

Research Article

Food Insecurity During the Covid-19 Confinement in Ecuador, Estimated by the Latin American and Caribbean Food Security Scale - A Cross-sectional Study

Inseguridad alimentaria durante el confinamiento por covid-19-en Ecuador, estimado por la escala latinoamericana y caribeña de seguridad alimentaria. Un estudio transversal

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Abstract

Confinement due to the COVID-19 pandemic had strong consequences for the health and nutritional status of the world population. The objective of the present work was to explore food insecurity in a sample of the Ecuadorian population during COVID-19 confinement. The research was a nonexperimental cross-sectional design with 850 participants. Data were collected through an online survey from October 2020 to January 2021. Participants were asked about sociodemographic and food security data using the Latin American and Caribbean Food Security Scale. Chi2 and logistic regression analysis were used for hypothesis testing. The main results were that 54% of the participants were insecure about food, this was especially higher among women, indigenous people, montubios, and afro-descendants than mestizos and whites; and it was more prevalent among rural than urban dwellers. It is concluded that food insecurity during pandemic confinement was a problem that affected social groups that is considered vulnerable in different ways.

Keywords: COVID-19, ELCSA, Ethnicity, Indigenous, Women, Food security.

Resumen

El confinamiento debido a la pandemia por COVID 19 trajo fuertes consecuencias en el estado de salud y alimentación de la población mundial. El objetivo del presente trabajo fue explorar la inseguridad alimentaria en una muestra de población ecuatoriana durante el confinamiento por COVID-19. La Investigación fue de diseño no experimental de tipo transversal en el que participaron 850 sujetos. Los datos se tomaron a través de una encuesta en línea durante los meses de octubre de 2020 hasta enero 2021. Se preguntó a los participantes sobre datos sociodemográficos y de seguridad alimentaria con la Escala Latinoamericana y Caribeña de Seguridad Alimentaria.

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Se usó Chi2 y regresión logística como prueba de hipótesis. Los principales resultados fueron: 54% de los participantes tuvo inseguridad alimentaria, la inseguridad alimentaria fue mayor en mujeres, en los indígenas, montubios y afrodescendientes que, en los mestizos y blancos; y más prevalente en los habitantes de las zonas rurales que en los de la zona urbana. Se concluye que la inseguridad alimentaria durante el confinamiento por la pandemia fue un problema que afectó de distinta manera a grupos sociales considerados vulnerables.

Palabras Clave: COVID-19, ELCSA, Etnia, Indígena, Mujer, Seguridad alimentaria.

1. Introduction

According to the Food and Agriculture Organization of the United Nations (FAO), food security at the individual, household, national, and global levels is achieved when all people, at all times, have physical and economic access to safe, nutritious, and sufficient food to meet their nutritional needs for an active and healthy life [1]. It also emphasizes that the right to food should be universally covered by the immeasurable benefit to human beings, therefore, it is the duty of national and international organizations to comply with it [2].

Food security is related to a variety of factors, including purchasing power, household income, self-production, and the implementation of social programs [3] and forms an essential part of the development of people. In times of pandemics, the increase in food insecurity is a major concern in both developing and developed countries, mainly because the stages of health emergencies have repercussions on the economic, social, and family environment in which an individual lives [4, 5, 6].

The key to food security lies in continuous and systematic access to sufficient food in quantity and quality; during the COVID-19 confinement, the problem of access to food was related to the abrupt and catastrophic fall in employment, economic income, and trade, causing a large part of the population to remain under a clear situation of food stress [7,8].

Latin America and the Caribbean are the main food exporting and producing regions in the world. Ecuador is a country that has a food supply with which it can meet the needs of its inhabitants; however, not everything that is produced is within the reach of its citizens, and during the pandemic, the lack of availability and access to safe food, in addition to the economic problems already existing in Ecuador, aggravated the access and availability of food [9]. Food insecurity is a complex and multidimensional variable whose measurement has been a constant challenge for researchers; however, today, food insecurity measurement scales based on access to food have become a practical, effective, and consistent way to measure this complex condition that many households



around the world are going through. One of these scales is the Latin American and Caribbean Food Security Scale (ELCSA), which belongs to the family of food insecurity measurement scales based on household experience [10].

The present research was conducted with the interest of exploring the prevalence of food insecurity in the Ecuadorian adult population during COVID-19 confinement, mainly in historically neglected groups such as women and ethnic groups.

2. Materials and methods

2.1. Population and sample

A cross-sectional study was conducted in people over 18 years of age residing in Ecuador from October 2020 to January 2021. A total of 850 subjects participated in an online survey using Google Forms. The first block of the survey contained the informed consent; if the person did not confirm their participation, the survey was automatically closed.

2.2. Variables and data collection instruments.

The digitally disseminated survey collected information on weight, height, age, ethnic group, place of residence, economic income, whether the participants received any type of social assistance, diet, and mode of access to food, and finally, the Latin American and Caribbean Food Security Scale (ELCSA) was used to identify food security. The ELCSA scale is made up of 15 items, of which the first 9 were applied to people whose households correspond only to people over 18 years of age, and the remaining 6 questions were also applied to households where children live. The questions of the ELCSA questionnaire are presented in Supplementary Table 1. The response option for each item was dichotomous (yes, no). The "Yes" option was assigned a score =1 and the "No" option =0. Thus, the cut-off points for food security vary depending on whether or not persons under 18 years of age live in the household. The cut-off points are: 0 points(p) households with and without under-18s = Food Security; 1-3p and 1-5p households with adults and households with under-18s respectively = Mild Food Insecurity; 4-6p and 6-10p households with adults and households with under-18s respectively = Moderate Food Insecurity and 7-8 and 11-15 households with adults and households with under-18s respectively = Severe Food Insecurity. Finally, a division of the variable into food security and food insecurity was considered, with the latter being the sum of mild, moderate, and severe food insecurity [11].



2.3. Ethical considerations

The study was conducted in accordance with the Declaration of Helsinki. Participants had access to the survey once they accepted their participation; otherwise, the screen showed the thank you and end of process interfaces.

2.4. Statistical analysis

R software [12] was used for statistical analysis. Nominal variables were summarized in frequency tables with numbers and percentages. Chi 2 and logistic regression were used to test the association between sociodemographic conditions (place of residence, ethnic group, and sex) and food insecurity. A value of $p < 0.05$ was considered statistically significant.

3. Results and Discussion

Regarding the sociodemographic characteristics of the population, it was observed that most of the subjects were between 18 and 25 years of age, followed by those between 46 and 60 years of age; 53% were women; 60.71% of the participants lived in urban areas, 64.71% were of mixed race. Most of the participants belonged to families with 2 to 5 members; only 10% of the subjects belonged to families with more than 6 members. In terms of monthly income, only 10.94% of the participants had a salary higher than \$600, and 35.94% did not provide information on their income (Table I).

Regarding food insecurity according to sociodemographic characteristics, it was found that there is a higher prevalence of moderate and severe food insecurity in women (32.6%) compared to men (10.27%), in rural areas (33.53%) more than in urban areas (14.73%), and in indigenous and other groups (42.91%) more than in mestizos and whites (11.79%) (Table II).

When analyzing the risk of food insecurity according to sociodemographic characteristics, it was observed that the risk of food insecurity was higher in the ethnic group made up of indigenous, Afro-descendants, and montubios (OR= 0.966) compared to the ethnic group made up of mestizos and whites (OR=0.288; $p = 0.022$), in the same way, a higher risk of food insecurity was observed in subjects living in rural areas (OR= 0.544) compared to subjects living in urban areas (OR=0.137; $p = 0.016$); it was also found that women have a higher risk of food insecurity (OR=0.745) than men (OR= 0.188; $p = 0.012$) (Table III).

**Tabla 1**

General characteristics of the study group.

| General characteristics | n (%) 850(100) |
|---|----------------|
| Age (years) | |
| 18 – 25 | 299 (35.18) |
| 26 – 45 | 122 (14.35) |
| 46 – 60 | 280 (32.94) |
| More than 60 | 149 (17.53) |
| Gender | |
| Female | 451 (53.06) |
| Male | 399 (46.94) |
| Residence area | |
| Rural | 334 (39.29) |
| Urban | 516 (60.71) |
| Household members (person or people) | |
| 1 | 130 (15.29) |
| 2 | 410 (48.24) |
| 3 - 5 | 206 (24.24) |
| 6 - 8 | 84 (9.88) |
| More than 8 | 20 (2.35) |
| Ethnic group | |
| Mestizo | 550 (64.71) |
| Indigenous | 239(28.12) |
| Afro-descendants | 27(3.18) |
| Caucasian | 18(2.12) |
| Montubio | 16(1.88) |
| Caucasian and mestizo | 568(66.82) |
| Indigenous and other ethnic groups | 282(33.18) |
| Economic characteristics | |
| Income (monthly, USD) | |
| Less than 100 | 143 (16.82) |
| 100 a 400 | 112 (13.18) |
| 400 a 600 | 171 (20.12) |
| More than 600 | 93 (10.94) |
| Unanswered | 331 (38.94) |

3.1. Discussion

This study presents results on the prevalence of food insecurity in the context of the COVID-19 pandemic in a sample of Ecuadorian adults. We found a high prevalence (54%) of food insecurity during the pandemic period and marked differences in the prevalence of food insecurity among ethnic minority groups, women, and those living in rural areas. The results of this research highlight the importance of implementing better health policies based on principles of equity and equality that allow the most vulnerable groups to achieve food security.

The 2021 report of the Food and Agriculture Organization of the United Nations (FAO) on the state of food insecurity in the world [13] shows an increase in both undernutrition



Tabla 2

Prevalence of food insecurity according to sociodemographic characteristics.

| | Total | Gender | | Area | | Ethnia | |
|----------------------------|----------------|-------------------------|--------------------------|----------------------|----------------------|---|---|
| | n(%) | | | | | | |
| | n=850(100%) | Femenino n=451(100%) | Masculino n=399(100%) | Rural n=334(100%) | Urban n=516(100%) | Mestizo and Caucasian n=568(100%) | Indigenous and other ethnic groups n=282(100%) |
| Mild insecurity | 272(32.0) | 100(22.17) | 172(43.11) | 182(54.49) | 90(17.44) | 143(25.18) | 129(45.74) |
| Moderate insecurity | 111(13.0) | 90(19.96) | 21(5.26) | 67(20.06) | 44(8.53) | 42(7.39) | 69(24.47) |
| Severe insecurity | 77(9.0) | 57(12.64) | 20(5.01) | 45(13.47) | 32(6.20) | 25(4.40) | 52(18.44) |
| Food security | 390(46.0) | 204(45.23) | 186(46.62) | 40(11.98) | 350(67.83) | 358(63.01) | 32(11.35) |
| Food insecurity | 460(54) | 247(54.77) | 213(53.38) | 294(88.02) | 166(32.17) | 210(36.97) | 250(88.65) |
| Food security | 390(46) | 204(45.23) | 186(46.62) | 40(11.98) | 350(67.83) | 358(63.04) | 32(11.35) |

Tabla 3

Association between food insecurity and sociodemographic factors.

| | P-Value | N=850(100%) | | |
|---|---------|-------------|---------|-------|
| | | OR | CI | |
| | | | LICI95% | |
| Ethnia | | | | |
| Indigenous and other ethnic groups | 0.022 | 0.966 | 0.911 | 0.989 |
| Mestizos and caucasian | | 0.288 | 0.233 | 0.299 |
| Area of residence | | | | |
| Urban | 0.016 | 0.137 | 0.122 | 0.144 |
| Rural | | 0.544 | 0.59 | 0.511 |
| Gender | | | | |
| Female | 0.012 | 0.745 | 0.655 | 0.855 |
| Male | | 0.188 | 0.122 | 0.199 |

OR = odds ratio; LICI95% = lower limit of the confidence interval 95%; LSCI95% = Upper limit of the confidence interval 95%.

and food insecurity between 2019 and 2020 caused by already existing factors but mainly by the economic downturn resulting from the pandemic.

The Economic Commission for Latin America and the Caribbean of 2021 [14] pointed out that the impact of COVID-19 aggravated the structural problems already existing in each nation: the presence of the pandemic represented greater adversities for people living in conditions of poverty, since not being able to access basic and health services



increased their risk of contagion and complications in the case of infection by COVID-19. During the pandemic, Ecuador was among the twenty countries with the highest number of deaths per million inhabitants [15].

In this context, the food security situation presents special characteristics since before the pandemic, female-headed households were often already in a situation of poverty and food insecurity; the pandemic exposed them to a greater impact due to structural factors: poverty, gaps and segmentation in education, labor markets, and unpaid work overload [16]. Food security is associated with a problem of social vulnerability caused by problems of food accessibility whose origin lies in development asymmetries [17]. The latest report on the state of food security and nutrition in the world in 2020 noted that the gender gap in access to food increased from 2018 to 2019, especially at the moderate or severe level [18].

In addition, according to the results obtained by FAO, at the global level, it shows that food insecurity at moderate and severe levels is more prevalent in women than in men, including an increase in the gap between both sexes, especially in Latin America and the Caribbean [19]. In Ecuador, the research conducted by Robayo et al. also reaffirms that women are more food insecure than men and that food insecurity is one of the challenges that local governments still have to face in order to safeguard the health of the population [20]. The data obtained in the food security and nutrition survey (ESAA) between December 2020 and January 2021 in a sample of several countries, reported that in Ecuador 32% of households are headed by women, and female-headed households do not increase their consumption of packaged or prepared products more than their male counterparts, This leads to think about other possible strategies for households headed by women to face food insecurity [21], in addition to the fact that the rate of unpaid employment for Ecuadorian women in January 2021 was approximately three times higher than that of men [22], affecting family income and thus the risk of violating household food security. A similar situation occurs in countries such as Ethiopia, where female-headed households are twice as food insecure as their male counterparts, probably due to cultural, social, and economic constraints that affect women's participation in all aspects of food security [23]. The second important finding in this study is the differences in food insecurity according to ethnic self-identification, where mestizos and whites were the most favored population groups with the lowest risk of food insecurity. It has long been known that food insecurity mainly affects the indigenous population more than other ethnic groups, not only in developing countries but also in high-income countries. The main causes of this problem are limited access and availability of food in grocery stores, greater exposure to unhealthy



food environments, high food prices in grocery markets, and mainly the socioeconomic inequality faced by indigenous people compared to other ethnic groups [24].

“Indigenous women face triple discrimination that includes poverty, gender, and ethnicity, both within and outside their communities, making them highly vulnerable” [25].

Finally, the unequal impact of COVID-19 on food security in rural areas compared to urban areas should also be highlighted. Access to land is one of the most important ways for rural families to have the conditions to produce and satisfy their needs [26]; however, confinement could have caused a blockage in the commercialization of products from rural areas, which could lead to a reduction in the amount of food purchased in urban markets [27] and trigger food insecurity. In this research, it was found that living in rural areas increases the risk of being food insecure, however, in other research conducted before and during the pandemic, they state the opposite. For example, in an investigation on household food insecurity and dietary patterns in rural and urban American Indian families in 2017, a high prevalence of food insecurity was determined in families living in the urban area compared to those living in rural areas. These contrasts in the prevalence of food insecurity by place of residence were due to the different strategies adopted by urban and rural households to address food insecurity, such as, for example, urban households with greater access to food outlets purchasing food more frequently, resulting in spending more on food than planned. Rural families, on the other hand, made infrequent trips to the city to buy food, which resulted in the purchase of fewer fresh fruits and vegetables and more frequent hunting, gathering, and distribution of food to supplement their diet [28]. A similar statement was reported by Vuong et al. before the pandemic, who indicated that food insecurity still remains a major public health problem in large urban areas despite industrialization and modernization, due to the financial difficulties that people in large cities may face, which in turn may lead to poorer health outcomes, particularly in relation to the prevention and management of noncommunicable diseases [29]. Already in the context of the pandemic, in other parts of the world, a higher risk of food insecurity was reported in urban than in rural areas. In a study conducted in Bangladesh during confinement, severe food insecurity was higher in urban households (42%) than in rural households (15%), and poverty was the determining factor significantly associated with the degree of food insecurity [30]. Although these results are the opposite of those found in the present study, it should be emphasized that unemployment, low educational levels, social isolation, food literacy, time, and mainly poverty continue to be the factors that put people living in rural, regional, and remote communities at greater risk of food insecurity [31]. Ecuador is not exempt from this risk situation, as its poverty rates have increased in recent years, being



higher in rural areas than in urban areas. Thus, in December 2020, income poverty in the country increased to 32.4%, urban poverty to 25.1%, and poverty in rural areas to 47.9%, while extreme poverty stood at 14.9% at the national level, 9% in urban areas, and 27.5% in rural areas, placing the population living in rural areas of the country at risk of food insecurity, mainly due to the decrease in the accessibility of food [22].

4. Conclusions

Finally, it can be concluded that the problem of food insecurity and hunger has increased with the COVID-19 pandemic in Ecuador. This problem has an unequal and disproportionate distribution, depending on the most vulnerable population groups. New strategies should be considered to achieve Sustainable Development Goal 2, "Zero Hunger and Food Security".

5. Limitations and strengths of the study

This study provides current evidence on the food security situation among a group of Ecuadorian adults. The estimation of food security was carried out using the Latin American and Caribbean Scale for Food Security, which is a validated instrument that allows a reliable estimation. This study was not conducted on a representative sample, so its results should be interpreted with caution. In addition, it should be noted that the data were collected using a virtual survey, which on the one hand allowed for rapid data collection during the COVID-19 health emergency but presented the problem of access to the survey for people with limited internet connectivity, the elderly, or people with limited use of electronic devices.

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Conflict of Interest

The authors of this study declare that they have no conflicts of interest.

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**Tabla 4**

Questions from the Latin American and Caribbean Food Security Scale, original version.

| Item | Pregunta |
|------|--|
| 1 | P1. En los últimos 3 meses, por falta de dinero u otros recursos, ¿alguna vez usted se preocupó porque los alimentos se acabarán en su hogar? |
| 2 | P2. En los últimos 3 meses, por falta de dinero u otros recursos, ¿alguna vez en su hogar se quedaron sin alimentos? |
| 3 | P3. En los últimos 3 meses, por falta de dinero u otros recursos, ¿alguna vez en su hogar dejaron de tener una alimentación saludable*? |
| 4 | P4. En los últimos 3 meses, por falta de dinero u otros recursos, ¿alguna vez usted o algún adulto en su hogar tuvo una alimentación basada en poca variedad de alimentos? |
| 5 | P5. En los últimos 3 meses, por falta de dinero u otros recursos, ¿alguna vez usted o algún adulto en su hogar dejó de desayunar, almorzar o cenar? |
| 6 | P6. En los últimos 3 meses, por falta de dinero u otros recursos, ¿alguna vez usted o algún adulto en su hogar comió menos de lo que debía comer? |
| 7 | P7. En los últimos 3 meses, por falta de dinero u otros recursos, ¿alguna vez usted o algún adulto en su hogar sintió hambre, pero no comió? |
| 8 | P8. En los últimos 3 meses, por falta de dinero u otros recursos, ¿alguna vez usted o algún adulto en su hogar solo comió una vez al día o dejó de comer durante todo un día? |
| 9 | P9. En los últimos 3 meses, por falta de dinero u otros recursos, ¿alguna vez algún menor de 18 años en su hogar dejó de tener una alimentación saludable*? |
| 10 | P10. En los últimos 3 meses, por falta de dinero u otros recursos, ¿alguna vez algún menor de 18 años en su hogar tuvo una alimentación basada en poca variedad de alimentos? |
| 11 | P11. En los últimos 3 meses, por falta de dinero u otros recursos, ¿alguna vez algún menor de 18 años en su hogar dejó de desayunar, almorzar o cenar? |
| 12 | P12. En los últimos 3 meses, por falta de dinero u otros recursos, ¿alguna vez algún menor de 18 años en su hogar comió menos de lo que debía? |
| 13 | P13. En los últimos 3 meses, por falta de dinero u otros recursos, ¿alguna vez tuvieron que disminuir la cantidad servida en las comidas a algún menor de 18 años en su hogar? |
| 14 | P14. En los últimos 3 meses, por falta de dinero u otros recursos, ¿alguna vez algún menor de 18 años en su hogar sintió hambre, pero no comió? |
| 15 | P15. En los últimos 3 meses, por falta de dinero u otros recursos, ¿alguna vez algún menor de 18 años en su hogar solo comió una vez al día o dejó de comer durante todo un día? |

Source: FAO. Escala Latinoamericana y Caribeña de Seguridad Alimentaria (ELCSA). Roma: Comité Científico de la ELCSA; 2012.