Revista Información Científica

ISSN 1028-9933
Universidad de Ciencias Médicas de Guantánamo

November 2024 Volume 103 e4614
DOI: https://doi.org/10.5281/zenodo.11094465

ORIGINAL ARTICLE

Traditional medicine and COVID-19: influence on the recovery and satisfaction of the Tsáchila nationality

Medicina tradicional y COVID-19: influencia en la recuperación y satisfacción de la nacionalidad Tsáchila

Medicina tradicional e COVID-19: influência na recuperação e satisfação da nacionalidade Tsáchila

Walter Patricio Castelo Rivas[I]*, David Israel Gallardo Córdova[I]*, Allison Juliana Zúñiga García[I], Jesica Liliana Cueva Toaquiza[I], Ángel Ramón Sabando García[I]

[I]Pontificia Universidad Católica del Ecuador. Ecuador.

***Corresponding author:** digallardoc@pucesd.edu.ec

Received: 17-03-2024 **Accepted:** 01-11-2024 **Published:** 11-11-2024

ABSTRACT

Introduction: traditional medicine is a healing alternative used by indigenous nationalities with the aim of promoting recovery from certain diseases, where ancestral processes were an option to mitigate the repercussions of COVID-19. **Objective:** to establish whether ancestral medicine influenced the levels of satisfaction and recovery time of members of the Tsáchila nationality who presented symptoms of COVID-19 infection. **Method:** the scope of the research was correlational; with transversal design. A total of 1,003 members of the Tsáchila nationality participated in the study, to which a questionnaire consisting of 22 closed questions was applied through non-probabilistic sampling. The data were analyzed through processes of convergent validity, discriminant validity and modeling of structural equations developed in SPSS24 and AMOS 24. **Results:** it was proven that contagion symptoms influenced conventional medicine (β=0.228), traditional medicine (β =0.529), treatment with plants (β=0.507), and that traditional medicine (β=0.328) and plant-based medicine (β=0.568) influenced the recovery time and satisfaction levels of the members of the Tsáchila nationality who were infected. **Conclusions:** it was conclude that traditional medicine and medicine based on medicinal plants influence the satisfaction rates and recovery time of members of the Tsáchila nationality who had symptoms of COVID-19 during the pandemic, while conventional medicine does not.

Keywords: COVID-19; contagion; treatment; satisfaction; traditional medicine

ISSN 1028-9933
Universidad de Ciencias Médicas de Guantánamo

RESUMEN

Introducción: la medicina tradicional es una alternativa de curación utilizada por las nacionalidades indígenas con la finalidad de favorecer a la recuperación de ciertas enfermedades, donde los procesos ancestrales fueron una opción para mitigar las repercusiones de la COVID-19. **Objetivo:** establecer si la medicina ancestral influyó en los niveles de satisfacción y tiempo de recuperación de los miembros de la nacionalidad Tsáchila que presentaron síntomas de contagio de COVID-19. **Método:** el alcance de la investigación fue correlacional; con diseño transversal. Un total de 1003 miembros de la nacionalidad Tsáchila participaron en el estudio, a quienes a través de un muestreo no probabilístico se les aplicó un cuestionario conformado por 22 preguntas cerradas. Los datos fueron analizados a través de procesos de validez convergente, validez discriminante y modelados de ecuaciones estructurales desarrolladas en SPSS24 y AMOS 24. **Resultados:** se comprobó que los síntomas de contagio influyeron en la medicina convencional (β=0.228), medicina tradicional (β=0.529), tratamiento con plantas (β=0.507), y que la medicina tradicional (β=0.328) y la medicina basada en plantas (β=0.568) influyeron en el tiempo de recuperación y los niveles de satisfacción de los miembros de la nacionalidad Tsáchila que se contagiaron. **Conclusiones:** se concluye que la medicina tradicional y la medicina basada en plantas medicinales influye en los índices de satisfacción y el tiempo de recuperación de los miembros de la nacionalidad Tsáchila que tuvieron síntomas de COVID-19 durante la pandemia, mientras que la medicina convencional no lo hizo.

Palabras clave: COVID-19; contagio; tratamiento; satisfacción; medicina tradicional

RESUMO

Introdução: a medicina tradicional é uma alternativa de cura utilizada pelas nacionalidades indígenas com o objetivo de promover a recuperação de determinadas doenças, onde os processos ancestrais foram uma opção para mitigar as repercussões da COVID-19. **Objetivo:** verificar se a medicina ancestral influenciou os níveis de satisfação e tempo de recuperação de membros da nacionalidade Tsáchila que apresentaram sintomas de infecção por COVID-19. **Método:** o escopo da pesquisa foi correlacional; com desenho transversal. Participaram no estudo um total de 1.003 membros da nacionalidade Tsáchila, aos quais foi aplicado um questionário composto por 22 questões fechadas através de amostragem não probabilística. Os dados foram analisados através de processos de validade convergente, validade discriminante e modelagem de equações estruturais desenvolvidas em SPSS24 e AMOS 24. **Resultados:** comprovou-se que os sintomas de contágio influenciaram a medicina convencional (β=0,228), a medicina tradicional (β=0,529), o tratamento com plantas (β=0,507), e que a medicina tradicional (β=0,328) e a medicina vegetal (β=0,568) influenciaram o tempo de recuperação e os níveis de satisfação dos membros da nacionalidade Tsáchila que foram infectados. **Conclusões:** concluiu-se que a medicina tradicional e a medicina baseada em plantas medicinais influenciam os índices de satisfação e o tempo de recuperação dos membros da nacionalidade Tsáchila que apresentaram sintomas de COVID-19 durante a pandemia, enquanto a medicina convencional não o fez.

Palavras-chave: COVID-19; contágio; tratamento; satisfação; medicina tradicional

How to cite this article:
Castelo Rivas WP, Gallardo Córdova DI, Zúñiga García AJ, CuevaToaquiza JL, Sabando García AR. **Traditional medicine and COVID-19: influence on the recovery and satisfaction of the Tsáchila nationality.** RevInfCient [Internet]. 2024 [cited Access date]; 103:e4614. Available in: https://revinfcientifica.sld.cu/index.php/ric/article/view/4614

Email: ric.gtm@infomed.sld.cu

INTRODUCTION

The outbreak that started in Wuhan at the end of 2019, known as later COVID-19, swept significantly, going around the world and bringing with it an extreme change in the lives of many people, since in such a short time it evidenced a large number of infected people and at the same time bringing with it the loss of numerous lives.[1]

In this sense, COVID-19 is a disease transmitted by a pathogenic agent, originally SARS-CoV-2, which was rapidly transmitted worldwide and declared a global pandemic in March 2020, according to the World Health Organization.[2] Depending on the associated symptoms, the infection can vary in intensity, ranging from mild to severe. In uncomplicated cases, viral infection in the upper respiratory tract is distinguished by the presence of general symptoms.[3] Rural areas inhabited by indigenous communities were negatively impacted, resulting in a situation of persistent marginalization characterized by high levels of poverty and inequity in terms of access to health care.[4]

On the other hand, at the beginning of the pandemic, there was limited knowledge about COVID-19 and its therapeutic approach, which led to the need for experimental therapies and drug repurposing to combat this new viral disease. However, thanks to the tireless efforts of clinical researchers globally, significant progress has been made since then.[5] Despite the absence of a scientifically proven treatment for coronavirus (COVID-19), numerous efforts have been devoted to investigating effective methods of prevention and treatments for the symptoms of the infection. Alternative options to conventional medicine have been explored in the treatment of the signs associated with the disease.[6]

This disease severely affected indigenous communities, which prompted a resurgence of traditional knowledge, practices and strategies on the use of medicinal plants, which continues to be an integral part in indigenous communities to face the clinical picture of the disease.[7] According to shaman Abraham Calazacón, the pandemic has motivated the Tsáchilas to rediscover and value ancestral wisdom; among the valuable legacies transmitted by ancient shamans, there is a kind of guide that offers guidelines to preserve the body's health.[8]

Thus, Tuaza[9] in his research on the impact of COVID-19 on the indigenous populations of Chimborazo, Ecuador, which included online interviews conducted with leaders of indigenous entities at the national level, mentions that concern about the loss of life caused by the coronavirus and the difficulty in meeting the costs associated with the purchase of medicines have led to the revival of ancestral practices of disinfection and treatment of respiratory diseases in indigenous communities.

According to a study conducted by Horbath[10] focused on indigenous populations and the initial spread of COVID-19 in Mexico, he used a descriptive statistical analysis with a sample of 1054 individuals, establishing that the highest mortality rate and infection rates were recorded in municipalities with indigenous populations. In addition, these municipalities are characterized by greater exposure and spread of infection. This is attributed to the fact that health care coverage is very limited and functional means are inadequate to deal with the pandemic.

According to a research carried out by Castelo and Yépez[11] in relation to the effect of COVID-19 focused on communities of Poste and Otongo Mapalí, which are indigenous members belonging to Ecuador, they used a quantitative approach with correlational scope, in which they worked with a sample of 210 inhabitants. This research reflects that most people, when infected, chose to combine Western medicine with their ancestral medicine, which proved to be more effective in the recovery process, resulting in greater satisfaction.

According to Del Aguila,et al.[12] in their research on medicinal plants used in the indigenous population belonging to the Department of Loreto, specifically in Urarina, Peru, as a strategy to face the COVID-19 epidemic, they used qualitative methods, mainly using semi-structured interviews with a sample of 101 people. Thus, during the pandemic, 16 plant species were the only tools available to face it, because of the lack of access to the health sector and its attention; the community had to resort to traditional knowledge with some plants that had healing properties to face an unknown virus. The low mortality rate, which was less than 1% despite the widespread spread among the inhabitants, suggests the efficacy of some preparations used in the community against COVID-19.

A study by Castelo and Lara[13] obtained a significant finding regarding the period of recovery from treatment, after the administration of the combined medicine in the residents of Comuna Chibuleo, indicating that 93.6% of the participants recovered within three to seven days. In view of this, the satisfaction with the treatments received stands out, since the results revealed that 98.7 % of the inhabitants were satisfied and very satisfied with the procedures applied.

It should be noted that the COVID-19 situation up to May 2023 reached a total of 192490065 cases of infection and a total of 2949383 cases of deaths in the Americas.[14] Despite the actions taken by the World Health Organization (WHO), which decreed on May 5, 2023 the end of the emergency that kept many people in international alarm due to the coronavirus, it recognizes that this does not mean that it has ceased to be a threat, therefore, countries must maintain surveillance activities and recommendations issued.[15]

In Ecuador, the first person infected with COVID-19 was reported on February 29, 2020. In response to this, an urgent request was made to send a Health Response Plan to address the adequacy of health centers and consolidate their services. Throughout the pandemic, the number of deaths per day experienced three waves. In the first wave, 671 confirmed deaths were recorded. In the second wave, which occurred in epidemiological week 16 of 2021, 536 confirmed deaths were reported, coinciding with the presence of the Delta variant in Ecuador.[16]

The demand for patients with COVID-19 exceeded the capacity of the Gustavo Domínguez hospital, as well as other hospitals in Santo Domingo, and there was a high rate of deaths.[17] The collapse of the hospitals led some people to opt to receive care at home. A member of an indigenous community commented that the general preference was to cure themselves at home using medicinal plants instead of going to the hospitals, according to his experience, it gave them better results, since in the city many people were dying, while in the rural areas there were fewer deaths.[18]

The present research is based on the need to obtain a more complete understanding through scientific methods about the measures implemented by members of the Tsáchila nationality to confront COVID-19. The results obtained will be valuable to science by providing information to evaluate the efficacy of ancestral practices and medical treatments used to mitigate the effects and sequelae of the virus.

The objective was to establish the influence of traditional treatments within the levels of satisfaction and recovery time of members of the Tsáchila nationality who had symptoms of COVID-19 infection. Taking into account the above, the research model to be tested is presented below:

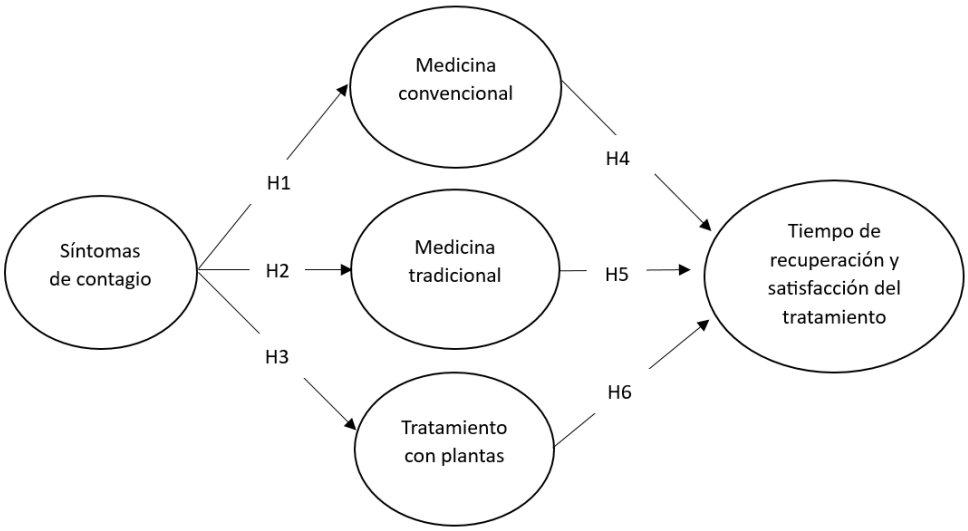


Fig.1. Hypothesized research model.

	Conventional medicine	
Symptoms of contagion	Traditional medicine	Recovery time and treatment satisfaction
	Treatment with plants	

METHOD

The present investigation was developed with a quantitative research perspective with a correlational scope and a cross-sectional design, in which we worked with 1756 members of the Tsáchila nationality of Santo Domingo de los Colorados - Ecuador, from which we took a sample of 1003 people who determined that they felt symptoms of COVID-19 contagion, that is, 57%.

A questionnaire was applied to this group of people using non-probabilistic convenience sampling. As part of the inclusion criteria, only Tsáchilas residing in the Tsáchilas communes, whose ages exceeded 12 years, were considered. Community members with disability problems, people over 85 years of age and people who had been intoxicated during the survey were excluded.

In order to collect information, a survey was designed, which consisted of three sections:

(a) Informed consent
(b) Demographic questions
(c) Questions for study variables.

A total of eight questions formed the demographic section, while the dimensions were measured through 22 closed questions that analyzed the variables of: symptoms of contagion, conventional medicine, traditional medicine, treatment based on plants (vegetation to combat COVID-19 such as: eucalyptus, guayusa, three-finger leaf and verbena), recovery time and satisfaction with the treatment.

The instrument was validated by professionals in the field of health, psychology and academic experts in research methodology and after it was corrected, a pilot test was applied with 52 Tsáchilas. Once it was identified that the instrument yielded a good Cronbach's alpha result (0.892), the questionnaire was implemented.

The survey was carried out entirely in person. Six 6 Tsáchilas communities were visited during the period between December 1 and 30, 2022. We took advantage of the festivities, in this way; most of the members of the communities attended the communal house, where Christmas was being celebrated. In this propitious and cooperative context, the survey was conducted.

The statistical analyses were developed through the SPSS 21 and AMOS 24 statistical programs, where initially the total Cronbach's alpha was calculated for the whole instrument, as well as for its dimensions, and then the descriptive results of the demographic questions were determined, followed by the correlational results through the following statistical techniques: Exploratory Factor Analysis (EFA), Confirmatory Factor Analysis (CFA) through convergent and discriminant validity, and finally Structural Equation Modeling (SEM) was applied to determine the goodness-of-fit indices of the hypothesized model and the subsequent acceptance or rejection of the hypotheses.

To guarantee the ethical aspects of the study, an official letter was sent to the presidents of the Communes requesting authorization for the application of the surveys. In turn, before beginning the application of the questionnaire, the inhabitants of the commune were asked to fill out the informed consent form to certify their willingness to participate in the research and were informed that all the information collected in the study was for the exclusive use of the research and that the anonymity of each of the participants was assured.

RESULTS

In order to determine the findings of the research and facilitate their understanding, the results will be presented in terms of the following sections: (a) demographic results, (b) convergent validity, (c) discriminant validity and (d) goodness-of-fit indexes and acceptance or rejection of hypotheses.

The findings obtained in the research revealed that 57.5% of the study participants were female, of which 56.3% were between 20 and 43 years of age, which suggests that more than half of those infected belonged to mature ages. In addition, it was found that 68% of the community members are married or are in a union relationship; it is important to note that this finding reveals the low importance given by the Tsáchilas to formalizing their sentimental situations through marriage. Finally, it was possible to identify that 43.2% of the community members are farmers and 27.5% of the participants in the study belong to the Commune of El Cóngoma.

Table 1 Demographic findings

Variable	Category	n	%
Sex	Male	427	42,5
	Female	576	57,5
Age group	12-19	131	13,0
	20-27	204	20,3
	28-35	219	21,8
	36-43	143	14,2
	44-51	109	10,9
	52-59	99	9,9
	60-67	58	5,8
	68-75	27	2,7
	76-83	13	1,3
Marital status	Single	296	29,5
	Married	283	28,2
	Widowed	22	2,2
	Unmarried	402	40,0
Occupation	Housewife	422	42,0
	Shaman	18	1,8
	Farmer	436	43,4
	Textile worker	12	1,2
	Student	54	5,4
	Merchants	11	1,1
	Teachers	50	5,0
Community	Peripa	9	0,9
	Chiguilpe	197	19,6
	Otongo Mapalí	133	13,2
	Naranjos	195	19,4
	Colorados del Búa	193	19,2
	Cóngoma	276	27,5
Total:1003(community members who had symptoms of contagion)			

Convergent validity of the research model

After having applied all the surveys of the study, it was necessary to determine the internal consistency of the instrument, for which the internal consistency of the instrument was evaluated using a Cronbach's alpha test.

The consistency analysis determined the following results: symptoms of contagion (0.862), treatment with conventional medicine (0.906), traditional treatment (0.880), and treatment based on plants (0.893), recovery time and satisfaction with the treatment (0.960). Subsequently, a Confirmatory Factor Analysis (CFA) was performed to measure the convergent and discriminant validity of the hypothesized model variables.

Regarding convergent validity, the factor loadings of the variables were calculated and then the Composite Reliability (CR) and the Mean Variance Extracted (MVE) of the model variables were calculated. The results obtained allowed us to identify that the CC values were ≥ 0.50 and greater than the SMV values, thus confirming convergent validity.[19,20] (Table 2).

Table 2 Convergent validity of the research model

Variable	Item	Loading factor	Cronbach's alpha	Composite reliability (CR)	Extracted mean variance (EMV)
Contagion Symptoms (CS)	CS1	,577	0,862	0,895	0,637
	CS2	,913			
	CS3	,723			
	CS4	,921			
	CS5	,803			
Conventional Medicine (CM)	CM1	,947	0,906	0,925	0,720
	CM2	,892			
	CM3	,937			
	CM4	,499			
	CM5	,884			
Traditional medicine (TM)	TM1	,849	0,880	0,911	0,673
	TM2	,810			
	TM3	,865			
	TM4	,822			
	TM5	,751			
Treatment with plants (TP)	TP1	,851	0,893	0,907	0,662
	TP2	,840			
	TP3	,679			
	TP4	,848			
	TP5	,838			
Recovery time and treatment satisfaction (RS)	RS1	,967	0,960	0,969	0,940
	RS2	,973			
Alfa total: 0,866					

Discriminant validity of the research model n

To determine the discriminant validity it was necessary to compare the square root of the SMV values of each variable with the values of the correlations of each pair of variables that were part of the model. When the values of the square root of the SMV (SMRV) are greater than the correlations between each pair of constructs, discriminant validity is corroborated.[19,21] See Table 3.

Table 3 Discriminant validity of the research model

Variables	SC	MC	MT	TP	RS	RVME
CS	**0,637**					0,798
CM	,208**	**0,720**				0,849
TM	,132**	,132**	**0,673**			0,820
TP	,276**	,307**	,191**	**0,662**		0,814
RS	,080*	,173**	,140**	,157**	**0,940**	0,970

Goodness-of-fit index and structural equation modeling

After testing the convergent and discriminant validity criteria of the research model, an SEM was developed to determine the acceptance or rejection of the hypotheses put forward. The relationships between the variables that were part of the model were examined and the results determined by maximum likelihood estimation showed that the data met the goodness-of-fit: $\chi 2$ (df)=241.804 (96); $\chi 2/g$=1.874; NFI=0.966; TLI=0.981; CFI=0.984; RMSEA=0.044.(19,22)

After analyzing the relationships between the variables of the proposed model, five hypotheses were accepted and one was rejected. The estimated values obtained through AMOS 24 determined that contagion symptoms influenced conventional medicine (β=0.228), traditional medicine (β=0.529), treatment with plants (β=0.507) and, on the other hand, traditional medicine (β=0.328) and plant-based medicine (β=0.568) influenced the recovery time and satisfaction levels of the members of the Tsáchila nationality who were infected with COVID-19 during the pandemic. The low levels of significance in the relationship Conventional medicine with recovery times and treatment satisfaction led to rejection of the hypothesis (Table 4 and Figure 2).

Table 4 Acceptance or Rejection of Hypotheses

Hypothesis results				
Hypothesis	**Relationship**	**β**	**Values -p**	**Hypothesis**
H1	CS-CM	0,228	**	Accepted
H2	CS-TM	0,529	**	Accepted
H3	CS-TP	0,507	**	Accepted
H4	CM-RS	0,328	0,078	**Rejected**
H5	TM-RS	0,568	0,002*	Accepted
H6	TP-RS	0,591	0,006*	Accepted

Note: **Correlation is significant at the 0.01 level (bilateral). *. Correlation is significant at the 0.05 level (bilateral).

Note(s): Goodness-of-fit indices: χ2 (gl) = 241.8054 (129), χ2/g = 1.874, NFI = 0.966, TLI = 0.981, CFI = 0.984, RMSEA = 0.044; * p < 0.05; ***p < 0.001.

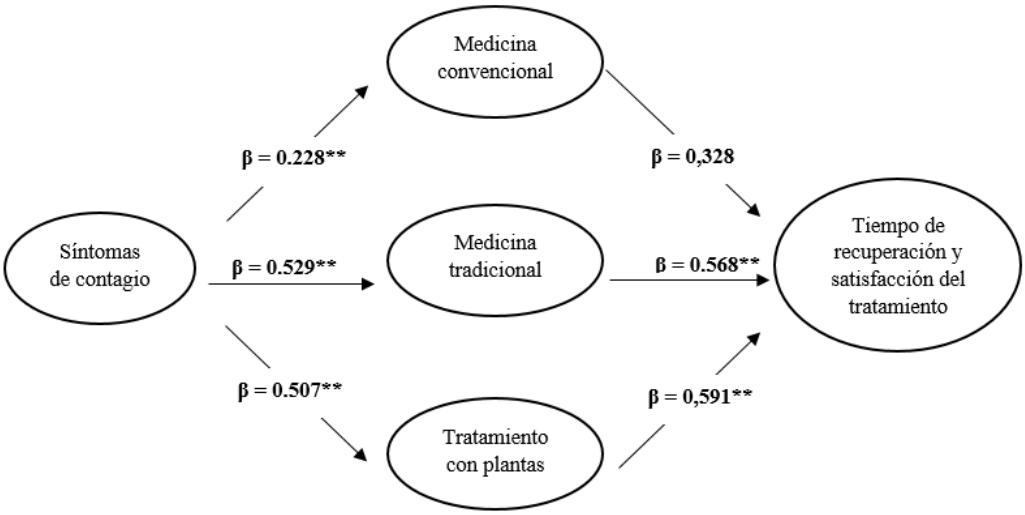
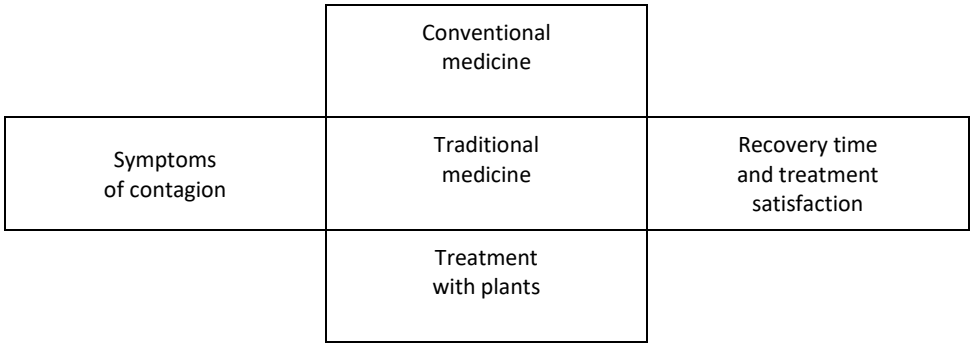


Figure 2 Beta values of hypothesized model.



DISCUSSION

Regarding the discussion of the demographic findings, it was found that 56.3% of the participants were between 20 and 43 years of age, which suggests that more than half of those infected were of mature age. This result is similar to the 57% of participants between 20 and 45 years of age in the study by Siren, et al.[23] On the other hand, it was found that 48.2% of the community members were married or in a union relationship, a result that is similar to the study by López, et al.[24] who identified that 39% of their study population were married or in a union.

Statistical analysis showed a relationship and statistical significance in five of the six variables that were part of the model. Therefore, H1 is approved, that is, the symptoms of contagion influenced the use of conventional medicine of the members of the Tsáchila nationality during the pandemic, which represents that the members of this nationality decided to use medicines such as paracetamol, ibuprofen, azithromycin and in some few cases ivermectin; this shows that despite the belief in their traditional treatments that the members of the community have, they also decided to supplement with pharmaceutical medicine. This finding supports the manifestation of Tenorio, et al.[25] who determined that paracetamol was one of the medicines mostly used to combat fever and muscle pain in COVID-19 infected people. As well as Castelo, et al.[26] who through their study identified that the most used drugs during the pandemic were paracetamol and azithromycin.

On the other hand, H2 is accepted, that is to say that the symptoms of contagion influenced the use of traditional medicine (beliefs, rituals and experiences of the Shaman) by members of the Tsáchila nationality during the pandemic, which represents that in the face of the risk of worsening of the disease, the members of the community resorted to their ancestral knowledge to make use of eucalyptus, guayusa and sangre de drago (dragon's blood); thus corroborating that the use of time waters and vaporizations helped to decrease the levels of affections in the members of the community who acquired the virus. This finding supports the determination of several investigations that indicated that ancestral medicines have been highly effective treatments to fight problems such as flu or fever.[9,27,28]

At the same time, it is supported by Velasco,[29] who determined that the vaporizations developed through eucalyptus improve the problems of respiratory congestion and raise the body's defenses. It is necessary to emphasize that there are authors who oppose the frequent use of this type of treatments, as in the case of Roque, et al.[30] who indicated that the excessive use of medicinal plants without medical supervision can generate health problems.

In addition, H3 is accepted, that is, the symptoms of contagion influenced the use of treatment with plants in the members of the Tsáchila nationality during the pandemic, which represents that the members of the community applied vaporizations, took water of time and homemade syrups based on the combination of several plants, with the purpose of counteracting the effects of the virus. Such is the case of verbena, which has anti-inflammatory and antioxidant properties[31] and the three-points plant or Neurolaena lobata with anti-inflammatory effects,[32] which were used by the inhabitants on the recommendation of friends and relatives, with positive results on their health; in the same way, the medicinal properties of eucalyptus serve as an antiseptic and disinfectant of viral processes in humans, and also raise the levels of protection in the immune system. These findings support the determination of several investigations, which have shown that the use of medicinal plants favor in the treatment of viral diseases.[23,25,9]

In the case of H4, the determination that conventional medicine influenced the recovery time and satisfaction of the members of the Tsáchila nationality who had symptoms of COVID-19 is denied. In this sense, it is evident that the members of the indigenous peoples and nationalities defend their positions and beliefs about their medicinal treatments, arguing that the recovery in their state of health is due to the use of traditional medicine, but not to conventional medicine. This finding is in contrast to the research that has determined that conventional medicine influences the recovery perceptions of patients with respiratory problems.[23,25]

In consideration of the above, the study showed that the community members feel confidence and protection in their traditional treatments based on plants, which is what improved their state of health. Therefore, they feel quite satisfied with the recovery time of the disease. In this sense, H5 and H6 are accepted, that is, the traditional treatment and the treatment with plants influenced the recovery time and satisfaction of the members of the Tsáchila community who had symptoms of COVID-19. This finding supports what has been evidenced by other researchers, who have determined that the main source of treatment for diseases within indigenous peoples and nationalities, are the traditional ones.[9,27,28,29]

The study made it possible to identify the effectiveness of traditional treatments for COVID-19 infection problems, which favored patient recovery and levels of satisfaction with the treatment received. However, several criticisms have been made about treatments without medical prescription, since the lack of knowledge about COVID-19 and the confinement to homes led several infected patients to use treatments prescribed for other patients, which led to the presence of critical conditions due to the overuse of drugs.[30]

Similarly, medical sciences have proven that the frequent use of traditional medicines can affect people's health, especially when they are not under the control of a medical specialist;[30] such is the case of verbena, which is used as an insecticide in the agricultural field, while for health it is used as an antibiotic, which cannot be used for more than 12 days because it can destroy the body's natural flora.[33]

The main limitation of the study was the difficulty in gaining frequent access to the Tsáchilas Communes, and the repeated visits to apply the survey and obtain the largest possible sample.

CONCLUSIONS

We conclude that traditional medicine and medicine based on medicinal plants influence the satisfaction rates and recovery time of members of the Tsáchila nationality who had COVID-19 symptoms during the pandemic, whereas conventional medicine did not.

ACKNOWLEDGMENTS

The authors thank PhD. Nelson Carrión, professor at the Universidad Católica del Norte de Chile, for his support within the construction of the research model and guidance in the statistical analyses of the study.

REFERENCES

1. Organización Mundial de la Salud. Enfermedad por coronavirus (COVID-19) las conversaciones científicas de la OMS [Internet]. www.who.int 2020 [consulted 11 Jun 2023]. Available in: https://www.who.int/es/emergencies/diseases/novel-coronavirus-2019/media-resources/science-in-5
2. Organización Mundial de la Salud. Declaración acerca de la decimoquinta reunión del Comité de Emergencias del Reglamento Sanitario Internacional (2005) sobre la pandemia de enfermedad por coronavirus (COVID-19) [Internet]. www.who.int2023 [consulted 11 Jun 2023]. Available in: https://www.who.int/es/news/item/05-05-2023-statement-on-the-fifteenth-meeting-of-the-international-health-regulations-(2005)-emergency-committee-regarding-the-coronavirus-disease-(covid-19)-pandemic
3. Góngora O, Gámez L. Manifestaciones extrapulmonares de la infección por el nuevo Coronavirus SARS-CoV-2. Rev Habanera Cien Méd [Internet]. 2020 [cited 11 Jun 2023]; 19(1):1-17. Available in: http://scielo.sld.cu/scielo.php?script=sci_arttext&pid=S1729-519X2020000400006
4. Comisión Económica para América Latina [CEPAL]. El impacto del COVID-19 en los pueblos indígenas de América Latina-Abya Yala [Internet]. 2020 [consulted 14 Jun 2023].Available in: https://www.cepal.org/sites/default/files/publication/files/46543/S2000817_es.pdf
5. Cascella M, Raknik M, Aleem A, Dulebohn S, Di Napoli R. Features, Evaluation, and Treatment of Coronavirus (COVID-19). NCBI. Treasure Island (FL): StatPearls [Internet]. 2023 [consulted 14 Jun 2023]. Available in: https://www.ncbi.nlm.nih.gov/books/NBK554776/
6. Abreu LPS, Martinazzo AP. A busca pelo uso de produtosnaturaisnaprevenção de infecção por Covid-19. Brazilian J Develop [Internet]. 2021 [cited 15 Jun 2023]; 7(4):41613-41650. DOI: https://doi.org/10.34117/bjdv7n4-565
7. Brañas M, Villacorta M, Fabiano E, Zárate R, Dávila N, Palacios J, Leia A, Mozombite W. Plantas y animales usados para combatir la pandemia del COVID-19 en dos comunidades indígenas Ticuna del departamento de Loreto, Perú. Folia Amazónica [Internet]. 2022 [cited 15 Jun 2023]; 31(2):149-161.DOI: https://doi.org/10.24841/fa.v31i2.618
8. Espinosa M. Los Tsáchilas recurren a su medicina ancestral para fortalecer su sistema inmunológico en la pandemia. El Comercio www.elcomercio.com [Internet]. 2021 [consulted 15 Jun 2023]. Available in: https://www.elcomercio.com/sociedad/tsachilas-medicina-ancestral-pandemia-covid19.html
9. Tuaza L. El COVID-19 en las comunidades indígenas de Chimborazo, Ecuador. Latin American and Caribbean Ethnic Studies

[Internet]. 2020 [cited 15 Jun 2023];15(4):413–424. DOI:https://doi.org/10.1080/17442222.2020.1829793

10. Horbath J. Propagación inicial de la pandemia COVID-19 entre la población indígena de México. Revista Némesis [Internet]. 2022 [cited 25 Jun 2023]; (18):1-24. Available in: https://ultimadecada.uchile.cl/index.php/RN/article/view/66149
11. Castelo W, Yépez G. Impacto del COVID-19 en las nacionalidades Indígenas Tsáchilas OtongoMapali y Poste. Polo del Conocimiento [Internet]. 2023 [cited 25 Jun 2023]; 8(4):510–524. Available in: https://polodelconocimiento.com/ojs/index.php/es/article/view/5441/html
12. Brañas M, Villacorta M, Fabiano E, Zárate R, Dávila N, Palacios J, Leia A, Mozombite W. Plantas usadas para combatir la pandemia del Covid-19 en una comunidad indígena urarina del departamento de Loreto, Perú. Folia amazónica [Internet]. 2021 [cited 26 Jun 2023];30(1):87-106.DOI: https://doi.org/10.24841/fa.v30i1.542
13. Castelo W, Lara M. Satisfacción de la Comunidad Chibuleo sobre el acceso a la salud en tiempos de COVID-19. Polo del conocimiento [Internet]. 2023 [cited 27 Jun 2023]; 8(5):628-642. DOI: https://doi.org/10.23857/pc.v8i5
14. Organización Panamericana de la Salud. Situación de la Región de las Américas por el brote de COVID-19 [Internet]. www.paho.org 2020 [consulted 4 Jun 2023]. Available in: https://www.paho.org/es/temas/coronavirus
15. Organización Panamericana de la Salud. Se acaba la emergencia por la pandemia, pero la COVID-19 continúa [Internet]. www.paho.org 2023 [consulted 4 Jul 2023]. Available in: https://www.paho.org/es/noticias/6-5-2023-se-acaba-emergencia-por-pandemia-pero-covid-19-continua
16. Ministerio de Salud Pública. Lineamiento de vigilancia integrada para covid-19 y otros virus respiratorios [Internet]. www.acess.gob.ec 2022 [consulted 04 Jul 2023]. Available in: https://www.salud.gob.ec/wp-content/uploads/2022/01/Lineamiento-vigilancia-COVI-19-Enero-2022- .pdf
17. El Universo. 26 muertos por COVID-19 en una semana en Santo Domingo de los Tsáchilas, provincia que con el 51% lidera positividad de casos. El Universo [Internet]. 2021 [consulted 04 Jul 2023]. Available in: https://www.eluniverso.com/noticias/ecuador/26-muertos-por-covid-19-en-una-semana-en-santo-domingo-de-los-tsachilas-provincia-que-con-el-51-lidera-positividad-de-casos-nota/
18. Constante S. Cómo usan los indígenas las plantas medicinales para aliviar los síntomas del coronavirus. El País [Internet]. 2020 [consulted 04 Jul 2023]. Available in: https://elpais.com/planeta-futuro/2020-10-26/lo-que-pueden-aportar-las-plantas-medicinales-a-la-lucha-contra-el-coronavirus.html
19. Hair J, Black W, Babin B, Anderson R. Multivariate Data Analysis. 7th ed. Prentice-Hall; 2010.
20. Hoyos-Vallejo CA, Carrión-Bósquez NG, Ortiz-Regalado O. The influence of skepticism on the university Millennials' organic food product purchase intention. British Food J [Internet]. 2023 [cited 22 Jul 2023]. DOI: https://doi.org/10.1108/BFJ-02-2023-0093
21. Carrión-Bósquez NG, Arias-Bolzmann LG, Martínez-Quiroz AK. The influence of price and availability on university millennials' organic food product purchase intention. British Food J [Internet]. 2023 [cited 22 Jul

2023]; 125(1):536-550. DOI: https://doi.org/10.1108/BFJ-12-2021-1340

22. Carrión-Bósquez NG, Arias-Bolzmann LG. Factors influencing green purchasing inconsistency of Ecuadorian millennials. British Food J [Internet]. 2022 [cited 22 Jul 2023]; 124(8):2461-2480. DOI: https://doi.org/10.1108/BFJ-05-2021-0558
23. Sirén A, Uzendoski M, Swanson T, Negrete I, Gualinga E, Tapia A, Machoa A, Tanguila A, Santi E, Machoa D, Andi D, Santi D. Resiliencia contra la pandemia de COVID-19 en comunidades indígenas kichwa en la Amazonía Ecuatoriana. Rev Lat Políticas Acción Púb [Internet]. 2020 [cited 21 Jul 2023];7(2):101-107.DOI:https://doi.org/10.17141/mundosplurales.2.2020.4738
24. López J, Larreal A, Chamorro P, Vargas L, Proaño F. Percepción de la medicina ancestral y convencional en comunidades indígenas de la ciudad de Ambato. Enfermería Investiga [Internet]. 2018 [cited 24 Jul 2023]; 3(4):180-185. DOI: http://dx.doi.org/10.29033/ei.v3n4.2018.04
25. Tenorio J, Lazo M, Monroy A, Málaga G, Cárdenas M. Precios de medicamentos esenciales para el manejo y tratamiento de la COVID-19 en establecimientos farmacéuticos peruanos públicos y privados. Acta Médica Peruana [Internet]. 2020 [cited 24 Jul 2023];37(3):267-277.DOI:http://dx.doi.org/10.35663/amp.2020.373.1560
26. Castelo W, Pilalumbo D, Zambrano L, Zambrano D. Pharmacological profile used in the COVID-19 pandemic at the Pontificia Universidad Católica del Ecuador, Santo Domingo Campus. Acta Médica del Centro. 2022 [consulted 1 Ago 2023; 16(2):338-358. Available in: http://scielo.sld.cu/scielo.php?pid=S2709-79272022000200338&script=sci_arttext&tlng=en
27. Jaramillo M, Narváez C, Cano J. Costumbres y creencias de la medicina ancestral para reducir el Covid-19, en la población de Mariscal Sucre–Otavalo. Revista Universidad y Sociedad [Internet]. 2021 [cited 07 Ago 2023]; 13(3):283-290. Available in: https://rus.ucf.edu.cu/index.php/rus/article/view/2479/2434
28. Chauca R. La COVID-19 en Ecuador: fragilidad política y precariedad de la salud pública. História, Ciências, Saúde-Manguinhos [Internet]. 2021 [cited 12 Jul 2023]; 28(1):587-591. Available in: https://www.scielo.br/j/hcsm/a/Mt4Y7Ykrnwt5x7tzKdZHDYG/abstract/?format=html&lang=es
29. Velasco B. Santo Domingo de los Tsáchilas necesita 3000 pruebas para detectar el COVID-19. El Comercio. 13 de Abr 2020 [Internet] [consulted 23 Jun 2023]. Available in:https://www.elcomercio.com/tendencias/sociedad/santo-domingo-pruebas-coronavirus-covid19.html
30. Roque, F., Zambrano, S., Ruiz, W., Huacasi, A., Flores, G., Mendoza, I., y Puma, M. Potencial antineoplásico e inmunológico del lechero africano en pacientes con factores de riesgo a Covid 19. Revista Veritas Et Scientia [Internet]. 2020 [cited 25 Jul 2023]; 9(2):263-272. DOI: https://doi.org/10.47796/ves.v9i2.401
31. Cruz Rodríguez RI, Maldonado Fernández AP, Castillo Valencia R, Salgado Gutiérrez MC, Hernández Cruz M del C. Estudio del Potencial Antimicrobiano de Extractos Orgánicos de Verbena litoralis. Inicio [Internet]. 7 de junio de 2024 [cited 28 de octubre de 2024];13(35). Available in: https://www.espacioimasd.unach.mx/index.php/Inicio/article/view/365
32. McKinnon R, Binder M, Zupkó I, Afonyushkin T, Lajter I, Vasas A, *et al*. Pharmacological insight into the anti-inflammatory activity of sesquiterpene

lactones from Neurolaena lobate. Phytomedicine. [Internet]. 2014 [cited 28 de Ago 2024]; 21(12): 1695-1701. DOI:https://doi.org/10.1016/j.phymed.2014.07.019

33. Arango Gutiérrez GP, Vásquez Villegas MC. Toxic effect of Verbena officinalis (Verbenaceae family) in Sitophilus granarius (coleoptera: curculionidae). Revista lasallista de Investigación [Internet]. 2008 [cited 29 Ago 2023]; 5(2):74-82. Available in: http://www.scielo.org.co/scielo.php?pid=S1794-44492008000200010&script=sci_abstract&tlng=en

Declaration of conflicts of interest:
The authors declare that there are no conflicts of interest.

Authors' contribution:
Walter Patricio Castelo: conceptualization, project management, supervision, visualization.
David Isrrael Gallardo Córdova: formal analysis, methodology, writing the original draft, revision, editing.
Ángel Ramón Sabando García: data curation.
Jesica Liliana Cueva Toaquiza: research.
Allison Juliana Zúñiga García: writing the original draft, revision, editing.

Financing:
No funding was received for the development of this article.

Complementary file (Open Data):
Análisis estadísticos y encuesta validada aplicada en Medicina tradicional y COVID-19 influencia en la recuperación y satisfacción de la nacionalidad Tsáchila