

PARADIGMS

Utilization of Ayurveda in Health Care: An Approach for Prevention, Health Promotion, and Treatment of Disease. Part 2—Ayurveda in Primary Health Care

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ABSTRACT

Ayurveda is a comprehensive natural health care system that originated in India more than 5000 years ago. It is still widely used in India as a system of primary health care, and interest in it is growing worldwide as well. Ayurveda has unique concepts and methodologies to address health care throughout the course of life, from pregnancy and infant care to geriatric disorders. Common spices are utilized, as well as herbs, herbal mixtures, and special preparations known as *Rasayanas*. Purification procedures known as *Panchakarma* remove toxins from the physiology. Research has been conducted worldwide on Ayurveda. There are encouraging results for its effectiveness in treating various ailments, including chronic disorders associated with the aging process. Pilot studies presented in this paper were conducted on depression, anxiety, sleep disorders, hypertension, diabetes mellitus, Parkinson's disease, and Alzheimer's disease. These preliminary studies yielded positive results and provide a basis for conducting larger, more rigorous clinical trials. Conducting research that compares Ayurveda's comprehensive treatment approach, Western allopathic treatment, and an integrated approach combining the Ayurvedic and allopathic treatments would shed light on which treatment approach is the most effective for the benefit of the patient.

INTRODUCTION

Ayurveda, the Science of Life, is a comprehensive system of natural health care that originated in India more than 5000 years ago. It is still widely used in India as a system of primary health care.¹ Ayurveda has the knowledge base and methodologies to provide health care throughout the course of life, from the antenatal period to the geriatric stage. It provides simple, cost-effective techniques that do not have the prevalence of toxic side-effects inherent in Western allopathic medicine. There is a large body of research on Ayurveda that has been conducted during the past

100 years.² This research shows encouraging results in many areas of health care, especially the management of chronic disorders associated with the aging process.²⁻⁴

AYURVEDA THROUGHOUT THE COURSE OF LIFE

In Ayurveda, many methods are described to promote the health of the pregnant woman in the antenatal and postnatal periods⁵ (Gupta 1999*), (Sharma 1981*), (Gupta 1994*). Breast feeding is highly recommended for optimal growth of

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the baby in the early period of life. The herb *Asparagus racemosus* Willd. (*Shatavari*) promotes lactation in the postnatal period (Ayyagari*)^{6,7} and the herbs *Sida cordifolia* Linn. (Bala), (Rao*), (Dixit*)⁸ and *Abutilon indicum* Linn. (*Atibala*) (Trivedi 1988*), (Srivardhane*)⁸ promote growth of the baby.

Withania somnifera Dunal (*Ashwagandha*), (Paul*)⁹⁻¹¹ *Asparagus racemosus* (Singh 1995*)¹² and *Tinospora cordi-*

folia (Willd.) Miers (*Guduchi*)¹³ are immunity-promoting herbs that can play an important role in primary health care from the standpoint of prevention, health promotion, and treatment of disease. *Withania somnifera* also has adaptogenic, cognition-promoting, antistress, mood-stabilizing, anti-inflammatory, and rejuvenating properties.^{3,9,14,15} *Ocimum sanctum* Linn. (*Tulsi*)¹⁶ and *Azadirachta indica*

TABLE 1. AYURVEDIC HERBS THAT PROMOTE FUNCTIONING OF VARIOUS ORGANS AND SYSTEMS OF THE BODY

For promoting immunity ²	
In childhood	<i>Sida cordifolia</i> Linn. (<i>Bala</i>) ^{(Rao),(Dixit),8} and <i>Abutilon indicum</i> Linn. (<i>Atibala</i>) ^{8,(Trivedi 1988),(Srivardhane)}
In adulthood	<i>Withania somnifera</i> Dunal (<i>Ashwagandha</i>) ^{(Paul),9-11,(Chudasama),(Hejmadi)}
In old age	<i>Emblica officinalis</i> Gaertn. (<i>Amalaki</i>) ^{13,98,99}
In all age groups	<i>Ocimum sanctum</i> Linn. (<i>Tulsi</i>) ¹⁶
For promoting functions of the brain ²	
	<i>Convolvulus pluricaulis</i> Chois. (<i>Shankhapushpi</i>) ^{64,100,101(Singh 1976)}
	<i>Centella asiatica</i> (Linn.) Urban (<i>Mandukaparni</i>) ^{79,102,(Mishra),(Joshi)}
	<i>Bacopa monnieri</i> (Linn.) Pennell (<i>Brahmi</i>) ^{60-62,103(Singh 1977),(Singh 1978),(Pathak)}
	<i>Acorus calamus</i> Linn. (<i>Vacha</i>) ^{104,105,(Doshi),(Jadhav)}
	<i>Celastrus paniculatus</i> Willd. (<i>Jyotishmati</i>) ^{77,78,(Doshi),106}
	<i>Tinospora cordifolia</i> (Willd.) Miers (<i>Guduchi</i>) ^{80,(Sinha 1975),(Sinha 1981)}
For promoting functions of the heart ^{2,107}	
	<i>Terminalia arjuna</i> Wight & Arn. (<i>Arjuna bark</i>) ^{36,37,(Joshi),107,108,(Gupta 1971),(Chaturvedi),(Dikshit)}
	<i>Commiphora mukul</i> Engl. (<i>Guggulu</i>) ^{39,(Tripathi 1973),109,(Upadhyay 1980)}
	<i>Inula racemosa</i> Hook f. (<i>Pushkarmula</i>) ^{38,39,107,110,111,(Gupta 1982),(Sharma 1984)}
	<i>Saussurea lappa</i> C.B. Clarke (<i>Kustha</i>) ^{111,112,(Singh 1989),(Shanbag)}
For promoting functions of the respiratory tract ²	
	<i>Curcuma longa</i> Linn. (Turmeric; <i>Haldi</i> ; <i>Haridra</i>) ^{42,(Singh 1962)}
	<i>Adhatoda vasica</i> Nees (<i>Vasa</i>) ^{113-116,(Dwivedi)}
	<i>Glycyrrhiza glabra</i> Linn. (<i>Yasthimadhu</i>) ^{(Dwivedi),117}
	<i>Albizia lebbek</i> (Willd.) Benth. (<i>Shirisha</i>) ^{40,41,(Dwivedi),(Sharma 1977)}
For promoting functions of the stomach ^{2,(Agrawal)}	
	<i>Emblica officinalis</i> Gaertn. (<i>Amalaki Rasayana</i>) ^{118,119,(Varma)}
	<i>Eclipta alba</i> Hassk. (<i>Bhringaraja</i>) ^{120,(Gupta 1976),(Tiwari)}
	<i>Asparagus racemosus</i> Willd. (<i>Shatavari</i>) ^{7,120,121,(Batchu),(Maheshwari),(Prasana)}
For promoting functions of the liver ^{2,(Pandey 1975)}	
	<i>Phyllanthus niruri</i> auct. non Linn. (<i>Bhumyamalaki</i>) ^{44,(Vora)}
	<i>Piper longum</i> Linn. (<i>Pippali</i>) ^{122,(Pandey 1976)}
	<i>Andrographis paniculata</i> (Burm.f.) Nees (<i>Kalmegha</i>) ^{43,(Tomar),(Ramji)}
	<i>Picrorhiza kurroa</i> Royle ex. Benth. (<i>Kutaki</i>) ^{(Pandey 1975),123,124,(Pandey 1966),(Singh 1975)}
For promoting functions of the alimentary canal ²	
	<i>Aegle marmelos</i> (L.) corr. ex Roxb. (<i>Bilva</i>) ^{125,(Verma)}
	<i>Terminalia chebula</i> Retz. (<i>Haritaki</i>) ^{99,126,(Tripathi 1983)}
	<i>Holarrhena antidysenterica</i> (Linn.) Wall. (<i>Kutaja</i>) ^{127,128,(Tewari),(Singh 1981),(Trivedi 1984)}
For promoting functions of the pancreas ^{2,33,129}	
	<i>Cinnamomum tamala</i> Nees & Ebern. (<i>Tejapatra</i>) ^{31,32,69,(Singh 1983)}
	<i>Eugenia jambolana</i> Lam. (<i>Jambu</i>) ^{130,131,(Badesha),(Kohli),(Upadhyay 1986)}
	<i>Pterocarpus marsupium</i> Roxb. (<i>Vijayasar</i>) ^{26,27,(Sidhpataki),(Singh 1989),(Adhikari),(Chaurasia),(Pandey 1978),(Pandey 1973),(Singh1979),(Tripathi 1977)}
	<i>Momordica charantia</i> Linn. (<i>Karela</i>) ^{28-30,(Sidhpataki)}
	<i>Swertia chirata</i> Buch-Ham (<i>Chirayata</i>) ^{2,33,34,(Bhatia),(Prasad 1999)}
For promoting functions of the urinary system ^{2,49,(Jain),(Singh 1969)}	
	<i>Boerhavia diffusa</i> Linn. (<i>Punarnava</i>) ^{(Singh 1969),132,133,(Narain),(Narayan 1988),(Painuli)}
	<i>Tribulus terrestris</i> Linn. (<i>Gokshura</i>) ^{49,134-136,(Prasad 1998),(Singh 1993),(Upadhyaya)}
	<i>Crataeva nurvala</i> Buch-Ham (<i>Varuna</i>) ^{47-49(Singh 1993),(Chopra),(Singh 1973)}
For promoting functions of the reproductive system in men ²	
	<i>Mucuna pruriens</i> (Stickm.) DC. (<i>Kapikacchu</i>) ^{45,46,(Agrawala),(Tripathi 1994)}
	<i>Withania somnifera</i> Dunal (<i>Ashwagandha</i>) ^{(Paul),137,(Poojari)}
For promoting functions of the reproductive system in women ²	
	<i>Asparagus racemosus</i> Willd. (<i>Shatavari</i>) ^{(Gupta 1994),(Ayyagari),6,7,138,(Agarwane)}
	<i>Saraca indica</i> Linn. (<i>Ashoka</i>) ^{139,(Puranik)}
	<i>Hibiscus rosa-sinensis</i> Linn. (<i>Japapushpam</i>) ^{(Michael),(Pandey 1972),(Sinha 1978),20,21,(Devi),(Pandey 1977),(Dave)}

Note: Superscripted numbers refer to References; names in superscript are in Research in Theses appendix.

A. Juss. (*Neem*)¹⁷ enhance immunity and can be used for strengthening the body against possible infections. This could reduce unnecessary use of antibiotics, which have side-effects and ultimately lower the immunity.

There are Ayurvedic herbs that promote the functioning of various organs and systems of the body (Table 1). These organ-specific herbs can be used for the treatment of disease. Research conducted on these medicinal plants has shown specific action on the various organs.^{2-4,18,19} For family planning, the herbs *Hibiscus rosa-sinensis* Linn. (*Japapushpam*), (Michael*), (Pandey 1972*), (Sinha 1978*)^{20,21} *Piper longum* Linn. (*Pippali*),²² and *Azadirachta indica* (*Neem*)²³ have shown promising results.

A large number of Ayurvedic herbs are showing effectiveness in the management of chronic disorders. Before discussing this topic, it is important to note that Ayurveda's approach to the diagnosis of disease is quite different from that of allopathic medicine. Singh wrote:

The *Caraka Samhita* (Caraka 700 BC), the foremost classic text on Ayurveda, states that it is neither possible nor necessary to "name" every disease because every patient is unique in terms of the nature of his or her illness and its precise clinical presentation and thus the needed treatment. Therefore, the label of diagnosis in Ayurveda is not always in terms of the "name" of a disease but is in terms of the nature or the phenomenon of the disease state. This phenomenon is to be depicted in terms of the *Samprāpti* (pathogenesis) of the disease in each patient. . . . In spite of the above dictum, one may find a number of diseases described in Ayurveda by "name," which can be clinically correlated with certain diseases as known in Western modern medicine. . . ."²⁴

Mishra² and Athavale²⁵ provide details of the Ayurvedic etiology, pathology, and pathogenesis of various chronic disorders.

TABLE 2. EFFECT OF *ALLIUM SATIVUM* LINN. ON DEPRESSION

Symptom	Mean score ^a		Percent relief	p-value
	Before	After		
Depressed mood	2.23	0.92	55.19	<0.001
Guilt	1.38	0.53	61.33	<0.01
Suicidal tendency	0.53	0.30	43.54	<0.10
Insomnia	1.23	0.61	50.03	<0.001
Work and interest	3.00	1.23	51.28	<0.001
Agitation	1.07	0.30	71.89	<0.001
Gastrointestinal	1.46	0.07	94.83	<0.001
Genital symptoms	0.38	0.07	80.97	<0.05

^aThe mean score highlights the grading of symptoms based on mild, moderate, and severity of symptom.

TABLE 3. EFFECT OF *BRAHMI* MIXTURE ON ANXIETY

Symptom	Mean score ^a		Percent relief	p-value
	Before	After		
Anxious mood	2.88	1.57	45.08	<0.01
Tension	1.85	0.43	77.18	<0.001
Depressed mood	2.28	1.29	43.85	<0.01
Insomnia	1.14	0.14	87.56	<0.02
Intellectual (cognitive)	1.43	0.57	60.00	<0.02

^aThe mean score highlights the grading of symptoms based on mild, moderate, and severity of symptom.

Pterocarpus marsupium Roxb. (*Vijayasar*),^{26,27} *Momordica charantia* Linn. (*Karela*),²⁸⁻³⁰ *Cinnamomum tamala* Nees & Ebern. (*Tejapatra*),^{31,32} and *Swertia chirata* Buch-Ham (*Chirayata*)^{33,34} are effective in treating diabetes mellitus. *Rauwolfia serpentina* Benth. (*Sarpagandha*) treats hypertension.³⁵ *Terminalia arjuna* Wight & Arn. (*Arjuna*)^{36,37} and *Inula racemosa* Hook f. (*Pushkarmula*)^{38,39} are used to treat ischemic heart disease. *Albizia lebeck* (Willd.) Benth. (*Shrisha*)^{40,41} and *Curcuma longa* Linn. (Turmeric; *Haldi*; *Haridra*)⁴² are used in the treatment of bronchial asthma. *Andrographis paniculata* (Burm.f.) Nees (*Kalmegha*)⁴³ and *Phyllanthus niruri* auct. non Linn. (*Bhumyamalaki*)⁴⁴ are effective in treating infectious hepatitis. *Mucuna pruriens* (Stickm.) DC. (*Kapikacchu*) treats impotency^{45,46} and *Crataeva nurvala* Buch-Ham (*Varuna*)⁴⁷⁻⁴⁹ is used in treating urinary stones. *Withania somnifera*,⁵⁰ *Commiphora mukul*,⁵¹ *Boswellia serrata*,⁵² and RA-11, an Ayurvedic drug,⁵³ are effective in treating osteoarthritis.

ADDITIONAL RESEARCH ON CHRONIC DISORDERS

There is a large body of research that has been conducted worldwide on Ayurvedic methodologies. Additional research is needed that uses current scientific technologies to further validate the therapeutic efficacy of Ayurveda. In the last several years, India has taken up this challenge.^{1,2,54,55} The most obvious area of research involves Ayurveda's extensive materia medica, a rich source of leads for new herbal drugs. India's Council for Scientific and Industrial Research (CSIR) is actively pursuing this avenue of investigation in collaboration with leading medical institutions in India. Standardized herbal drugs have been developed, or are under development, for the treatment of a variety of chronic diseases.^{55,56} The Central Council for Research in Ayurveda and Siddha (CCRAS) has an extensive program of research on herbal drugs and has conducted research on Panchakarma therapies.^{2,57,58} The Indian Council of Medical Research

(ICMR) is actively investigating herbal medicines and other Ayurvedic treatment approaches.^{26,59}

Following is a description of pilot studies carried out at one of the major Ayurvedic universities in India. These studies were conducted on chronic disorders associated with the aging process. The studies produced positive results and can be used as the basis for conducting larger, more rigorous clinical trials.

Depression

Depression is a common disorder found in elderly patients. According to Ayurveda, *Allium sativum* Linn. (garlic) has intellect-promoting properties that may alleviate depression. In this pilot study, dehydrated powder of garlic was administered to 32 patients with depression (Parikh*). The garlic powder was given at a dose of 1 g (equivalent to 5 g of crude garlic) three times a day for 1 month. Results showed significant relief in seven of eight symptoms tested (Table 2).

Anxiety

Anxiety is a common condition observed during old age due to elevated Vata. Two pilot studies were conducted on Ayurvedic methodologies that are used to treat patients with anxiety (Sharma 1999*). The first study investigated the effects of the *Brahmi* herbal formulation, which contains *Bacopa monnieri* (Linn.) Pennell (*Brahmi*), *Asparagus racemosus*, *Acorus calamus* Linn. (*Vacha*), and *Saussurea lappa* C.B. Clarke (*Kustha*). Previous research on *Brahmi* extracts indicated it has an anxiolytic effect.⁶⁰⁻⁶² For the present study, the *Brahmi* mixture was administered to 7 patients with anxiety at the dose of 5 g three times a day. The study lasted 2 months, and the *Brahmi* mixture significantly alleviated all five symptoms tested (Table 3).

The second pilot study investigated the effects of an Ayurvedic nasal therapy known as *Nasya*. In this treatment, herbal drops are used to cleanse the nasal passages. *Nasya* is purported to balance the brain and the mind by stimulating the base of the brain via the olfactory nerve endings. In

TABLE 4. EFFECT OF CHAITAS GHRITA NASYA ON ANXIETY

Symptom	Mean score ^a		Percent relief	p-value
	Before	After		
Anxious mood	3.17	1.50	36.82	<0.001
Tension	2.17	1.00	53.83	<0.02
Depressed mood	2.83	1.33	47.05	<0.02
Insomnia	1.50	0.33	77.93	<0.05
Intellectual (cognitive)	1.33	0.50	62.49	<0.01

^aThe mean score highlights the grading of symptoms based on mild, moderate, and severity of symptom.

TABLE 5. EFFECT OF AYURVEDIC THERAPIES ON DURATION OF SLEEP

Group	Mean score ^a		Percent relief	p-value
	Before	After		
Mamsyadi vati	3.95	3.65	92.41	<0.001
Yashadadi vati	3.80	3.20	84.21	<0.001
Shirodhara	4.75	4.13	86.84	<0.001

^aThe mean score highlights the grading of symptoms based on mild, moderate, and severity of symptom.

this study, a classical Ayurvedic preparation, called *Chaitas Ghrita*, was used for *Nasya*. *Chaitas Ghrita* contains *Operculina turpethum* (Linn.) S. Manso, *Marsdenia tenacissima* (Roxb.) Wight & Arn., *Pluchea lanceolata* Oliver & Hiern., *Cedrus deodara* (Roxb.) Loud., *Tribulus terrestris*, *Dashamula* (a mixture of 10 roots: *Desmodium gangeticum* DC., *Uraria picta* Desv., *Solanum indicum* Linn., *Solanum xanthocarpum* Schrad. & Wendl., *Tribulus terrestris*, *Oroxylum indicum* [Linn.] Vent., *Aegle marmelos* Corr., *Gmelina arborea* Linn., *Clerodendrum phlomoides* Linn., and *Stereospermum suaveolens* DC.), and cow's *ghee* (clarified butter). This study was conducted on 6 patients with anxiety. *Chaitas Ghrita* was administered at the dose of 16 drops in each nostril for 7 days for the duration of 4 weeks, with a gap of 7 days. Results showed significant relief in all five symptoms measured (Table 4).

Sleep disorders

Sleep disorders are a common occurrence in elderly patients. Research studies were conducted on patients with sleep disorders to investigate the effects of two herbal formulations and the *Panchakarma* procedure known as *Shirodhara*, in which a stream of oil was poured on the forehead (Narayan 2000*). One of the herbal formulations was *Mamsyadi vati*, which contains *Nardostachys jatamansi* DC., *Withania somnifera*, *Valeriana wallichii* DC., and *Convolvulus pluricaulis* Chois. Previous research showed that an isolated component of *Nardostachys jatamansi* has a tranquilizing effect,⁶³ and that patients suffering from anxiety slept better when given *Convolvulus pluricaulis*.⁶⁴ In the present study, *Mamsyadi vati* was administered in tablet form at the dose of 1 g twice a day with milk. It was given for 2 months to 20 patients with insomnia. The second herbal mixture was *Yashadadi vati*, which contains zinc, *Achyranthes aspera* Linn., *Peristrophe bicalyculata* Nees, and *Boerhavia diffusa* Linn. This was administered in tablet form at the dose of 1 g twice a day with milk for 2 months. Ten (10) patients with insomnia received this herbal mixture. The third group of patients received *Shirodhara*, using oil containing *Withania somnifera* (Ashwagandha). *Shirodhara* was administered to 8 patients for the duration of 15 days. Results showed a significant improvement in the duration

of sleep (Table 5), quality of sleep (Table 6), and mood upon awakening (Table 7) with all three therapies. Subsequent research on *Valeriana wallichii*, one of the herbs in *Mamsyadi vati*, showed that flavonoids isolated from it have sleep-enhancing properties.⁶⁵

Hypertension

Hypertension is a common disorder described in Ayurveda as *Raktatavata* and *Raktavritavata*. In this pilot study, 36 patients with essential hypertension were divided into three groups (Patel*). Group 1 received an herbal formulation containing *Bacopa monnieri*, *Convolvulus pluricaulis*, *Withania somnifera*, *Nardostachys jatamansi* DC., and *Hyoscyamus niger* Linn. in equal proportions. Previous research revealed the hypotensive action of *Convolvulus pluricaulis*⁶⁶ and the prolonged hypotensive effect of a total alkaloid extract of *Withania somnifera*⁶⁷ and essential oil of *Nardostachys jatamansi*.⁶⁸ In the present study, group 1 patients were given the herbal mixture at a dose of 9 g per day in 3 divided doses for the duration of 8 weeks. Group 2 received the *Panchakarma* procedure *Shirodhara*, in which a stream of milk was poured on the forehead for 45 minutes. This procedure was done for 21 days. Group 3 received a combined therapy, in which both the herbal formulation and the *Shirodhara* treatment were administered.

Results of this study showed a significant reduction in both systolic and diastolic blood pressure in all three groups (Table 8). Some of the patients improved to such an extent that they were able to minimize the dose of their allopathic antihypertensive drug or even stop it completely. This suggests that the Ayurvedic methods potentiated the therapeutic efficacy of the antihypertensive drug. The Ayurvedic methods may be helpful in avoiding the toxic side-effects of the allopathic drug, since the dosage can be reduced or the drug stopped completely.

In this study, there was significant symptomatic improvement in headache, disturbed sleep, fatigue giddiness, redness of eyes, feeling of tension, and palpitation in all three groups, with a better effect in the group receiving combined therapy. Emotional stress was relieved significantly as measured by a brief psychiatry rating scale.

TABLE 6. EFFECT OF AYURVEDIC THERAPIES ON QUALITY OF SLEEP

Group	Mean score ^a		Percent relief	p-value
	Before	After		
<i>Mamsyadi vati</i>	2.7	2.50	92.59	<0.001
<i>Yashadadi vati</i>	2.6	2.40	92.31	<0.001
<i>Shirodhara</i>	3.0	2.75	91.67	<0.001

^aThe mean score highlights the grading of symptoms based on mild, moderate, and severity of symptom.

TABLE 7. EFFECT OF AYURVEDIC THERAPIES ON MOOD UPON AWAKENING

Group	Mean score ^a		Percent relief	p-value
	Before	After		
<i>Mamsyadi vati</i>	2.80	2.45	87.50	<0.001
<i>Yashadadi vati</i>	2.90	2.50	86.21	<0.001
<i>Shirodhara</i>	3.38	3.00	88.89	<0.001

^aThe mean score highlights the grading of symptoms based on mild, moderate, and severity of symptom.

Diabetes mellitus

In Ayurveda, the diseases named *Prameha* and *Madhumeha* have descriptions corresponding to diabetes mellitus (Chandola*).³³ Several pilot studies were conducted to evaluate the therapeutic efficacy of single Ayurvedic herbs, as well as polyherbal formulations, in patients with noninsulin-dependent diabetes mellitus (NIDDM), as determined by the glucose tolerance test. The duration of treatment for these studies was 2 months.

In the pilot study on *Swertia chirata* (*Chirayata*), (Bhatta*)³³ a water-soluble extract of the herb was administered to patients in tablet form at a dose of 1 g three times a day before breakfast, lunch, and dinner. Results showed a significant decrease in fasting and postprandial blood-sugar levels (Fig. 1). Subsequent research analyzed methanol extracts of *Swertia chirata* that contain constituents with antidiabetic activities.³⁴

In the pilot study on *Cinnamomum tamala* (*Tejapatra*), the powdered form of the leaves was administered to patients at a dose of 1–2 teaspoonfuls three times a day, half an hour before breakfast, lunch, and dinner. The specific dose for each patient was determined based on the severity of diabetes. Results showed a significant decrease in fasting and postprandial blood-sugar levels (Fig. 2). The blood-sugar levels were decreased through the stimulation of the release of insulin (Figs. 3 and 4).^{31,32,69}

In the pilot study on *Pterocarpus marsupium* (*Vijayasar*), a decoction was prepared with 40 g of coarse powder of *Pterocarpus marsupium* and administered in two divided doses before lunch and dinner. Results showed a significant decrease in fasting and postprandial blood-sugar levels (Fig. 5) (Sidhpataki*). This correlates with the results of several multicentered phase II and III clinical trials carried out on *Pterocarpus marsupium*, which showed it to be as effective as tolbutamide in the treatment of NIDDM.²⁶ Subsequent investigation of the butanol subfraction of the alcohol extract of *Pterocarpus marsupium* showed it has significant antidiabetic activity and also corrects diabetes-related metabolic alterations in an animal model.²⁷

A pilot study investigated the effects of administering *Pterocarpus marsupium*, along with *Tinospora cordifolia* (*Guduchi*). Six (6) g of *Tinospora cordifolia* powder was

TABLE 8. EFFECT OF AYURVEDIC METHODOLOGIES ON BLOOD PRESSURE IN PATIENTS WITH ESSENTIAL HYPERTENSION

Group	Blood pressure	Mean score (mmHg)		Percent relief	p-value
		Before	After		
1	Systolic	160.20	133.60	16.60	<0.001
	Diastolic	98.00	86.40	11.60	<0.001
2	Systolic	173.80	132.40	23.82	<0.001
	Diastolic	104.20	89.80	13.82	<0.001
3	Systolic	163.80	131.40	19.78	<0.001
	Diastolic	96.60	84.40	12.63	<0.001

administered twice a day before lunch and dinner, along with the *Pterocarpus marsupium* decoction from the previously mentioned pilot study. Results showed a significant decrease in fasting and postprandial blood-sugar levels (Fig. 6) (Sidhpataki*). Subsequent investigation revealed that an alcohol extract of *Tinospora cordifolia* has hypoglycemic and hypolipidemic activity.⁷⁰

A pilot study was conducted on Guduchi Rasayana, which contains *Tinospora cordifolia*, *Pterocarpus marsupium*, and *Momordica charantia*. A previous pilot study showed a significant hypoglycemic effect of an aqueous extract of *Momordica charantia*.²⁸ In the present study, tablets were prepared by giving seven bhavanas of *Momordica charantia* (Karvellaka) juice to powder consisting of 50% *Pterocarpus marsupium* and 50% *Tinospora cordifolia*. Bhavana is an Ayurvedic process that blends a liquid constituent with a powder, paste, or mixture to make a homogeneous substance that can be formed into tablets. The tablet was administered at a dose of 4 g three times a day before breakfast, lunch, and dinner. Results showed a significant decrease in fasting and postprandial blood-sugar levels (Fig.

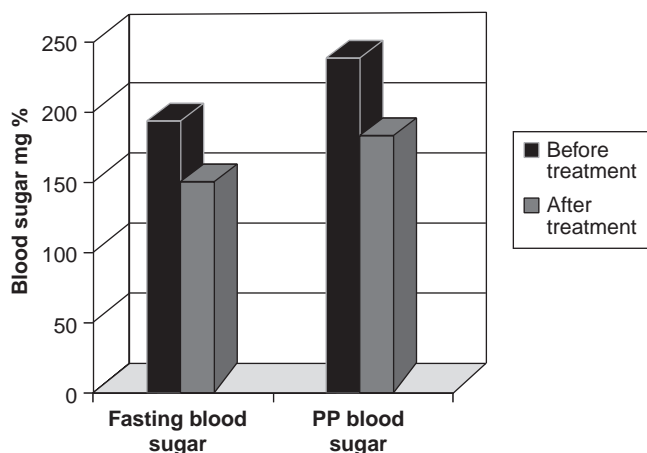


FIG. 1. Effect of *Swertia chirata* Buch-Ham (*Chirayata*) on fasting and postprandial (PP) blood sugar levels in noninsulin-dependent diabetes mellitus.

7) (Sidhpataki*). Subsequent research showed that dried powder of *Momordica charantia* improves diabetic status.³⁰ A methanol extract of *Momordica charantia* normalizes blood glucose, reduces triglycerides and low-density lipoproteins, and increases high-density lipoproteins. Discontinuation of the extract resulted in reversion to a diabetic state.²⁹

The results of the aforementioned pilot studies show that Ayurvedic herbal preparations can produce a significant decrease in fasting and postprandial blood-sugar levels. These antihyperglycemic medicinal herbs may be useful in decreasing the dose of allopathic antidiabetic drugs.

Parkinson's disease

In Ayurveda, the disease named *Kampavata* has a description corresponding to Parkinson's disease. *Mucuna pruriens* (*Kapikacchu*) contains levodopa in its natural form and research conducted on its use in treating this disease has shown encouraging results. A multicenter, clinical trial on a formulation derived from *Mucuna pruriens* showed it to be effective in treating patients with Parkinson's disease.⁷¹ A smaller study showed significant improvement in patients who underwent *Panchakarma* therapy prior to treatment with an Ayurvedic formulation that contains *Mucuna pruriens*.⁷² In the present pilot study, the powder of *Mucuna pruriens* was administered at a dose of 6 g three times a day for 45 days to 8 patients with Parkinson's disease. Significant symptomatic improvement was seen in 9 of 12 symptoms tested (Table 9) (Dhurve). The results of a subsequent double-blind, clinical trial on *Mucuna pruriens* indicates it may have advantages over standard levodopa treatment for the long-term management of Parkinson's disease.⁷³ Synthetic levodopa treatment has side-effects that occur after several years of use. Under laboratory conditions, *Mucuna pruriens* protected against plasmid DNA and genomic DNA damage caused by synthetic levodopa.⁷⁴

Alzheimer's disease

It is estimated that 24 million people worldwide have dementia, and it is recognized that Alzheimer's disease is the

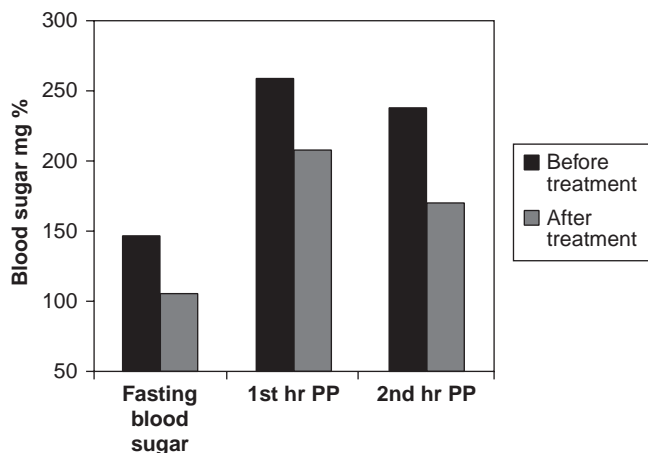


FIG. 2. Effect of *Cinnamomum tamala* Nees & Ebern. (*Tejapatra*) on fasting, 1-hour postprandial (PP) and 2-hour PP blood-sugar levels in noninsulin-dependent diabetes mellitus.

main cause of dementia syndrome.⁷⁵ In the early stage of dementia, the features observed are: memory impairment, cognitive difficulties that interfere with daily activities, frustration, anxiety, depression, suicidal thoughts, and errors in judgment. In the middle stage, the patient is unable to work, gets easily lost and confused, has impaired language and deficits in performing sequential tasks, and is unable to do simple mathematical calculations. The suitable term for dementia in Ayurveda may be *Smritibhramsha*. The memory is impaired due to being overcome by psychic factors known as Rajas and Tamas.

A pilot study on 14 patients with Alzheimer’s disease investigated the effect of two Ayurvedic herbal preparations and *Nasya*–Ayurvedic nasal therapy (Shah*).⁷⁶ The patients were divided into two groups. Group A received *Medhya Rasayana*, an herbal mixture that purportedly promotes men-

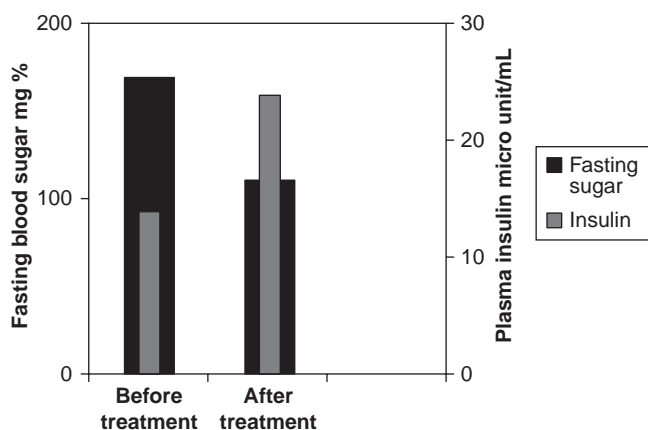


FIG. 3. Effect of *Cinnamomum tamala* Nees & Ebern. (*Tejapatra*) on fasting blood-sugar and plasma-insulin levels in noninsulin-dependent diabetes mellitus.

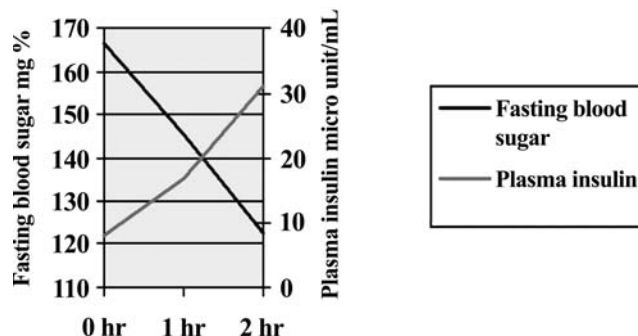


FIG. 4. Immediate effect (0–2 hours) of *Cinnamomum tamala* Nees & Ebern. (*Tejapatra*) on fasting blood-sugar (glucose) and plasma-insulin levels in noninsulin-dependent diabetes mellitus.

tal health. This formulation contains *Celastrus paniculatus* Willd., *Convolvulus pluricaulis*, *Centella asiatica* (Linn.) Urban, *Mucuna pruriens*, *Semecarpus anacardium* Linn. f., *Ocimum sanctum*, *Tinospora cordifolia*, *Glycyrrhiza glabra* Linn., *Asphaltum puniabiunum*, and zinc. This was administered in tablet form at a dose of 3 g three times a day for 2 months. Group B received *Medhya Rasayana* and, in addition, were given an antioxidant tablet containing *Emblica officinalis* Gaertn., *Curcuma longa*, and *Allium sativum*, with three bhavanas of carrot juice and *Emblica officinalis* (*Amalaki*) juice. The antioxidant tablet was given at a similar dose. The 14 patients under both the groups were also given *Vachadi Ghrita Nasya*, using oil containing *Acorus calamus*, *Saussurea lappa*, and *Piper longum* at a dose of 16 drops in each nostril for 10 days. Four such courses of 2 months duration, with 7 days between successive courses, were carried out. Results showed symptomatic improvement in both groups, with a decreased number of errors on the Bender Gestalt Motor Visual Test, improvement in scores

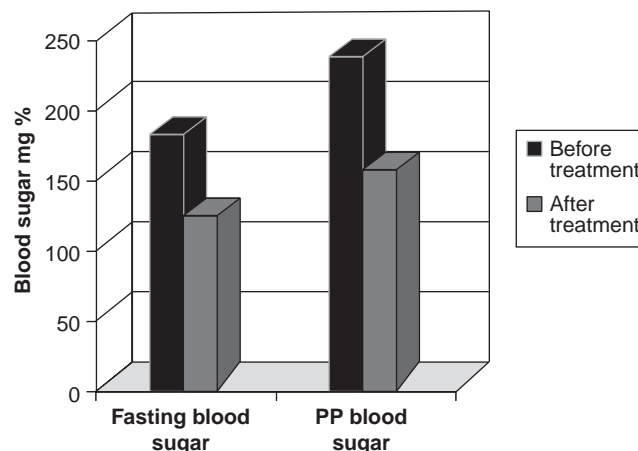


FIG. 5. Effect of *Pterocarpus marsupium* Roxb. (*Vijayasar*) on fasting and postprandial (PP) blood-sugar levels in noninsulin-dependent diabetes mellitus.

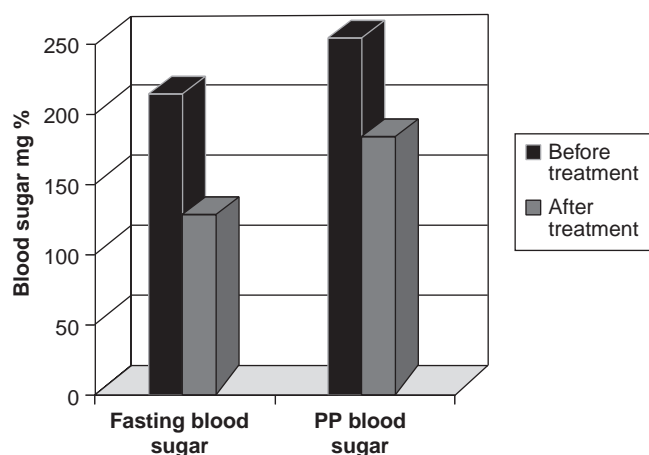


FIG. 6. Effect of *Pterocarpus marsupium* Roxb. (*Vijayasar*) with *Tinospora cordifolia* (Willd.) Miers (*Guduchi*) on fasting and postprandial (PP) blood-sugar levels in noninsulin-dependent diabetes mellitus.

on the Mini Mental Status Questionnaire, and mild improvement in depression based on the Hamilton Rating Scale for Depression.

Ayurveda has a large number of herbs and *Rasayanas* that are purported to enhance memory and intellect as well as rejuvenate mental faculties.²⁻⁴ These are known as *Medhya Rasayanas*.² The present study and additional research seem to support this claim for several of the herbs that were used in this pilot study: *Celastrus paniculatus*,^{77,78} *Centella asiatica*,⁷⁹ *Semecarpus anacardium*,⁸⁰ *Tinospora cordifolia*,⁸⁰ *Ocimum sanctum*,⁸¹ *Glycyrrhiza glabra*,⁸² *Emblica officinalis*,⁸³ *Curcuma longa*,⁸⁴⁻⁸⁷ and *Allium sativum*.⁸⁸ In view of previous encouraging research results, it would be useful

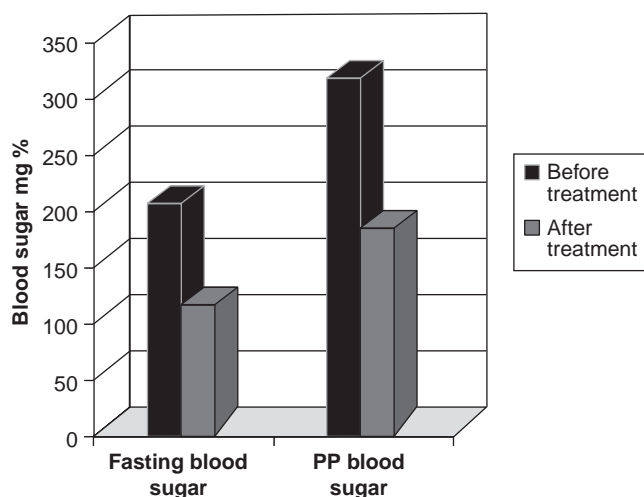


FIG. 7. Effect of *Guduchi Rasayana* on fasting and postprandial (PP) blood-sugar levels in noninsulin-dependent diabetes mellitus. *Guduchi Rasayana* contains *Tinospora cordifolia* (Willd.) Miers (*Guduchi*), *Pterocarpus marsupium* Roxb. (*Vijayasar*), and *Morinda charantia* Linn. (*Karela*).

to carry out a large-scale clinical study on Alzheimer's disease, utilizing *Medhya Rasayanas*.

CONCLUSIONS

The rising health care costs of Western allopathic medicine and its inability to effectively improve the health of the world's population⁸⁹⁻⁹⁷ signal the need for a more holistic system of health care to come to the forefront. Ayurveda is a time-tested system of natural health care that comprehensively addresses the patient as a whole. It has been widely used in India as a system of primary health care for thousands of years. Research over the last 100 years has shown encouraging results for Ayurvedic treatment of various ailments, especially chronic disorders.

The cornerstone of research on Ayurveda continues to be in the area of herbs and herbal drugs. However, this system of health care provides fertile ground for many other areas of investigation. The comprehensive nature of Ayurveda and its primary emphasis on prevention are key features that should be investigated. Research into how disease may be effectively prevented would be of immense value to a world accustomed to "disease care" as opposed to "health care."

With regard to the management of diseases, Ayurveda's comprehensive approach is much more extensive than simply using an herb instead of a pharmaceutical drug. It would be valuable to conduct research on the multistrategy approaches of Ayurvedic treatment. Clinical trials could be carried out in the following manner: one arm of the patient population would receive the comprehensive Ayurvedic treatment, another arm would receive the standard allopathic treatment, and the third arm would receive an integrated approach, using the comprehensive Ayurvedic treatment in ad-

TABLE 9. EFFECT OF *MUCUNA PRURIENS* (STICKM.) DC. IN PARKINSON'S DISEASE

Symptom	Mean score ^a		Percent relief	p-value
	Before	After		
Tremors	1.63	0.75	53.99	<0.001
Rigidity	2.00	1.53	25.00	<0.10
Gait disorder	1.85	1.00	42.50	<0.001
Speech disorder	1.29	0.57	55.81	<0.01
Impaired memory	0.63	1.38	54.34	<0.001
Depression	2.00	1.13	43.50	<0.001
Pill rolling	2.00	0.87	56.25	<0.001
Micrographia	2.00	1.14	43.00	<0.001
Rombergism	2.00	1.25	37.50	<0.01
Finger to nose	2.00	1.50	25.00	<0.05
Glabellar tap	2.00	1.40	30.00	<0.10
Impairment of upward gaze	2.00	1.40	30.00	<0.10

^aThe mean score highlights the grading of symptoms based on mild, moderate, and severity of symptom.

dition to the allopathic treatment. This type of clinical study would reveal which treatment approach is the most effective. The overarching consideration should be what works best for the benefit of the patient.

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APPENDIX: RESEARCH IN THESES

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