

Artículo Original

Sociocultural description of the use of folk-domestic medicine for the treatment of symptoms in COVID-19 patients: an exploratory study

Descripción sociocultural del uso de la medicina popular-doméstica para el tratamiento de síntomas en pacientes con COVID-19: un estudio exploratorio

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RESUMEN

Introducción. Un nuevo virus llamado SARS-CoV-2 que causa la enfermedad COVID-19 ha surgido en el mundo, y, por lo tanto, aún se desconoce el tratamiento y la cura. Se ha incrementado el uso de la medicina popular-doméstica en México con el fin de fortalecer el Sistema inmunológico contra el SARS-CoV-2 y para tratar la enfermedad por COVID-19, favoreciendo el empoderamiento de saberes y procedimientos ancestrales. **Objetivo.** Describir las percepciones, conocimientos, usos y prácticas en pacientes positivos a COVID-19 que utilizaron la medicina popular-doméstica como alternativa a la atención primaria de salud. **Métodos.** La investigación es cualitativa, de alcance exploratorio, transversal y con un diseño fenomenológico. Para la recolección de datos se aplicó una guía de preguntas con 23 ítems clasificados en 3 categorías (experiencia con COVID-19, uso de medicina popular-doméstica y experiencia con medicina popular-doméstica); así mismo, los participantes fueron seleccionados a través de un muestreo de tipo bola de nieve, con un total de 10 participantes del sureste de México. **Resultados.** Los resultados indican que la población entrevistada utilizó preparaciones herbales, para atender los principales síntomas como dolor torácico pectoral, tos, dificultad para respirar, ya que, desde su experiencia y perspectiva, las preparaciones, tienen la capacidad de promover la recuperación con la disminución de los síntomas del COVID-19. **Conclusión.** Existe el uso de la medicina popular doméstica en pacientes positivos a COVID-19 del sureste de México; y su uso está ampliamente identificado en la literatura médica como beneficioso por su actuación en la patogenia de dicha la enfermedad respiratoria aguda; sin embargo, no existen datos suficientes para determinar dosis adecuada y posibles efectos adversos de su uso incontrolado.

Palabras clave: COVID-19, medicina popular doméstica, plantas medicinales, SARS-CoV-2.

SUMMARY

Introduction. A new virus called SARS-CoV-2 which causes COVID-19 disease has emerged in the world and, therefore, the treatment and cure are still unknown. There has been an increase in the use of folk-domestic medicine in Mexico to strengthen the immune system against SARS-CoV-2 and to treat COVID-19, favoring the empowerment of ancestral knowledge and procedures. **Objective.** Describe the perceptions, knowledge, uses and practices in COVID-19 positive patients who used folk-domestic medicine as an alternative to primary healthcare. **Methods.** The research is qualitative, exploratory in scope, cross-sectional and with a phenomenological design. For data collection, a question guide was applied with 23 items classified into three categories (experience with COVID-19, use of folk-domestic medicine and experience with folk-domestic medicine); Likewise, the participants were selected through snowball sampling, with a total of 10 participants from Southeast Mexico. **Results.** The results indicate that the interviewed population used herbal teas and infusions alleviating the main symptoms such as chest pain, cough, and shortness of breath, since, from their experience and perspective, they have the ability to promote recovery with the decrease of COVID-19 symptoms. **Conclusion.** There is use of domestic popular medicine in positive patients for COVID-19 in southeastern Mexico and that its use is widely identified in the medical literature as beneficial due to its action in the pathogenesis of said disease, however there are not enough data to determine adequate dose and possible adverse effects of its uncontrolled use.

Keywords: COVID-19, folk-domestic medicine, medicinal plants, SARS-CoV-2. COVID-19.

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Introduction

On December 31st 2019, the authorities of Wuhan municipality in China informed the world about a set of pneumonia cases with unknown etiology. On January 9th 2020, the Chinese Center for Disease Control and Prevention identified a new virus of the Coronaviridae family that causes 2019 Coronavirus Disease (COVID-19). On January 30th 2020, with over 9,700 confirmed cases in China and 106 confirmed cases in other 19 countries, the director-general of the World Health Organization (WHO) declared that the outbreak was a public health emergency of international concern, following the advice of the International Health Regulations (IHR) Emergency Committee [1].

Prevention and effective treatment are fundamental for facing epidemics or pandemics such as the one caused by Severe Acute Respiratory Syndrome Coronavirus 2 (SARS-CoV-2) [2]. Folk-domestic medicine, enriched by the contributions of indigenous traditional medicine, plays a pivotal role in complementing existing needs and can sometimes act as an alternative for the limited options available for COVID-19 [3]. Folk-domestic medicine is defined as the knowledge, resources and therapeutic actions that take place within a household. Healthcare actions deriving from it are performed by immediate family or community members without the direct participation of a formal health professional [5]. The people who have suffered from COVID-19 use different plants depending on the symptoms they experience (self care).

The dissemination of the use of folk-domestic medicine, influenced by traditional medicine particularly in rural and indigenous areas, has served as a resource for providing better healthcare for those who can't afford medical bills or who lack access to more technologically advanced alternatives [6].

This research aims to provide a description of the perceptions, knowledge, uses and practices of folk-domestic medicine in people who have suffered from COVID-19.

Material and Methods

Study design

This research is qualitative, data were collected through an interview and the patients' answers are presented here for further interpretation; its scope is exploratory since we inquired about a new subject caused by an emergent agent called SARS-CoV-2; it is cross-sectional given that the information was gathered in a specific time period and sample; and it has a phenomenological design because it focuses on knowing the patients' experiences through their narrative.

Study site

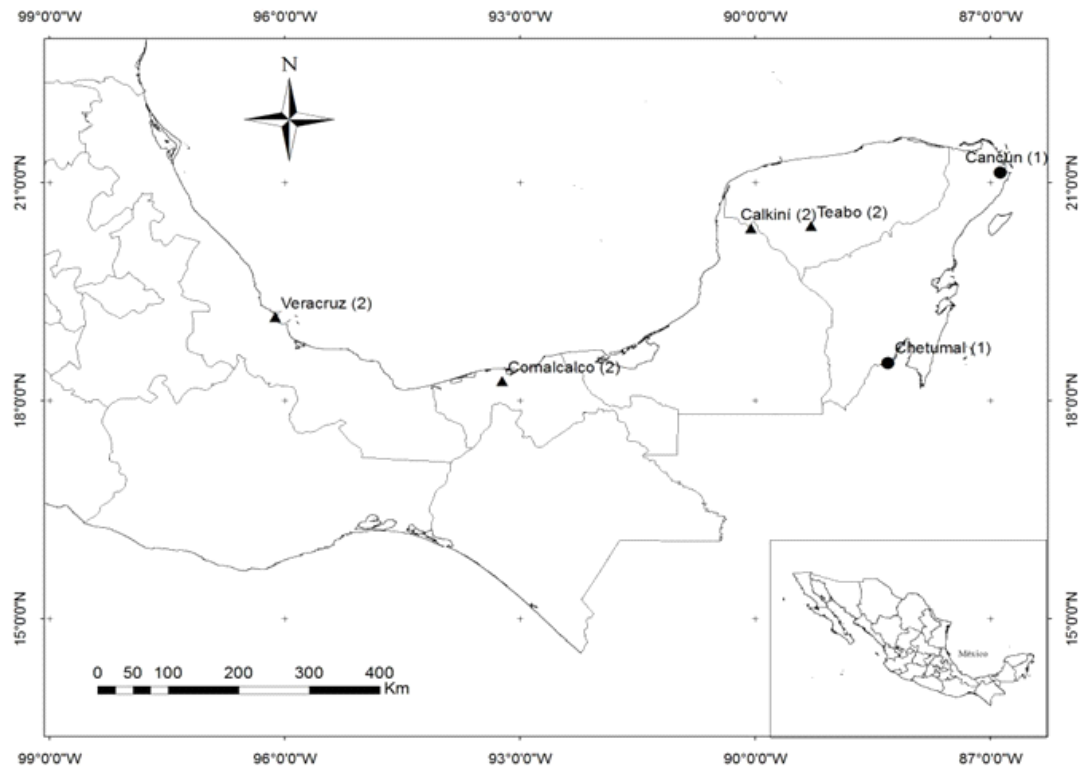
The study subjects are from different areas in Southeast Mexico:

Teabo, Yucatán, Mexico (20°-24'01"-N, 89°-17'06"-O) is located in the state's central region, within the maize production area. It has a population of 6,551 people, of which 3,267 are men. There is a total of 1,464 households. The main economic activities are agriculture and livestock farming [7]. The mean annual temperature is 26 °C, with rains during the summer (85.010 mm in average) and rainforest vegetation [7].

Calkiní, Campeche, Mexico (20°-22'162"- N, 90°-03'03"- O) is located in the northern part of the state of Campeche, it has a population of 56,537 people [8]. Its main economic activities are agriculture, livestock farming, silviculture and fishing. The mean annual temperature is 26.4°C and the vegetation types are coastal dunes, mangrove, savanna and lowland tropical rainforest.

Cancún, Quintana Roo, Mexico (21°-09'38"- N 86°-50'51"- O) is located in the Benito Juárez municipality, 370 km away from Quintana Roo's capital city. It has a population size of 722,800 people [9]. Tourism is both the municipalities and the cities main source of income, making it the motor of the economy. The mean annual temperature is 25.5°C. The total annual precipitation oscillates between 1.000 and 1.300 millimeters. Rainforests constitute around 90% of the vegetation cover, while mangroves and tulars are located mainly near the coastal dunes.

Figure 1: Geographic location of patients with COVID-19 in Southeast Mexico (1 patient, 2 patients). Source: Created by the authors, 2021.



Chetumal, Quintana Roo, Mexico (1.8°-30'13"-N, 88°-18'19"-O) is the state capital and it is located in the Othón P. Blanco municipality. It has a population size of 169,700 people [9] with 34,562 households [10]. Its main economic activities are commerce and public administration. The mean annual temperature is 26.7° C. The predominant vegetation types are wetlands and tropical rainforest [10].

Comalcalco, Tabasco, Mexico (18°-16'48"-N, 93°-12'6"-O) is located in the state's northeast region and its municipal head city is Comalcalco City. It has a population of 192,802 people, with 51,994 households. Its main economic activities are commerce and services. The mean annual temperature is 26.4 °C, with a mean monthly maximum temperature of 34.5 °C in May and a mean monthly minimum temperature of 22 °C in December and January. Comalcalco is and has always been an eminently agricultural municipality, having been the first cacao producing municipality in Mexico [11].

Veracruz, Mexico (19°-10'22"-N, 96°-7'60"-O) is located in the central region of the Gulf of

Mexico. It has a population size of 8,112,505 people with 2,251,217 households. Its main economic activity is commerce. The mean annual temperature is 23 °C, with a mean monthly maximum temperature of 32 °C in April and May and a mean monthly minimum temperature of 13 °C in January. Most vegetation is aquatic, but there are also rainforests, dry forests and grasslands [8]. The map in the figure 1 shows the location of the interviewed patients by state, so as to indicate their place of residence as well as the amount of participants per state.

Participant selection

Participants were selected according to the following criteria: a) they had been COVID-19 patients and, b) they used folk-domestic medicine to treat the disease. Before conducting the interviews, participants were selected through snowball sampling which is a method for finding research subjects. In this method, a research subject provides the researcher with another potential subject's name who, in turn, points the researcher to a

Table 1. Sociodemographic characteristics of the interviewees from Southeast Mexico, 2020.

	Age	Sex	Comorbidities	Residence
Interview 1	50	Woman	N/A	Teabo, Yucatán
Interview 2	35	Man	Diabetes	Teabo, Yucatán
Interview 3	52	Man	Hypertension Diabetes	Calkiní, Campeche
Interview 4	44	Man	N/A	Calkiní, Campeche
Interview 5	24	Woman	N/A	Cancún, Quintana Roo
Interview 6	33	Man	N/A	Chetumal, Quintana Roo
Interview 7	53	Man	Hypertension	Comalcalco, Tabasco
Interview 8	71	Man	Hypertension	Comalcalco, Tabasco
Interview 9	69	Woman	Diabetes Hypertension	Veracruz, Veracruz
Interview 10	28	Woman	N/A	Veracruz, Veracruz

*N/A: Does not apply

Source: Created by the authors, 2020.

third subject, and so on [12]. Ten participants between the ages of 20 and 75 were selected, four of which were women and six were men. They were equally distributed between the 5 southeast states (Yucatán, Campeche, Quintana Roo, Tabasco y Veracruz) until the sample size was covered according to the data saturation criterion.

Data analysis

To collect the data:

(a) Communication with the participants was established via phone calls and express delivery services in order to contextualize and authorize participation in the study. Afterwards, the interview was conducted through phone calls and video calls in digital platforms to which the participants had access, beginning with a brief introduction of the process.

(b) The interview was semi-structured: it was conducted with the help of a question guide written for the purpose of this research and divided into three categories (experience with COVID-19, use of folk-domestic medicine and experience with folk-domestic medicine). The interview had 23 items in total and lasted between 35 and 55 minutes. Before applying the instrument, authorization for the voluntary participation of the interviewees was requested through an informed consent form, which also requested permission for recording

the conversations and for managing the resulting information. Confidentiality of the information was guaranteed. Table 1 shows the sociodemographic characteristics of the interviewees from the Southeast of Mexico, 2020.

Ethical aspects

The Research Ethics Committee (Comité de Ética en Investigación) of the Hideyo Noguchi Regional Research Center (Centro Regional de Investigación Hideyo Noguchi) of the Autonomous University of Yucatán (Universidad Autónoma de Yucatán) (Mérida, Yucatán, Mexico) approved this study's ethical declarations, as a goal of the project registered under the number CIRB-2020-0010.

Results

Six men and four women who no longer carry SARS-CoV-2 were interviewed. The participants' age oscillated between 20 and 75, and most of them were young adults; 50% of them suffered from morbid diseases and the male sex was prevalent. It is important to note that eight of the ten participants stated that they were the only ones who contracted the virus in their household, meaning that they managed to isolate themselves before infecting the people they cohabit with, thus preventing

Table 2. Medicinal plants used by COVID-19 positive patients

MEDICINAL PLANTS	CHEMICAL COMPOSITION	BENEFITS
Guava leaf <i>Psidium guajava</i> (L.) Burm	Acoradiene, Eugenol, Caryophyllene, Caryophyllene oxide, β -bisabolene, Longiborneol, Selinene, Nerolidol, cis- α -bisabolene, α -Caryophyllene, α -terpineol, Copaene and α -bisabolol have been detected (13).	Cardiovascular, inflammatory and cancer disease prevention (14).
Eucalyptus <i>Eucalyptus camaldulensis</i> Dehnh	The main component is 1,8-Cineole, followed by Terpinen-4-ol, α -Pinene, Limonene, α -Terpinene, α -Terpineol, β -Myrcene and α -Copaene (15).	Eucalyptus leaves are used for infections, fever, stomach problems and cough (15).
"Hoja santa" <i>Piper auritum</i> Kunt	Presence of α and β - phellandrene, α and β -pinene, sabineno, α and γ -terpinene, terpinolene and α -tuyeno, cadina-1,4-diene, β - bisabolene, β -bourbonene, batacaryophyllene oxide, α - copaene, α cubenene and β - sitosterol (16).	Insective, repellent and anti-feedant properties (17).
Basil <i>Ocimum basilicum</i> L.	Fourteen components have been identified constituting 77,22% of the oil. These include: Isoestragole (58,33%), humulene (5,71%), eucalyptol (4,09%), β -linalool (2,71%), cis- β -ocimene (2,00%) and camphor (1,63%) (18).	Therapeutic infusion. Anti-inflammatory, antiseptic, antispasmodic and analgesic. Its is used in traditional medicine for the treatment of respiratory and gastrointestinal diseases (18).
Laurel <i>Litsea glaucescens</i>	Among its over 80 components, there are α -terpynil acetate, terpinen-4-ol, α and β -pinene, sabinene, para-cymene, limonene, eugenol, methyl-eugenol, geraniol and linalool (19).	The leaves have been traditionally administered as an infusion to treat the symptoms of digestive disorders and to act as a gastric and intestinal antispasmodic and as an astringent for diarrhoea. They have also been used for rheumatic pain, respiratory conditions, cough, asthma, and cardiac conditions (19).

the propagation of the virus to their surroundings.

The context of the experience with COVID-19

Regarding the instrument's categories, the first one called "Experience with COVID-19" consists of variables that were adopted according to the

approaches to the diseases, as well as elements that allowed the researchers to know the patients' experiences and the process that they

Table 2a. Medicinal plants used by COVID-19 positive patients (continue).

MEDICINAL PLANTS	CHEMICAL COMPOSITION	BENEFITS
Rosemary <i>Rosmarinus officinalis</i> L.	The presence of α -pinene, β -pinene, camphene, terpene esters like 1,8-cineole, camphor, linalool, verbenol, terpineol, carnosol, rosmanol, isorosmanol, 3-octanone, isobanyl-acetate and β -caryophyllene; vanillic, caffeic, chlorogenic, rosmarinic, carnosic, ursolic, oleanolic, butilinic and betulinic acids, betulin, α -amyrin, β -amyrin, borneol, and bornyl acetate has been identified (20).	It generates a tonic and stimulant action over the nervous system, the circulatory system, and the heart, while also acting as a choleric, a cholagogue, an antispasmodic a diuretic, an emmenagogue and an antigonadotropic (20).
Peppermint <i>Mentha piperita</i> L.	Among the main compounds are: menthol (35-45%), menthone (15-20%), menthyl acetate (3-5%), isomenthone (2-3%) neomenthol (2.5-3.5%) menthofuran (2-7%), limone, pulegone, α and β -pinene, and trans-sabinene hydrate (21).	Treatment of nausea, vomit and gastrointestinal disorders (22).
Oregano <i>Plectranthus Amboinicus</i>	The main compounds are carvacrol (28,65 %), thymol (21,66 %), α -humulene (9,67 %), undecanal (8,29 %), γ -terpinene (7,76 %), p -cymene (6,46 %), caryophyllene (5,85 %), α -terpineol (3,28 %) and β -selinene (2,01 %) (23).	As a medicinal plant, it is used for chronic cough, bronchitis, asthma and other respiratory conditions, rheumatoid arthritis, epilepsy, convulsions, hiccups, stomachache, ear pain, colics, fever, flatulence, kidney stones and gallstones. It is also used to fight infections caused by fungi and bacteria, diarrhoea and intestinal parasites (24).
Lemon grass <i>Cymbopogon citratus</i>	β -citral and α -citral are the main compounds (25).	It is used to induce relaxation and sweat, as an antidepressant, a diaphoretic, an antiseptic, and a febrifuge; it also reduces digestive problems, weakness, intestinal gas and worms, flatulence, neuralgia, asthma, and rheumatism (26).
Lemon balm <i>Melissa officinalis</i>	Eugenol has been identified as the main compound with 45.47%, followed by caryophyllene, α -caryophyllene, 3-methyl-4-isopropylphenol, germacrene D, with 40.77%, 2.94%, 1.52% and 1.17% respectively (27).	Digestive stimulant and treatment of gastrointestinal spasms (28).

went through depending on their medical condition.

Preexisting conditions of diabetes, obesity or hypertension were taken into consideration so as to analyze the perceived impact of the disease on the patients. Of the ten interviewees, one woman and two men suffer from diabetes and hypertension, while two other men only have hypertension; therefore, half of the patients suffer from chronic illness and most of them are men.

In terms of the disease's impact on patients with chronic illness, the general perception is that COVID-19 affected them through moderate to strong symptoms. They expressed that the main symptoms they experienced were the loss of taste and smell, fever, fatigue, lack of oxygen, chest pain, dry cough and weakness. Following the acute medical condition, they presented neurological sequels like memory loss as well as neuromuscular sequels such as weakness, fatigue, pulmonary damage and sexual inactivity. In contrast, patients without comorbidities perceived that they presented similar but weak symptoms of which the most common were fever, weakness, dry cough, fatigue and shortness of breath. One patient experienced facial paralysis as a probable neurological sequel.

Once the patients tested positive for SARS-CoV-2 in different health institutions, they put themselves in domiciliary isolation, staying in adjacent rooms to the rest of their family with the necessary objects for their stay and recovery. Likewise, they relied on family support networks that provided them with meals during the day and night, as well as complementing activities that the patients were unable to perform including doing the laundry, cleaning the bathroom (being the only space that they shared with other family members) and washing and disinfecting the objects that they had contact with.

Within the same process of support networks, their family members adopted preventive measures to avoid the propagation of the virus. Every time they had contact with the sick person, they used hand sanitizer before and

after leaving the room; they also disinfected objects and washed their hands frequently, wore face masks and used sanitizing mats and special cleaning products (bleach) to minimize the risk of spreading germs and infecting the other family members.

The use of folk-domestic medicine for the treatment COVID-19

The patients stated that when they had COVID-19 they turned to homemade remedies such as teas and infusions prepared with medicinal plants and ingredients recommended by family members, friends and acquaintances who had been through the same experience so as to reduce the symptoms, promote a quick recovery and boost the immune system.

The medicinal plants used by the patients can be found in Table 2 and 2a. It is important to mention that the interviewees used additional ingredients such as garlic, onion, honey, ginger, cellery, cinnamon, pineapple, lemon, orange, vanilla, laburnum and chamomile.

As for the preparation of the remedies for the disease, the participants mentioned the following procedures:

"... In a pot, heat 3 liters of water, add 6 acuyo, eucalyptus, guava and ginger leaves..." (E9).

"... I boiled water in a pot and added eucalyptus and "vaporub" leaves; for another preparation, I added orange and lemon to hot water..." (E10).

"... I heated one liter of water and added guava leaves with honey and lemon..." (E1).

"... In the pot, I boiled all of the ingredients which were holy leaf, laurel, cinnamon, ginger, vanilla, rosemary, onion, laburnum and eucalyptus..." (E4).

"... I heated water and added a lemon, a teaspoon of honey and cinnamon; for another concoction, I added garlic, onion and honey to the hot water and then strained it and drank it. For another one, I heated water, added eight guava leaves, strained it and added honey to sweeten it..." (E2).

"... I boiled water and added two or three oregano leaves and a piece of ginger, and I added honey to sweeten it..." (E7).

“... Hot water and I added chamomile, two aspirin, two lemons and two holy leaf leaves. Additionally, I heated water and added eucalyptus, chamomile and ginger...” (E8).

“... Boiled 150 ml of water with three to four cinnamon sticks, boil for three minutes, remove from the flame, allow to rest, remove the cinnamon, and add lemon dops and a teaspoon of honey...” (E5).

It should be noted that two patients were not familiar with the preparation process of the concoctions since their family members were the ones who brewed them.

As for the preparations, they served two purposes: firstly, the remedies were consumed daily during specific hours (morning, afternoon, and evening); the infusions had to be hot at the time of ingestion for them to have an effect on the body. Likewise, their steam was inhaled before they were ingested to reduce respiratory discomfort.

Experience with folk-domestic medicine

Interviewees assign an important value to folk-domestic medicine given that they use these practices as an important option for satisfying their healthcare needs. Of the ten participants, six mentioned that they had previous experience with this alternative having used it to treat other conditions such as kidney stones, diarrhea, the common cold and headaches, among others. Therefore, the health implications indicate that the interviewed population used medicinal plant-based teas and infusions to relieve COVID-19's main symptoms such as chest pain, dry cough, shortness of breath and stomach discomfort since, from their personal experience and perspective, they can lead to recovery by reducing the symptoms and boosting the immune system.

The following are some of the testimonies given by the interviewees who had recurred to folk-domestic medicine before suffering from COVID-19:

“... Pineapple leaves with basil help to reduce stomach inflammation and tomato helps to relieve sore throats and discomfort...” (E9).

“... To treat numerous diseases or home remedies like insomnia, stomachache, and relaxation...” (E7).

“... For kidney stones, intestinal disorders, vomit, and the common cold...” (E5).

On the contrary, four of the participants experienced this complementary strategy for the first time and they affirmed that it benefited their recovery and physical and emotional wellbeing, which is why they are convinced that they will continue to consume these remedies, to gather information about them and to recommend them to other people. Likewise, the main benefits these remedies brought the patients were: the relief of stomachache and chest pain, the reduction of lung and throat inflammation, respiratory regulation, phlegm expulsion, relaxation, the improvement of metabolic performance and the strengthening of the immune system. All of these were helpful in serious COVID-19 cases. Additionally, the patients mentioned that, when using folk-domestic medicine in conjunction with conventional medicine, it is important to consume the remedies responsibly and at different times of day, to know in advance their specific benefits and properties, and to follow the health professionals' advice.

In terms of the importance of folk-domestic medicine, patients externalized the following:

“... If this testimony is of any use, I would like to say that one should not necessarily turn to folk-domestic medicine with this disease, but to any other, go to a doctor to get diagnosed, since he would not recommend consuming remedies without consulting with a professional first...” (E3).

“... I widely recommend the use of folk-domestic medicine and we should not wait until we get sick to use it. Tea helps us to overcome the disease, since it is recommended for those with strong symptoms to only drink it moderately, twice or thrice a week...” (E1).

“... It is very important nowadays and, with this new disease, it has helped many people to get well and to have a good immune system, and

with natural remedies without chemicals. The most important thing is that we have it at home and nowadays many of these remedies have saved lives regarding COVID-19. Anything to avoid arriving at a hospital or contracting a severe case of pneumonia..." (E2).

"... From my point of view, drinking teas does not have any negative consequences or reactions since one feels relief and satisfaction while drinking it; after ingesting it, the organism improves. I recommend it, it worked for me and there are many beneficial plants. It is a millenary tradition with which our ancestors cured themselves in a natural way, without any chemicals..." (E7).

"... We depend on this medicine, since our ancestors did not know drugs and folk-domestic medicine helps us to overcome diseases and is beneficial because it is natural..." (E8).

"... A great importance, given that it is inherited from generation to generation, and it is great valued for a family since it has worked for them..." (E5).

"... Basically, they should not stick to the idea that everything needs to be a drug, since there are many plants that we can find in nature which provide us with benefits; likewise, they are within reach and economically viable..." (E6).

From all of the previous information, it is concluded that, from the patients' perspective, folk-domestic medicine has fulfilled their expectations and efficacy for treating this new disease. However, it is important to highlight that folk-domestic medicine treatment was functional when complemented with conventional drugs prescribed by medical specialists; based on the interviewees' experiences, this alternative is still currently in use and should be promoted as an element of cultural identity and heritage.

Discussion

Since COVID-19 is an emergent disease, the population resorts to natural remedies including medicinal plants that have antiviral and anti-inflammatory properties, boost the

immune system, or help treat respiratory conditions. So far, there is a comprehensive review based on pharmacology on medicinal plants and their possible effects on the pathogenesis of COVID-19 by Atefeh Jalali et al., which mentions the possible inhibition of virus entry into human cells by means of angiotensin converting enzyme (ACE) blockade, and many others such as *A. paniculata*, *Citrus* spp. and *Cuminum cyminum* are mentioned in the article for their ability to relieve respiratory symptoms associated with SARS-CoV-2 infection. [34].

This study aims to describe the perceptions, uses and practices related to folk-domestic medicine that have been considered as an option for primary healthcare by people who have suffered from COVID-19. Patients highlight the importance of using medicinal plants for treating the disease. The most commonly used plants were guava, eucalyptus, holy leaf, basil, rosemary and laurel leaves prepared as teas and infusions, and they were said to induce a fast recovery and to relieve the symptoms quickly. At the same time, participants acknowledge that it is important to view folk-domestic medicine as a complement for other treatments, meaning it is viewed as an additional therapeutic method to conventional medicine that has few to no secondary effects [29]. However, since medicinal plants act directly on the pathogenesis of COVID-19, by blocking the angiotensin-converting enzyme, pharmacological properties can be attributed to them, which also implies possible interactions and adverse effects on the patient who consumes them. Currently, there is no proven scientific evidence on the exact dosages and their association with adverse reactions. For this reason, the authors of this research suggest caution when taking any type of traditional medicine due to its probable short- and long-term adverse effects.

The overall lack of research on the use of folk-domestic medicine for the treatment of COVID-19 led this study to document patients' experiences with this medical practice applied to the new disease, as well as the perceptions, knowledge and uses that precede its adoption,

considering that the economic factor influences the preference of easily accessible resources such as natural remedies [30], and that some patients turn to folk-domestic medicine for the treatment of diverse illnesses permanently. Therefore, the interviewees agreed that the use of medicinal plants constitutes a low cost and accessible option, making it their first choice of treatment in case of sickness.

Practices such as folk-domestic medicine have become more common for primary healthcare, in which patients without any previous experience stated their interest in continuing and recommending the use of medicinal plants for the treatment of other ailments, as they have personally experienced physical and emotional benefits deriving from it. However, if this type of medicine is not administered correctly, it can cause serious health risks, specially for patients that have never used natural remedies before. Additionally, this practice is usually recommended by people who are close to the patient's family or social circle, are not certified professionals and encourage the self-consumption of these products.

There is more behind medicinal plants and their therapeutic use than traditional and popular knowledge; all plants possess a large number of chemical compounds, most of them without any pharmacological effect. Plants' medicinal effects are frequently due to the interactions between their different compounds. Combinations of different species and compounds are commonly used in folk-domestic medicine, as exemplified by the complementary natural ingredients with beneficial properties used by the patients such as garlic, onion, honey, ginger, cinnamon, lemon, and orange. Additionally, chemical compounds in medicinal plants are not uniformly distributed along the plant but are concentrated in certain parts or organs like flowers, leaves, roots, or seeds [31].

No fruit, vegetable or medicinal plant is known to confer protection against COVID-19 by itself. Any proposal of a drug or treatment against this disease must be carefully considered, since a

thorough research, experimentation and secondary effect control process is needed to validate its efficiency and massively and safely promote its use among the population [3].

There is many information regarding the social, economic, cultural and sanitary impacts that this pandemic is causing worldwide. Therefore, it is important to acknowledge that Natural and Traditional Medicine (NTM) has something to say and to contribute in the fight against the propagation and effects of coronavirus [3]; as is the case for Traditional Chinese Medicine (TCM), where experts have found that TCM could be used to treat COVID-19 alongside antiviral modifiers and antibiotics [29].

NTM is also used in Mexico to treat this disease. In Sonora, it was documented that 30% of the 350 inhabitants of the Comca'ac ethnic group (the Series mouth) showed COVID-19 symptoms and received the support of the community's traditional medicine practitioners, who offered symptomatic remedies using medicinal plants of the region. The community relied on Martín Maldonado's (respiratory therapist) role as an intercultural link, who decided to intervene out of empathy for his fidelity towards traditional medicine practitioners who in turn, have delivered assertive results against COVID-19 symptoms. Thanks to the strategies developed by the Community Health Committee (Comité de Salud Comunitario) that include the use of local resources (herbalism) and the adoption of alternative measures for boosting health, there have been no deaths in the community [32].

Future research should adopt a traditional physician's approach, comparing between folk-domestic medicine and traditional medicine since, given that they are both associated with medicinal plants, their resources are more abundant, accessible and well-known. However, traditional medicine is much more than medicinal botany, since there is a wide range of "specialists" such as *curanderos*, *yerberos*, *sobadores*, *rezadores*, *hechiceros*, *parteras* etc., who don't only recur to herbalism but also perform ceremonies and rituals that are rich with curative symbolism. Overall,

traditional physicians have been a strongly cohesive group, a cultural identity factor and a curative resource with wide social recognition [33].

Conclusion

The patients who entered the study highlight the importance of the use of medicinal plants for the treatment of the disease, and the most used plants are guava, eucalyptus, holy leaf, basil, rosemary and prepared bay leaves. As a hot drink like, in teas and infusions, and were said to induce rapid recovery and rapid relief of symptoms.

At the same time, the participants believe that it is important to look at popular-domestic medicine as a complement to other treatments, which means that it is seen as an additional therapeutic method to conventional medicine; that it has few side effects according to the experience of the populations that practice it. However, it is possible to note that medicinal plants act directly on the pathogenesis of COVID-19, by blocking the angiotensin-converting enzyme, that is, pharmacological properties can be attributed to them, which also implies possible interactions and adverse effects in the patient who consumes them. Currently there is no proven scientific evidence on the exact doses and their association with adverse reactions, a pending task for complementary treatment for COVID-19

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