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A pilot study to evaluate the efficacy of *Neelyadi taila* (Sri Lankan Traditional oil) with lime juice on Hypertension

Kumudu Rupika Weerasekera ^{1,*}, Horadugoda Gamage Sujatha Hewageegana ¹, Edirisinghe Dewage Thanuja Priyangani Gunarathna ¹ and Susantha Priyadarshani Molligoda ²

¹ Department of Ayurveda Medicine and Traditional Medicine, Faculty of Indigenous Medicine, University of Colombo, Sri Lanka.

² Department of Basic Sciences and Ayurveda Anatomy and Physiology, Faculty of Indigenous Medicine, University of Colombo, Sri Lanka.

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Abstract

Sri Lankan traditional system of medicine has many internal and external treatment procedures for diseases practiced for many decades. In this system, traditional physicians apply oils to the head with internal treatments for hypertension to control hypertension. Hence, this preliminary pilot study was conducted using traditional oil, *Neelyadi taila* with lime juice (*Citrus aurantiifolia*) externally to find out the effectiveness to control hypertension who were attending the Kayachikitsa clinics, at Ayurveda Teaching Hospital, Borella, Sri Lanka. For this study, 28 patients were randomly selected from either sex between the ages 40 to 70 years who were detecting hypertension at sight. 10ml of *Neelyadi* oil mixed with 10 drops of lime juice apply the patient's head and detect their blood pressure thrice in intervals of ten minutes to thirty minutes. The results showed that 70% of patients' systolic blood pressure deteriorate only 10mmHg after 30 minutes. Therefore, this traditional claim of applying *Neelyadi oil* with lime juice for hypertension can be effective with internal medicine but not only as an external application.

Keywords: *Neelyadi oil*; High blood pressure; Lime juice; Control; Traditional Medicine

1. Introduction

Hypertension is an alarming global health challenge, that has been identified as the leading cause of global mortality, and hypertension can cause coronary heart disease or stroke and more than three-quarters of these deaths occur in low- and middle-income countries [1]. A common definition of hypertension is based on an average systolic BP (SBP) ≥ 140 mm Hg, and diastolic BP (DBP) ≥ 90 mm Hg. The risk of high blood pressure is initiated before the diagnosis of hypertension and the majority of patients are detected incidentally. Several hypertension risk factors are more prevalent in developing countries than the developed regions resulting in huge economic impacts as a significant percentage of the productive population becomes chronically ill.

Sri Lankan traditional medicine is an ancient culture-based healthcare practice that deals with a wider range of medicinal recipes comprising herbal plants that claim therapeutic efficacy. *Neelayadi taila* [2] is a Sri Lankan traditional herbal oil that has been used for several decades as an external application on the scalp with lime juice (*Citrus aurantiifolia*) for the management of hypertension with internal treatments. Nevertheless, the efficacy of only external application of *Neelyadi* oil with lime juice for hypertension is not been clinically conducted. Hence, this pilot study was planned to evaluate the efficacy of *Neelyadi oil* combined with lime juice for hypertension as an external application.

* Corresponding author: Kumudu Rupika Weerasekera

2. Material and method

Neelyadi oil made by the Siddhalepa company, Ratmalana, Sri Lanka, have used for this pilot study. *Neelyadi* oil consists of nine main ingredients: *Madatiya kola, pothu* (bark and leaves of *Adenantha pavonine* Linn), *Ankenda kola, pothu* (bark and leaves of *Acronychia pedunculata* L), *Vel keppetiya kola, pothu* (bark and leaves of *Croton caudatus geisel*), *Nil avariya* (whole plant of *Indigofera tinctoria* Linn), *Diya habarala* (whole plant of *Monochoria vaginlis* presl), *Polkiri* (milk juice of fruits of *Cocos nucifera* Linn), *Pol tel* (oil of *Cocos nucifera* Linn), *Sudulunu* (bulbs of *Allium sativum* Linn), *Deduru* (seeds of *Nigella sativa* Linn and *Cuminum cyminum*) and for *Kalka dravya*: *Sadikka* (fruit of *Myristica fragrans* Houtt), *Vasavasi* (fruit cover of *Myristica fragrans* Houtt), *Karabu* (nuts of *Eugenia caryophyllus* Thumb), *Suduru* (seeds of *Cuminum cyminum*), *Asamodagam* (seeds of *Carum copticum* Hook), *Atividayam* (roots of *Aconitum heterophyllum* wall), *Tippili* (fruit of *Piper longum* Linn), *Kaluduru* (seeds of *Nigella sativa* Linn) and *Katukarosana* (roots and tuber of *Picrorrhiza kurrooa* Royle). This purchased *Neelyadi* oil 10ml mixed with ten (10) drops of lime juice was applied on the heads of the selected patients.

2.1. Mode of selection of patients

The patients who came to the *Kayachikitsa* clinic at National Ayurveda Teaching Hospital, Borella, Sri Lanka, were examined for blood pressure and who have elevated blood pressure (systolic BP (SBP) ≥ 140 mm Hg, and diastolic BP (DBP) ≥ 90 mm Hg) have randomly selected. The study period was from April 2022 to April 2023. These selected patients' blood pressure was detected thrice in intervals of five (5) minutes and then applied *Neelyadi* oil mixed with lime juice on the head and again checked their blood pressure thrice in intervals of ten (10) minutes. 28 patients were randomly selected (both male and female patients) between the ages of 40 to 70 years for this study and taken their consent. After the study, these patients were cautiously treated.

3. Results

Selected patients' Blood pressure before applying oil and after the treatment was mentioned in Table 1.

Table 1 Blood pressure before applying oil and after the treatment

	Gender	Before treatment Blood pressure (mmHg)	After treatment		
			After 10 minutes	After 20 minutes	After 30 minutes
Patient 1	Female	160/100	150/100	150/100	150/100
Patient 2	Female	150/90	150/90	140/90	140/90
Patient 3	Male	140/100	140/100	140/100	140/100
Patient 4	Female	150/100	150/100	140/100	140/100
Patient 5	Female	160/90	160/90	150/90	150/90
Patient 6	Female	140/100	140/100	130/100	130/100
Patient 7	Female	150/90	150/90	150/80	150/80
Patient 8	Mala	150/100	150/100	140/100	140/100
Patient 9	Male	170/100	170/100	160/100	160/100
Patient 10	Female	160/100	150/100	140/100	140/100
Patient 11	Male	150/90	150/90	140/90	140/90
Patient 12	Female	150/100	150/100	140/100	140/100
Patient 13	Female	140/100	140/100	140/100	140/100
Patient 14	Female	150/90	150/90	140/90	140/90
Patient 15	Female	150/100	150/100	140/100	140/100
Patient 16	Female	150/90	150/90	140/90	140/90

Patient 17	Female	180/100	170/100	160/100	160/100
Patient 18	Male	150/90	150/90	140/90	140/90
Patient 19	Female	140/90	140/90	130/90	130/90
Patient 20	Female	140/100	140/100	130/100	130/100
Patient 21	Male	150/90	150/90	150/90	150/90
Patient 22	Male	150/90	150/90	140/90	140/90
Patient 23	Male	150/100	150/90	140/90	140/90
Patient 24	Female	150/90	150/90	140/90	140/90
Patient 25	Female	140/90	140/90	130/90	130/90
Patient 26	Male	140/100	140/100	130/100	130/100
Patient 27	Female	140/100	140/100	140/100	140/100
Patient 28	Female	150/90	150/90	140/90	140/90

Among the treated patients twenty patients' systolic blood pressure was reduced only by 10 mmHg after 20 minutes and after 30 minutes also same reading was detected. Four patients' blood pressure was not changed and one patient's blood pressure was reduced 10mmHg on diastolic. Also, one patient's blood pressure was reduced both systolic and diastolic by 10mmHg after 30 minutes. Two patients' pressure was reduced by 20mmHg on systolic pressure after 30 minutes.

The properties of the ingredients of *Neelyadi taila* and lime juice are mentioned below in Table 2.

Table 2 Properties of the ingredients of *Neelyadi taila* and lime juice

Ingredient	Rasa	Guna	Virya	Vipaka
<i>Madatiya</i> [3] (<i>Adenanthera pavonine</i> Linn)	<i>Kashaya, Tikta</i>	<i>Laghu</i>	<i>Shita</i>	<i>Katu</i>
<i>Ankenda</i> [4] (<i>Acronychia pedunculata</i> L)	<i>Amla, Kashaya, Tikta</i>	<i>Ruksha, Ushna</i>	<i>Ushna</i>	<i>Amla, Katu</i>
<i>Vel keppetiya</i> [5] (<i>Croton caudatus geisel</i>)	-	-	-	-
<i>Nil avariya</i> [6] (<i>Indigofera tinctoria</i> Linn)	<i>Katu, Tikta</i>	<i>Laghu, Ruksha</i>	<i>Ushna</i>	<i>Katu</i>
<i>Diya habarala</i> [7] (<i>Monochoria vaginlis</i> presl)	-	-	<i>Shita</i>	-
<i>Polkiri</i> [8] (milk of <i>Cocos nucifera</i> Linn)	<i>Madhura</i>	<i>Guru, Snigdha</i>	<i>Shita</i>	<i>Madhura</i>
<i>Pol tel</i> [8] (oil of <i>Cocos nucifera</i> Linn)	<i>Madhura</i>	<i>Guru, Snigdha</i>	<i>Shita</i>	<i>Madhura</i>
<i>Sudulunu</i> [9] (<i>Allium sativum</i> Linn)	<i>Madhura, Lavana, Kau, Tikta, Kashaya</i>	<i>Snigdha, Guru, Tikshna, Pichchila, Sara</i>	<i>Ushna</i>	<i>Katu</i>
<i>Sadikka</i> [10] (<i>Myristica fragrans</i> Houtt)	<i>Katu, Tikta, Kashaya</i>	<i>Laghu, Snigdha, Tikshna</i>	<i>Ushna</i>	<i>Katu</i>
<i>Vasavasi</i> [10] (<i>Myristica fragrans</i> Houtt)	<i>Katu, Tikta, Kashaya</i>	<i>Laghu, Snigdha, Tikshna</i>	<i>Ushna</i>	<i>Katu</i>
<i>Karabu</i> [11] (<i>Eugenia caryophyllus</i> Thumb)	<i>Katu, Tikta</i>	<i>Laghu, Snigdha, Tikshna</i>	<i>Shita</i>	<i>Katu</i>

Suduru[12] (<i>Cuminum cyminum</i>)	Katu	Laghu, Ruksha	Ushna	Katu
Asamodagam[13] (<i>Carum copticum</i> Hook)	Katu, Tikta	Laghu, Ruksha, Tikshna	Ushna	Katu
Atividayam[14](<i>Aconitum heterophyllum</i> wall)	Katu, Tikta	Laghu, Ruksha	Ushna	Katu
Tippili[15] (<i>Piper longum</i> Linn)	Katu	Laghu, Snigdha, Tikshna	Anushna	Madhura
Kaluduru[16] (<i>Nigella sativa</i> Linn)	Katu, Tikta	Laghu, Ruksha, Tikshna	Ushna	Katu
Katukarosana [17] (<i>Picrorrhiza kurroa</i> Royle)	Tikta	Laghu, Ruksha	Shita	Katu
Lime juice [10]	Amla	Tikshna, Laghu	Ushna	Amla

4. Discussion

The overall analyzed results showed among the 70% of treated patients' only systolic blood pressure was reduced by 10mmHg after 20 minutes and continuing till on 30 minutes time. Most of the ingredients of *Neelyadi* oil have *Ushna virya* and *Katu vipaka* hence the main regulator of the body called *Vata dosha* is pacifies.

The arterial blood pressure resulting from the ejection of blood during ventricular contraction of the heart regulates systolic blood pressure, which is controlled by the impels surge by the SA node, driven by the autonomic nervous system via Sympathetic and parasympathetic nerves. This mechanism is primarily governed by the *Vyana vata*, seated in the *Hridaya* (Heart) according to the Ayurveda. The *Vyana vata* is one of five types of *Vata* components that act under the influence of *Prana vata*, which is found in the *Moordha* (Brain). The *Prana vata* governs the regular function (*Gati kriya*) of the *Hridaya* (Heart). *Vyana vata* and *Prana vata* can be understood in this sense to represent nerve control of circulation because *Vata*, in general, denotes all neural and endocrine mechanisms stabilizing hormones levels caused by an increase in sympathetic and parasympathetic nerve activation and subsequent decrease in cortisol hormones.

Thus, applying *Neelayadi* oil with lime juice to the scalp will affect the autonomic nervous systems in the human body by stimulating the *Prana* and *Vyana vata*, which regulate the function of the heart by stimulating the constriction and relaxation of the cardiac muscles, thereby maintaining the systolic blood pressure in individuals.

Diastolic pressure is not changed by administering the *Neelyadi taila* with lime juice onto the scalp where the diameter and elasticity of the blood vessels and peripheral resistance offered by the arteries will not be changed due to the selected sample size being nearly over fifty's.

5. Conclusion

It can be concluded that applying only *Neelyadi* oil with lime juice is not effective for controlling high blood pressure specially in diastolic blood pressure practiced by Ayurveda and traditional physicians but only effective on reduce systolic pressure. However, with internal treatments, it can be controlled and more studies of this are to be accomplished.

Compliance with ethical standards

Disclosure of conflict of interest

No conflict of interest to be disclosed.

Statement of ethical approval

This is a pilot study therefore consent from the patients were taken.

Statement of informed consent

Informed consent was obtained from all individual participants included in the study.

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