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El Adulto Mayor con COVID-19 y su Alimentación en el Ecuador

(The Elderly with COVID-19 and their Diet in Ecuador)

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RESUMEN

Introducción: La mayor susceptibilidad de los adultos mayores al COVID-19 radica que son más propensos a padecer enfermedades subyacentes que impiden la capacidad del organismo para combatirlas, recuperarse y la respuesta inmunitaria se disminuye con los años. **Metodología**: Es un estudio observacional, descriptivo y transversal, se investiga las características generales y de contagio a 1018 adultos mayores y su alimentación en una submuestra de 310 individuos, la información fue obtenida por universitarios y los casos registrados en el Servicio Nacional de Gestión de Riesgos y Emergencias del Ecuador. **Resultados**: La mayoría son de la sierra, de 65 años y más y son tanto del área urbana como rural. El 26% se han contagiado de un familiar y el 48% no saben quién los contagió, el 20% de ellos se han quedado en casa con cuidados de médico particular, han utilizado analgésicos, antipiréticos, antiinflamatorios y corticoides entre otros, de los cuales el 52% han fallecido. En la evolución de los casos de contagio, se observa que mientras la tendencia a nivel nacional sube ascendentemente, en los adultos mayores hay una disminución a través del tiempo. La alimentación refleja un déficit del 70 al 80% de adecuación en calorías y macronutrientes siendo los más afectados del sexo masculino. Con esta pandemia se manifiesta haber perdido la sensación de tranquilidad y se sienten inseguros sobre lo que pasará en el futuro. **Conclusión**: Aunque los adultos mayores tienen grandes riesgos fisiológicos que potencian el contagio, todos los grupos poblacionales están afectados por el COVID-19.

Palabras clave: Adulto mayor. Contagio por COVID-19. Tendencia de la enfermedad. Alimentación

ABSTRACT

Introduction: The greater susceptibility of older adults to COVID-19 is that they are more prone to suffer from underlying diseases that impede the body's ability to fight and recover, as well as their immune response, decreases over the years. **Methodology**: It is an observational, descriptive, and cross-sectional study. It investigates the general characteristics and contagion of 1018 older adults in Ecuador and their diet in a subsample of 310, information obtained by university students in the different cities of the country, and the trend of cases of the National Service for Risk and Emergency Management. **Results**: Most are from the highlands, 65 years and older, and are from both urban and rural areas. A relative has infected 26%, and 48% do not know who infected them, 20% have stayed at home with private doctor care and have used analgesics, antipyretics, anti-inflammatories, and corticosteroids, among others, of which 52% have died. In the evolution of contagion cases, it is observed that while the national trend rises upward, in older adults, there is a decrease over time. The diet reflects a deficit of 70 to 80% of calories and macronutrients, the most affected being males. With this pandemic, it is manifested to have lost the feeling of tranquility, making people feel insecure about what will happen in the future. **Conclusion**: Although older adults have significant physiological risks that enhance contagion, all population groups are affected by COVID-19.

Keywords: Elderly. COVID-19 contagion. Disease trend. Feeding

1. Introduccion

The population of all countries is aging, although, in different countries, its ages at different speeds and at different times. (1)

In Latin America and the Caribbean, where aging is not associated with a favorable socioeconomic situation as is the case in more developed regions, poor health in old age is not inevitable, and it has been shown that there is an association between poor health and conditions social and health of the population. (2)

The Ecuadorian population, in the second half of the last century, improved its life expectancy, since it went from 48.3 years in 1950-55 to 75.6 years in 2010-15 (3); This allowed many Ecuadorians to reach the age of 65, increasing from 4.2% reached in 1970 to 6.5% of the national population according to INEC 2010 (4), estimating that by 2050 it would reach 16% of older adults concerning the total population. (5)

This demographic behavior has been altered by the suffering of the COVID-19 Coronavirus pandemic highly affected elderly population group, who are more likely to suffer from underlying diseases that impede the body's ability to recover. Besides, in older adults, the immune response decreases with age since it is established that there is a decrease in the level of T cells, which are the protectors of viral invasion in many cases. (6)

SARS-CoV-2 is the official name that the International Committee on Taxonomy of Viruses (ICTV) gave COVID-19 in February 2020; This name comes from "coronavirus 2" (CoV-2) and the acronym for Acute and Severe Respiratory Syndrome (SARS). ICTV chose this name because of the genetic similarity between SARS-CoV-1 that caused the SARS outbreak in 2003 and the current SARS-CoV-2. (7)

It is called coronavirus because its membrane has crown-shaped tips, ribonucleic acid (RNA) viruses, and a vast family of viruses, some can be transmitted from animals to people, and others circulate between animals, such as camels, cows, cats, and bats. (8)

Structurally, coronaviruses are spherical viruses of 100-160 nm in diameter, enveloped by a lipid bilayer. The structure of the SARS-CoV-2 virus genome encodes four structural proteins: protein S (spike protein), protein E (envelope), protein M (membrane), and protein N (nucleocapsid) that is inside with the ability to infect, associated with viral RNA, and the other three proteins are associated with the viral envelope. Protein S forms structures that protrude from the virus that fuse with the membrane of the receptor of the cells it infects and, in this way, allows the release of the viral genome inside the cell to be infected, particularly the oral mucosa considered the main route of entry to the body. (9) Thus, the genetic material remains in the cytoplasm and, being a virus with RNA, uses the cellular machinery for its replication or reproduction (creation of copies), and through exocytosis and endocytosis mechanisms, they invade pneumocytes. Millions of immune system cells invade infected lung tissue and cause massive damage to eliminate the virus and any infected cells. (10)

It is usually transmitted quite quickly, the first symptoms of which include loss of taste and smell with fever, headache, fatigue, accompanied by a dry cough and dryness, and in many cases of dyspnea and respiratory failure characterized by the incapacity of the pulmonary system. and cardiac to maintain an adequate exchange of oxygen and carbon dioxide. (11)

An adequate diet, as well as nutritional support, is essential to meet nutritional needs. There is an essential link between respiratory diseases and diet since diet influences the excellent recovery of the patient. Therefore, an inadequate diet, with effects of overweight or obesity and malnutrition, can significantly influence the evolution of COVID-19. (12)

This study aims to determine the affectation suffered by the elderly with Covid-19 and their diet in Ecuador.

2. Methodology

2.1. Study Type

It is an observational, descriptive, cross-sectional study.

2.2. Universe and sample

The universe comprises adults aged 60 years and over who have coronavirus disease or have suffered from it. From which a sample of 1018 older adults were selected, obtained through non-probabilistic convenience sampling, with a confidence level of 95% and variability p = 0.39 (proportion of older adults with coronavirus at the beginning of the pandemic, (National COE Infographic # 3) (13) q = 0.61, whose sample size for the unknown population was obtained (14), using the following formula:

$$n = \frac{Z^2 \, x \, p \, x \, q}{d}$$

Encode:

Z = Confidence level = 1,962 (95% confidence)

p = probability of success (average of the proportion of older adults with coronavirus in the Ecuadorian population at the beginning of the pandemic (39% = 0.39)

q = probability of failure (1-p = 1-0.39 = 0.61)

d = precision (maximum permissible error in terms of proportion) = 3% = 0.03

Data:

$$n = \frac{1{,}962_{\alpha} \, x \, 0{,}39 \, x \, 0{,}61}{0{,}03^2}$$

$$n = 1018$$

For food consumption, a subsample was defined, considering the previously obtained sample as the universe, and with the same considerations, the subsample of 310 subjects was determined, knowing the size of the population with 5% precision.

2.3. Study variables

In the first part, variables related to general elderly characteristics and contagion, both sexes who have or have had COVID-19 and their usual diet at the time of the contagion crisis, are studied. After that, in the second part, the trend analysis of the elderly contagion with coronavirus reported in the statistics of the Ministry of Public Health and the National Emergency Operations Committee (National COE), from March 15, 2020, to July 23, 2021 (Date on the which was suspended in registration).

2.4. Methods

To determine the minimum amount of caloric energy for the development and normal functioning of the elderly, what is recommended by the RDA (Recommended Daily Allowance) is used, which indicates a value of 2,200 Kcal for men over 51 years of age and 1,900 Kcal for women of the same age. (15)

Current recommendations at a general level indicate that protein should not contribute more than 10-15% of the total energy consumed. However, in the elderly, as energy intake is usually low, the caloric intake of protein, according to the Recommended Intakes, may be greater than 12 to 17% of the Total Caloric Value (16), taking this reference.

2.5. Statistical analysis

The information was entered into an Excel database for subsequent statistical analysis in the PSPP Free Software.

2.6. Process

An elaborated process in the information collection instrument, the questions' content, clarity, and understanding were validated at the professional level and in a group of older adults. In addition, the information collected was at the national level by students of the Nutrition and Dietetics and Medicine careers of the ESPOCH from their places of residence, using the interview technique.

3. RESULTS

3.1. GENERAL CHARACTERISTICS OF THE ELDERLY ADULT WITH COVID-19 IN ECUADOR

In the general characteristics of the elderly researcher, it stands out that the highest percentage of those investigated corresponds to the region of the Sierra (72%), aged 65 years and over (61%), male (55%), of Marital status married (61%), lives with their relatives (86%) and belongs to both urban and rural areas (53% and 47%, respectively).

3.2. CHARACTERISTICS OF THE CONTAGION AND CORONAVIRUS DISEASE OF THE OLDER ADULT

83% of the people investigated correspond to infected patients. The remaining percentage (17%) are informants from relatives and people who knew the evolution of the disease of those infected and could report the information with certainty. See Table 1.

Of those investigated with COVID-19, only 26% know with certainty that they were infected by a relative and at home (24%), and 27% consider that an unfamiliar person infected them. However, most of them, 48%, do not know who infected them or where they were infected.

In Table 2, the characteristics of the disease in the patients are reported, where it is reported that 67% of them presented symptoms such as fever, chills, dry cough, loss of appetite, feeling of shortness of breath, sore throat, among others, however, 33% did not present symptoms. Furthermore, only 36% report that they appeared immediately approximately 8 to 15 days after being infected of those who presented symptoms.

Of the infected patients, 39% did not attend public health institutions, and those who attended, especially the MSP (36%), the IESS (22%), and a private health institution (19%); Although there are also patients with COVID-19 who have not attended any health institution and have stayed at home (20%), being cared for by private doctors. The length of stay in the health institution is variable. However, the majority (63%) have stayed up to 28 days, with 37% staying longer.

As for the drugs used, there is a variety, the most used were paracetamol, ibuprofen, and azithromycin. Moreover, among them also, analgesics and antipyretics (aspirin, acetaminophen, analgan, novalgin, etc.); anti-inflammatories (dexamethasone, hydroxychloroquine, medrol, etc.); corticosteroids (prednisone); antivirals and antibiotics (lopinavir, klaricid, ritonavir, etc.); antiparasitics (ivermectin) and mutose and aspirin to prevent clots and thrombi, among others, accompanied by vitamins, minerals, and hydrating solutions in 3% of cases.

From the people who have been infected and did not go to public health care hospitals (20%), the reasons were "Hospitalization death fear, because of the contagious rate by another disease and lack of medicines," among others.

The treatment carried out when the public health institution was not attended was medication (65%), natural remedies (19%), and both (16%). Natural remedies are plants that have been used to vaporize, such as eucalyptus, cypress, the royal sage, walnut, and ginger, and honey have been used to balance body temperature.

Of the older adults sick with COVID-19, 97% have registered comorbidities such as hypertension, diabetes, kidney problems, and cardiovascular diseases; of all the investigated patients, 52% have died, 42% have recovered from this condition.

3.3. COVID-19 IN THE ELDERLY ADULT IN ECUADOR FROM MARCH 2020 - JULY 2021

According to the statistics of the National Risk and Emergency Management Service (National COE), the values / percentages -among others- of infected older adults in the categories of 50 to 65 years and more than 65 years are reported, according to information confirmed with “Polymerase Chain Reaction” (PCR) tests, which are used to check if a person is infected or not by COVID-19, of which the relationship of these cases with the national total.

In Figure 1, the evolution of COVID-19 cases in older adults is reported, since the beginning of the pandemic registration on March 15, 2020 -according to the National COE-, where it was reported to this date 57 infected cases and of the 14 were from 50 to 64 years old, and seven were over 65 years old.

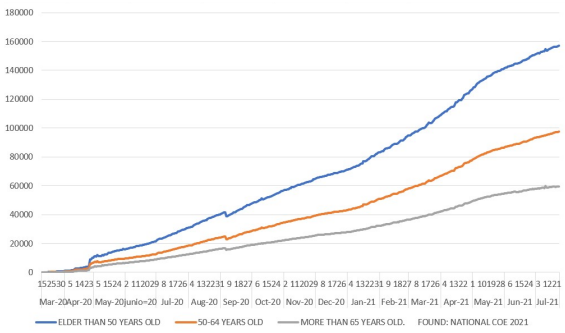

Figure 1. Evolution of COVID-19 cases in the Elderly of Ecuador in the period from March 2020 to July 2021

On April 1, 2020, there was a nationwide contagion of 2,748 cases, of which 970 were over 50 years of age. Nevertheless, on April 24, infections tripled, and on April 30, there was a considerable increase (27,910 confirmed cases) due to the increased capacity to process COVID-19 tests in the country.

In May, a nationwide contagion of 361 cases on average per day is reported, which in June increases to 575 cases on average per day, and in July and August, it increases to 936 and 917 cases on average per day, respectively. However, there is a lower average per day of 827 cases from September 5 to 6, 2020. Therefore, rapid tests were eliminated, registering only cases confirmed with PCR tests. In October, 955 cases were registered on average per day, reaching 168,192 confirmed cases as of October 31.

In all this evolution of cases at the national level, from March 15, 2020, to July 23, 2021, confirmed cases of older adults register a downward trend of 25% of adults aged 50 to 64 years to 20, 3%, and in adults over 65 years of 18% registered on March 17, to this date 12.4% is registered, concerning the national total, which can be observed in figure 2.

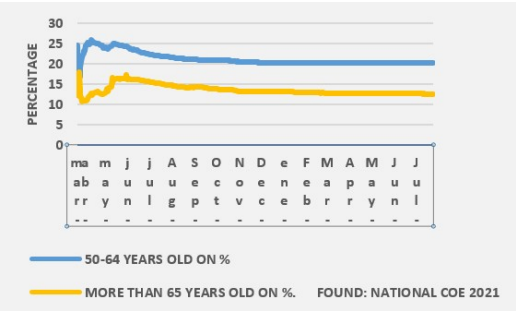

Figure 2. The trend of COVID-19 cases (%) in the Elderly of Ecuador in the period from March 2020 to July 2021

In this older adults' cases evolution in Figure 1 and Figure 2, as cases increase at the national level, the contagion of cases in older adults does not follow the same trend, determining the range of infections in adults over 50 to 64 years of age of 21.23% on average and 13.54%. On the other hand, 65 years old register the highest infections in the other age groups, especially those of 20 to 49 years, according to the analysis of 487 days of the pandemic.

3.4. FEEDING OF THE OLDER ADULT AT THE TIME OF CONTAGIOUS

The diet of the elderly at the time of infection has been irregular and deficient (See Table 3) characterized by deficiencies concerning the nutritional recommendation defined by RDA, reaching adequacy of 60 to 70% in proteins and fats; only in carbohydrates, it increases to 77% for men and 80% for women.

When older adults were in hospitals, they were fed a hyper-liquid protein and hyper protein diet only, in which 1350 to 1500 calories and 45 grams of protein were administered, which does not meet the nutritional needs and without having consumed all the food supplied, for respiratory distress.

3.5. FEELINGS AND EMOTIONS ABOUT THE CORONAVIRUS PROBLEM

This pandemic has brought with it a lot of personal, family, local, and national affectation, and 95% of the people investigated have expressed fear of the possibility of being infected or dying. They have had stress, anxiety about the coronavirus problem, sadness, loneliness due to the compulsory social isolation, concern for the family and loved ones exposed, mistrust for the neighbor. This passerby may be infected and often rage and anger: those who do not take care of themselves and do not follow social norms to avoid contagion.

On the other hand, 88% consider that this time has served to be with the family. However, 89% also consider that it has been a negative time due to the impossibility of working, studying, or buying food.

95% of those investigated state that in this COVID-19 pandemic, "having lost the feeling of tranquility, certainty, security, and predictability, makes them feel insecure in life,

especially about what will happen in the future."

4. Discussion

Most of the older adults surveyed belong to the mountains, probably because most of the students who obtained the information are from this region. However, results concerning gender agree with the values reported by Amarilis G. et al. (17), in which male patients predominate in their study and the WHO. A preliminary analysis of the COVID-19 data shows that men in 51% were infected and 58% died, relative to women, and establishes that men and women are likely to have different sensitivities to the virus and different vulnerabilities to infection factors related to sex and gender. (18)

On the other hand, in Situation Report No. 14 PAHO / WHO in Paraguay, 71% of confirmed cases are male (19). In Ecuador, as of October 31, 2020, it is specified that 53% of cases confirmed corresponds to the male sex (20). In Italy, 71% of deaths from COVID-19 are defined as male, which when making a comparison of the ratio between the sexes, the WHO, specifies that the female immune and endocrine system is more resistant than that of men; estrogen, a female sex hormone, is primarily responsible for this, as it stimulates the immune system. Therefore, it fights pathogens quickly and effectively. On the other hand, male testosterone inhibits the immune system (21). For On the other hand, in infected men, higher levels of cytokines have been found since they are deployed as part of the body's innate immune reaction, which is a physical barrier, which causes fluids to accumulate in the lungs, depriving the body of oxygen—causing shock, tissue damage, and multiple organ failure.

The areas of belonging of those investigated are slightly different, affecting both urban and rural people. As reported by the Center for Disease Control and Prevention (22) (CDC), it establishes that “systemic and long-standing social inequalities and access to health increase the risk of many racial and ethnic minority groups of getting sick and die from COVID-19”, it is probably people with social inequalities from both areas which have been affected. On the other hand, it is established in the United States that hospitalization and mortality doubles in the black and Hispanic population, compared to whites, whose reasons are that these racial groups live in public housing among many families. They have maintained their work to survive, move-in collective means of transport, do not have appropriate medical care, and do not qualify for medicare, aggravating their condition. (23)

In September 2020, the elderly whom COVID-19 has infected at the national level over 50 years is 34.9% and over 65 years 14%, which is higher reported by ECLAC in some countries, where the percentage of people aged 60 and over infected by COVID-19 within the total population was 21.7% in Cuba, 20% in Mexico, 19% in Panama, 13% in El Salvador, 9% in Guatemala and 5% in Costa Rica. (24)

Of the total investigated, it is determined that 67% had the symptoms of the disease, and 36% were immediate with the symptoms present between 8 to 15 days, which is within times defined this disease already. It is reported that the symptoms appear after an incubation period that can go from 2 to 14 days, and the most frequent is the appearance of symptoms on the fifth day of exposure. (25)

It is established that the symptoms of COVID-19 can vary from mild to moderate respiratory symptoms in most cases to severe infections that can lead to death, especially in people over 70 years of age and people with comorbidities (cardiovascular disease, diabetes mellitus, arterial hypertension, chronic lung disease, cancer, chronic kidney disease) (26). The reality was related to data registered in Ecuador, where 13.54% of the national total reported people over 65 years of age on 07/23/2021.

It is believed that the transmission is similar to that of the flu. The virus (present in respiratory secretions) is transmitted in droplets that are eliminated by coughing, sneezing, or talking and can infect another person when they contact the mucous membranes. The droplets that spread the virus do not travel more than one or two meters in the air, so social distance is significant. It can also be transmitted through contact with surfaces that have been contaminated. For example, if a person touches a contaminated surface with their hand and then touches their eyes, nose, or mouth, they

could become infected. There is still some uncertainty about the different ways of transmission of the virus. Although the virus has been isolated from feces, fecal-oral transmission is not part of the transmission modes. It is not known precisely how many days a person can transmit the virus. Periods ranging from 8 to 37 days have been observed. People with a more severe disease course shed the virus for longer than mild cases. (27)

In the variety of drugs used reported in this research, analgesics, antipyretics, anti-inflammatory and antivirals stand out, which will allow for calming specific symptoms since it is established that, like other CoVs, COVID-19 is sensitive to rays Ultraviolet and heat. In addition, these viruses can be effectively inactivated by lipid solvents (which destroy the lipid bilayer), including surfactant substances such as soap, detergents, and ether, ethanol, and disinfectants containing chlorine, peroxyacetic acid, and chloroform. Except for chlorhexidine (25), of course, these products are harmful to the human body. However, it is considered that relieving symptoms with the medications used is not enough to eliminate COVID-19.

The Madrid Medical Redaction (28) specifies that most of the patients with COVID-19 treated received antibiotics, antivirals, and glucocorticoids (types of steroids). In addition, some received intravenous immunoglobulin or interferon alfa-2b. However, it manifests that, regarding the effectiveness of these treatments, "it is not completely known," to which they add that "the combination of antimicrobial drugs (antivirals and antibiotics) did not significantly help these patients."

Recent research is looking for mechanisms that prevent the replication of COVID-19. One of them is the research that establishes that Quercetin (29), a molecule found in vegetables, such as capers, red onions, or fennel, is an antioxidant, anti-inflammatory, antiallergic and anti-proliferative. It is an enzyme called 3CLpro, which disables COVID-19 for its replication. Unfortunately, the stomach's gastric juices degrade when consuming these foods. Therefore, to take advantage of the antimicrobial effect, it should be applied nasally or by inhaler, which is under study.

On the other hand, one of its primary studies analyzes the antibodies functioning and the immunity in those who overcame the virus. Thus, a team of experts from the University of Pittsburgh in the United States (30) achieved the isolation of the biological molecule whose property is to neutralize the SARS-CoV-2 virus that causes COVID-19 effectively; this antibody component is ten times smaller than a regular antibody. Specialists used it to make a drug called Ab8. The objective is to be applied as a potential therapeutic and prophylactic treatment to combat the new coronavirus.

Scientists and researchers from around the world assure that the most effective solution to end the COVID-19 pandemic is the development of a safe and reliable vaccine. And, although the process to develop a vaccine generally takes between 10 to 15 years, the scientific community points out that this time it will take months. (31)

The scientist, Soumya Swaminathan of the WHO assures that normality, will not return until 2022 since, for the virus to reduce a significant reduction, 60% to 70% of the population must have immunity, and it is not known how long the vaccines will protect? How long will immunity last? Is it possible that a booster will be needed? (32) "It is severe. We are not even halfway there; we are at the beginning," said David Nabarro, one of the six special envoys of the WHO for Covid-19. (33)

At the beginning of the pandemic, at the national level, the number of infected people over 65 years of age was one of the highest in this age group (18%). However, the percentage has decreased (13.2% as of October 2020). So, it is worth asking, are there currently fewer older adults in the country? or are they better cared for?

Whether at home or the hospital level, the food consumed by older adults does not cover nutritional recommendations, which aggravates their nutritional condition. Since it must be considered that vulnerable groups such as the elderly, children, and patients with diseases chronic and catastrophic must carry a daily caloric intake according to their estimated requirement. Especially now in times of

pandemic where a robust immune system must be maintained, although no food or dietary supplement can prevent or cure COVID-19, however, a healthy diet is essential both for the proper functioning of the immune system and to reduce the likelihood of other health problems such as obesity, heart disease, diabetes, and some types of cancer. (34)

Thus, it is also established that essential amino acids influence the immune system, nucleotides in the diet modulate the system at the intestinal and systemic level, and polyunsaturated fatty acids influence the immune system and inflammatory processes. Iron, copper, zinc, fat-soluble vitamins A, D, K, and selenium influence the immune system among the micronutrients. It is also detailed that lymphocytes proliferation occurs due to the activation of retinoic acid receptors and. Therefore, vitamin A plays a fundamental role in the developing and differentiation of Th1 and Th2 lymphocytes. (35)

In essence, the diet for the elderly must be balanced, varied, and gastronomically acceptable; The food should be stimulating to the appetite and well presented, palatable, easy to chew, and digest. For this reason, it is essential to administer a variety of foods that contain proteins, carbohydrates, lipids, mineral salts, and vitamins and regularly incorporate foods rich in fiber (36) with a large intake of water.

With this problem, there is a concern because physical and social distancing measures can affect the mental health and general well-being of the elderly (37) and of all age groups, since according to the present research in 95% of the people investigated there are feelings of fear, anxiety, stress, distrust, and uncertainty about the future, in the presence of COVID-19 worldwide.

5. Conclusions

Elderly COVID-19 contagion in Ecuador was 37% at the beginning of the pandemic, in the 50 years old group and over, which as of July 2021 was 32.7%, that means it has been decreasing slowly, reaching 20.3% in 50 years and 12.4% in 65 years older adults. Most of the information obtained corresponds to the Sierra region, male, belonging to both urban and rural areas. Regarding the contagion, in a high percentage, it is unknown who or where they were infected, whose symptoms appeared approximately 8 to 15 days, 33% of people who did not present symptoms reported, many of them went to a public health center. Although 19% were cared for in private centers and 20% stayed at home with care from private doctors; They have used a variety of medications from analgesics, antipyretics, anti-inflammatories, corticosteroids, among others, to vitamins and moisturizing solutions, as well as the use of home and natural remedies in 19% of those investigated, the presence of hypertension, is reported, diabetes and cardiovascular diseases, whose mortality has been 52%. The diet registers a deficit of 70 to 80% of adequacy. The pandemic has caused stress, anxiety, and uncertainty, making life and the future feel insecure.

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Interest conflict

It is expressed that there is no conflict of interest for the publication of this article.

Liability limitations

The results, analysis, and points of view reported in this article are the authors' sole responsibility, not the Nutrition and Dietetics School of the Escuela Superior Politécnica de Chimborazo.

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