

# Medicine and Health: Integrative Approaches to Post-Covid Syndrome and Parasitic Involvement

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## Abstract

The term "post-COVID syndrome" (PCS) describes ongoing symptoms and sequelae that COVID-19 survivors experience and the need for all-encompassing treatment approaches. In order to address the multiple consequences of PCS, this literature review investigates the possibility of integrative medicine approaches that combine complementary wellness techniques with traditional treatments. The introduction summarizes the extent of PCS disease and the gaps in care that, given relevant research findings, holistic interventions could help to close. In the setting of recurring parasitosis, the case study discussion models a successful proprietary blend approach that integrates tailored supplements, detoxification, and lifestyle modifications to enable patient recovery. Additional parts support the protocol's elements with research on oregano oil, turmeric, and other herbal remedies with antiviral, antiparasitic, and immunomodulatory properties that have been demonstrated to help post-viral illnesses with comparable clinical manifestations and inflammatory symptoms. The body of additional literature delves deeper into topics such as the pathophysiology of PCS, the need to address neglected diseases and coinfections in the context of syndemic settings, the potential benefits of molecular profiling in identifying treatment targets, and the necessity of building resilient health systems that can adapt to changing healthcare needs. Key findings are summarized in the conclusion, which confirms that providing specific integrative interventions for PCS cases offers helpful clinical guidance, given the ongoing development of post-viral syndromes. Tailored protocols that combine readily available, evidence-based complementary techniques with mainstream therapies provide practical ways to address a variety of presentations.

**Keywords:** Post Covid Syndrome, Myalgic Encephalomyelitis/Chronic Fatigue Syndrome, Neglected Tropical Diseases, Post-Covid Mucormycosis, Post-Acute Sequelae of Covid, Post-Covid-19 Condition

## 1. Introduction

Post-COVID syndrome (PCS) refers to a wide range of persisting or new symptoms and health issues that remain after the initial SARS-CoV-2 infection, even with mild illness. PCS affects approximately 30% of COVID-19 survivors and creates chronic burdens impacting quality of life and ability to work. Integrative medicine approaches incorporating both conventional and complementary modalities may help address gaps in PCS treatment and provide more comprehensive, patient-centered care. This review examines the literature on potential integrative medicine protocols for PCS, particularly related to mitigating parasitic infections. It discusses how these approaches align with the proprietary blend protocol used in the provided case study. Emerging research demonstrates that certain natural compounds have antiparasitic, antiviral, and immunomodulating properties that could benefit PCS treatment when incorporated into integrative protocols, as exemplified in the successful proprietary blend protocol used in the case study.

### 1.1. Adjuvant Ayurvedic Therapy for Post-COVID Mucormycosis

Adluri and Perugu 2022 evaluated the efficacy of adjuvant Ayurvedic therapy for patients with severe post-COVID

mucormycosis at a government tertiary care hospital in India [1]. Mucormycosis is a serious fungal infection affecting COVID-19 patients and survivors due to immunosuppression from the virus and certain treatments. The study compared outcomes between two demographically matched groups of mucormycosis patients - an Ayurveda group receiving adjuvant Ayurvedic therapy alongside conventional treatment and a control group receiving only conventional treatment.

The customized Ayurvedic therapy included oral medicaments like Guduchi Ghana vati, Vyoshadi vati, and Sudarshan ghan vati as immunomodulators and rejuvenators based on the tridosha theory of Ayurveda to balance vata, pitta, and kapha. Topical applications like Jatyadi tailam and coconut oil nasal drops were also administered. The study found that the Ayurveda group showed significantly better Diabetes Control (as measured by HbA1C), higher platelet recovery, reduced necrosis progression, and lower mortality rate compared to controls. The authors conclude that adjuvant Ayurveda therapy can improve outcomes for post-COVID mucormycosis patients by modulating immunity, countering diabetes, preventing necrosis, and enabling recovery [1]. The holistic approach addresses

multiple physiological root causes simultaneously. With PCS also implicating immune dysregulation and metabolic disorders, this study provides a precedent for integrating customized, multidimensional Ayurvedic protocols alongside conventional treatment. The case study similarly adopted a multifaceted proprietary blend strategy, with turmeric known for its immunomodulating benefits. Larger systematic trials are still needed to consolidate the evidence.

### 1.2. Underdiagnosis Burden of Post-Viral ME/CFS

Araja 2021 examined the hidden burden of undiagnosed myalgic encephalomyelitis/chronic fatigue syndrome (ME/CFS) from a societal perspective by estimating retrospective cases and projecting increased incidence following viral triggers like COVID-19 [2]. ME/CFS is a complex, chronic neuroimmune condition typically initiated by viral or bacterial infections, marked by disabling fatigue, cognitive dysfunction, sleep abnormalities, post-exertional malaise, pain, sensory hypersensitivities, and more. An estimated 15-30% of patients with symptomatic COVID-19 are developing ME/CFS-like conditions with overlapping symptomology.

However, ME/CFS remains largely underdiagnosed or misdiagnosed due to clinical unfamiliarity. The study estimates that roughly 206,000 European citizens and 1.86 million Americans are likely afflicted by ME/CFS without a formal diagnosis. Hence, patients struggle without care while societies absorb hidden costs in healthcare utilization and productivity losses of ~€14.5 billion and ~\$17.2-24 billion per year, respectively [2]. With COVID-19 projected to trigger 2-3 times more ME/CFS cases, failure to diagnose will exacerbate patient suffering and socioeconomic burdens. The authors recommend disseminating ME/CFS information to healthcare providers, recovery clinics and support groups to help recognize and manage growing incidence following COVID-19 based on lessons from past epidemics.

While this study did not explore integrative medicine specifically, raising ME/CFS awareness has parallels with ensuring proper diagnosis of post-COVID complications underlying PCS, so appropriate care plans can be instituted early, whether incorporating holistic modalities or not [2]. The case study notes years of mismanaged symptoms prior to COVID-19 infection, indicating missed diagnoses, before ultimately trialling the proprietary blend protocol with documented improvements. With PCS research still evolving, clinical guidance will rely significantly on patient experiences directing further solutions.

### 1.3. Integrative Considerations for Long COVID Management

Calabrese, Kirchner and Calabrese 2022 put forth clinical, diagnostic and therapeutic considerations around 'Long COVID' for rheumatologists, given overlapping autoimmune-like symptoms between PCS and rheumatic conditions [3]. Long COVID refers to lingering symptoms  $\geq 12$  weeks post-infection, further categorized as ongoing symptomatic COVID-19 or postCOVID-19 syndrome based on symptom timing. Core PCS symptoms like fatigue, cognitive impairment, chest/joint pains, dysautonomia and sleep

disturbances mimic various rheumatologic illnesses. Post-viral autoimmunity triggered by past viral epidemics may also manifest as PCS-rheumatologic overlaps, supported by elevated autoantibodies in Long COVID patients.

Authors suggest rheumatologists assimilate lessons from ME/CFS, dysautonomia and post-viral chronic fatigue management into Long COVID care. Proposed frameworks integrate both conventional treatment and holistic modalities like meditation, yoga, nutrition optimization and supplements to address mind-body connections in post-infectious exhaustion syndromes [3]. Combining standard symptomatic relief using NSAIDs, disease-modifying medications, physiotherapy and mental health support as needed with individualized lifestyle/dietary adjustments and evidence-based complementary approaches allows for more comprehensive, patient-centred Long COVID management.

Furthermore, early identification of windows of therapeutic opportunity, rather than late-stage disease symptoms, when individuals have curable lengthy COVID-rheumatologic symptom overlaps, may enhance outcomes. The case study's iterative proprietary blend protocol is consistent with these integrative principles; over 18 months, the patient showed progressively better function as a result of the personalized supplements and detoxification procedures that supported biomechanical restoration in addition to standard medical care [3]. Combining complementary and conventional treatments that are specific to the patient's circumstances gives a practical way ahead as PCS research continues to advance.

To summarize, new research suggests that integrative medicine techniques, which are based on modalities researched for related post-viral disorders like ME/CFS that show multidimensional pathophysiology, may be useful in the management of PCS. Further investigation is still needed to combine particular protocols. An encouraging example of tailored supplementation based on the patient's history and symptom response over time is the proprietary blend protocol employed in the case study [3]. Given the varied, complicated character of PCS itself, ongoing documenting of integrative interventions supporting PCS cases could yield important real-world data to further clinical understanding.

### 1.4. Perispinal Etanercept for Post-Infection Brain Syndromes

Clark 2022 put forth a unifying pathogenesis for varied post-infectious brain syndromes, including long COVID/PCS based on TNF-alpha excess, microglial activation driving neuroinflammation, and potential blood-brain-barrier permeability changes, supporting perispinal etanercept treatment. Etanercept is a TNF-alpha inhibitor biologic medication used for rheumatoid arthritis, formulated for perispinal administration targeting cerebrospinal venous system pathways hypothesised to reach brain inflammations better [4]. Clark argues that etanercept's anti-inflammatory effects can ameliorate chronic, treatment-resistant postinfectious neurocognitive, pain and fatigue symptoms

by neutralising excess central nervous system TNF-alpha from prior infections like COVID-19, stroke or encephalitis.

He cites open-label clinical studies showing perispinal etanercept yielding marked cognitive, mood, and motor improvements in small cohorts of patients with traumatic brain injury, stroke, neuroinflammatory disorders like Alzheimer's, and post-infectious issues including PCS refractory to other interventions. Clark believes perispinal etanercept could provide similar benefits for 30-50% of long-term COVID patients struggling with enduring cognitive/neuropsychiatric problems, given comparable underlying pathology of persistent CNS inflammation [4]. If validated by systematic trials, perispinal biologics offer another pharmacotherapeutic avenue for specific PCS sub-populations alongside holistic modalities as part of comprehensive protocols. However, risks around biologics like etanercept warrant consideration before large adoption, given immunosuppression concerns during or after COVID-19. The proprietary blend protocol from the case report notably used natural supplements to help rebalance immunity. An integrative approach combining biologics and complementary modalities may ultimately provide optimal, individualized PCS care based on presenting symptomology once further research establishes safety guides.

### 1.5. Medical Ecology Viewpoint on COVID-19

De Ver Dye 2020 employed a medical ecology lens that incorporated social, environmental, and epidemiological components to examine planning for urban COVID-19 research and interventions [5]. This viewpoint holds that interactions between related surroundings, pathogens, and individuals determine how diseases present. Urbanization tendencies like inequality, crowded housing, and pollution can accelerate epidemics. SARS-CoV-2 and other coronaviruses pose an additional risk of zoonotic transmission from animal markets into human populations. In order to guide context-specific COVID-19 preparation and reaction, a pragmatic, dynamic medical ecology approach makes it possible to connect these intricate ecological interactions [5]. This approach integrates the evaluation of urban environmental hazards and social susceptibilities, contact tracing of illnesses spread through interpersonal or environmental channels, and the mapping of multisectoral datasets to inform public health strategies related to lockdowns, healthcare capacity surges, or quarantines.

By minimizing social disruption, this systems-based approach ultimately seeks to enact prompt, evidence-based pandemic policy. While not specifically pertaining to PCS, the idea of prioritizing an individual's well-being within larger groups and habitats is similar to the holistic, patient-centred medicine ideas when viewed via a medical ecology lens [5]. The case report's custom blend procedure treated not only post-COVID symptoms but also mercury-filling toxicity and physiological equilibrium. Additional investigation can assess whether ecological insights could find beneficial environmental adjustments that reinforce PCS coping mechanisms.

### 1.6. Integrated NTD Management Amidst COVID-19

In order to prevent and control neglected tropical diseases (NTDs) during the COVID-19 pandemic, Ehrenberg 2020 reported on integrated measures. A class of infectious diseases common in tropical and subtropical regions that disproportionately afflict the poorest communities are non-tropical diseases (NTDs), which include intestinal worms, schistosomiasis, trachoma, and vector-borne infections [6]. Programs for NTD that are currently in place and concentrate on vector control, clean drinking water/sanitation access, case management, and preventative chemotherapy have been shown to be economical [6]. Still, COVID-19 runs the risk of undoing the gains made because the interventions were put on hold. As a result, the WHO approved interim guidelines to safely pick up where NTD left off, utilizing prior investments in primary healthcare and community outreach while adhering to modified country-specific standards that took COVID-19 risks into account. Coordinated preparations for telemedicine, digital health instruments for monitoring, dispensing multi-year prescriptions when necessary, providing safety gear for distributors, decentralized drug distribution, and incorporating NTD service provision into mandatory programs such as childhood vaccination are among the recommendations.

Given the potential effects of the pandemic on already vulnerable populations, it is imperative to maintain strong NTD programs during COVID-19. The case report reveals the successful treatment of parasite infestations alongside PCS using the unique blend procedure throughout multiple rounds of cleansing, indicating the possibility of infection-related comorbidities [6]. The present focus of health priorities in developed countries may be on long-term COVID-19. However, in underprivileged areas, health systems can benefit from integrated platforms that address both the immediate pandemic and long-term community welfare by acknowledging the intricacies of PCS that are linked to other social obligations like NTDs.

### 1.7. Post-COVID Mucormycosis Review

An updated narrative review of Post COVID-19 Mucormycosis (PCM), an aggressive fungal opportunistic infection that affects COVID-19 patients, was presented by Firke Deshmukh 2023 [7]. Fungi belonging to the mucorales order—most frequently *Rhizopus arrhizus*—cause mucormycosis. PCM commonly presents as a cutaneous, pulmonary, or rhino-orbital-cerebral illness. Important risk factors include uncontrolled diabetes, immune-impaired conditions from extended stays in the intensive care unit, voriconazole exposure during COVID-19 treatment, and glucocorticoid therapy, which reduces innate immunity against fungal growth and elevates serum glucose levels.

During its severe second pandemic wave in 2021, India saw an unusual spike in PCM cases, which were linked to poorly managed diabetes and overuse of steroids. Sinusitis, ophthalmoplegia, proptosis resulting in visual loss, nasal discharge that is black, and facial pain are among the clinical characteristics. Although radiography and histology also aid in early identification prior to fulminant progression,

microscopy and culture are the methods used to confirm the diagnosis [7]. Surgical debridement, systemic antifungals (particularly liposomal or lipid-complex amphotericin B formulations), stringent glycemic control, and stopping immunotherapy are all necessary for definitive treatment in order to promote recovery. If prompt action is not taken, PCM mortality will soon surpass 50%.

The integrative medicine adjuvant Ayurvedic protocol for PCM patients discussed earlier demonstrates promising results as immunomodulatory adjuncts alongside conventional treatment. Furthermore, the proprietary blend strategy from the case report encompassing antimicrobial and immunoregulating natural supplements bears similarities potentially generalizable to PCM. With rhino-orbital-cerebral disease linked to sphenoid sinus fungal invasion into brain spaces, the TNF-alpha inhibitor intervention proposed for neuroinflammatory PCS may also have implications for centralized PCM [7]. Overall, PCM remains an aggressive PCS complication necessitating rapid coordinated care, which integrative medicine could play increasing roles in optimizing based on emerging directions.

### 1.8. Long COVID Overview and Management

Koc 2022 provided an overview of Long COVID pathophysiology, symptoms and integrative management considerations [8]. Long COVID or Post-Acute Sequelae of COVID (PASC) refers to symptoms extending >4 weeks after initial SARS-CoV-2 infection, further delineating acute (<12 weeks), subacute (12-24 weeks) and chronic (>24 weeks) phases. Myriad mechanisms likely contribute, including viral persistency, autoimmunity, metabolomic dysregulation, microbiome shifts and microvascular injuries with various organ system effects.

Hallmark symptoms involve fatigue, dyspnea, neurocognitive dysfunction and exertional intolerance.

Management is individualized to presenting phenotypes and aimed at resolving underlying drivers where possible. Treatment mainstays currently rely on controlling inflammation using selective cytokine/chemokine modulation, regulating overactive immune responses with immunomodulators like intravenous immunoglobulin, and addressing pathological clotting with anticoagulants [8]. Supportive strategies encompass physical/cognitive rehabilitation programs, nutritional optimization, supplements that manage fatigue or enhance mitochondrial function, and Traditional Chinese Medicine modalities.

Overall, COVID is a heterogeneous, potentially disabling condition with unclear natural progression. While many pharmacological options are still off-label with small effect sizes, the authors conclude that personalized, precision medicine frameworks integrating antiinflammatory medications, rehabilitation, nutrition, and evidence-based complementary integrative health approaches offer the most promising path for restoring health and function [8]. The proprietary blend case protocol aligns remarkably well with these recommendations despite preceding the comprehensive PASC exposition.

### 1.9. Primary Healthcare and Global Threats

In their analysis of the COVID-19 pandemic, Lauriola 2021 emphasized the value of robust primary and community-based healthcare in tackling environmental changedriven threats to world health [9]. Despite limited resources, health systems that were excessively dependent on specialist facilities and curative treatments were unable to handle the increasing number of cases during the pandemic. In contrast, preventative and holistic community care options proved to be more equipped. Health systems that were vertically integrated were overwhelmed in the absence of decentralized capabilities. Since primary care physicians are already well-established in the communities they serve, their understanding of patients' homes and their ability to maintain continuity of care during lockdowns helped them maintain it most successfully [9].

Everywhere, there are public health connections between primary care clinics and regional administrations, which allow for real-time surveillance insights and coordinated mitigation activities; pandemic responses have also been increased. Building resilient, community-focused health systems with strong primary care workforces and decentralized capability is imperative in light of the realities of environmental health hazards like zoonotic infections. Even though the PCS treatment described in the case study is presented from an individualized viewpoint, it is crucial to acknowledge that everyone is eventually susceptible to these types of emergent crises until systemic resilience is strengthened. Through the bio-psycho-social perspectives that drive disciplines like family medicine, integrative care principles dedicated to holistic wellbeing throughout entire healthcare continuums offer a unifying path towards this goal.

### 1.10. Multi-omics Profiling of COVID-19

In order to comprehend the features and effects of SARS-CoV-2 infection encompassing genomes, epigenomics, transcriptomics, proteomics, and metabolomics, Li 2022 examined multi-omics studies on COVID-19 [10]. Using host or viral sequencing for genomic study, certain biomarkers linked to severe illnesses were found, such as TLR7 variations and ACE2 genotypes. One study indicated that in important cases, there is increased methylation of antiviral interferon genes, indicating that epigenetic alterations affect downstream genomic consequences. Gene expression profiles associated with pathways such as inflammation, neutrophil activity, complement activation, and lung cell injury are found using transcriptomic profiling, which distinguishes between moderate and severe symptoms.

Intense omic interplay is demonstrated by the integration of proteomics and metabolomics, which further captures physiological functionality. One examination of serum proteomemetabolome integration in COVID-19 patients revealed interactions between proinflammatory kynurenine pathway metabolites and cytokines regulating cell death [10]. The authors conclude that multi-omics strategies combining genomic, proteomic and metabolomic analyses could provide biological insights across molecular layers.



Findings may clarify mechanisms within COVID-19 heterogeneity and PCS by connecting genetic drivers to protein markers and metabolic phenotypes. It can also inform prognostic indications for triaging care based on higher risks. Developing predictive multi-omic COVID-19 models would support precision intervention. The proprietary case protocol did not utilize omics testing, but applying similar systems biology concepts to guide integrative PCS treatments accounting for individual variabilities may improve future patient outcomes.

### 1.11. Opportunistic Infections in COVID-19

Mewara, Sahni, and Jain 2021 highlighted overlooking opportunistic parasitic infections while concentrating solely on managing SARS-CoV-2 rather than considering disease co-occurrence effects on COVID-19 morbidity and mortality within local contexts [11]. Pathogens like Strongyloides, malaria and arboviruses remain endemic in many countries grappling with COVID-19. These infections often cluster in tropical low-resource settings, disproportionately affecting impoverished communities already facing health access constraints further exacerbated by lockdowns. Preexisting parasitic diseases also risk flare-ups in COVID-19 patients due to immunosuppression from the virus and the ensuing cytokine cascade [11]. Their unchecked persistence or recrudescence could worsen clinical trajectories through augmented organ system complications or coinfections. The authors recommend incorporating surveillance, prevention and treatment for prevalent opportunistic infections within national COVID-19 responses per regional epidemiology. Failing to adopt integrated control programs will enable endemic parasites to thrive among immunocompromised COVID-positive patients, causing avoidable deaths, viral persistence and amplification risks. This analysis reinforces the previous discussion on integrated NTD management, though specifically within pandemic contexts. It directly parallels the post COVID parasitic component successfully addressed through the proprietary blend case protocol over recurrent cleansing rounds [11]. The synergistic dynamic between SARS-CoV-2 and parasitic coinfections indicates complex interconnected disease equilibriums, whereby holistic care solutions balancing antiparasitic, antiviral and immunoregulating therapies can together restore health.

### 1.12. Ayurveda's Holistic Systems Viewpoint on COVID-19

Nesari Kajaria 2021 put forth Ayurvedic perspectives on COVID-19 causes, pathogenesis diversity, and holistic management principles centred around reinforcing host immunity against the SARS-CoV-2 virus [12]. Ayurveda recognizes disease manifestation as an interplay between external infective factors, bodily humour/dhatu, aggravated doshas, and vitiated immune function. Pandemics like COVID-19 represent exogenous exacerbating events, with variability in resulting symptom severity reflecting intrinsic prakriti constitutions and homeostatic imbalance. SARS-CoV-2 predominantly amplifies underlying kapha and vata disturbances. Clinical strategies should address both removing the pathogenic stimuli through antiviral measures and rebalancing doshas/dhatu to strengthen ojas, vyadhiksamatva and bala

(vital essence, immune capacity and strength).

Recommendations span herbal combinations like Guduchi and Ashwagandha as immunomodulators, Pippali as bioavailability enhancers, Tulsi and grains like wheat/barley as antioxidants, Sudarshan Kriya yoga for pulmonary rehabilitation, and dietary adjustments emphasizing fresh fruits/vegetables while minimizing cold, heavy foods [12]. The authors posit that Ayurveda's holistic framework offers sustainable preventative and therapeutic paths for combating COVID-19 centred on correcting constitutional excesses and deficiencies.

### 1.13. Schistosomiasis and COVID-19 Outcomes

Oyeyemi, Okunlola, and Adebayo 2020 investigated the relationship between COVID-19 outcomes and endemic schistosomiasis in Africa, as well as the impact of administering praziquantel in large quantities to combat the parasite [13]. Schistosomiasis remains one of Africa's most prevalent endemic neglected tropical diseases. Certain shared immunopathologies between schistosome infection and SARS-CoV-2, including pulmonary involvement, proinflammatory cytokines, chemokines like CCL2/CCR2, multiorgan impairment, thrombo inflammation, with helminth coinfections possibly increasing COVID-19 susceptibility through ACE2 modulation. However, routine praziquantel treatment offered through control programs may confer some protective advantages. Praziquantel has known antiviral activities against viruses like SARS-CoV-2 in vitro and anti-inflammatory effects observed in vivo that could mitigate COVID-19 severity [13]. The helminthic drug also reduces schistosomiasis organic pathologies and subsequent Mortality. Hence, the authors recommend continued mass drug administration against schistosomiasis within adapted COVID-19 protocols, given the potential morbidity and mortality benefits of both diseases. This data directly supports previous talks about controlling parasitic diseases in an integrated manner while interacting synergistically with SARS-CoV-2. It uses antioxidants, immunomodulators, and detoxifying techniques in conjunction with antihelminthic phytochemicals, mimicking the proprietary mix case regimen. Ensuring effective public health initiatives aimed at common neglected diseases may have a favourable impact on the outcomes of endemic populations in the face of emerging challenges such as COVID-19.

### 1.14. Preventing Future Zoonotic Epidemics

In order to combat potential zoonotic disease epidemics, Petrovan 2021 proposed multifaceted solutions that included surveillance, dietary changes, infrastructure improvements, climate action, and improved access to healthcare [14]. These solutions were based on a planetary health approach that acknowledged the interconnection of humans and the environment. The majority of newly emerging infectious diseases, such as COVID-19, spread from wildlife to human populations and are made worse by increased contact rates caused by habitat encroachment, globalized trade, intensified agriculture, and climate change. The range of suggested interventions includes risk mapping, outbreak simulation

models, early warning surveillance, biosecurity-oriented infrastructure modifications around livestock production and markets, proactive development of diagnostics and medical countermeasures against likely viral families, tying climate change mitigation to forest conservation, reorienting food systems away from factors driving demand for animal meat, and bolstering regional and international collaboration on outbreak preparedness [14]. In the end, reducing zoonotic spillover incidents requires a concerted One Health approach involving institutions of environmental, animal, and human health. This study exemplifies the medical ecology principles discussed earlier, framing COVID-19 as a socioenvironmental phenomenon requiring holistic responses interlinking community resilience initiatives, policy reforms and individual behaviours protecting collective wellbeing. While the proprietary case protocol addressed PCS treatment, prevention of such emerging zoonotic threats ultimately requires complementary actions across all levels of society and health systems.

### 1.15. Herbal Solutions Across COVID-19 Stages

Prajapati 2022 extensively reviewed Ayurvedic and other ethnomedicinal plantbased solutions against pre-exposure prophylaxis, symptomatic relief and post-COVID rehabilitation [15]. Phytochemicals like alkaloids, flavonoids, lignans, phenols, tannins, quinones and terpenes offer wide pharmacological activities, including as antivirals, immunomodulators, anti-inflammatories, antipyretics, analgesics, antioxidants, anticoagulants, neuroprotectants and restoratives that can target various COVID-19 and PCS pathologies. Different herbs demonstrate applicability across prevention and infection stages. Prophylactics include phytochemical-rich foods and classical Ayurvedic immunity promoters like Ashwagandha, Guduchi, Tulsi and ginger, plus vitamins/nutraceuticals that defend against viral entry and replication.

Early interventions encompass managing symptoms like fever, cough and sore throat using formulations containing liquorice, sesame oil, pepper, honey, Terminalia chebula, onion and thyme [15]. Post-COVID rehabilitative strategies feature medicinal plant cognitive, neurological, musculoskeletal and cardio-respiratory recovery actions to address chronic debilitating sequelae. The authors conclude that Ayurveda, with its extensive botanical remedies, provides accessible, affordable solutions supporting both COVID-19 therapy and building systematic resilience. The proprietary blend case protocol demonstrates parallels as a promising post-COVID multi-modal herbal formulation alongside other detoxification steps, ultimately enabling patient recovery. Further pharmacoepidemiological evidence can help consolidate specific integrative medicine protocols incorporating key phytochemicals and micronutrients matched to presenting symptoms.

### 1.16. Computational Drug Repurposing for COVID-19

Sahu 2021 reviewed computational approaches supporting integrated targetbased drug discovery and repurposing pipelines against COVID-19 [16]. Drug development traditionally follows lengthy sequential steps from target

identification, lead compound screening, preclinical testing and clinical trials before approval and marketing. This process proves time-intensive, with substantial failure risks along the discovery-to-market pipeline. Repurposing existing approved drugs or late-stage experimental compounds for alternative indications can expedite therapeutic access, given established safety data and availability.

COVID-19 triggered vast computational efforts predicting candidate molecules through virtual screening of chemical libraries against viral proteins like spike and main protease before experimental validation. Various databases and molecular modelling workflows facilitate target identification and small molecule docking [16]. Other drug repositioning approaches analyze gene expression profiles post-viral infection to match perturbation signatures with drug pharmacology databases. Ultimately, predictive analytics tools and AI models can accelerate finding targeted lead compounds. While still reliant on wet-lab verification, in silico pipelines offer valuable infrastructure for responding to future epidemics.

However, the authors also caution against simplistic "one drug-one target" outlooks given SARS-CoV-2 complexities where combination therapies addressing multiple pathways may prove necessary, not unlike integrative medicine principles using multi-modal interventions. The proprietary case protocol demonstrates this system approach combining various natural compounds, detoxification support and lifestyle changes to achieve clinical improvements [16]. Advancing therapeutic preparedness against emergent diseases like COVID-19 will necessitate integrating computational and experimental biomedicine with real-world clinical insights.

### 1.17. Post-COVID Muscle Dysfunction

Silva 2022 reviewed muscle impairment and rehabilitation approaches in postCOVID-19 condition (PCC) patients [17]. PCC refers to symptom persistence  $\geq 12$  weeks after initial infection. Myopathy symptoms like fatigue, muscle weakness and pain are reported in over 50% of long-term COVID patients, requiring adapted exercise programs different from standard deconditioning recommendations. Ongoing immune activation and microvascular injuries likely drive muscle inflammation and tissue damage. Strength tests, questionnaires evaluating activities of daily living, and imaging modalities such as ultrasound to distinguish patterns of muscle fat infiltration or atrophy for profiling dysfunction are some of the tools used in assessments to assist in determining severity [17].

Strength and endurance can then be restored through supervised therapy, which incorporates resistance, aerobic, and neuromuscular electrical stimulation modules that are customized to the patient's initial functional state. Finding the right balance between rest to prevent overexertion and preserve mobility is still difficult. Starting activity too soon runs the risk of momentarily aggravating cramping and exhaustion. Pacing regimens, taken as a whole, facilitate maximum recuperation. Here, the multi-systemic approach

that combines immune regulation, vascular support, and detoxification with tailored muscle-directed rehabilitative regimens in line with the proprietary case protocol aligns strongly with integrative medicine principles tailored to the individual's presentation for treating the varied effects of long-term COVID-19 [17]. Exercise progressions and the best therapeutic sequencing can be connected with the support of ongoing research.

### 1.18. Natural History Collections for Outbreak Surveillance

According to Thompson 2021, specimens from natural history museums that have host data indexed throughout time and space are a valuable resource for improving pandemic forecasts, understanding the ecology of zoonotic diseases, and strengthening outbreak surveillance [18]. These data are often disregarded. Unbiased references that precede recognized spillover episodes are provided by pathogens that have been preserved in vertebrate tissues without human observation. By examining preserved specimen samples, researchers were able to identify precursors or early strains of the coronaviruses that cause hepatitis B, influenza, SARS, and HIV. This allowed them to decipher the mysterious transmission networks. It is possible to track the evolutionary trajectory of viruses, even in the absence of many clinical cases, by integrating biobanks from collections of wildlife or livestock with public health surveillance systems [18].

Predictive algorithms that forecast potential hotspots for preventive actions are further informed by cross-referencing specimen microbiome data against environmental variables such as changes in land use. The contents of natural history museums are ultimately vast, interconnected resources that have been used for decades to study the interactions between hosts and pathogens and are thus in a position to promote proactive pandemic preparedness. Biodiversity archives serve as examples of applied "one health" ideas that connect the human, animal, and environmental domains. These principles support integrated medicine frameworks that contextualize health within surrounding ecologies that are also impacted by human activity, even though they are not direct biomedical interventions [18]. Even though the case study focuses on individual care, a balanced living within larger ecosystems is ultimately necessary for collective resilience against global challenges.

### 1.19. Global Parasitic Disease Control Post-COVID

Ung 2021 investigated how the COVID-19 pandemic affected efforts to manage parasitic diseases worldwide and offered chances to fortify health systems against endemic and new threats within improved governance frameworks [19]. Vulnerable communities with inadequate access to water, sanitation, and healthcare facilities are disproportionately affected by parasitic infections such as malaria, schistosomiasis, soil-transmitted helminths, and neglected tropical diseases (NTDs). Although vertical control programs that focused on certain parasites produced notable results in the past, they frequently distanced themselves from broader efforts to strengthen healthcare capacity.

The COVID-19 crisis brought about serious disruptions to infrastructure, monitoring, and medication distribution. Dismantling barriers across components of the health system can facilitate the integration of infectious disease control, as evidenced by the remarkable mobilization surrounding pandemic mitigation. Decentralized community-based care models that may adapt to competing goals and create mutually beneficial synergies are suggested by the authors [19]. In order to facilitate the administration of COVID-19 management with parasitological testing and treatment, gatekeeping constraints on health workers' scopes should be loosened. Regional datasets should be connected using digital tools. Ultimately, resilient, equitable health systems demand consolidated governance and financing schemes that foster stronger local capacity suiting dynamic needs. This analysis reinforces similar discussions on bridging COVID-19 responses with existing neglected disease programs to leverage efficiencies and serve vulnerable groups managing co-morbid threats. The individual proprietary protocol resonates by addressing parasitic complications amid the management of post-COVID syndrome [19]. Realizing robust primary care systems staffed and resourced to handle diverse caseloads will remain vital to alleviating immediate crises and fostering long-term communal health.

### 1.20. Ion Channels Gene Expression in COVID-19

Zhang Feng 2023 computationally investigated associations between ion channel gene expression and COVID-19 pathologies to elucidate disease mechanisms and predict correlated clinical traits related to viral entry, replication and hyperinflammatory responses [20]. Ion channels help regulate transmembrane electrical signals fundamental to all physiological processes. Differential channel functioning frequently arises in cancers and neurodegenerative conditions. Recent studies also demonstrate unique transcriptional channel signatures in SARS-CoV-2 infected samples. This paper integrated public datasets analyzing ion channel gene expression changes against COVID-19 clinical presentations and outcomes. Key genes like KCNJ2, KCNK3, SCNN1A and CFTR were found to be upregulated among severe versus mild patients. Network analysis further revealed gene subsets co-expressing with inflammatory markers or viral receptors like ACE2 associated with symptom severity [20]. The authors propose that ion channel modulation could mitigate downstream lung damage and cytokine storms. Specific channel inhibitors already applied for pain, cardiovascular therapy or cystic fibrosis may hence offer drug repurposing opportunities if bioinformatic findings translate to in vivo efficacy.

### 1.21. Global Health Systems Strengthening

In their discussion of policy goals for bolstering health systems to improve pandemic preparedness, Zhang 2023 emphasized the value of comprehensive universal health coverage (UHC) programs as opposed to isolated infectious disease control methods [20]. Systemic capacities in surveillance, medical supplies, infrastructure, coordination, and primary care were revealed by COVID-19. Stronger UHC frameworks were associated with more coordinated responses to outbreaks. Less successful control was

achieved by those without readily available, reasonably priced emergency methods and basic public health systems. The necessity for integrated governance that strengthens each pillar of health systems, rather than only discrete investments when disasters occur, is made evident by the current global crisis [21]. As a result, in order to promote national-level healthcare capacity encompassing basic infrastructure, workforce, access for marginalized groups, medical countermeasures, and data integration, the WHO suggests technical guidelines in addition to legal obligations and funding channels. In the end, pan-institution cooperation should focus on UHC under longterm, national platforms that will improve community well-being now and in the future by facilitating quick mobilization in the event of an emergency. This final study goes back to the original discussion of the COVID-19 pandemic, highlighting the need for participatory, decentralized healthcare capacity anchored throughout communities that demonstrated the greatest resilience to the developing crisis [21]. Talks about medication repurposing algorithms, ecological viewpoints, tailored care strategies, and parasite coinfections all work together to strengthen resilient systems that can fairly serve populations with a range of health requirements.

### 1.22. Integrated Infectious Disease Surveillance Systems

Zinsstag 2020 argued in favour of integrated surveillance-response systems that support UHC schemes for capacity maintenance and prevention and control of future pandemics [22]. Emergence episodes of infectious diseases in the last few decades, such as COVID19, SARS, MERS, and Ebola, have shown that coordination amongst disparate governance structures, early warning systems, and health system preparedness are persistent issues. Disease management strategies that are vertically organized run the risk of exclusively concentrating on particular infections without addressing their connected causes or fortifying the foundations of comprehensive healthcare for adaptable responses to emerging threats [22]. The authors advise integrating adaptable modules for infectious diseases into horizontal primary care systems, with information routes connecting the local, regional, and federal levels. Specialized response teams can be activated by frontline syndromic surveillance insights using integrated architectures. Under the auspices of UHC, ensuring cheap access and pandemic preparedness as essential, everyday health system functions can facilitate the quick containment of future epidemics.

This proposal links back to a number of earlier conversations about medical ecology perspectives, drug repurposing platforms, integration of parasitology, and health systems policy discourses that all centre on the need for decentralized, robust healthcare services that are coordinated across critical aspects of public infrastructure and governance frameworks [22]. The integrative clinical approach in the case report likewise resonates with these systems-based imperatives for sustainable, equitable health provision suited to arising needs. No individual exists in isolation, such that collective well-being through robust societal measures remains key to overcoming shared vulnerabilities against looming threats.

### 1.23. Turmeric for COVID-19 Sequaele

Chabot Huntwork 2021 explored utilizing turmeric (*Curcuma longa*) and its main bioactive curcumin to treat post-COVID olfactory dysfunction based on anti-inflammatory, neuroprotective and neurodegenerative effects demonstrated in other conditions causing anosmia like sinonasal disease, head trauma and neurodegenerative disorders [23]. Loss of smell represents a common long-term COVID symptom linked to inflammatory damage or viral persistence impairing olfactory pathways. Intranasal curcumin administration enhanced olfactory neuron recovery in animal studies by downregulating cytokines and inhibiting apoptosis while stimulating nerves through anti-amyloid, antioxidant and neural growth factor upregulation mechanisms [23]. Human trials found promising symptom improvements using curcumin alongside standard treatments for chronic rhinosinusitis. The authors posit similar benefits likely extrapolatable to post-COVID anosmia, given comparable inflammatory pathology. Curcumin's low toxicity and ability to access cranial base tissues when nasally delivered allows inexpensive self-administration, enabling sensory recovery. Though awaiting higher-level validation, turmeric and curcumin offer accessible options as adjuvant smell remediation based on extant mechanistic knowledge, reinforcing the proprietary blend protocol incorporating turmeric alongside varied pleiotropic natural compounds.

### 1.24. Post-Acute COVID-19 Syndrome Overview

Chippa, Aleem, and Anjum 2023 provided an updated overview of Post-acute COVID-19 Syndrome (PACS) encompassing Persistent Symptoms After Acute COVID (PSAC) persisting beyond 12 weeks post-infection and Long COVID extending beyond 12 months—factors like disease severity, reinfection risk, age and biological sex shape PACS likelihood [24]. Up to 80% of hospitalized patients develop enduring multi-system effects. Immunological dysregulation from viral epitope spreading, microvascular damage and inflammation may sustain chronic symptoms like fatigue, cognitive impairment, musculoskeletal pain, cardiac/respiratory manifestations and mental health issues. Proposed treatments target specific effects like anticoagulants against clotting risks or antiinflammatories for lasting symptoms, combined with gentle reconditioning programs for debility. However, optimal combinations and durations of pharmaco-rehabilitative interventions still need to be standardized given the heterogeneous, still unfolding presentations [24]. Ultimately, PACS pathophysiology appears dictated by both host and viral factors requiring personalized diagnosis and management grounded in emerging evidence, much like the customized proprietary blend protocol using measured biomarker improvements to direct iterative adaptations suiting the patient's evolving status.

### 1.25. Oregano Oil Against Candida Biofilms

Hacioglu, Oyardi, and Kirinti 2021 examined oregano (*Origanum vulgare*) essential oil's effects on inhibiting *Candida* species biofilms often implicated in recurrent infections unresponsive to antibiotics given matrix-sheltered persistence mechanisms [25]. *Candida* spp, like *C. albicans*



and *C. glabrata*, rank among the leading hospital-acquired pathogens, with biofilms posing particular virulence and drug resistance. Essential oils offer microbiostatic, microbicidal, and anti-biofilm properties as alternative antifungals, notably against *Candida*. This study tested oregano oil against *Candida* biofilms generated by four clinical isolates from blood cultures. Minimum inhibitory concentration (MIC) assays found effective antiplanktonic concentrations between 0.03-0.25% v/v, aligned with literature reporting strong oregano oil fungicidal attributes [25].

Minimum biofilm eradication concentration (MBEC) quantification determined 0.25-0.5% v/v doses could inhibit established, mature 24-72-hour *Candida* biofilms by  $\geq 50\%$  across tested species, demonstrating potent anti-adherence effects. Gas chromatography confirmed carvacrol as oregano oil's main component. Carvacrol disintegrates cell membranes but also showed transcriptional suppression of key *Candida* biofilm formation genes like *YWP1*, *EFG1* and *CSH1*. Overall, oregano oil exhibits broad anti-*Candida* potential, including against drug-resistant biofilms through both physical and genetic regulatory mechanisms of action. This resonates with the proprietary blend protocol's inclusion of *Oreganum* alongside other antifungal, antibacterial and antiparasitic antiparasitic components [25]. Further translational studies can better define oregano oil's clinical scope against specific *Candida* infections. As an accessible, affordable option, oregano oil could provide alternative or adjunct therapy, especially when fungal biofilms prove recalcitrant to standard antibiotics. Potent natural compounds may ameliorate numerous pathogens implicated in complex post-COVID Syndrome manifestations.

### 1.26. Turmeric vs Praziquantel for Schistosomiasis

Hussein 2017 explored turmeric (*Curcuma longa*) effects against schistosomiasis, testing ethanolic extracts against adult *Schistosoma mansoni* worms compared to praziquantel in infected mice [26]. Despite mass administration, praziquantel risks waning effectiveness as the sole chemotherapeutic against endemic schistosomiasis long-term. *S. mansoni* also exhibits particular liver pathogenicity. Turmeric demonstrated anti-schistosomal properties in earlier vitro and in vivo murine trials, but clinical translation remains lacking. This study specifically assessed curative efficacies and hepatic impacts. Mice receiving 1125 mg/kg turmeric extract for two weeks post-*S. mansoni* infection displayed antiparasitic potency quantitatively comparable to the standard 400mg/kg praziquantel dose [26]. Turmeric-treated mice showed total worm burden reductions up to 85.2% 100% hepatic tissue egg decline, with surviving eggs evidencing malformed shells and shrivelling. Praziquantel performed slightly better in eradicating all worms and eggs in 63% of subjects. However, turmeric conferred greater liver integrity with decreased granulomas, near-normal LFTs and higher antioxidant superoxide dismutase levels, indicating active tissue remodelling. Both treatments proved similarly tolerable.

Accordingly, the authors conclude that triple-curcuminoid turmeric exhibits promising anti-schistosomal therapeutic

potential, ameliorating hepatic immunopathology equal to or better than praziquantel alongside total egg elimination in a subset of cases. Fractionation could isolate particular antiparasitic alkaloids for synthesizing improved phytomedicines. These findings substantiate incorporating bioactive turmeric within the multipronged proprietary product blend addressing parasitosis along post-COVID symptoms [26]. Though still requiring corroboration trials in endemic populations, the accessible, affordable turmeric herb holds clinical relevance for helminth control strategies in resource-limited settings. Antiparasitic Antiparasitic phytomedicines could provide valuable adjuvant tools where singular chemical interventions struggle to contain tenacious eukaryotic pathogens.

## 2. Conclusion

This review examined integrative medicine approaches for the post-COVID syndrome (PCS), particularly related to mitigating parasitic coinfections, and discussed alignment with the proprietary blend protocol used in the presented case study. PCS constitutes a heterogeneous spectrum of lingering symptoms and secondary health issues affecting nearly 30% of COVID-19 survivors. Integrative protocols incorporating both conventional treatments and complementary modalities like customized supplementation, anti-inflammatories, gentle reconditioning, and detoxification measures can provide more comprehensive, patient-centred PCS care. Emerging research demonstrates certain natural compounds offer antiparasitic, antiviral and immunomodulating properties that could uniquely benefit PCS, as the iterative 18-month proprietary blend protocol exemplified enabling incremental functional improvements. Specifically, bioactive components of turmeric, oregano oil and medicinal herbs demonstrate applicability against acute COVID-19 pathology and enduring sequelae based on properties like anticoagulation, cellular protection, anti-biofilm effects, liver detoxification, tissue regeneration and neural recovery. Detailing integrative interventions supporting PCS cases provides valuable clinical insight given multifaceted, still-unfolding post-viral syndromes. Overall, this review substantiates tailored protocols combining accessible, evidence-based complementary techniques and mainstream therapies as a pragmatic approach to responding to PCS heterogeneous presentations while managing recurrent parasitosis risks amid dysfunctional immunity. Consolidating solutions that balance pharmaceutical and holistic measures maximizes therapeutic synergies suited to arising symptomologies.

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