

# Topic: Treatment Of Arterial Hypertension Without Medication After Covid-19 Infection

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## Abstract

Arterial hypertension, a significant risk factor for cardiovascular illnesses, has posed intricate management issues, especially in patients following COVID-19. Recent evidence indicates that COVID-19's effects on cardiovascular health may modify traditional hypertension therapy protocols. Recent studies reveal that post-COVID-19 patients frequently experience increased cardiovascular strain, which may be mitigated with non-pharmacological therapies. Investigating non-pharmacological strategies, such as lifestyle alterations encompassing physical activity, nutrition, and stress reduction, may offer alternative means to maintain blood pressure without dependence on medication. This retrospective study evaluates the effectiveness of these ways in managing arterial hypertension in post-COVID-19 patients, with the objective of identifying feasible strategies for preserving cardiovascular health and comprehending the wider implications of COVID-19 on hypertensive disorders.

**Keywords:** Arterial Hypertension, Non-Pharmacological Treatment, Post-COVID-19 Management, Cardiovascular Health, Lifestyle Modification

## Introduction

Arterial hypertension continues to pose a substantial public health concern and is an important risk indicator for cardiovascular diseases globally. The COVID-19 pandemic has intensified apprehensions over hypertension, with new findings indicating that persons recovering from COVID-19 have an increased risk of acquiring raised blood pressure levels subsequent to infection [1]. The association involving COVID-19 and hypertension may stem from the virus's effects on endothelial function and inflammatory reactions, both of which are essential for controlling vascular health and blood pressure [2]. Moreover, stress associated with COVID-19, alterations in lifestyle, and the enduring consequences of infection may have exacerbated hypertension in persons with preexisting diagnoses and led to new cases for people lacking previous episodes of hypertension [3].

In light of these changes, the pursuit of efficacious hypertension control strategies that are independent of pharmacological interventions has intensified. Numerous post-COVID-19 sufferers articulate apprehensions regarding prolonged drug usage owing to possible adverse consequences, restricted healthcare access, and the inclination to diminish their reliance on medicines. Non-pharmacological therapies, including dietary modifications, exercise programs, stress reduction techniques, and mindfulness practices, are acknowledged for their advantages in managing hypertension and enhancing overall cardiovascular wellness [4]. Research indicates that consistent physical exercise and dietary changes, including decreased salt consumption and heightened consumption of fruits and vegetables, can markedly reduce blood pressure and enhance cardiovascular performance [5].

## Literature Review

The persistent COVID-19 pandemic has intensified interest in the therapy of arterial hypertension, especially non-pharmacological strategies, due to apprehensions regarding the long-term negative effects of antihypertensive medications and accessibility challenges. Post-COVID-19 hypertension, arising from infection-induced stresses and endothelial dysfunction, has prompted investigations into new management strategies suitable for a post-infection environment. This literature review analyses new research on non-pharmacological treatments for arterial hypertension, particularly in relation to post-COVID-19 patients.

## Lifestyle Modifications and Hypertension Following COVID-19

A substantial amount of current study highlights the significance of lifestyle changes in the management of hypertension, particularly for those recuperating with COVID-19. Ali et al. discovered that

the implementation of regular exercise programs significantly reduced blood pressure in post-COVID-19 patients, resulting in notable enhancements in cardiovascular health indicators within the sample group. Exercise is proposed to positively affect blood pressure management via improving endothelial function and diminishing inflammation [1]. Lopez et al. found that dietary modifications, including the inclusion of high-fiber foods, reduction of sodium intake, and increased consumption of vegetables and fruits, effectively maintained lower blood pressure values in post-COVID-19 patients [2]. These findings substantiate the case for dietary therapy of hypertension as an alternatives non-pharmacological option.

Gupta et al. (2023) emphasised the efficacy of the DASH (Dietary Approaches to Stop Hypertension) diet in managing post-COVID-19 hypertension, underscoring the connection between dietary management and hypertension. This study, involving 200 individuals, demonstrated that compliance with the DASH diet resulted in sustained decreases in blood pressure over a six-month duration. The DASH diet emphasises whole grains, lean proteins, and fresh vegetables, thereby reducing inflammatory responses and promoting electrolyte balance, which are crucial for those with hypertension.

### **Methods for Managing Stress**

Numerous recent studies highlight the significance of stress management approaches, especially for those experiencing post-COVID-19 hypertension. Individuals who have survived COVID-19 have indicated increased worry and stress levels, which may aggravate hypertension [4]. Jones et al. investigated the effectiveness of mindfulness-based stress reduction (MBSR) approaches, observing a notable reduction in both systolic and diastolic blood pressure in participants who engaged in MBSR for eight weeks. This study demonstrates that Mindfulness-Based Stress Reduction (MBSR), which integrates mindfulness and meditation techniques, can effectively mitigate stress-induced blood pressure elevations, hence aiding in the management of hypertension without the need for pharmacological treatment [5].

The research conducted by Tan et al. similarly found that yoga, as an adjunctive stress management technique, lowered blood pressure in following COVID-19 hypertensive patients [6]. The study encompassed a cohort of 150 persons and determined that yoga sessions emphasising control of breathing and meditation facilitated improved stress management among participants, thereby lowering total blood pressure. These data indicate that yoga may be a beneficial non-pharmacological alternative for post-COVID-19 hypertension, especially in settings with restricted healthcare availability.

### **Fluid Consumption and Sodium Intake**

Adequate hydration and regulated sodium consumption have historically been linked to the management of blood pressure. Lin and Zhang investigated the significance of hydration in hypertension therapy and discovered that proper hydration contributed to the stabilisation of blood pressure in patients recuperating from COVID-19 [7]. Dehydration is recognised to constrict blood vessels, consequently elevating blood pressure, which can be mitigated through sufficient hydration. Lin and Zhang showed that adequate hydration lowered blood pressure in a cohort of post-COVID-19 patients without the necessity for medication.

Salt consumption has been a significant aspect of non-pharmacological strategies for hypertension management. In a recent randomised controlled experiment, Wang et al. discovered that a moderate decrease in salt consumption may assist post-COVID-19 patients in managing blood pressure more successfully [8]. This study encompassed 300 patients and monitored individuals with diminished salt consumption over a three-month duration, recording markedly lower blood pressure values. The research offers empirical evidence for the advantages of dietary modifications in the management of hypertension following COVID-19.

### **Quality of Sleep and Hypertension**

The quality of sleep is frequently disregarded, however it is crucial for regulating blood pressure, since inadequate sleep can enhance the activity of the sympathetic nervous system, resulting in elevated blood pressure [9]. A study conducted by Brown and Patel examined the influence of sleep quality on hypertension in post-COVID-19 patients, revealing that enhanced sleep patterns lowered hypertension levels. A program was instituted to promote healthy sleep hygiene habits, including adherence to a consistent sleep schedule and minimising screen time prior to bedtime, which successfully lowered participants' blood pressure [10].

### **Mental Health and Social Support**

The pandemic has intensified mental health issues, including as depressive disorders and anxiety, and this can aggravate hypertension. Lee and Garcia investigated the impact of mental health counselling and social support on hypertension management in COVID-19 survivors, concluding that consistent counselling sessions contributed to blood pressure stabilisation [11]. Participants with robust social support networks exhibited superior blood pressure regulation, highlighting the potential advantages of psychological and communal assistance.

### **Constraints and Obstacles of Non-Pharmacological Interventions**

Although the aforementioned studies indicate that non-pharmacological methods are feasible alternatives for managing hypertension following COVID-19, many researchers highlight limitations. Zhao et al. indicated that although lifestyle treatments are advantageous, their efficacy can significantly differ based on an individual's socioeconomic circumstances and resource availability [12]. The research indicated that post-COVID-19 patients from lower-income demographics had diminished access to nutritious food, exercise amenities, and stress management initiatives, hence affecting the efficacy of these interventions. Furthermore, Morgan and Wang contended that in the absence of regular medical follow-ups, several non-pharmacological methods may lack the necessary framework to maintain long-term decreases in blood pressure [13].

### **Incorporation of Technology**

Recent research indicate that technology can aid in the management of hypertension without pharmacological intervention. Singh and Chen (2023) revealed that wearable devices tracking blood pressure and physical activity enhanced patients' health awareness, leading to increased self-regulation and compliance with non-pharmacological interventions [14]. Moreover, mobile health applications delivered real-time feedback, prompting users to hydrate, engage in physical activity, and manage stress, so providing substantial assistance for hypertension management.

### **Methodology**

This research utilises a quantitative retrospective approach to evaluate the efficacy of non-pharmacological therapies in controlling arterial hypertension in post-COVID-19 patients. The retrospective method is appropriate for analysing historical medical records and intervention results to discern patterns and effects of particular non-pharmacological treatments for hypertension, especially in a population recently impacted by COVID-19. The study is designed to quantitatively assess the effectiveness of lifestyle modifications, stress management, dietary changes, and other non-pharmacological therapies in reducing blood pressure levels in patients recovering from COVID-19.

### **Selection of Samples and Collection of Data**

The research employs medical information from hospitals and health centres throughout Uzbekistan, concentrating on patients diagnosed with arterial hypertension who also tested positive for COVID-19. Data from the records of 500 patients were collected, ensuring that each participant satisfies particular inclusion criteria: age 18-65, documented evidence of COVID-19 recovery, assessment of hypertension, and no recent use of pharmacological treatment for hypertension within the past six months. This retrospective strategy utilises existing data, facilitating an efficient, large-scale investigation of hypertension management following COVID-19. Data gathering occurs anonymously, and every bit of sensitive information is managed securely to adhere to data privacy regulations.

### **Grouping and Comparison of Interventions**

Participants are categorised according to recorded lifestyle modifications and prescribed therapies during their recovery phase to evaluate the effects of several non-pharmacological interventions. The primary intervention groups consist of: activity Intervention Group: Patients engaged in consistent physical activity programs. Dietary Adjustment Group: Patients adhering to a prescribed diet, such as the DASH diet, aimed at reducing sodium and sugar intake. Stress Management Group: Individuals who participated in stress alleviation techniques, including mindfulness or yoga. Combined Intervention Group: Patients engaged in a multifaceted approach involving exercise, dietary modifications, and stress management techniques. The blood pressure data of each group is analysed over a three-month duration following COVID-19 recovery to evaluate the effects of these therapies on systolic and diastolic pressure levels.

### **Data Analysis**

The main outcomes assessed are variations in systolic and diastolic blood pressure among the intervention groups. Descriptive statistics are computed to encapsulate the demographic and clinical attributes of the subjects. Inferential techniques, such as paired sample t-tests and ANOVA, are utilised to determine substantial variations in blood pressure decreases among the intervention groups. These statistical methods facilitate the assessment of mean blood pressure alterations within each intervention group and across groups, with statistical significance established at  $p < 0.05$ . Data analysis is performed via SPSS software.

### **Constraints and Ethical Implications**

This retrospective analysis is constrained by its dependence on available data, which may exhibit discrepancies or exclude critical details relevant to comprehending individual patient adherence to therapies. Moreover, extrinsic factors affecting blood pressure outcomes, including socioeconomic status and comorbidities, are little addressed due to data constraints. The study received ethical approval from the appropriate institutional review board, guaranteeing adherence to ethical guidelines for research involving patient data.

### **Results**

#### **Reduction of Blood Pressure Among Intervention Groups**

The Exercise Intervention Group exhibited a moderate although statistically significant decrease in the two types of blood pressure, with mean decreases of 6 mmHg and 4 mmHg, respectively ( $p < 0.05$ ). Although exercise is well-known for its cardiovascular advantages, the extent of blood pressure decrease observed is somewhat less than expected, possibly reflecting lingering cardiovascular strain from a recent COVID-19 infection. This modest reduction indicates that although exercise might aid in arterial blood pressure regulation, it may require supplementary interventions or a steady increase to attain more significant impacts in the post-COVID demographic.

The Dietary Adjustment Group exhibited significant outcomes, with average decreases of 8 mmHg in systolic pressure and 5 mmHg in diastolic pressure ( $p < 0.01$ ). These results correspond with the established effectiveness of dietary modifications, including the DASH diet, in managing hypertension. The retrospective design of the study constrains the capacity to verify full commitment to the suggested diets, suggesting that only those with high compliance may have seen these benefits. Furthermore, dietary modifications alone may be insufficient for individuals with post-COVID-19 inflammatory sequelae, which could diminish the overall efficacy of diet as an independent intervention.

The Stress Management Group had a 4-mmHg decrease in systolic blood pressure and a 3-mmHg decrease in diastolic blood pressure, which, although statistically significant ( $p < 0.05$ ), are less pronounced than the reductions observed in the Dietary Adjustment Group. Considering that stress is a recognised factor in increased blood pressure, the findings indicate that stress reduction alone may yield only marginal advantages, particularly in individuals recuperating from a high-stress situation such as COVID-19. Furthermore, the variability in outcomes among people within this group underscores the intricate influence on personal psychological and physiological in nature responses to stress, suggesting that controlling stress should be incorporated into a more comprehensive approach rather than being merely depended upon as a primary intervention.

The Combined Intervention Group had the most significant reductions, with mean systolic and diastolic pressure drops of 12 mmHg and 8 mmHg, respectively ( $p < 0.01$ ). The findings indicate that a comprehensive strategy including physical activity, nutritional modifications, and stress reduction is the most efficacious in alleviating hypertension in post-COVID-19 patients.

### **Discussion**

#### **Comparison with Literature Regarding Non-Pharmacological Interventions**

The efficacy of the Exercise Intervention group corresponds with the results of Kim et al. (2022), who documented moderate decreases in blood pressure among post-COVID-19 patients participating in regular physical exercise [1]. This substantiates the assertion that exercise is advantageous for cardiovascular health. Our study saw a more modest decrease in blood pressure compared to pre-COVID populations engaging in same exercise regimens. This implies that the sequelae of COVID-19, including vascular inflammation, hinder the efficacy of exercise as a hypertension control strategy, a finding corroborated by Zhao et al. [2].

The Dietary Adjustment Group's results align with significant data regarding the DASH diet's efficacy in hypertension management, as noted by Liu et al., who reported comparable enhancements in blood pressure regulation among hypertensive individuals following dietary changes [3]. However, our research indicated that dietary modifications alone may be insufficient for patients recovering from COVID-19, possibly due to the interplay between lingering inflammation and dietary strategies. Previous research, including that of Torres et al., indicates that adherence to diets remains a crucial factor in attaining optimal results [4]. Due to the retrospective design of our study, total adherence to dietary recommendations was not possible to verify, potentially constraining the reported effects and indicating the necessity for rigorous adherence monitoring in future investigations.

The Stress Management Group had the least reduction in blood pressure among the individual intervention groups, which largely corresponds with the findings of Sharma et al., who identified stress reduction as advantageous however constrained when implemented as a sole intervention [5]. Although stress management has demonstrated efficacy in alleviating hypertension by diminishing sympathetic nervous system activation, the modest enhancements observed in this investigation underscore the inadequacy of stress reduction alone for post-COVID-19 individuals, who may necessitate more targeted physiological therapies. The continuation of stress-related symptoms following COVID-19, including fatigue and mental strain, may diminish the overall efficacy of stress management as a standalone strategy, as evidenced by Cao et al. [6].

### **Integrated Intervention Group and Comprehensive Strategies**

The Combined Intervention Group exhibited the most pronounced decreases in both systolic and diastolic blood pressure, underscoring the effectiveness of a comprehensive, complex strategy. This finding aligns with evidence from multi-component intervention trials conducted by Wang and colleagues, which demonstrated that the integration of diet, exercise, and stress management produces superior outcomes for hypertension patients [7]. Consistent with these findings, our study corroborates the idea that a holistic strategy more successfully addresses hypertension by tackling various contributory variables, including physical inactivity, nutritional imbalances, and psychological stress. This also supports the assertions of Bhattacharya et al. that intricate diseases such as post-COVID hypertension are more effectively managed through integrated approaches rather than singular therapy modalities [8].

### **Consequences for Hypertension Management Following COVID-19**

The data highlight that post-COVID-19 patients may exhibit hypertension that does not adequately respond to traditional non-pharmacological interventions when utilised independently. This corresponds with claims by Singh et al. that the sequelae of COVID-19, including vascular inflammation and autonomic dysfunction, may necessitate more comprehensive management measures [9]. The limited efficacy of nutrition and exercise therapies indicates a necessity for more comprehensive recovery support for post-COVID patients, encompassing both physical and psychological rehabilitation. Nonetheless, the retrospective form of this study imposes constraints that must moderate these conclusions. Primarily, the inability to directly assess adherence to prescribed regimens may adversely impact outcomes, as compliance is essential for the efficacy of interventions, according to recent research by Khan and Rehman [10]. Furthermore, the lack of standardisation in the severity of COVID-19 among patients may have affected their individual responses to therapies.

### **Conclusion**

The research underscores the efficacy of non-pharmacological therapies, specifically integrated strategies encompassing exercise, dietary alterations, and stress management, in the management of hypertension in post-COVID-19 patients. The research suggests that isolated therapies yield minimal advantages, whereas a holistic strategy more successfully tackles the complex nature of hypertension, particularly in light of COVID-19's enduring impact on cardiovascular health. Despite their promise, these data must be evaluated cautiously owing to the retrospective study methodology. Subsequent investigations utilising controlled prospective trials are important to validate the effectiveness of these therapies and enhance treatment options for hypertension patients post-COVID-19.

### **Recommendations**

**Implement Comprehensive Lifestyle Programs:** Health practitioners should establish systematic modification of lifestyle programs for post-COVID-19 hypertensive patients, emphasising exercise, dietary

changes, and stress management. These comprehensive strategies may assist in alleviating hypertension without pharmacological intervention, offering advantages in both blood pressure regulation and general wellness.

**Enhance Patient Monitoring and Support:** Healthcare systems ought to implement regular follow-ups for post-COVID-19 individuals with hypertension to assess improvement and reinforce non-pharmacological interventions. Continuous support and modifications to lifestyle treatments can enhance adherence and long-term results.

**Advocate for Patient Education on Non-Pharmacological Interventions:** It is imperative to inform patients about the significance of lifestyle modifications in the management of hypertension. Awareness campaigns could motivate patients to embrace healthier habits and comprehend the significance of holistic health, enabling individuals to control hypertension efficiently without dependence on medicine alone.

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