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Coconut oil as an adjunct therapy in management of hypertension: Current evidence and future perspectives

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Abstract

Hypertension is a chronic condition that is considered to be one of the major risk factors for cardiovascular disease worldwide. Despite the available blood pressure lowering medications, many people still resort to using adjunct therapies that can mainly come from natural products. The objective of this paper is to evaluate the current evidence on the use of coconut oil, particularly virgin coconut oil (VCO), as an adjunct therapy in hypertension management and to explore its possible physiological mechanisms.

A literature review was employed using Google Scholar, PubMed, PubMed Central (PMC), ScienceDirect, and MDPI in finding studies published between 1996 to 2025 that can potentially link the relationship between coconut oil and hypertension.

VCO may exert potential antihypertensive effects according to preclinical studies through its antioxidant and anti-inflammatory properties, lipid-modulating mechanisms, and regulation of the renin-angiotensin-aldosterone system (RAAS). This is contradicted by a single and only known clinical study on stage I hypertensive patients which did not demonstrate a significant blood pressure reduction.

In conclusion, though there are various mechanisms that VCO can offer involving blood-lowering activities, current clinical validation is still insufficient to prove this claim. Further studies are still needed to prove the adjunctive potential of VCO in managing hypertension.

Keywords: Coconut Oil; *Cocos nucifera*; Virgin Coconut Oil; Hypertension; Lauric Acid

1. Introduction

Hypertension is a leading global risk factor for cardiovascular disease, contributing significantly to high rates of illnesses and deaths. Despite the availability of medications, controlling blood pressure remains challenging due to high costs of medicines, limited access to healthcare, and poor patient adherence.

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Challenges in keeping blood pressure under control are leading more people to look into additional and complementary treatments, especially those that come from natural sources. Coconut oil, which comes from the kernel of Cocos nucifera, is widely used for both culinary and medicinal purposes [1]. In particular, Virgin coconut oil (VCO) has garnered interest due to its limited processing and high concentrations of bioactive constituents, such as phenolic antioxidants and medium-chain fatty acids, including lauric acid [2, 3].

The components of VCO might offer benefits for the heart, as medium-chain fatty acids are quickly used for energy. Antioxidants and anti-inflammatory which are present in specific compounds could potentially mitigate oxidative stress and vascular complications associated with hypertension [3, 4]**.** However, its high levels of saturated fat content raised concerns about a possible increase in low-density lipoprotein (LDL) cholesterol, making it difficult to see the overall impact on cardiovascular health [5].

2. Methods

A literature review was employed across four electronic databases, namely: Google Scholar, PubMed, PubMed Central (PMC), ScienceDirect, and MDPI. The objective of this paper is to evaluate the current evidence on the use of coconut oil, particularly VCO, as an adjunct therapy in hypertension management and to explore its possible physiological mechanisms. The following search keywords were utilized: coconut oil, *Cocos nucifera*, virgin coconut oil, hypertension, and lauric acid. Boolean operators “AND” and “OR” were combined to broaden or screen search results.

Due to limited studies linking VCO and hypertension management, no filter was applied to extract substantial references, resulting in the inclusion of published articles between 1996 and 2025. For initial screening, titles and abstracts were analyzed to ensure that VCO was examined to link with hypertension. All articles that were not in full text were excluded.

3. Results and discussion

3.1. Bioactive Constituents of Coconut Oil and Their Implications in Hypertension

Coconut oil, extracted from the kernel of *Cocos nucifera*, is primarily composed of triglycerides, which account for approximately 90–99% of its composition, with medium-chain fatty acids (MCFAs) as the principal constituents. Lauric acid, constituting approximately 40–53% of the overall fat composition, is the most abundant fatty acid present. Although lauric acid is often investigated for its antimicrobial characteristics, its relevance to hypertension primarily arises from the effects of coconut oil on lipid metabolism; changes in blood lipids can subsequently affect cardiovascular risk factors linked to increased blood pressure [3].

Table 1 Fatty Acid Composition of Coconut Oil

Fatty Acid Composition of Coconut Oil	Amount (g/100 g)
Lauric Acid	42
Myristic Acid	17
Palmitic Acid	9
Stearic Acid	3
Caprylic Acid	7
Capric Acid	5
Oleic Acid	6

VCO is distinguished by its content of minor bioactive components, encompassing phenolic compounds, tocopherols (vitamin E), and phytosterols. These constituents are of particular importance in the realm of hypertension, given their antioxidant capabilities. Oxidative stress is a contributing factor to endothelial dysfunction, which subsequently leads to heightened vascular resistance and an increase in blood pressure. Phenolic compounds, including ferulic acid, p-coumaric acid, and catechin, have the potential to alleviate oxidative stress through the neutralization of free radicals [6, 4].

Tocopherols and tocotrienols may also support vascular health by protecting lipids from oxidative damage and improving endothelial function. Likewise, phytosterols, including β-sitosterol, have been linked to better cholesterol levels, which indirectly supports cardiovascular health and helps control blood pressure [7].

The potential importance of coconut oil in managing hypertension does not come from a direct effect on blood pressure. Instead, it comes from its bioactive components, specifically the antioxidant and lipid-modifying compounds found in virgin coconut oil. These elements may contribute to cardiovascular well-being when consumed carefully.

This table shows that coconut oil is composed of 42 g/100 g lauric acid, 17 g/100 g myristic acid, 9 g/100 g palmitic acid, 3 g/100 g stearic acid, 7 g/100 g caprylic acid, 5 g/100 g capric acid, and 6 g/100 g oleic acid [5]. This shows that lauric acid is the main fatty acid in coconut oil which can potentially impact its antihypertensive property in humans.

3.2. Mechanisms of Actions: Potential Antihypertensive Effects

Previous studies have suggested that coconut oil may help lower blood pressure through several possible mechanisms. These include its antioxidant and anti-inflammatory effects, its ability to influence lipid metabolism, and its role in improving blood vessel function and nitric oxide availability. It may also have effects on the renin-angiotensin-aldosterone system (RAAS), which helps regulate blood pressure.

3.3. Antioxidant Activity

Naturally occurring antioxidants such as phenolic compounds and medium-chain fatty acids, are commonly found in coconut oil. These compounds help prevent scavenge free radicals, reduce lipid peroxidation, and oxidative stress in vascular tissues. A pretreatment with coconut oil is due to a decrease in reactive oxygen species generation and normalized GSSG/GSH ratio, indicating a reduction in oxidative stress, as shown in an in-vitro model of particulate-matter-stimulated alveolar macrophages [8]. This presented rationalized evidence that shows coconut oil's mechanism that reduces oxidative stress in a cellular model, which is a probable, however, not yet proven, pathway by which it might affect vascular health. Yet, there's not enough clinical evidence in humans. Animal studies have proven to have antioxidant benefits, however, this is not applicable to humans, as indicated by a placebo-controlled trial in stage-1 hypertensive adults that showed no significant changes in blood pressure or oxidative stress markers exactly after the 30 days supplementation of VCO [9].

3.4. Anti-Inflammatory Effects

Elevated blood pressure and vascular dysfunction exacerbates chronic inflammation. It has been observed that coconut oil also has anti-inflammatory properties aside from its antioxidant effect, this is by decreasing the proinflammatory pathways such as toll-receptor 4 (TLR4) and mitogen-activated protein kinase (MAPK) signaling. These molecular effects can help lessen endothelial damage and reduce vascular inflammation [8]. Although there's limited evidence in hypertensive patients, this suggests that coconut oil could contribute to reducing inflammation-related vascular stress when used together with antihypertensive medication.

3.5. Modulation of Lipid Metabolism

Lipid metabolism is one of the key contributing factors in the development of hypertension and cardiovascular disease. According to a randomized clinical trial, after four weeks of daily VCO consumption of adults with metabolic syndrome, it is noted that triglycerides and very-low-density lipoprotein (VLDL) gradually decreased [10]. However, a meta-analysis showed that there's a raise in high-density lipoprotein (HDL) levels and low-density lipoprotein (LDL) levels as to consumption of coconut oil [11]. These contradicting results show that coconut oil can help in altering some lipid features, however, it is still recommended to use it deliberately due to its saturated fat levels.

3.6. Endothelial Activity and Nitric Oxide Bioavailability

Endothelium produces nitric oxide (NO) which helps maintain vascular tone, however, its function can be disrupted by the activation of the TLR4/MAPK pathway. In particulate matter-stimulated macrophages, coconut oil reduced TLR4 expression and MAPK activation [8]. Moreover, **a**symmetric dimethylarginine (ADMA), a known inhibitor of NO synthase, can be regulated following virgin coconut oil consumption [12]. Although the results are positive, clinical data remain limited, and further research is required to validate the potential benefits in hypertensive individuals.

3.7. Renin-Angiotensin-Aldosterone-System (RAAS) effects

Experimental data presented that VCO may change the blood pressure control due to its effects on the RAAS. VCO supplementation enhanced cardiac histology and lessened angiotensin-converting enzyme (ACE) activity in

hypertensive rats, stating possible suppression of vasoconstrictive signaling [12]. However, the effects of coconut oil have not been formally evaluated in human clinical trials. Further research is needed to investigate the importance of the oil's potential antihypertensive properties.

3.8. Pre-Clinical Evidence and Clinical Evidence

Preclinical investigations indicate that VCO could potentially benefit vascular well-being and indirectly affect blood pressure via its antioxidant properties. Research involving experimental animals has demonstrated that VCO supplementation bolsters intrinsic antioxidant defense mechanisms, such as superoxide dismutase, catalase, and glutathione peroxidase, concurrently diminishing lipid peroxidation, which suggests a reduction in oxidative stress [13]. Oxidative stress is a major contributor to endothelial dysfunction and increased vascular resistance, both of which play key roles in the development of hypertension [14].

In addition, VCO contains medium-chain fatty acids (MCFAs), which are rapidly metabolized and may influence lipid metabolism. Experimental and clinical studies have suggested that consuming coconut oil might increase high-density lipoprotein (HDL) levels. However, the effects on low-density lipoprotein (LDL) and total cholesterol are less consistent [15]. These conflicting results indicate that the overall impact of VCO on cardiovascular health is still not fully understood.

Experimental investigations have also revealed that VCO and its derivatives possess anti-inflammatory characteristics. Lauric acid, along with its metabolite monolaurin, has been observed to influence inflammatory responses and diminish pro-inflammatory mediators [3]. Given that chronic inflammation is a contributing factor to endothelial dysfunction and elevated peripheral resistance, these mechanisms could potentially foster vascular well-being.

Contrary to pre-clinical data, the one and only identified clinical study that used coconut oil as an adjuvant to stage-1 hypertensive patients yielded a different outcome [9]. According to the result, it did not produce an antihypertensive effect in patients, either as a standalone intervention or in combination with exercise training. No effectiveness was seen in terms of blood pressure variability and oxidative stress levels. Although in this study, it can be noted that only 45 patients were involved including the placebo group—a relatively small number that can limit the generalizability of the findings. Although experimental studies suggest that VCO might have antioxidant, lipid-altering, and anti-inflammatory effects that could benefit cardiovascular health, the current clinical evidence does not show significant reductions in blood pressure. Currently, there are no strong randomized controlled trials showing that virgin coconut oil significantly lowers blood pressure. Therefore, the available evidence doesn't strongly support its use for preventing hypertension.

3.9. Safety and Toxicological Considerations

Adjunct therapy for hypertension using coconut oil requires attentiveness as this contains high volume of saturated fat and uncontrollable long-term effects. Studies have shown a rise in high-density lipoprotein (HDL) and low-density lipoprotein (LDL) levels due to coconut oil, a potential outcome depending on dosage and individual health status could be cardiovascular risk [10]. Whilst it can have a good impact on some lipid parameters, it can still lead to elevated LDL levels and possible gain of weight when taken in excessive amounts or due to long-term consumption.

Since coconut oil may affect nitric oxide activity and improve endothelial function, theoretically, it could strengthen the effects of antihypertensives and escalate the risk of hypotension. Nonetheless, this is still unreliable because of the lack of clinical trials. Evidence is not enough to support the long-term safety of coconut oil in individuals with hypertension [5]. Therefore, the use of coconut oil should be in moderation and only complementary, rather than solely relying on it or substituting it for prescribed antihypertensive therapy.

3.10. Other Adjunctive Therapy: Olive Oil

Other dietary adjuncts such as olive oil have demonstrated more consistent antihypertensive effects in clinical studies than coconut oil. Extra virgin olive oil (EVOO) has been linked with notable reductions in both systolic and diastolic blood pressure, especially when incorporated into a Mediterranean-style diet, since it is rich in monounsaturated fatty acids and bioactive polyphenols. Olive oil's beneficial effects are attributed to multiple mechanisms, such as improvement of endothelial function, increased nitric oxide bioavailability, and reduction of oxidative stress and inflammation. Other compounds further contribute to vascular protection such as Polyphenolic compounds like hydroxytyrosol and oleuropein by elevating antioxidant defenses and regulating inflammatory pathways [16].

Olive oil demonstrated stronger and more consistent support from human studies compared to coconut oil which shows promising mechanisms however only has limited clinical evidence. This indicates that olive oil compared to coconut oil suggests that it is a more reliable dietary adjunct in managing hypertension when used alongside standard pharmacologic therapy.

4. Conclusion

The role of coconut oil as an adjunct therapy, with all the available current studies, still remains inconclusive. Although preclinical studies suggest several potential mechanisms that VCO can demonstrate on managing hypertension—specifically its antioxidant and anti-inflammatory properties, lipid-modulating mechanisms, and regulation of the renin-angiotensin-aldosterone system (RAAS)—one clinical study that directly examined coconut oil in stage-1 hypertensive patients proved otherwise, reporting no significant antihypertensive outcomes. This indicates that there is still a large disparity between preclinical and clinical studies in terms of the effectiveness of coconut oil as an adjunct therapy in hypertension. Another key finding in the clinical study is that it did not impact the caloric load intake of the participants. Hence, it was reported to be safe when used as part of a dietary approach.

While extra virgin olive oil, which demonstrated significant reductions in both systolic and diastolic blood pressure, specifically when combined with a Mediterranean-style diet, coconut oil does not appear to be as effective in humans. However, it should be noted that the clinical evidence in coconut oil was conducted with a limited sample size which may affect the reliability of the result.

The limitations of current evidence is still insufficient to establish the use of coconut oil as an adjunct in managing hypertension. The promising pre-clinical studies can still offer a potential, as only one clinical study has investigated the link between hypertension and coconut oil.

Compliance with ethical standards

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Disclosure of conflict of interest

The authors declare no conflicts of interest related to this study

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