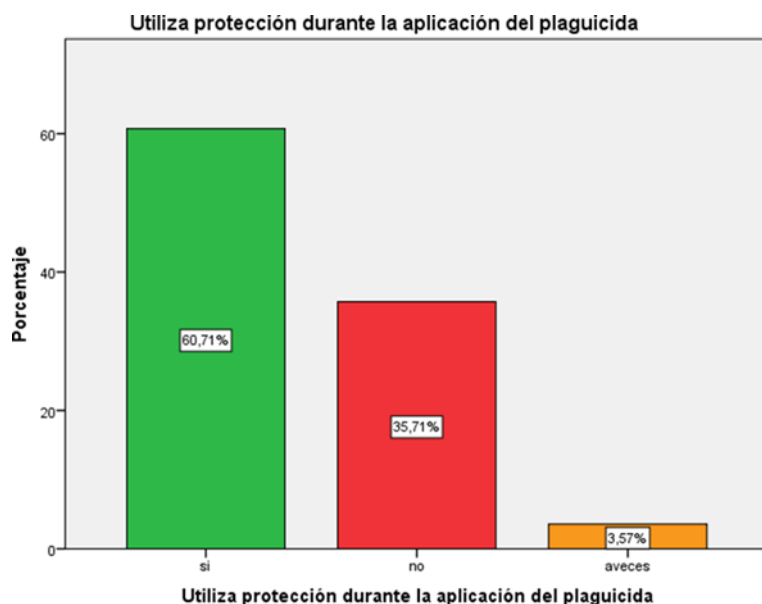


Figure 1. - Use of personal protection during the application of pesticides.

Final disposal of the containers: That 46.43% of the population discards it and that the other same proportion saves it for another occasion is of great danger, since it is recommended that they always try to buy only the amount of pesticide that they used immediately, otherwise use it in a reasonable time, these different pesticides have instructions on the label, in the plants or places indicated.

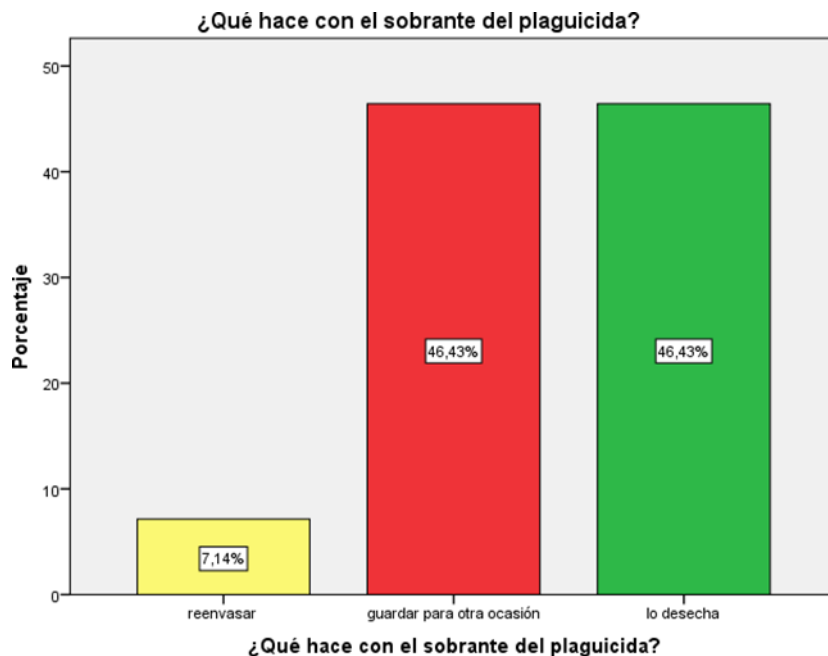


Figure 2. Final Disposal of Containers

Training in the proper handling of Pesticides: One of the biggest problems found was that 96.43% have not received the correct training on pesticides, this justifies the knowledge deficit that falls on misuse and lack of protective equipment.

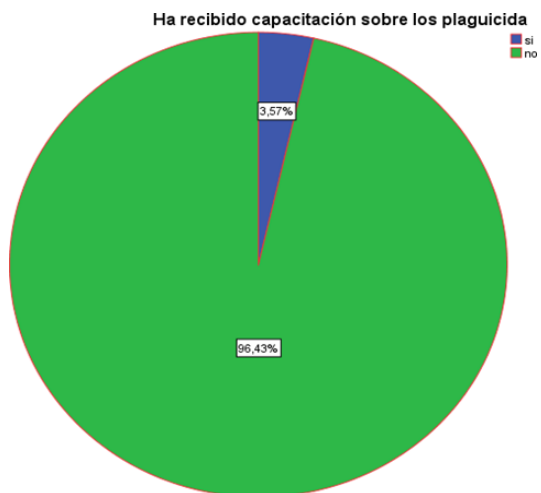


Figure 3. Training on pesticides

Symptoms presented by the farmers: These data continue to corroborate that the people who spray in this parish have a high level of insecticides in their bodies, among the possible symptoms when it is applied through the skin we have irritation, redness/swelling, if it occurs in large quantities absorption, the most common symptoms could be bluish lips and nails, the residents of the sector mentioned feeling characterized with these symptoms sometime after their fumigation work.



Figure 4. Pesticide spills.

Main route of exposure: One of the most common poisonings is inhalation poisoning, this can be related to all the symptoms that residents feel after fumigating, among the most common symptoms and signs we have: headache, nausea and vomiting, tremors, blurred vision, shortness of breath.

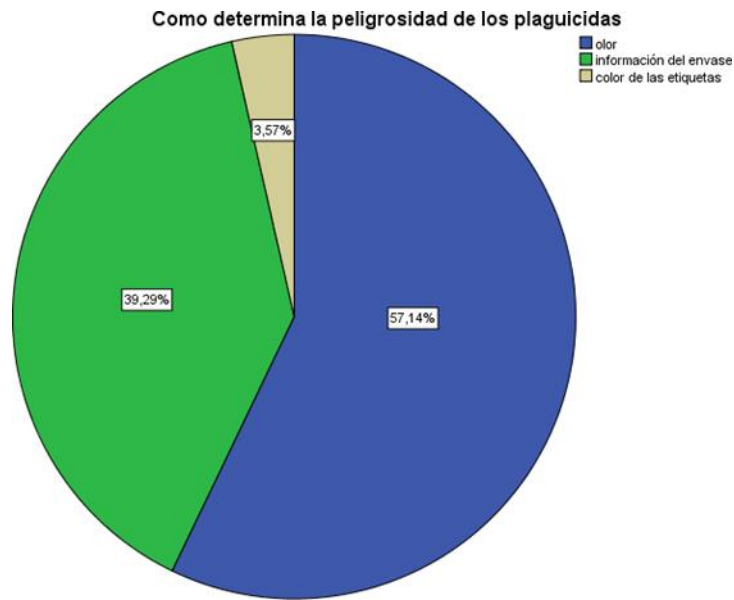


Figure 5. Danger of Pesticides.

Sanitary hygienic measures: Another of the serious errors found in the community was that more than half do not apply adequate sanitary hygienic standards, in this specific case, washing hands after handling this type of toxic agro.



Figure 6.- Sanitary Hygiene Measures.

3. RESULTS AND DISCUSSIONS

3.1. Results Of the Analysis Of Acetylcholinesterase In Blood

All the samples were analyzed, in which a correction factor was determined, within this we determined 4 possible results.

- Healthy
- Possibly has mild poisoning

- You need to see a specialist
- Requires immediate medical review

Within the samples already made with the respective correction factor, it can be observed that 56.25% of the population has a possible mild intoxication, which contradicts the results obtained from the initial survey, in which their answers stipulate that if use pesticide protection equipment correctly.

To obtain the correction factor, laboratory tests were performed on a person in optimal health conditions, giving us 99% activity of the Acetylcholinesterase enzyme.

Through the respective study of all the samples, the following results were obtained as shown in table 1.

Table 1. Results of the blood acetylcholinesterase analysis.

		Frecuencia	Porcentaje	Porcentaje válido	Porcentaje acumulado
Válido	Saludable	6	18,2	18,8	18,8
	Posiblemente Tiene intoxicación leve	18	54,5	56,3	75,0
	Necesita acudir a un especialista	7	21,2	21,9	96,9
	Requiere revision médica de inmediato	1	3,0	3,1	100,0
	Total	32	97,0	100,0	
Perdidos	Sistema	1	3,0		
Total		33	100,0		

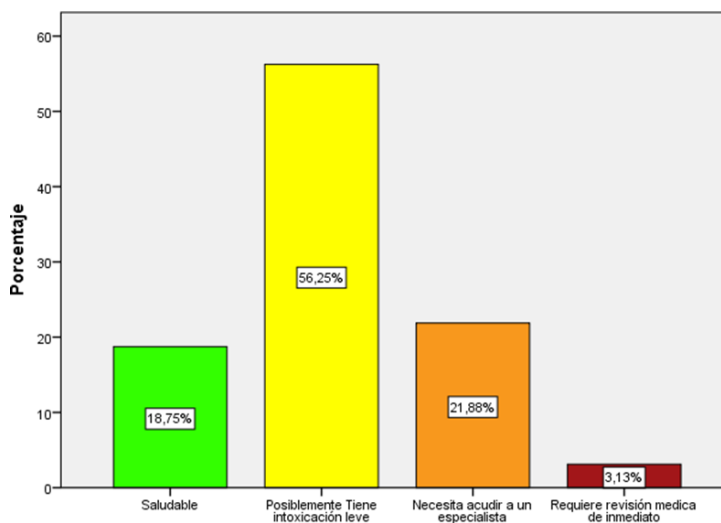


Figure 6.- Sanitary Hygiene Measures.

CONCLUSIONS

- It has been possible to verify through on-site visits and the application of surveys in the community the importance of environmental education in public health issues, and the results obtained are a sample of the local reality in terms of inequity in access to training. environmental, and therefore there is an inequity when it comes to the degree of knowledge of the manipulation in this case of the pesticide chemical substances used for the execution of its main economic activity in the rural communities.

- Pesticides do directly affect public health, since this involves the protection of the health of the human population, which directly depends, among others, on environmental determinants.
- Pesticides were invented to improve human living conditions, used in agriculture, livestock, public health, and domestic activities, but due to their toxicology they can be extremely or highly toxic.
- The production and commercialization of pesticides is a very profitable business for large transnational companies, which will not stop their production due to market demand and the permissive laws of the States.
- Pesticides contaminate the near and distant environment, and have long-term effects, contaminating the air, soil, microorganisms, plants, fish, birds, and mammals, producing microsomal alterations, even mutations and affecting trophic chains.
- Workers with pesticides are the most exposed, but the entire population is exposed to its harmful effects, from poisoning, death, reduced fertility, spontaneous abortions, mutations, and carcinogenic effects.
- Regarding the results of the 32 samples taken for the blood analysis, it is possible to determine a general concept that the community is affected by pesticides indirectly as a serious long-term poisoning since they do not have knowledge about the protection they should have. before a fumigation to their crops.
- The average percentage of all the results are 58% are not in the range of normal values; denotes a polluted community.
- A continuous training process in the use and management of pesticides is recommended, and focused not only at the urban level but also at the rural level, since the objective is to guarantee equity and reduce the gap of ignorance on environmental issues, in this way it would be putting into practice good environmental practices, the same ones that have the effect of contributing to the health of communities.
- Promote strategic alliances for the development of training with local governments.
- Execute educational spaces with a generational focus on the use and management of pesticides.

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