



Research Article

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Impact of Social Isolation Produced by Covid-19 on Eating Habits and Emotional States in Perú

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Abstract

COVID-19 pandemic changed our life. Though isolation and confinement help to reduce the spread of disease, remaining isolated for long periods brings negative consequences on mental health. This study describes the impact on dietary habits and emotional states of Peruvian population produced during COVID-19 quarantine. A nationwide survey containing multiple choice questions related to the types of diets and social states of Peruvian citizens was carried out. It was found that consumption of food like beans and legumes increased, while seafood and sauces decreased. Additionally, using emojis allowed those surveyed to easily and intuitively express their emotional state on delivery services and their feelings when eating foods. The most commonly used emojis were: crazy or fun face, face which enjoys food, and face with protective mask. Also, people reported not eating in excess and feeling happy about the recuperation of the environment, however, still worried about the increase in prices. Concurrently, the use of electronic devices, fear of losing one's job, and fear of contracting the virus increased by 76%, 51%, and 54%, respectively. Moreover, 56% of the population saw a lower rate of physical activity as a consequence of stress and emotional issues.

Keywords: Dietary habits; Emojis; Coronavirus; Emotions; Consumption

1. Introduction

On the 31st of December of 2019, the World Health Organization received, for the first time, reports on the existence of a new virus which revealed a group of cases suffering from "virulent pneumonia"

of unknown origin in the city of Wuhan, China. Health authorities of the country immediately identified the cause as a new strain of coronavirus which they designated SARS-CoV-2 (COVID19) (OMS, 2020). Because of the lack of knowledge regarding behaviour, propagation, and effects of COVID 19, it was not controlled, and the illness spread worldwide, generating a pandemic. Some countries were affected far more severely than others, depending on the level of preventative and control measures taken by their government authorities. This pandemic sorely impacted our society and its sanitary system, which is why healthcare systems had to adapt in record time to lower the spread of the infection (Pomar & Lesmes, 2020). COVID 19 is a disease with a severe mortality rate, with elderly people over 60 years of age and those with chronic illnesses such as hypertension, cardiovascular disease, obesity and diabetes in greater danger (Munayco *et al.*, 2020). The rapid expansion of COVID-19 caused the loss of numerous humans lives, therefore, social isolation was chosen, despite putting the global economy at risk. These measures led to the reduction of productive activities (Bank of Spain, 2020). Mendoza *et al.* (2020) state that these measures have generated an impact at the macroeconomic level, specifically due to the fall in productive activities, leading to a global economic slowdown.

Countries were gradually affected by the virus due to periodic confinement measures taken because of the pandemi (Romeo-Arroyo *et al.*, 2020). The current global crisis is worsening due to runaway food and fuel inflation, fertilizer shortages and the effects of climate change, which is resulting in a rapid increase in poverty. According to the INEI, in 2019, 20.2% of the population was poor; In 2020, it increased to 30.1%, and although in 2021 it decreased to 25.9%, Peru has not yet recovered pre-pandemic levels. In addition, indicators of food insecurity are increasing, such as anemia, overweight and obesity, because more than 50% of the population cannot access a healthy diet, forcing them to consume ultra-processed foods with high content. of sugar, salt and saturated fats that are harmful to health (FAO, 2022). In Peru, the first coronavirus case was confirmed on March 6th of 2019, generating fear in the Peruvian population which led to a collapse in supply chains as people bought up food and other necessities in droves to avoid suffering from a lack of them. Peruvian authorities made social isolation and distancing an obligation on March 16th, as a preventative measure to lower the spread of the virus, restricting movement to only medical emergencies, buying household necessities and commuting to work in important industrial sectors and work from home (Diario el Peruano, 2020).

During isolation there were some economic changes across various sectors in the market, such as the food industry, directly affecting the purchasing power of the consumers. The National Institute of Statistics and Computing (INEI) reported an increase in price on vegetables and fresh legumes (5.6%); meats and processed meats (2.1%); legumes and their derivations (1.9%); edible fats and oils (0.5%); bread and cereals (0.4%) (INEI, 2020). At the same time, the pandemic changed other aspects of daily life. Though isolation and confinement are both basic and strict measures of reducing the spread of disease, remaining isolated for long periods of time from such activities brings negative consequences with it. The emotional and psychological health of many people was severely affected with effects similar to post-traumatic stress disorder including long term effects (Pinazo- Hernandez, 2020). Because of this, some countries have taken the decision to end confinement procedures for certain population groups at different times as a therapeutic measure and strengthen their mental health.

Additionally, there has been an increase in the interest of knowing and measuring emotional reactions of consumers through the use of emojis (small icons used for digital communication found in social media platforms and smartphones across the world) (Sick *et al.*, 2020). Many studies seek to identify the impulses that lead to consumer behavior and selection of products through emojis (Cardello & Jaeger, 2021). Jaeger utilized surveys based on words and emojis to figure out correlations between a product and the emotion evoked by them, as verbal communication cannot fully convey feelings and attitudes as well as non-verbal signs can (Jaeger *et al.*, 2018). Emojis have an advantage when it comes to conveying meaning non-verbally which could not be done through the use of words. Additionally, various studies have demonstrated that men and women of different ages have

begun to use emojis more often in social media, blogs, and other applications indicated that people express their emotional reactions to food and drink spontaneously through emojis, allowing researchers to obtain new information in the field of sensory and consumer research (Wolf, 2000; Huffaker & Calvert, 2005; Huan *et al.*, 2014; Vidal *et al.*, 2018). The objective of this study was to figure out the perspective of consumers on their dietary habits and their emotional states during periods of social isolation through the use of multiple-choice questions and emojis.

2. Materials and Methods

This investigation was carried out in Peru, a country located in the southeast of South America, where 2,003,625 confirmed COVID cases have been registered to the date of the 16th of June, 2021, with a mortality rate of 9.42%, according to the numbers reported by the Ministry of Health (MINSA, 2021).

For the development of this study, an online survey which covered various regions of the country was carried out, advertised with topics of interest relating to the types of diets and social states of Peruvian citizens while in social isolation, making use of multiple choice questions and emojis. The decision to carry out the study online was done based on the use of internet in Peru and the increase of internet bandwidth use (42%) during the last week of April (MINSA, 2021). Additionally, electronic commerce increased by 58% in shopping and payments through digital means. On the other hand, the pandemic caused social media users -34% between 25 and 34 years of age, 25% between 35 and 44 years old, and 18% between 21 and 24 years old respectively- to share information about COVID-19 (Gestion, 2020).

The survey was carried out online by sharing the survey link; there was a sample of 1,534 participants selected through non-probabilistic convenience sampling. Data collection was carried out with Google forms software. Furthermore, the reliability and validity were 0.72 (Cronbach's alpha coefficient) for the survey applied in the study. Those surveyed included men and women of different income brackets, ages, and education level. The description of the participants as relating to their sociodemographic characteristics is shown in Table 1. The majority of the surveyed population (91%) engaged in grocery shopping. The survey included the informed consent of its participants. The survey was divided in three main sections.

The first section consisted on multiple choice questions relating to: a) increase or decrease of food consumption at the times they were not isolated, based on the questionnaire of food categories by Goni-Mateos and Romeo-Arroyo with modifications, b) Acquiring of foods by delivery services, c) Survey of emotional states, with a scale of 1 to 5 where 1 = completely disagree, 2 = disagree, 3 = neither in agreement nor disagreement, 4 = agree, 5 = completely agree; and d) Changes in activities and feelings, utilizing a scale of 1 to 3 where 1 = decreases, 2 = normal and 3 = increases.

The second section's objective was to express diverse feelings through the use of emojis, making use of 40 emojis: (👏) clapping hands, (😞) confused face, (😟) uncertain face, (😞) disappointed face, (😐) expressionless face, (😊) joyful face, (😱) face screaming in fear, (😘) kissy face, (😓) stressed out face, (😷) masked face, (🤢) vomiting face, (😶) silent face, (🙏) face with pleading eyes, (😝) mocking or joking face, (😂) laughing face, (😳) flushed face, (😬) grimacing face, (🤪) crazy face, (❤️) red heart, (😭) sobbing face, (😐) indifferent face, (😠) hot face, (😞) melancholic face, (😡) angry face, (😌) relieved face, (😤) offensive face, (😴) sleepy face, (😍) heart-eyed face, (😈) imp face, (😊) blushing face, (🙄) face with hand over mouth, (😎) cool or sunglasses face, (😏) smirking face, (🤧) sneezing face, (🤔) thinking face, (👎) thumbs down, (👍) thumbs up, (😐) unamused face, (😫) tired face, (😴) yawning face (Andina, 2020; Romeo-Arroyo *et al.*, 2020). Those surveyed were asked to indicate how they felt about their food, delivery services and emotional state (Goñi-Mateos *et al.*, 2016; Jaeger *et al.*, 2018; Schouteten *et al.*, 2018).

The third section consisted on a series of questions about both general and sociodemographic information. To complete the survey, participants were asked to answer the questions considering their behavior during the months of the pandemic spent in isolation.

3. Results

3.1 Sociodemographic Data

On Table 1 we show sociodemographic data of the participants (52% male, 48% female). 79% of surveyed participants were between ages 18-29, of which 68% had a college education level. By and large, most participants were from the coast, making up 75% of the total surveyed population, while the smallest source of participation came from the Amazonia region (5%). Moreover, 59 and 36% of the population belonged to low and middle socioeconomic classes, respectively. 38% of participants had a family composed of 5 or more people in their home. As for the frequency of shopping, 49, 30 and 8% of participants bought once a week, twice a week, and every day respectively.

Table 1. Sociodemographic data

| Characteristics | % of participants |
|------------------------------------|-------------------|
| Gender | |
| Masculine | 52 |
| Feminine | 48 |
| Age (years) | |
| 18-29 | 79 |
| 30-39 | 10 |
| 40-49 | 6 |
| >50 | 5 |
| Education level | |
| Highschool | 14 |
| Trades | 18 |
| College degree | 68 |
| Socioeconomic status | |
| Low | 59 |
| Middle | 36 |
| High | 5 |
| Number of people in a house | |
| 1 | 9 |
| 2 | 11 |
| 3 | 15 |
| 4 | 27 |
| ≥5 | 38 |
| Region | |
| Coast | 75 |
| Sierra | 20 |
| Amazonia | 5 |
| Times shopping per week | |
| 1 | 49 |
| 2 | 30 |
| 3 | 13 |
| Every day | 8 |

3.2 Attitude of the population during isolation

Social isolation caused issues in the attitudes of the population at a world-wide level, noticing strong changes in the behavior of people. Table 2 shows the percentages of agreement and disagreement expressed in different situations during the pandemic. Of the participants, 48.10, 45.65 and 41.79% showed disagreement when asked “I’m scared of losing my appetite”, “I eat in excess during quarantine” and “I feel sad during quarantine”, respectively. The highest percentage of agreement related to the following statement: “I’m happy that the environment is recovering because of the quarantine” (77.46%). The next elements in the survey with over 50% agreement stated: “I’m glad to stay at home with my family”, “I’m worried about the increase in food prices”, “I’m scared of being infected with the virus”, “I’m worried about the exhaustion of supplies”, “I’m scared of losing or not finding a job”, and “I’m scared of fake news”, with 68.58, 65.74, 55.76, 54.93 y 51.32%, respectively.

Table 2. Percentage of surveyed participants in agreement or disagreement with the statements relating to isolation.

| | Median | Standard Deviation | % Participants in disagreement | % Participants in agreement |
|---|--------|--------------------|--------------------------------|-----------------------------|
| I feel sad during quarantine | 2.83 | 0.30 | 41.79 | 33.35 |
| I eat in excess during quarantine. | 2.75 | 0.25 | 45.65 | 29.81 |
| I’m worried about the exhaustion of supplies | 3.32 | 0.57 | 27.30 | 55.76 |
| I’m happy that the environment is recovering | 4.00 | 0.99 | 15.58 | 77.46 |
| I’m glad to stay at home with my family | 3.74 | 0.73 | 17.32 | 68.58 |
| I’m worried about the increase in food prices | 3.59 | 0.68 | 20.67 | 65.74 |
| I’m scared of losing my appetite | 2.61 | 0.24 | 48.10 | 24.98 |
| I’m scared of being infected with the virus | 3.37 | 0.52 | 26.66 | 54.93 |
| I’m scared of fake news | 3.06 | 0.37 | 34.39 | 42.95 |
| I’m scared of losing or not finding a job | 3.25 | 0.48 | 29.36 | 51.32 |

3.3 Use of Emojis regarding feelings, home delivery and food consumption

Based on the study done by Ares, emojis were utilized to express the feelings of surveyed participants during periods of isolation. On Figure 1, the emojis selected by the participants at the time of consuming their food, ordering delivery services or their emotional state can be observed. Regarding food consumption it was observed that 40.0; 34.0; 33.8 and 23.0% of the participants chose the expressions: (😜) crazy face, (👍) thumbs up in agreement, (😊) blushing face, (😄) joyful face or (😌) relieved face, respectively. Relating to the level of delivery services, 25, 23, 20 and 18% of the participants indicated: (😜) crazy face, (😷) masked face, (👍) thumbs up in agreement and (🤔) thinking face, respectively. As for the level of emotions caused by social isolation, 64, 31, 30, 29, 25 and 24% of the participants selected: (😜) crazy face, (😷) masked face, (🥱) yawning face, (😴) sleepy face, (😊) blushing face and (🤔) thinking face, respectively (Schouteten *et al.*, 2019).

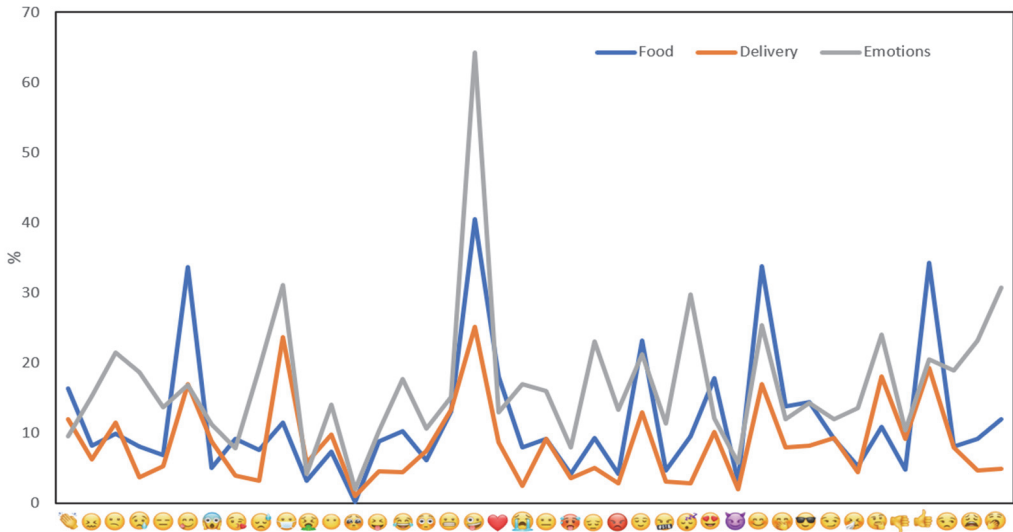


Figure 1. Use of emojis regarding dietary habits, home delivery services and emotional states.

3.4 Consumption of foods by category

The variation of food consumption is shown in Figure 2, where over 44% of the surveyed population indicated having a normal consumption of potatoes, yucca, sweet potatoes, tea/coffee, cereals, oats, granola, noodles or pasta, fresh meats, fruit juice, soup/purees/stews, dairy products, vegetarian products and breads. However, participants did indicate an increment in consumption of beans, legumes, lentils, fresh fruits, water, eggs and rice by 20%. On the other hand, a 40% decrease in consumption of fish meats, seafood, junk food, sauces/creams, saltine crackers, sandwich cookies, icecreams and desserts, nuts, cakes and pies was registered. However, 60% of the participants did not drink energy drinks, alcoholic beverages, frozen foods, sausages, snacks or powered juice.

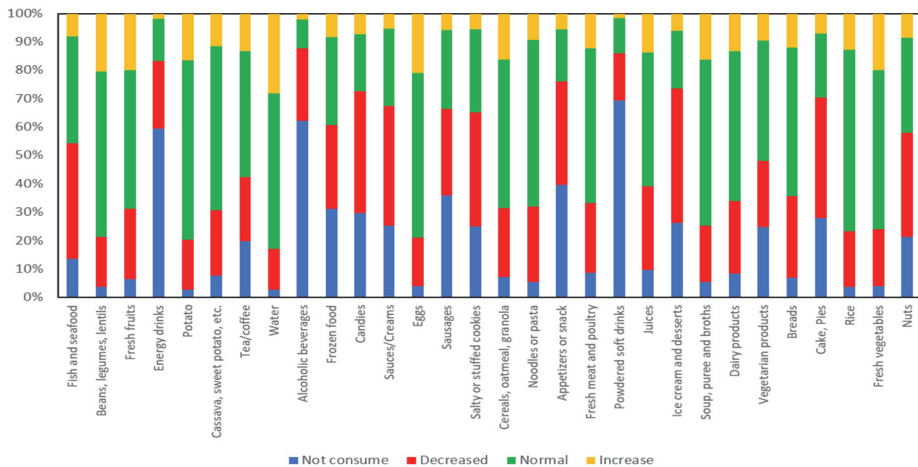


Figure 2. Variation of informed consumption of different food categories.

3.5 Changes in activities

On Figure 3, a change in activities produced by social isolation can be observed. 76% of participants increased their use of cellphones, laptops and TV; 59% said they felt more stressed, 48% reported feeling more anxiety and 38% said they slept more. Moreover, 56% of the surveyed population decreased their physical activity, 57% retained their eating habits within the norm, and 51% reported feeling scared.

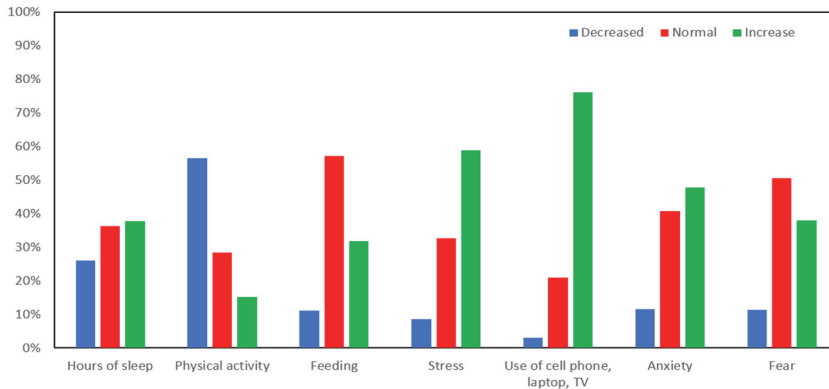


Figure 3. Changes in activities, emotions and eating habits during isolation.

4. Discussion

The high percentage (77.46%) of participants that were in agreement with the statement “I’m happy that the environment is recovering because of the quarantine” during isolation, agree with the information reported by Del Carment Conopoima (Ares *et al.*, 2021), which mentioned lower pollution levels, higher care of animals, the ecosystem and the environment are subjects valued by the participants of similar studies realized during the pandemic. Similarly, Brooks, Morales & Guevara indicated that the principal variables implicated on the psychological impact are fear of becoming infected by viruses and illnesses, the manifestation of feelings of boredom and frustration, a lack of income to cover basic needs and lacking updated and precise information of current events, which supports the results of this investigation (Brooks *et al.*, 2020; Del Carmen, 2021). Moreover, the percentage of those surveyed shows that the people who show fear of losing their jobs or not finding one is a global tendency that has been detected in many studies. For example, Hernández found that 21% of those surveyed in the Dominican Republic have lost their jobs temporarily and 3% permanently (Morales *et al.*, 2021). Within the number of those who have retained their jobs, 73.6% have kept the same working conditions, 22.5% present worse working conditions, and only 3.9% have improved their working conditions. Similarly in Argentina, 15% of small business workers reported bankruptcy and over 19% of them had lost a significant portion of their savings to the point where they no longer could afford to buy food or pay their mortgage (Hernandez, 2021). Various research has shown that the COVID-19 pandemic, specifically during social isolation, affects people’s nutritional habits. It was observed that the purchase of processed foods, snacks, junk and ready-to-eat has increased during (Bin *et al.*, 2020; Ammar *et al.*, 2020). However, a group of consumers increased their preferences for organic foods, legumes, seafood, fruits and vegetables (Di Renzo *et al.*, 2021; Didinger & Thompson, 2020). Health prioritization has affected food purchasing patterns, and the perception of physical shopping as a risk led many people to quickly switch to online shopping (Fanelli, 2021; Izzo *et al.*, 2021). The pandemic has gradually changed the way consumers buy and

consume food, particularly long-life foods such as UHT milk, rice, sugar, salt, pasta and canned vegetables, to reduce the risk of future shortages (Sevim & Yalcin, 2022).

Regarding the use of emojis, the use of the 'crazy face' stands out in how the participants feel regarding their dietary habits, home delivery services and their feelings on food consumption. As Valdez mentions in his study, the emojis described experiences relating to emotions and stress during isolation (Castillo, 2021). This emoji in particular is associated to the many changes in emotional and behavioral states during confinement, as well as others detected by it such as resignation, bewilderment, feelings of burden and uncertainty (Castillo, 2021). These are critical attitudes capable of exacerbating the emotionally influenced consumption of food and are associated with the chosen emojis. Regarding the level of home delivery service orders, because of the restrictions imposed during confinement procedures, consumers avoided heading to stores or shopping centers (Romeo-Arroyo *et al.*, 2020). Because of this, businesses began to engage in at-home services, not only delivery services for stores and supermarkets, but also streaming services such as Netflix, YouTube Premium, and others. Businesses dealing in food also changed rapidly in order to deliver basic products such as fruits, vegetables, and other edibles to homes (Valdez *et al.*, 2021). In Central America and the Caribbean, companies like Uber Eats, Glovo and Rappi began to bring their services to different restaurants, pharmacies, and other kinds of stores, observing an increase in demand due to COVID-19 (Casco, 2020). The emojis used by participants to describe their attitude regarding home delivery are similar to those used to show their emotions produced by isolation. These express behaviors similar to those reported by Ho, whose study revealed widespread feelings of uncertainty, fear, lethargy and distress, but also responsibility and caution regarding COVID-19, although it indicated mental health and financial problems (Caparroso, 2020).

On the other hand, the variation of consumed foods by category was similar to Colombia, which registered an increase in the consumption of rice, beans, legumes, lentils, water, rice and a normal consumption of dairy products, tubers, fruits and fresh vegetables and a similar behavior to Spain, where there was a 25% reduction in sales of cookies, liquor store products and snacks (Bejarano-Roncanio *et al.*, 2020; Ho *et al.*, 2020; Sanchez, 2020). However, there was a reduction in the consumption of foods harmful to one's health (Perez-Rodrigo *et al.*, 2020). In some countries, however, a reduction of healthy and immune-boosting foods, such as fruits and vegetables, was noted, as well as an increase in unhealthy foods such as breads, junk food, sugary and alcoholic beverages, due to the increase in prices (Fernandez-Jeri, 2020; Romeo-Arroyo *et al.*, 2020).

Regarding the changes in activities due to isolation, an increase in the use of technology was observed, agreeing with the results reported by Hernández y Chaparro who found significant changes in the use of digital gadgets during the pandemic (Sudria *et al.*, 2020). Moreover, an increase in stress, anxiety and sleeping hours was noted as well, as the population, when in cases of isolation caused by pandemic illnesses, is more likely to present acute stress disorders, adaptive disorders, and pain (Sprang & Silman, 2013; Hernandez & Chaparro-Medina, 2021). There was a decrease in physical activity and an increase in fear of contracting the virus and losing one's job or not finding one. These changes can be attributed to the fact that confinement has forced people to remain in their homes without being able to realize their usual activities (going to school, work, and participating in social, cultural or sports-related activities) (Wang *et al.*, 2020). Many studies warn about the mental health consequences that COVID-19 and social isolation have caused in the general population, shedding light on psychological issues, physical problems and severe or moderate stress risk (e.g., bad dietary habits, unhealthy sleep schedules, sedentarism and an increase in use of device screens) (Sprang & Silman, 2013; Wang *et al.*, 2020; Molina, 2020; Proaño, 2020; Boris, 2021; Franco *et al.*, 2021; Lopez-Arteaga, 2021). Balluerka *et al.* (2020) mention that people expressed numerous mood changes during confinement, such as: resignation, sadness, among others. Regarding the mood that stood out during the quarantine, it was characterized by: agitation, sleeping difficulties, excessive worry and, finally, irritability. Pacheco *et al.* (2020) found a state of stress, anguish and uncertainty attributed to the insecurity that the situation itself generates. Alzueta *et al.* (2021) indicated that adults experienced symptoms of depression at moderate levels and anxiety.

5. Conclusions

The study showed evidence that prolonged social isolation due to COVID-19 has caused changes in dietary habits, showing a tendency to an increase in the consumption of stews, legumes, fruits, water, eggs and rice, and a reduction in the consumption of fish, junk food, sauces, desserts, and nuts due to the changes in emotional states and the lower degree of physical activity. The use of emojis was one of the tools employed for its intuitive and easy use for gathering data on expressions regarding eating habits, home delivery services and emotional states during isolation, with the most common emoji being 'crazy face'. Moreover, the study shows that the peruvian population agrees with the recovery of the environment, spending time with the family, although still worried about prices, supply shortages, losing their jobs or not finding one, and becoming infected. As a consequence of the limitations of the isolation, physical activity decreased, sedentarism increased and the use of cellphones, laptops and TVs increased. In this new, ongoing phase of returning to normalcy, it is necessary that consumers change their dietary habits such that it includes the consumption of healthy foods and also increase their exercise habits in order to better the regulation of their emotional states.

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