

RESEARCH ARTICLE

Integrative medicine in the recovery of patients with post-COVID-19 syndrome

Tomás Trevisan, Talita Bonato de Almeida, María Imaculada de Lima Montebello, Roberto González González, Amália Dávila Hernández, María da Luz Rosário de Sousa

Department of Public Health, Pediatric Dentistry and Orthodontics

Corresponding Author: María da Luz Rosário de Sousa. Department of Public Health, Pediatric Dentistry and Orthodontics, Universidade Estadual de Campinas UNICAMP, Brazil. E-mail: luzsousa@fop.unicamp.br

Received: May 30, 2025

Published: June 10, 2025

Citation: María de Sousa. Integrative medicine in the recovery of patients with post-COVID-19 syndrome. Int J Complement Intern Med. 2025;6(3): 374–383. DOI: 10.58349/IJCIM.3.6.2025.00152

Copyright: ©2025 María de Sousa. This is an open access article distributed under the terms of the Creative Commons AttributionLicense, which permits unrestricted use, distribution, and build upon your work non-commercially.

Abstract

Introduction: The pandemic caused by COVID-19 in early 2020 impacted public health worldwide. In addition to the disease itself, there are long-lasting symptoms that characterize the Acute Post-COVID-19 Syndrome, which involves a wide spectrum of symptoms and directly affects the quality of life of patients, being integrative and complementary practices, important allies in the restoration of health in these cases.

Objective: To measure the impact of Traditional Chinese Medicine (TCM) intervention, through the Gonzalez protocol, in patients with acute post-COVID-19 syndrome.

Methods: The present study is characterized by a series of cases of patients who presented sequelae of COVID-19 in whom consecutive sessions of TCM techniques were performed through the Gonzalez protocol (acupuncture, moxibustion, bloodletting and cupping) and the impact was measured using the tools Verbal Analog Scale (VAS) for the intensity of reported symptoms, WHOQOL-bref for quality of life and pulse and tongue analysis according to TCM for energetic evaluation.

Results: After the end of the sessions there was a drop in mean VAS from 7.6 to 2.4 ($p=0.035$) and a perception of improvement in patients' quality of life. There was a change in the characteristics of the tongue throughout the treatment, which started with a purple color becoming pink with a whitish tartness at the end, and the pulse remained constant during the sessions.

Conclusion: The use of TCM practices was successful in reducing persistent complaints caused by COVID infection, positively impacting the quality of life of these patients.

Keywords: Acute post-COVID-19 syndrome; Acupuncture; Quality of life; Complementary Therapies

Introduction

The pandemic caused by the coronavirus (COVID-19) in early 2020 challenged public health management worldwide, causing a large number of morbidity and mortality.¹ The most common symptoms associated with COVID-19 are fever, cough, dyspnea, expectoration, headache and myalgia or fatigue. In contrast, less common signs at the time of hospital admission include diarrhea, hemoptysis and shortness of breath,² which may progress to more complicated conditions. In Brazil, the hospitalization profile of patients was predominantly male (59.6%), with an average age of 40 years. The most frequent symptoms were fever (67.5%), nasal congestion (42.4%), cough (41.6%) and myalgias/artralgias (36.3%). Chest CT was performed in 78 (15.3%) patients, and 93.6% of them had abnormal results.³

The recent scientific knowledge about the new coronavirus, its high transmissibility, in addition to its high pathogenicity and virulence, have made it difficult to choose the best strategies to be used to combat the pandemic worldwide.⁴

Among the main non-pharmacological interventions were public health measures, such as the use of face protection, frequent hand hygiene - including the frequent provision of 70° alcohol gel in public places - and social isolation.⁵

The long-term consequences of COVID-19 are not yet fully understood, but it is understood that the occurrence of prolonged symptoms and functional limitations is common among both hospitalized and non-hospitalized adults and children. This spectrum of symptoms is broad and ranges from mild discomfort to severe adverse effects on the patient's overall health.⁶

A follow-up study 6 months after the onset of COVID-19 symptoms showed that more than 60% of these patients had persistent symptoms of fatigue or muscle weakness.⁷ Difficulty sleeping (26%), anxiety or depression (23%) were not uncommon. Other symptoms included changes in smell or taste, palpitations, joint pain, dizziness, diarrhea, vomiting, and chest pain, which constitute a cluster of symptoms called "acute post-COVID-19 syndrome," directly affecting the quality of life of these patients.^{8,9}

One option for managing persistent post-COVID symptoms is the use of integrative and complementary practices, such as Traditional Chinese Medicine (TCM), to restore physical health and improve the quality of life of these patients.¹⁰

Some studies in the area have already been carried out and the main results found with the use of TCM were reduction in the period of detection of SARS-COV-2 virus in patients, systemic improvement of the patient in less time, better recovery from

lung damage, reduction of hospitalization period, fewer cases of disease progression to severe forms, rare adverse events.¹⁰

It is worth mentioning that TCM includes, in addition to acupuncture, several pharmacological and non-pharmacological tools, such as phytotherapy, auriculotherapy and moxibustion.¹¹

Therefore, the aim of this article was to follow up and treat patients with post-COVID-19, related sequelae using acupuncture, bloodletting, cupping and moxibustion protocols, and to evaluate the impact of this intervention on their quality of life.

Materials and Methods

Study Design

The present study is a clinical case series approved by the Research Ethics Committee of the Universidade Anhembi Morumbi (CEP CAAE 12797119.9.0000.5418), conducted in a public health unit providing high-demand specialized care in the city of Piracicaba/SP, Brazil, following the STRICTA protocol.

Participants

The study included patients using the public health system, referred by doctors and showing signs and symptoms of sequelae related to COVID, of both sexes, any gender, over 18 years of age and who signed the Free and Informed Consent Form from the search. Pregnant women were excluded.

Interventions

The patients were attended weekly with a minimum of 5 acupuncture sessions by acupuncturists linked to the Faculdade de Odontologia de Piracicaba (FOP/Unicamp).

The protocol used during the sessions was designed by Roberto Gonzalez and was called the Gonzalez Protocol.¹²

1. The patient was instructed to lie on the stretcher in the supine position to perform moxibustion on the "magic square" (points BL20 to BL23) and on the bilateral point BL43, for approximately 5 minutes and/or until the patient reports symptoms of heating in the region and/or the acupuncturist sees signs of this heating due to reddening of the skin.
2. Subsequently, needles were inserted at points BL23, BL20 and BL13 bilaterally and toned.
3. At point BL17, bleeding was performed (by lancet puncture) and cupping was applied, also bilaterally. This treatment continued for 10 to 15 minutes.

4. Finally, the patient was placed in prone position for needle insertion at points ST36 (bilateral), SP6 (bilateral) and CV12 in toning, for another 15 to 20 minutes.

Disposable stainless-steel needles (DongBang Medical Co., China) measuring 0.25 x 30mm, moxa sticks (Dragon, China), suction cups (Suzhou, China) and lancets (HMD Biomedical Inc., Taiwan) were used and all of the needles inserted were manually stimulated. The needle insertion sites were sterilized using 70° alcohol and the needles were discarded in a suitable container after use.

Outcomes

Initial TCM questionnaire

An initial anamnesis was performed from the TCM point of view, by means of 30 questions, for the subsequent assessment of issues related to energetic emptiness and fullness.

VAS to measure the condition improvement

In each session, the worst condition reported by the patient at that moment was evaluated by means of the Verbal Analog Scale (VAS), which was applied before and after each session.

Photograph register of tongue and pulse measurements

Before and after each session, a photographic record of each patient's tongue was also taken to assess the color of the tongue body and the existence of tongue fur, as well as palpation of their pulses for energetic assessment of the corresponding zones. to the Triple Warmers (TW) and their corresponding organs/viscera: Upper TE (Heart and Lung), Middle TE (Spleen and Stomach) and Lower TE (Liver, Kidneys, and Bladder).¹³

WHOQOL-bref questionnaire

Before the 1st session (Initial) and at the end of the 5th session (Final) the patient completed the WHOQOL-bref quality of life questionnaire, which consists of 26 questions, 02 of which make up a self-assessment of quality of life and the other 24 thematic questions (called facets) which are divided into four domains: Physical, Psychological, Social Relationships and Environment.

In this instrument, each facet is represented by a single question, so the facet scores are not presented individually,

so the result is measured based on the total score of each of the domains, which are composed of a varied number of facets.¹⁴⁻¹⁶

Statistical Analysis

The transcription of the WHOQOL-bref data was carried out in several stages, the first of which was to verify that the 26 questions were completed with values between 1 and 5. As there are positive and negative questions, the values of the questions whose response scale is opposite, transforming the answer with score 5 into score 1, 2 transformed into score 4 and vice versa, keeping the value 3.

The result for each domain should be multiplied by four, represented on a scale from 4 to 20.¹⁵ Using this scale, in the present study a comparison was made between the domains at the two moments of the investigation (in initial and after the 5th session).

From this, the scores of the four domains can be converted into a scale from 0 to 100,¹⁴ being represented, in this study, with graphs and percentages.

The VAS analysis was carried out before the first session and after the end of the treatment, in order to obtain results regarding the treatment as a whole. In addition, VAS analysis was also carried out before and after the first treatment session to understand the reduction obtained in the initial session.

The effects of acupuncture were evaluated using the results of the VAS analysis and the WHOQOL-bref life questionnaire at baseline and endpoint. The data obtained were statistically analyzed in the Statistical Package for the Social Sciences (SPSS, version 22) using the paired t-test to compare intragroup parameters, adopting $p \leq 0.05$.

Qualitative analysis of pulse palpation according to TCM was performed according to strength (Absent, Weak, Normal and Strong) and location (Lower, Middle and Upper TE). Photographs of the patients' tongue, taken before and after the sessions, were compared to note any changes in the color of the tongue body (pink referring to normal, purple referring to blood stasis, red presence of heat and white with little blood) and saburra (presence or absence.)

Results

Sixteen patients were seen in the service, 12 of whom were women, with an average age over 55 years, of whom 8 were white, 6 were of mixed race and 2 did not want to answer.

The most frequent complaints were a painful component or asthenia (66%), followed by fatigue and shortness of breath (50%), emotional and memory changes (33%) and various other symptoms, with 14 of the 16 patients presenting more than one complaint.

Analysis of VAS related to the most frequent complaint showed that patients came to care with an average of 7.6 and after the sessions there was a statistically significant drop to 2.4 ($p=0.035$) (Figure 1). A statistically significant reduction in VAS can also be seen in the first session of treatment, from 7.6 to 3.6 ($p=0.007$).

The description of the characteristics throughout the sessions of the patient's tongue and pulse according to TCM is shown in Figure 2.

Figure 2A shows a predominance of the pulse in medium strength TE (2 and 3 crosses), showing that, in most patients, there is no energetic deficiency verified by the pulse. Figure 2B shows the analysis of the patients' tongue color throughout the sessions, showing an excess of blood stasis (represented by the violet color) at the beginning of the study, which passes to pink and red colors at the end of the treatment, demonstrating a reduction of this stasis.

Figure 3 shows the characteristics of the tongue of one of the patients before the start of treatment and after its completion and highlights an important pattern found throughout the study, which was the change in the appearance of the tongue tone, which tended from purple and red to pink (as shown in Figure 2B), and the saburra, which adopted a healthier characteristic. As the sessions were carried out, being more present and with a whitish physiological appearance.

At baseline, 14 of the 16 patients had a coating.

The analysis of the means of the WHOQOL domains before (Initial) and after 5th session of the treatment (Final) showed that there was a difference statistically significant between the physical domain, but not in the other domains (Table 1). However, there were a numerically greater difference in the other groups comparing the Initial and Final moment.

When reviewing the facets of each domain, it was noted that some showed greater changes throughout the study. Within the Physical domain, the most significant improvement occurred in the sleep and rest facet, whose average percentage in the first session was 39.71% and, at the end of the tenth session, reached 53.13%. In the Psychological domain, a significant increase was observed in the patients' self-esteem, which increased from 57.35% to 70.31% between the time prior to the first session and after the last session. Regarding

the Social Relations domain, a large increase was observed in the facets of personal relationships and sexual activity, while a drop was observed in the facet referring to personal support and support. There was little change in the Environmental domain, but it is worth noting that within the facet of physical safety and security there was a subtle improvement, increasing the score from 58.82% to 70.31%. The mean percentiles for each domain of the WHOQOL- bref before the 1st session and at the end of treatment can be seen in Figure 4.

Discussion

The present study allowed us to better understand and reinforce what the literature already describes about post-COVID or prolonged COVID syndrome, as well as to understand that TCM can, through a combination of its techniques, help to recover the quality of life of these patients, as observed in the results of the present study, with a reduction of complaints and an improvement in quality of life.

In this study there was a predominance of female patients; of the 16 patients studied, 12 were female, even though the literature indicates a greater occurrence of the disease in men³ and most of them were white (8), 6 of them were mixed and 2 did not want to declare their race. This fact probably highlights the greater demand of women for health services.¹⁷ The age profile was characterized by an average age of over 55 years, demonstrating the great impact of the disease even in individuals under 60 years of age, with a high rate of participants who were hospitalized and intubated, higher than 50% of patients, as well as in other parts of the world.¹⁷

The main presenting complaint was the intensification or occurrence of pain (14 of 16 patients presented at least 1 pain complaint throughout the sessions), followed by respiratory and neurological complaints, corroborating the literature showing that the presence of musculoskeletal and mental health-related symptoms are related to post-COVID.¹⁸

When analyzing the self-reported results, there is a significant perception of improvement in the complaints presented, especially when considering the difference in VAS between the first and the last session, whose score was, respectively, 7.6 and 2.4. In other words, there was a very significant perception of improvement in the complaints presented by the patients throughout the sessions, with a reduction in pain of 68.42%, and this perception was already reported in the end of the first session, where the VAS decrease 52.63% compared

Table 1: Averages and confidence Interval of WHOQOL-bref domains before (Initial) and after (Final) treatment, showing statistically significant improvement in the physical domain. Piracicaba/SP, 2023

Domain	Initial		Final	
	X	CI 95%	X	CI 95%
Physical	11,80 ^{Aa}	10,28 a 13,33	13,35 ^{Ab}	12,16 a 14,55
Psychological	13,58 ^{Aa}	11,87 a 15,29	14,08 ^{Aa}	12,60 a 15,57
Social relationships	14,42 ^{Aa}	12,29 a 16,54	14,37 ^{Aa}	11,94 a 16,81
Environment	13,41 ^{Aa}	11,95 a 14,86	13,59 ^{Aa}	12,27 a 14,92

X: average.

CI: confidence interval.

Different capital letters in the same row mean statistical difference. Different lowercase letters in the same column mean statistical difference.

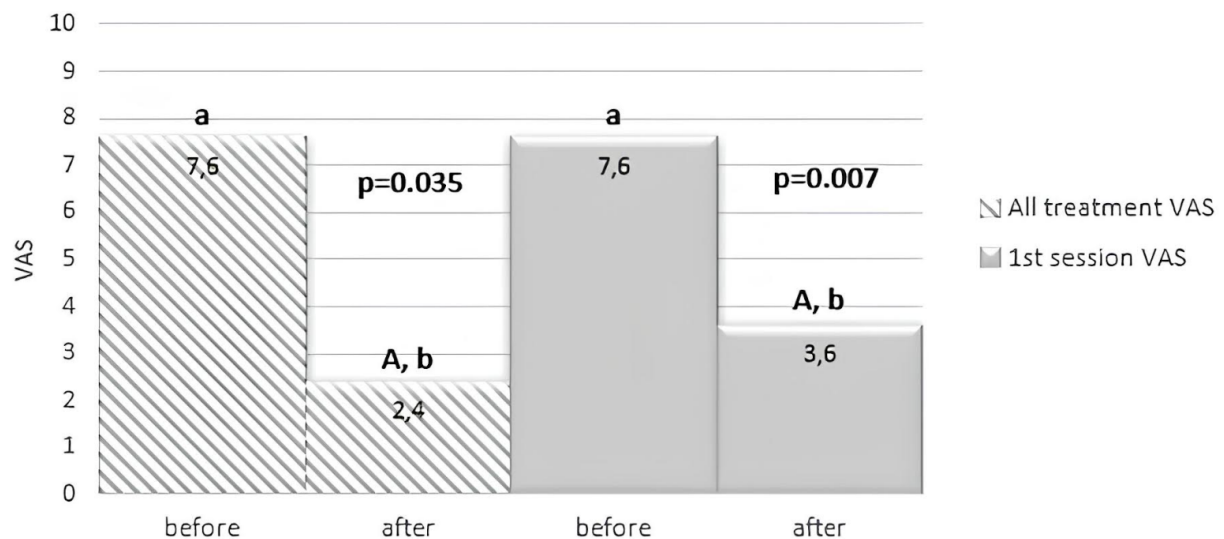


Figure 1. Average VAS related to the most frequent complaint before the first session and after the last session of the treatment (hatched) and before and after the first treatment session (gray).

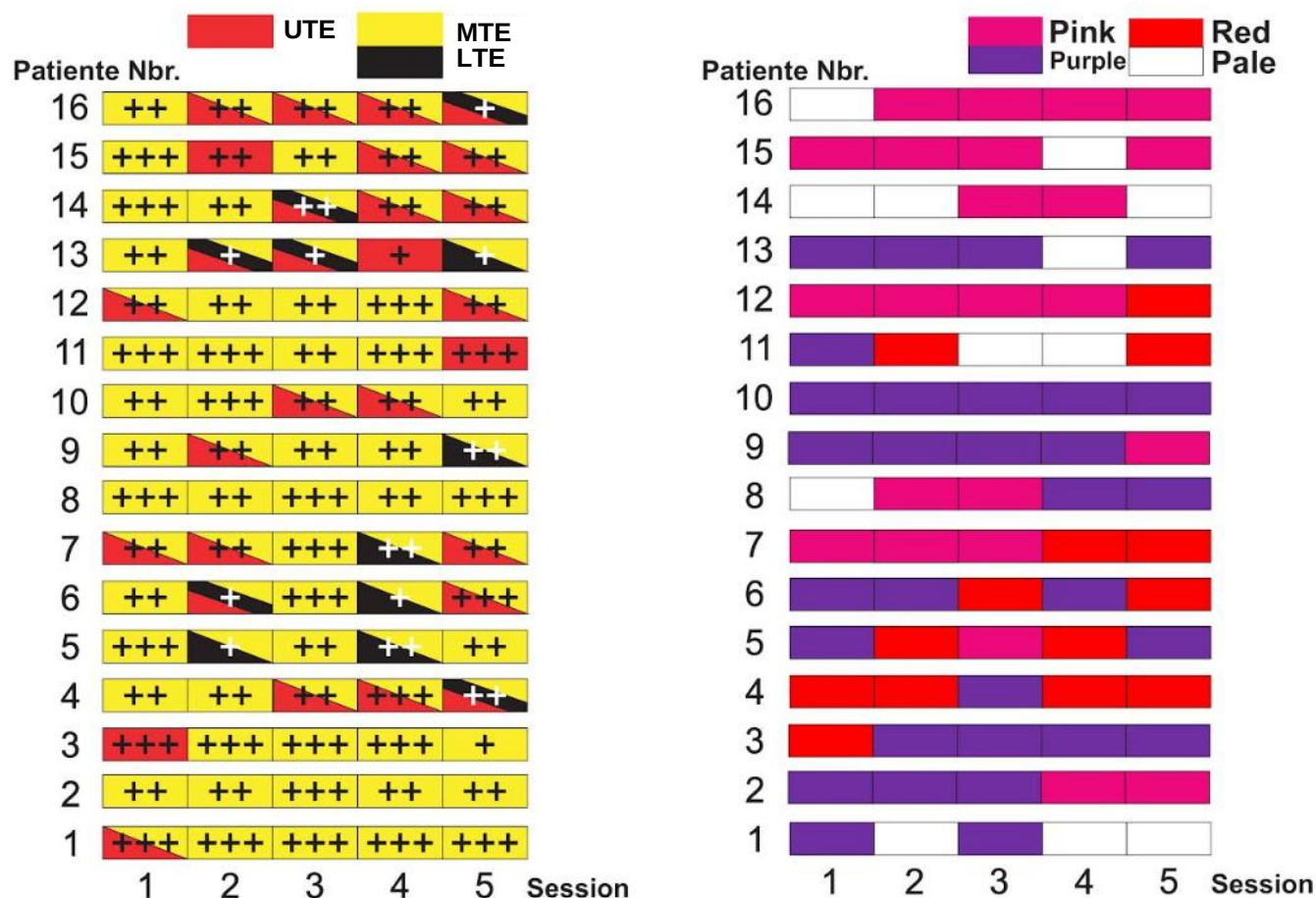


Figure 2. Representative plots of pulse (A) and tongue (B) characteristics of patients per session. In A, LTE, MTE and UTE refer to the presence of a pulse at the respective points and the crosses determine the strongest pulse collected. In B, the legend shows the colors observed on each patient's tongue throughout the sessions.

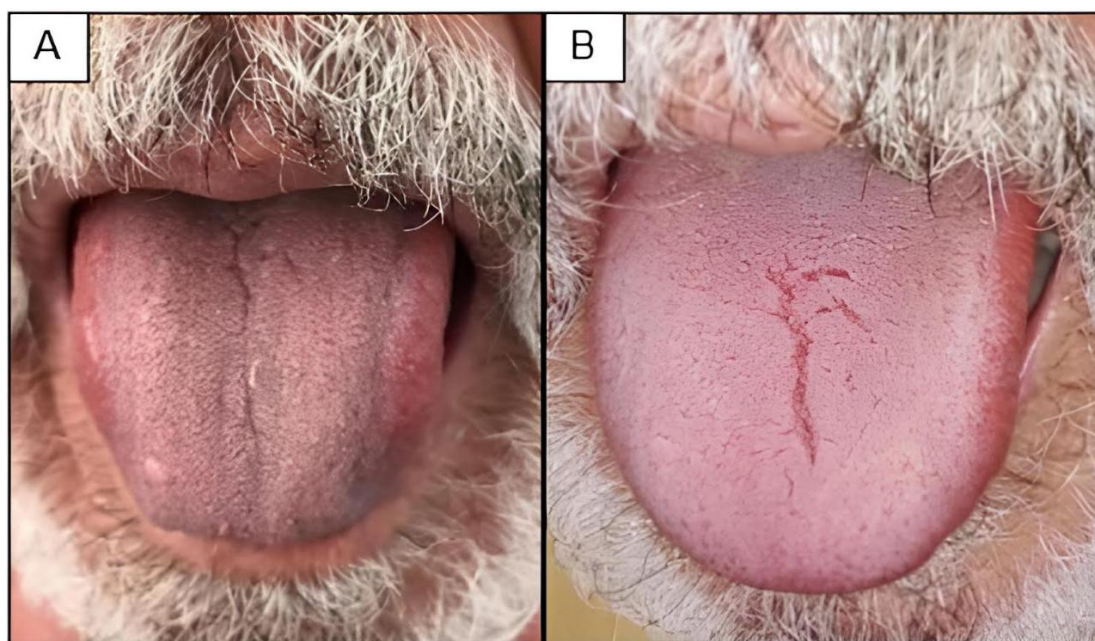


Figure 3. Appearance of the tongue of one of the patients before the first (A) and after the last session (B).

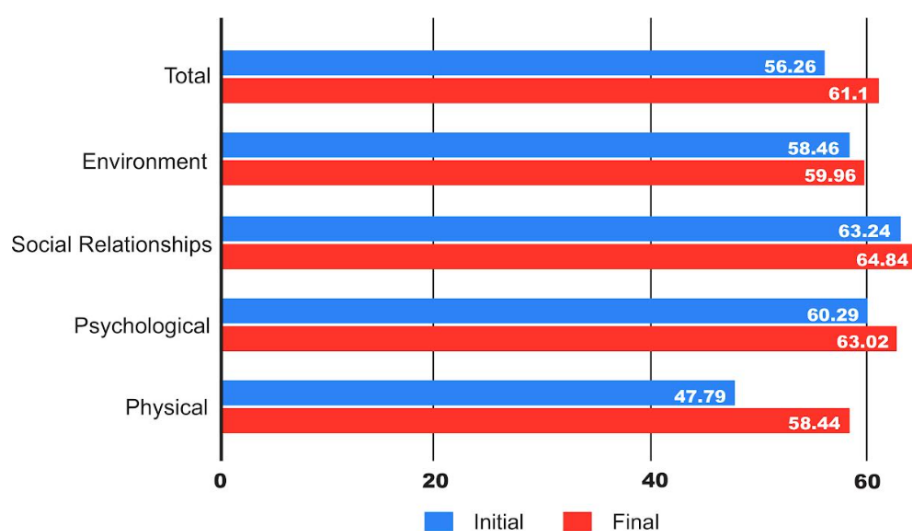


Figure 4. Graphs representing WHOQOL domains, as well as their total percentage average, before the first session (Initial - blue) and after the 5th session (Final - red).

with the initial. Several studies have evaluated the use of acupuncture in different situations using VAS to record clinical outcomes, such as acute pain¹⁹ and chronic pain,²⁰ demonstrating reductions of 89.3% and 64.1% respectively, and in the case of this study pain symptoms related to post-COVID the use of this tool was easy and effective, in addition to being able to capture a reduction in symptoms.

Principled speech and pulse analysis. TCM energetics was an important part of the patient's examination, since it was possible to better understand the syndrome affecting him. In a previous study on acute pain, Almeida et al (2021)¹⁹ found energetic deficit in patients with pulpitis, proposing this relationship between pain and low energetics. Such an association did not occur in the present study, since despite the fact that the patients presented pain related to COVID, the characteristics observed in the tongue at the beginning of the study, such as the presence of a coating in most of the patients, showed signs that energy remained at a constant level normal parameters despite being affected by the disease.

A retrospective cohort developed by Lima²¹ showed that most of the patients presenting characteristics of lack of energy had some chronic disease or symptomatology, corroborating the findings of the present study, since although the viral infection caused by COVID is acute, persistent symptoms can be considered chronic. The change in color of the tongue from purplish to pinkish, considered normal, shows that the energy mobilization methods of bloodletting and cupping were effective. The presence of a whitish color coating, according to TCM, reflects an energy balance,¹³ which seems to have been restored at the end of the sessions following the proposed protocol. The pulse analysis showed the average TE holding the patient's energy at the beginning and during the sessions, suggesting that the patient's energetic recovery was favored by having energy in the Stomach and Spleen of these patients.¹³

The WHOQOL-bref instrument can be applied to healthy or chronically ill populations,²² regardless of cultural or socioeconomic differences, just like the population in the present study. Therefore, analyzing the increase in percentiles for each of the domains throughout the sessions, shown in Figure 4, may indicate that there was a considerable improvement in the perception of the quality of life of the patients in treatment, in different aspects of their lives. As verified by the present study, the literature demonstrates that a worse perception of quality of life is associated with post-COVID syndrome and that its measurement may allow the development of care plans and interventions for this affected population.²³ The use of the TCM therapy protocol provided a more evident improvement in the physical and psychological domains of the WHOQOL-bref, which has already been verified in other studies in the isolated use of auriculotherapy in the management of premenstrual

symptoms²⁴ and cranial acupuncture in patients with temporomandibular disorders.²⁵

In the Brazilian pandemic scenario, it was possible to understand how the impacts of the disease go beyond health outcomes. The various peculiarities of a developing country, such as socioeconomic inequality, problems in the public health system, political instability and population concentration, have a great impact in maximizing the effects of the pandemic on the daily life of the population and on the economic structure of the country. and its image on the international scene.²⁶ Thus, it is very important the existence of the National Policy of Integrative and Complementary Practices in the Unified Health System, since through it allowed the practice of various complementary therapies in basic health units and public services, such as acupuncture, which has proven to be a strong ally in the treatment of various pathologies.²⁷

However, there were limitations inherent to a case series study, which are the absence of a control group, as care was provided on demand, which made it difficult to develop a control group, and the small sample size, which may have interfered with the equality of results in the WHOQOL instrument domain analysis before and after treatment. Thus, it becomes important to continue studies in this field of knowledge.

Conclusion

The combined use of Traditional Chinese Medicine practices was able to reduce persistent complaints caused by COVID infection, positively impacting the quality of life of these patients.

Acknowledgement

The authors thank all the participants in the study for their participation and collaboration, the Piracicaba School of Dentistry, the Anhembi Morumbi University, Municipality of Piracicaba for their assistance and help with the study.

Funding

Fundação de Amparo a Pesquisa do Estado de São Paulo (FAPESP) – nº 2022/13305-3. We declare that the founding source had no role in the study design, in the collection, analysis and interpretation of data, in the writing of the report or in the decision to submit the article for publication.

Conflicts of Interest

The author declares no conflict of interest.

References

- Rodriguez-Morales AJ, Bonilla-Aldana DK, Balbin-Ramon GJ, et al. History repeats itself: probable zoonotic spillover as a cause of the 2019 novel coronavirus epidemic. *Infez Med*. 2020;28:3-5.
- Xu XW, Wu XX, Jiang XG, et al. Clinical findings in a group of patients infected with the novel 2019 coronavirus (SARS-CoV-2) outside Wuhan, China: retrospective case series. *BMJ*. 2020;368:m606.
- Teich VD, Klajner S, Almeida FAS, et al. Epidemiologic and clinical features of patients with COVID-19 in Brazil. *Einstein (Sao Paulo)*. 2020;18:eAO6022.
- Barreto ML, Barros AJD, Carvalho MS, et al. What is urgent and necessary to inform policies to deal with the COVID-19 pandemic in Brazil? *Rev Bras Epidemiol*. 2020 Apr 22; 23:e200032.
- Garcia LP, Duarte E. Nonpharmacological interventions to combat the COVID-19 epidemic in Brazil. *Epidemiol Serv Saúde*. 2020;29(2):e2020222.
- Munblit D, Nicholson TR, Needham DM, et al. Studying the post-COVID-19 condition: research challenges, strategies, and importance of developing the core outcome set. *BMC Med*. 2022; 20(1):50.
- Huang C, Huang L, Wang Y, et al. 6-month consequences of COVID-19 in patients discharged from hospital: a cohort study. *Lancet*. 2021;397(10270):220-232.
- Baig AM. Chronic COVID syndrome: Need for an appropriate medical terminology for long-COVID and COVID long-haulers. *J Med Virol*. 2021;93(5):2555-2556.
- Baig AM. Harmful outcomes in long-distance COVID-19: the effects of SARS-CoV-2 on the CNS in chronic COVID syndrome. *ACS Chem Neurosci*. 2020;11:4017-4020.
- Chamorro MG. Integrative and Complementary Practices (ICP) in the treatment of patients with covid-19: an integrative review. 2021. 51 et seq. Dissertation (Professional Master's Degree in Family Health - PROFSA UDE) - Presidência, Fundação Oswaldo Cruz, Campo Grande-MS, 2021.
- Liu WH, Guo SN, Wang F. Understanding of *guidance for acupuncture and moxibustion interventions on COVID-19* (Second edition) issued by CAAM. *World J Acupunct Moxibustion*. 2020;30(1):1-4.
- González R, Dávila A. Synoptic analysis of SARS - CoV-2 infection and management of post - COVID 19 sequelae. Shuangyi Institute of Integrative Synomedicine, CDMX, Mexico. 2021.
- Maciocia G. The Fundamentals of Chinese Medicine. São Paulo: Roca. 3rd Ed. 2017;978-8527731744.
- WHOQOL group. World Health Organization. WHOQOL: measuring quality of life. Geneva: WHO; 1997 (MAS/MNH/PSF/97.4).
- Fleck MP, Louzada S, Xavier M, et al. Aplicação da versão em português do instrumento abreviado de avaliação da qualidade de vida "WHOQOL-bref". *Rev Saúde Pública*. 2000;34(2):178-83.
- Fleck MP, Leal OF, Louzada S, et al. Desenvolvimento da versão em português do instrumento de avaliação de qualidade de vida da OMS (WHOQOL-100). *Rev Bras Psiquiatr*. 1999;21(1):19-28.
- Levorato CD, Mello LM, Silva AS. Fatores associados à procura por serviços de saúde numa perspectiva relacional de gênero. *Ciênc Saúde Coletiva*. 2014;19(4):1263-1274.
- Silva Andrade B, Siqueira S, de Assis Soares WR, et al. Long-COVID and Post-COVID Health Complications: An Up-to-Date Review on Clinical Conditions and Their Possible Molecular Mechanisms. *Viruses*. 2021;13(4):700.
- de Almeida TB, Zotelli VLR, Wada RS. Comparative Analgesia Between Acupuncture and Dipyrone in Odontalgia. *J Acupunct Meridian Stud*. 2019;12(6):182-191.
- Zotelli VLR, Grillo CM, Gil MLB, et al. Effect of acupuncture on pain, mouth opening limitation, and energy meridians in patients with temporomandibular dysfunction: a randomized controlled trial. *J Acupunct Meridian Stud*. 2017;10:351-359.
- Lima M, Zotelli VLR, Bressiani Gil ML, et al. Diagnosis and evaluation of patients treated with acupuncture in the public service. *Rev Int Acupuncture*. 2022.16(2):100178.
- Amin MF, Bhowmik B, Rouf R, et al. Assessment of quality of life and its determinants in type-2 diabetes patients using the WHOQOL-BREF instrument in Bangladesh. *BMC Endocr Disord*. 2022;22(1):162.
- Nikolic Turnic T, Vasiljevic I, Stanic M, et al. Post-COVID-19 status and its physical, nutritional, psychological and social effects in working-age adults: a perspective Questionnaire study. *J Clin Med*. 2022;11(22):6668.
- Korelo RIG, Moreira NB, Miguel BAC, et al. Effects of auriculotherapy in the treatment of women with premenstrual syndrome symptoms: a randomized, placebo-controlled clinical trial. *Complement Ther Med*. 2022;66:102816.
- Peixoto KO, da Silva Bezerra A, Melo RA, et al. Short-term effect of scalp acupuncture on pain, sleep disturbances, and quality of life in patients with temporomandibular disorders: a randomized clinical trial. *Dolor Med*. 2021;22(4):905-914.
- Boschiero MN, Palamim CVC, Ortega MM, et al. One year of coronavirus disease 2019 (COVID-19) in Brazil: a political and social overview. *Ann Global Health*. 2021;87(1):44.
- Brazil. Ministry of Health Department of Health Care Department of Primary Care. National policy for integrative and complementary practices in the SUS: attitude towards expanding access / Ministry of Health, Department of Health Care, Department of Basic Care - 2nd ed. - Brasília: Ministry of Health, 2015.