

ARTICLE / INVESTIGACIÓN

Use, knowledge, attitudes and practices of formal and alternative medicine related to Covid-19 in the Ecuadorian population

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Abstract: The Covid-19 pandemic revealed a complex health problem for people and national health systems. Faced with the initial ignorance of the behavior of the SARS-COV-2 virus in populations, people turned to relief and alternative medicines. In Ecuador, the use of traditional or western medicine and the systematic approach of people to conventional medicine are evident realities. Our work aimed to assess the knowledge, attitudes and practices regarding Covid-19 and the use of formal and traditional medicine to treat the disease or contagion. An open, personal and confidential survey was carried out, with 158 questions on general data, ethnicity, health status, covid-19 tests, use of self-medication, use of medicinal plants or other chemical products, and use of antibiotics or antiparasitics, among other data. In the control of the patients, six months after finishing the survey, they were asked about the acceptance of the vaccine and the decision to be vaccinated or not. The results in 3,000 persons (50% female and 50% male) show frequent use of alternative or traditional medicine, even in health personnel or university studies. The study's conclusions reflect that people choose any of the therapies they have access to and even mix traditional treatments with traditional ones that are unproven or toxic.

Key words: Knowledge, attitudes, practices, covid-19, formal medicine, traditional medicine.

Introduction

Ecuador is a very diverse country with a population that is self-defined as mountainous mixed-blood Mestizo (71.9%), African descendants (7.2%), indigenous natives from the Americas (7.1%), coastal mixed-blood Montubio (7.4%), Caucasian (6%) and others (0.4%)¹. Regarding the geographic distribution of the population, Mestizos live primarily in urban areas of the country, while indigenous natives from the Americas and African descendants tend to stay in rural areas¹. This distribution influences access to health services and reflects deeply ingrained cultural traditions. A previous analysis identified that persons residing in suburban districts and shamans of indigenous communities have little information about conventional Western medicine and knowledge of genetics². Instead, as in many other countries, they rely on knowledge passed by oral tradition. This traditional knowledge has seen a resurgence and acceptance in the form of alternative medicine in many developing and developed regions of the country³.

In the current SARS-CoV-2 pandemic, research began concerning the virus's epidemiology, genetics and genomics, affected individuals, and especially regarding treatments and vaccines. Institutions have established basic guidelines and policies to protect the community⁴. Nevertheless, in parallel, a reappearance of popular beliefs is surging to face, prevent and treat COVID⁵⁻¹⁴.

Medical practices in Ecuador are classified into (a) Formal or Western medicine, (b) Traditional or Native medicine and (c) Popular Non-Formal Medicine. This Non-Formal or non-conventional medicine is known by many other names,

including complementary medicine. The WHO recognizes its importance in providing services as a complement or supplement to the already existing health system to deal with disease³.

Within the practices of Popular or Non-Formal Medicine, we find the use of home remedies with the intent to provide an immediate effect and cure, which differs from Western Medicine practice. Both Popular and Traditional-Ancestral medicine credit curative properties to plants and animals. One example of this is the well-known belief of the population of the high mountains of Ecuador that a solid or severe illness needs to be treated with a strong plant to achieve a cure, such as eucalyptus¹⁵.

During the pandemic, many challenges were identified, including navigating a complex health system, the event's gravity, intense social and family experiences, prolonged therapeutic interventions, and high cost and death, among others. In this environment, the population searched for curative answers in alternative, non-formal and traditional Native Medicine^{3,5-15}.

To identify the widespread knowledge developed and seen as helpful against COVID-19, we proposed to evaluate the use of non-formal, alternative and popular practices for individuals affected with the disease. We initiated this evaluation process through information obtained from patient surveys from our Covid Research Project. We ensured meeting all appropriate bioethical standards.

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Materials and methods

Three thousand individuals infected with SARS-CoV-2 were surveyed under the Ecuadorian Covid Research Project, which the National Ministry approved of health. Inclusion criteria for individuals to be studied included: having a positive result for infection with SARS-CoV-2 with a qPCR or antibodies (considered time of diagnosis) and a later negative impact once overcoming the acute illness (considered time of cure from the disease). Surveys were obtained for 25 weeks between July and December of 2020, with a one-year follow-up.

Every person surveyed signed informed consent and answered a survey questionnaire of 23 questions that contained general data and demographics, including place of birth, place of residence, gender, age, education level, and clinical data, including symptoms from mild to severe forms of the disease, and specific questions about the management of the illness and overall health status.

Ecuador began the anti-Covid vaccination of the population in 2021, so two additional questions were included in the follow-up, do you agree with the vaccine or not? If you are not vaccinated, would you get vaccinated?

Variables from basic information, clinical data and management of the disease were compared. The analysis was performed in IBM SPSS Statistics v21.0. A value of $p < 0.05$ was considered statistically significant.

Results

Out of the 3,000 participants, 1,500 were male and 1,500 female. The age range was from 14 to 89 years, with a mean of 45 years and a median of 42,5. They were all Ecuadorian natives from 30 different localities and 13 provinces (Figure 1).

It was established that the education level was heterogeneous: 3.9% had no educational background, 8.3% had only elementary school instruction, 18.9% had secondary school instruction, 2.2% had technical school training, 47.2% had university training, and 19.5% had postgraduate school training.

Initially, 82% of participants were tested for the detection of the virus at the time of diagnosis, and 74% were later tested at the time of cure with qPCR. Antibodies were initially tested for 18% and 26% of those groups.

Concerning the severity of the illness, 183 individuals (6.1%) were asymptomatic, 1,317 (43.9%) had mild disease, 867 (28.9%) had a moderate condition, and 516 (17.2%) had severe illness. From the latter, 117 (3.9%) individuals died in the hospital.

From the participants, we gathered that 68.3% could identify the person or situation of contagion, 28.9% of cases occurred in employees of health centers and all of those affirmed being infected at work.

Asymptomatic patients learned about their positive results of viral infection after being tested at their place of work. Since they remained asymptomatic, they did not have to receive any treatment and were kept under mandatory quarantine for 14 days, as the national health authority instructed. It is important to note that they were against this compulsory measure as they did not believe they were genuinely infected, had no symptomatology, and remained in good health.

Once they received their positive results, Symptomatic patients maintained isolation due to the virus; 61% of them had between 1 and 14 family members also infected while maintaining this isolation as a family unit (Table 1).

All symptomatic patients except two took the recommended treatment for the illness by guidelines: antibiotic, anti-inflammatory medication and anticoagulant. They reported receiving treatment with Azithromycin and acetami-

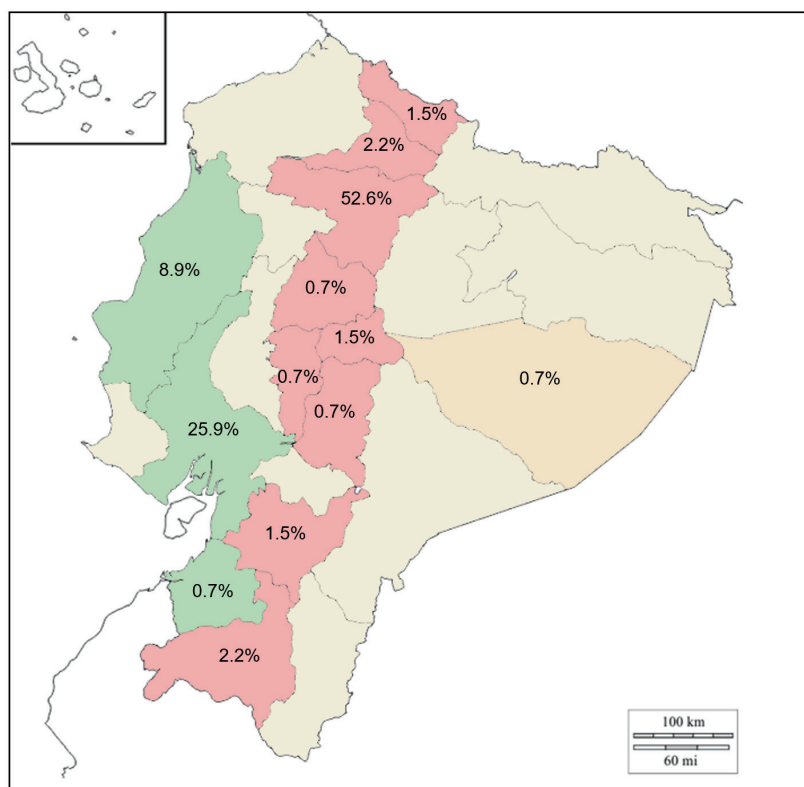


Figure 1. Distribution by the province of origin of people infected with SARS-CoV-2.

Situation	No. Cases	Relationship
Only sick	1.167	
A sick family member	733	Partner (333), children (67), father or mother (83), siblings (183), uncle (33), nephew (17), father-in-law (17)
Two sick relatives	617	Partner and son (182), partner and father-in-law (18), partner and siblings (16), partner and brother-in-law (17), children (67), father and mother (101), mother and brother (99), siblings (67), brothers and brothers-in-law (17), uncles and cousins (17), brother-in-law and wife (16)
Three sick relatives	183	Partner and children (16), partner, son/daughter and daughter-in-law/son-in-law (15), partner, son/daughter and father/mother-in-law (14), partner, son/daughter and uncle/aunt (17), parents and son/daughter (52), parents and brother/sister (50), sons and brother (19)
Four sick relatives	167	Father, mother and siblings (101), partner and children (48), parents, partner and son (18)
Five sick relatives	67	Parents, partner, son/daughter and uncle (18), partner, children and nephews (16), parents, son/daughter, cousins (17), parents, grandparents and uncle (16)
Six sick relatives	33	Partner, son, daughter-in-law, aunt and nephews (17), partner, parents, aunt and cousins (16)
Eight sick relatives	17	Grandparents, mother, brother, uncles and cousins (17)
Fourteen sick relatives	16	Parents, partner, children, nephews, father-in-law, brothers-in-law (16)
Un familiar muerto	183	Grandparents (72), father (34), mother (32), partner (16), sister (15), father-in-law (14)

Table 1. The situation of patients and deceased in each patient's home in the study.

nophen for five days. Aspirin was the leading anticoagulant. Most patients did not know that anticoagulant was ordered.

Of the total participants in the study, 69.4% utilized alternative medicine treatments in addition to conventional therapies, especially in the setting of mild to moderate illness. Patients with severe diseases opted to use both therapies only after hospital discharge.

Alternative remedies included vaporizations, herbal waters, juices, deworming, chloride dioxide, alcoholic beverages alone or mixed with diluted herbal-water extracts and visits to a healer (Table 2).

Two thousand two hundred patients (73%) expressed the importance of religious practices and divinity as a factor in their healing.

Vaporizations (using steam inhalations) with eucalyptus alone or with as many as eight other herbal combinations were used, including other herbs like chamomile and Rosemary.

The ingestion of medicinal infusions or extracts listed as many as 33 ingredients, with the most common ones being ginger, lemon, honey, cinnamon, chamomile, garlic, onion and lemon verbena. The infusions were prepared with one or many ingredients. The more prevalent combinations included ginger and lemon; garlic and onion; cinnamon and lemon; ginger, lemon and honey; lemon verbena and lemon; and lemon verbena and honey. One hundred seven patients detailed that those infusions used raw cane sugar as a sweetener, not refined sugar, to make it healthier and more palatable.

Some patients put their trust in being cured by drinking

natural juices. In contrast, others used alcoholic beverages such as church consecration wine and a variety of moonshine named "Puntas" (which is pure alcohol obtained from sugar cane) in combination with some other plants.

Survey evaluation revealed that other practices were utilized, such as the use of the bovine antiparasitics: Ivermectine in 433 patients (14.4%) and Dectomax (Endectocide) injectable in 33 patients (1.1%). Seventeen patients (0.6%) used oral hydroxychloroquine. Of these, 13.3% of patients had high school education, 50.6% had graduate education, and 36.1% had postgraduate education.

One hundred thirty-three patients were self-treated with Chloride dioxide, including 43 medical doctors and 21 with training as technicians. They mentioned that they had adjusted the dilution concentration depending on the stage of the illness (but no details were provided). Additionally, 117 patients carried around their necks a necklace saturated with chloride dioxide that was procured from Toamit, Japan. This card was the size of an ID card measuring 5.5 x 8 x 0.5cm and was named "Virus Shut Out." The purpose of this card was to create an antiviral halo around the wearer.

Finally, 167 participants visited a naturopathic healer. The treatments by these Shamanic healers often included: "Cleansing from evil influences" by using Guinea pigs, chickens, and rubbing eggs. A "miraculous healing potion" was recommended by all Shamans while also using frequent baths. Vaporizations were used in all patients with moderate to severe symptoms. It was only one healer who recommended the practice of vaporizations.

Remedy	No. Cases	%
Vaporizations		
<i>Eucalyptus</i>	900	30,0
<i>Eucalyptus and chamomile</i>	83	2,8
<i>Eucalyptus, chamomile and mint</i>	34	1,1
<i>Eucalyptus, chamomile, onion and orange peel</i>	32	1,1
<i>Eucalyptus, chamomile and menthol</i>	100	3,3
<i>Eucalyptus and menthol</i>	50	1,7
<i>Eucalyptus, menthol and pine</i>	17	0,6
<i>Eucalyptus and rosemary</i>	167	5,6
<i>Eucalyptus and wood of life</i>	67	2,2
Infusions		
<i>Baking soda</i>	33	1,1
<i>Baking soda and vodka</i>	17	0,6
<i>Baking soda, lemon and salt</i>	67	2,2
<i>Borruga, cinnamon, lemon, lemon verbena and jamaica</i>	17	0,6
<i>Borruga, eucalyptus, nettle, potato root and soldier's herb</i>	17	0,6
<i>Borage, honey and lemon</i>	33	1,1
<i>Chamomile</i>	67	2,2
<i>Chamomile, cinnamon and lemon</i>	33	1,1
<i>Chinchona and puntas</i>	83	2,8
<i>Eucalyptus and chamomile</i>	33	1,1
<i>Eucalyptus, cinnamon, ginger and lemon</i>	17	0,6
<i>Garlic, chinchona, ginger and puntas</i>	50	1,7
<i>Garlic and onion</i>	33	1,1
<i>Garlic, onion and lemon</i>	19	0,6
<i>Garlic, onion, lemon and ginger</i>	16	0,5
<i>Garlic, onion, lemon and honey</i>	16	0,5
<i>Garlic, onion, lemon and puntas</i>	67	2,2
<i>Garlic, onion, honey and radish</i>	83	2,8
<i>Ginger</i>	267	8,9
<i>Ginger and chamomile</i>	117	3,9
<i>Ginger and honey</i>	17	0,6
<i>Ginger and lemon</i>	183	6,1
<i>Ginger, lemon, apple, cucumber and spinach</i>	17	0,6
<i>Ginger, lemon, baking soda and salt</i>	16	0,5
<i>Ginger, lemon and black pepper</i>	16	0,5
<i>Ginger, lemon and chamomile</i>	50	1,7
<i>Ginger, lemon, chamomile and lemon verbena</i>	33	1,1
<i>Ginger, lemon and cinnamon</i>	183	6,1

Table 2. Alternative medicine in patients infected with SARS-CoV-2.

<i>Ginger, lemon and garlic</i>	17	0,6
<i>Ginger, lemon, garlic, baking soda, onion, Kaloba, and puntas</i>	18	0,6
<i>Ginger, lemon and honey</i>	100	3,3
<i>Ginger, lemon, honey and lemon verbena</i>	33	1,1
<i>Ginger, lemon and impletol</i>	17	0,6
<i>Ginger, lemon and puntas</i>	18	0,6
<i>Ginger, lemon and turmeric</i>	50	1,7
<i>Ginger, orange and cinnamon</i>	33	1,1
<i>Ginger, orange and turmeric</i>	17	0,6
<i>Ginger and puntas</i>	33	1,1
<i>Lemon</i>	150	5,0
<i>Lemon and cinnamon</i>	17	0,6
<i>Lemon, cinnamon and honey</i>	33	1,1
<i>Lemon and honey</i>	50	1,7
<i>Lemon verbena and honey</i>	67	2,2
<i>Onion, ginger, lemon and orange</i>	33	1,1
<i>Onion, honey, lemon and radish</i>	17	0,6
<i>Potato and aloe vera</i>	17	0,6
<i>Rosemary and taraxacum</i>	15	0,5
<i>Soldier's herb and cat's claw</i>	19	0,6
<i>Valerian</i>	17	0,6
Juices		
<i>Orange</i>	67	2,2
<i>Orange and cinnamon</i>	17	0,6
<i>Tomato</i>	33	1,1
<i>Tomato, lemon, garlic and pepper</i>	16	0,5
<i>Tomato, lemon and honey</i>	18	0,6
<i>Tree tomato</i>	34	1,1
<i>Tree tomato and lemon</i>	32	1,1
<i>Tree tomato, lemon and honey</i>	17	0,6
Religion		
<i>Church consecration wine</i>	117	3,9
<i>Pray to God</i>	2200	73,3
Antiparasitic		
<i>Dectomax vaccine</i>	33	1,1
<i>Hydroxychloroquine</i>	17	0,6
<i>Ivermectin</i>	433	14,4

Table 2. Alternative medicine in patients infected with SARS-CoV-2.

Chloride dioxide		
<i>Drinkable solution</i>	133	4,4
<i>Impregnated ID card</i>	117	3,9
Consult a healer	167	5,6

Table 2. Alternative medicine in patients infected with SARS-CoV-2.

We looked at the impact of gender with the use of vaporizations ($P = 0.346$), with other treatments ($P = 0.381$) and with religious practice ($P = 0.50$) without finding a statistically significant association. We extended the analysis using educational level in relation to using vaporizations ($P = 0.167$), other treatments ($P = 0.077$) and religious practices ($P = 0.062$) without finding statistically significant differences.

In comparing symptoms and alternative medicine use, we found that vaporizations were associated with dyspnea ($P = 0.008$) no other statistically significant associations with other symptoms were identified.

To further show that the severity of the disease is essential in the application of alternative therapies, the analysis showed a statistically significant association between the use of vaporizations ($P = 0.000$) in other treatments ($P = 0.001$) and religious practices ($P = 0.000$).

The number of relatives influenced the use of alternative medicine with vaporizations ($P = 0.000$), with other treatments ($P = 0.000$) and with religious practices ($P = 0.000$).

A follow-up took place from July to December of 2021 with all patients. Of those who were symptomatic during the illness, 36.1% had sequelae that included headache so far, back pain, dysgeusia and anosmia (lasting between 1 week and three months) after they had a negative test for the presence of the virus. This symptomatology prompted them to continue using ancestral, traditional and alternative medicines.

Regarding vaccination, 78% of individuals responded that they agreed with immunization, but only 14% stated categorically that they would not be vaccinated.

Discussion

For this research project, obtaining two qPCR or antibodies test results was paramount, one at the beginning with a positive impact on infection and one negative effect to confirm that the virus was no longer present. Participants complained that the test cost was high, with an average of \$100 US dollars, while the minimum wage in the country is \$398 per month. This occurrence prompted the discussion and request from the government to provide free access to testing as part of its community health plan, as the cost and access to services were prohibitive. Expensive testing did not encourage equal access to testing as in other countries¹⁶.

All patients infected with SARS-CoV-2 maintained isolation for the recommended time stated by the treating physician. A minimum of 14 days was prescribed before retesting for the presence of the virus. Nevertheless, 106 patients were required to be isolated for long periods, according to the recommendations of the Ministry of Public Health of Ecuador.

Although our research did not evaluate the clinical therapies provided, it is indispensable to mention what treat-

ments were given. As previously noted, it was common to prescribe Azithromycin and acetaminophen for five days to all patients. 2.2% of patients refused to take those medications because their symptoms were mild and preferred to try alternative therapies. The use of alternative, traditional and ancestral medicine was quite prevalent in patients with COVID infection at 69.4%, which hints at the population's trust in this type of practices. There was no difference in using non-Formal medicine based on gender, age and educational level.

One significant finding previously noted was that 61.1% of participants had between 1 and 14 family members affected by the disease. This occurred despite maintaining appropriate isolation as recommended with distancing, cleaning, and recurrent personal and familial hygiene measures. No information was available to track the infection sequence among those family members. The degree of illness varied among family members; in 182 household families, one person died. These factors: the death of a relative, the lack of formal treatment for the virus, the absence of a vaccine, and limited access to the main health system due to cost appeared to cause individuals to favor alternative therapies ($P = 0.000$)^{3,17}.

Regarding vaporizations with *Eucalyptus* (*Eucalyptus globulus* & *E. citriodora*) took place with different degrees of frequency depending on intent for prevention, cure or maintenance of health. Eucalyptus is commonly used to purify the air¹⁸ and was introduced in Ecuador in 1860¹⁹. It is found in a higher percentage in the mountainous provinces of Chimborazo, Pichincha, Loja, Imbabura, Azuay, Cañar and Cotopaxi. Patients use this tree in various ways depending on the leaf type (in recognition of the different species found in Ecuador). Tradition recommends vaporizations with the addition of Chamomile (*Matricaria recutita*) for the flu and Rosemary (*Salvia rosmarinus*) for headaches¹⁸.

The use of eucalyptus vaporizations by people with dyspnea differs significantly ($P = 0.008$) from those without that symptom. This effect is consistent with the indication of traditional medicine that recommends it for respiratory conditions^{18,20-23}.

Ingestion of hot waters (infusions), also known as "homemade waters" or miracle waters, follows a deeply rooted tradition for healing diseases. For the treatment of COVID-19, it contained the main ingredients; lemon, ginger, garlic, cinnamon, onion, lemon verbena, chamomile and honey. COVID is a disease that is felt to be related to being in an unconscious state. Based on traditional beliefs associated with the cosmovision of the illness process, using hot infusions acts as an antagonist or with a counteracting effect¹⁷.

Lemon (*Citrus limonum*) is a medication instead of a food^{18,24}. It stimulates the immune system, acidifies the body, helps digestion, and cleanses the liver. It is used combined with other ingredients in cold and hot beverages for medical purposes in Ecuador¹⁵.

Ginger (*Zingiber officinali* Roscoe) is seen as a benefi-

cial intervention to alleviate nausea, dizziness, and pain, in addition, to causing an improvement in digestion and fighting the flu, among other indications^{20,21}. Even though ginger is not a native plant in Ecuador, it has been cultivated in humid tropical and subtropical areas for the last 20 years approximately and quickly became an essential component of healing infusions²⁵.

Of all medicinal vegetables, garlic (*Allium sativum*) is considered the most extraordinary and compelling for its antibiotic effects, purifying, disinfecting, and anti-cold actions, as well as for relieving congestion and cough^{18,20,21,24}.

An infusion with Cinnamon (*Cinnamomum zeylanico*) has many medicinal applications and it is recommended to be used in beverages to heal colds¹⁸.

On the onion (*Allium cepa*) there is much popular and even written information about its use and effectiveness against many diseases²⁴. For the flu, the combination with lemon and honey¹⁸ is specified, and currently, it has been widely used for covid-19 due to its similarity in symptomatology.

Lemon Verbena (*Aloysia citriodora*) is called Cedron, Cedar or Verbena by the Indians. This plant is originally from South America, frequently found in gardens and used as an expectorant¹⁸. Patients with SARS-CoV-2 mentioned using it often.

Chamomile infusion, one of the most widely used medicinal plants in Ecuadorian coastal and mountainous regions, is used as a febrifuge¹⁸.

Honey is seen as an agent that can alleviate fatigue, cough, and sore throat¹⁸. Hence, its use was every day among patients with COVID.

Other plants employed less frequently for this illness came from their widespread and ancestral armamentarium. La "borraja" or borage (*Borago officinalis*) plant is used as an infusion with lemon juice and honey to facilitate expectoration and relieve cold and flu symptoms¹⁸. There are testimonies of this plant being used in the mountains of Ecuador for respiratory problems¹⁵.

Red Chinchona or Chinchona Bark (*Chinchona officinalis* and *Chinchona pubescens*) is the plant from which quinine is obtained to fight malaria. It is recognized as the national plant of Ecuador. It is used for intermittent fevers¹⁸ and has been used by Native Americans since before the Spanish Conquistadors came to the Americas. It is a plant at risk of extinction. During the pandemic, patients who were resistant to synthetic pharmacological treatment with Chloroquine and Hydroxychloroquine (anti-malaria treatments) or those unable to access those medications used the plant instead¹⁵.

Our research found that most of the many different infusions used also contained two compounds: (1) Impletol, which is the commercial name of the local anesthetic Chlorhydrate of Procaine with caffeine²⁶, and (2) Kaloba, which is an extract of the South African Geranium (*Pelargonium sidoides*) used to relieve symptoms of the common cold²⁷.

One hundred seven participants used raw cane sugar as a sweetener to make the infusions more palatable. It was very frequently used in Ecuador and obtained by boiling sugar cane¹⁸.

Regarding the practice of juicing, some patients utilize fruits such as oranges (*Citrus aurantium*) which is valued as a medicinal tonic to revitalize and cleanse the body¹⁸; Tree tomato (*Solanum betaceum*) with is native of many countries in South America and provide many minerals and vitamins; and tomatoes (*Solanum lycopersicum*) which is also

rich in vitamins like oranges are and is recommended for throat problems¹⁸.

Some infusions or waters included Puntas or Moonshine (High-proof distilled alcohol), which was obtained from sugar cane and then distilled following a method passed from generation to generation²⁸.

Despite facing a viral illness, 16.1% of individuals used antiparasitic agents. This was seen as quite surprising, as people who have had high school, university and postgraduate training are aware that this is not an appropriate use of those medications, even more, astounding for that 2.1% of healthcare professionals who did it. It was also surprising that many participants utilized Chloride Dioxide to treat and prevent the disease. This agent is known for its high toxicity²⁹. All the patients who utilized it had previous school and university training. It was even more shocking that 43 physicians also used it. The National Health Authority prohibits the use of Chloride Dioxide due to its toxicity and potential risk to humans.

In searching for a quick cure, many patients visited healers (also known as Traditional Doctors) who prescribed Miracle Waters (see Table 2) and recommended frequent immersion baths to address pain and general malaise. We interviewed a healer who treated many patients who were participants in our study and declared that he had learned this healing wisdom from his father³⁰. The passing of knowledge in this oral and practical way is frequent in the training of urban shamans and the popular culture³¹.

The survey revealed that 73.3% of participants attributed their healing to religion, metaphysical or magical beliefs. Equally, in the post-illness period, patients with moderate to severe disease continued alternative treatments and respiratory exercises recommended by healers. This Popular and ancestral medicine is quite disseminated in Ecuador¹⁷.

The word "Popular Knowledge" referred to knowledge from indigenous native people. "Farmer Knowledge (Campesino)" refers to an ancestral tradition typically obtained by farmers from native people. (i.e., natives from the Andes Mountains)¹⁷. A subgroup of participants had popular beliefs that did not come from natives. This subgroup mainly included marginalized socioeconomically poor individuals, whose ideas were usually not considered much by others³. Regardless of origin, 66.7% of Ecuadorian patients with graduate education utilized widespread knowledge in addition to conventional Western medicine. Healthcare workers used Chloride Dioxide and veterinary drugs despite risks and conventional knowledge²⁹.

It is suspected that fear in the face of infected or dying family members played a role in adopting alternative medical treatments, as noted by 2,082 patients.

It is also necessary to note that our population was exposed to a lot of information from the news and social media, which was, in many cases, exaggerated, inaccurate or unverified. This in turn translated into adopting and accepting practices that were not reliable and not effective.

Popular beliefs are natural to humans and allow us to manage our environment with simple interpretations and for specific purposes^{5,15,17}. In Ecuador, more than 500 species of vegetables with medicinal use have been identified^{32,33}. This knowledge of a variety of potential therapies has influenced the attitudes, practices, preferences and trust for specific treatments for the illness caused by this Coronavirus. Approximately 80% of the Ecuadorian population utilizes medicinal plants, folk physical therapies and other natural products daily. Increased availability and low costs

are significant drivers in this trend³².

Many myths about vaccines exist and have been widely reported^{34,35}, and initial fears about the vaccine's benefits have changed over time and the vaccine's safety. Official figures from the Ministry of Public Health of Ecuador³⁶ report that only 14% of individuals do not accept the vaccine or have not been vaccinated. Therefore, the current vaccination statistics are at 78%, and it is expected to reach 90% at the end of the free national vaccination campaign.

Conclusions

Covid-19 collapsed our world's health system. It showed its weaknesses in dealing with policies and processes regarding public health. In Ecuador, the health system showed severe strain and exhaustion during the pandemic due to its limited infrastructure, slow implementation of security and preventive measures, lack of consistency in maintaining staffing of health workers and inability to see patients. All of these caused people to return to their homes to infect indiscriminately, and in many cases dramatically dying on the streets or right outside hospitals. It is the sum of all those circumstances that contributed to the creation, consolidation and attachment to popular knowledge and practices in facing SARS-CoV-2.

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