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Provocative dietary factors in geriatric hypertension: A surveillance study

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Abstract

Hypertension is the most common psychosomatic disorder affecting 972 million people worldwide being more prevalent in old age. The present survey of hypertensive patients fulfilling the standard diagnostic criteria of WHO/ISH (2004) is carried out in geriatric age group from the Saurashtra region of Gujarat in India to observe the dietary pattern and provocative factors. Total 120 patients of 50 to 80 years of age having systolic blood pressure >140 mm Hg and ≤180 mm Hg and diastolic blood pressure >90 mm Hg and ≤110 mm Hg irrespective of gender and religion were selected for the present study. They were interviewed for list of provocative factors enlisted in Ayurveda. As observed, the study supported the facts described in Ayurveda that dietary etiological factors, such as excess intake of *Lavana* (salty), *Amla* (sour), *Katu* (pungent), *Tikshna*, *Ushna* (hot), *Vidahi* (producing burning sensation), *Viruddha* (incompatible), *Snigdha* (unctuous), *Abhishyandi* (leading to obstruction), *Madhura* (sweet), *Guru* (heavy to digest) dietary articles, *Ajirnashana* (taking diet before complete digestion of previous meal), *Adhyashana* (repeated eating at short intervals), will vitiate *Rakta dhatu* as well as *Pitta dosha* in the body leading to disorders like hypertension. Hypertension in old age is found to be a disease of *Vata-Pitta* dominant vitiation with the involvement of *Rasa*, *Rakta*, *Meda* as main *Dushya* (vitiated factors) and dietary factors can contribute to worsening of the disease. The etiological factors having role in the pathogenesis can also be applied for preventive guidelines for the management of hypertension.

Key words: Ayurveda, dietary factors, geriatric age group, hypertension

Introduction

Hypertension is an important public health challenge due to its associated morbidity, mortality, and economical burden to the society affecting about 972 million people worldwide.[1] It is opined that as not a disease entity, rather a product of several etiological processes ultimately leading to the development of hypertension. Hypertension as a disease is not described in Ayurvedic literature; however, its pathophysiology and symptomatology can be traced in many parallel conditions described in the classics. Depending on involvement of *Dosha* (*Vata-Pitta*) and *Dushya* (*Rasa*, *Rakta*, *Meda*) the spectrum of hypertension is interpreted in terms of *Raktavata* or *Raktagata Vata* and in recent years as *Vyana Bala Vaishamya*[2]/*Vyana Bala Vriddhi* in Ayurvedic parlance.[3] It is surprising that in spite of all advances in medicine field, exact cause of hypertension is less known. As a result, limited preventive measures could be undertaken.

Government of India initiated a National Campaign on Ayurveda for Geriatric Health Care in 2008 to make aware the elderly population about their health status for preventive, promotive, and curative aspects. The objectives of the campaign are to identify geriatric age-related diseases and to explore the possibilities where Ayurveda can contribute to deliver the goods for healthy dietetics, lifestyle, according to *Prakriti* (constitution) and to prevent the increasing incidence of geriatric hypertension. The incidence of hypertension increases as age advances irrespective of gender. There are many factors specified in relation to old age (*Vardhakya*). Ayurveda states *Vata Dosha Pradhanata* (dominancy of *Vata*), *Parihani Kala* (declining period of life), *Kshiyamana Dhatu* (degeneration of body tissues),[4] *Paripakwa Shariratwam* (aged body),[5] in old age. Whereas according to modern science thickening of vessel wall, decrease in elasticity and lumen of vessels,

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increased vascular resistance, favor the manifestation and exaggeration of hypertension. Human body is nourished by food. Health and disease manifestation are basically outcome of the *Ahara* (dietary articles). It has direct impact on *Agni*, which is the prime and ultimate factor responsible for the maintenance of life. Keeping all these views in mind, a survey with the objective to evaluate role of dietary factors provoking hypertension in geriatric age group was carried out in the vicinity of Jamnagar, Gujarat, India.

Materials and Methods

Diagnostic criteria

The standard diagnostic guidelines of World Health Organization (WHO)/International Society of Hypertension (ISH) (2004),[6] and The Sixth Report of the Joint National Committee[7] for prevention, detection, evaluation, and treatment of high blood pressure were adopted for selection of the patients.

Inclusion criteria

1. Patients in between 50 to 80 years of age.
2. Patients presenting with the classical symptoms of hypertension.
3. Those with systolic blood pressure >140 mmHg and ≤180 mmHg and diastolic blood pressure >90 mmHg and ≤110 mm Hg and who are not taking any treatment.
4. Patients on modern antihypertensive treatment with any level of blood pressure.

Exclusion criteria

Patients with accelerated and malignant hypertension and other serious systemic illnesses, such as severe diabetes mellitus, tuberculosis, major endocrine disorders, malignancies, HIV, and renal failure, were excluded. A detailed research proforma was prepared for the survey incorporating diet and other related factors. Direct interview method was done for assessing the association of factors. The duration of study was from June 2008 to March 2010.

Total 120 patients irrespective of gender and religion attending the outpatient and inpatient department of Kayachikitsa and cases referred by other departments of the institute were selected in the present survey. In present era of stress, considering the onset of hypertension at an early age due to stress-related factors, the lower age limit for the survey was limited to 50 years.

Observations and Results

The observations made on 120 patients of hypertension showed that maximum number of patients (55%) were between age group of 50–60 years; 51.67% were males; 70% were Hindu; 87.50% were married; and 35% were house wives. The 25% each had primary education and were graduates; 41.77% belonged to middle socioeconomic status; 26.67% were consuming betel leaf; 23.34% had a habit of tobacco chewing; and 17.50% were addicted to smoking. *Dashavidha Pariksha* (ten-point patient Ayurvedic examination) biostatistics revealed that maximum number of patients showed *Vata-Pitta* dominance in *Prakriti* (37.50%) followed by *Kapha-Pitta* dominance in 33.34% patients. *Rajasika Manasa Prakriti* (60.84%), *Madhyama Sara* (58.34%), *Madhyama Samhanana* (45.84%), *Avara Sattva* (69.17%), *Madhyama Vyayama Shakti* (50%), *Mandagni* (45.84%), and *Krura Koshtha* (50%) were also predominantly observed. Most of the patients had irregular bowel habits (66.67%) and constipated bowels (58.33%). In concern to stage wise distribution, Stage II hypertension was observed more followed by Stage I type. Stage III hypertension was less observed [Table 1].

Elaborated dietetic history showed that maximum number of patients (81.67%) were taking vegetarian diet, same number of patients were found to consume *Adhika Lavana* (additional intake of salt other than the salt content in diet), *Ati-Tikshna Ahara* (excess pungent food), and *Abhishyandi Bhojana* (heavy to digest and lead to obstruction), *Ati-Ushna* (excess hot) (78.34%), *Vidahi* (creating burning sensation) (61.67%), *Viruddha* (incompatible food) (58.33%), *Ati Madhura* (excess sweet items) (63.34%), *Ati-Snigdha* (unctuous) (58.33%), and *Ati-Guru* (heavy to digest) *Ahara* (53.34%) were observed in maximum number of patients. In majority of patients *Madhura* (sweet) (63.34%), *Katu* (pungent) (58.33%), and *Amla* (sour) (55%) was observed as dominant *Rasa* in diet. The 60.24% patients were consuming excess amount of food than needed (*Atimatra Bhojana*). The 56.67% and 33.33% were following *Adhyashana* (frequent eating) and *Ajeernashana* (taking diet before complete digestion of previous meal), respectively.

Predominant chief complaints observed in the patients are presented in Table 2. Analysis of *Doshik* involvement as per signs and symptoms showed that *Gadha-Varchastwam* (hard stools) (51.81%) and *Anaha* (distension of abdomen) (66.26%) in *Vata Vriddhi* symptoms and *Arati* (non-desire) (46.10%)

Table 1: Stage wise distribution of hypertensive patients (*n*=120)

Hypertension stage (mmHg)	Sitting position		Supine position	
	No. of patients	%	No. of patients	%
Optimum				
Systolic ≤120	2	1.67	3	2.50
Diastolic ≤80	9	7.50	7	5.83
Normal				
Systolic ≤130	7	5.83	4	3.33
Diastolic ≤85	17	14.17	15	12.50
High				
Systolic=130-139	9	7.50	9	7.50
Normal				
Diastolic=85-89	1	0.83	4	3.33
Hypertension stage I				
Systolic=140-159	45	37.50	41	34.17
Diastolic=90-99	31	25.83	40	33.83
Hypertension stage II				
Systolic=160-179	48	40.00	51	42.50
Diastolic=100-109	51	42.50	37	30.83
Hypertension stage III				
Systolic ≥180	9	7.50	12	10.00
Diastolic ≥110	11	9.17	17	14.17

in *Vata kshaya* symptoms were the most common findings. In case of *Pitta Dosha Prakopa Lakshanas* (signs of vitiation), *Daha* (burning) (36.14%), and *Sweda* (excess sweating) (16.90%) were found in maximum. In *Kapha Dosha Vriddhi* (vitiation of *Kapha*) symptoms, *Shwasa* (dyspnoea) was found in maximum (33.73%) patients. It can be said that these are the symptoms found predominantly in geriatric hypertensive patients. In *Rasa Vriddhi Lakshanas*, *Hridayotkleda* (chest congestion) was found in 49.40%, *Praseka* (nausea) in 32.53%. The 19.28% of patients showed *Shrama* (fatigue) in *Rasa kshaya* symptoms. In *Rakta Vriddhi Lakshanas*, *Raktakshi* (redness in eyes) was found in 69.09%. *Gurugatrata* (heaviness in body) (69.09%), and *Udara parshva vriddhi* (excess accumulation of fats in abdominal region and flanks) (57.83%) showed *Mamsa Vriddhi*. *Daurbalya* (weakness) (69.09%) and *Pipasa* (excess thirst) (49.40%) indicate *Oja* and *Mutra Kshaya* symptoms. In *Rasavaha Srotodushti Lakshanas*, *Aruchi* (tastelessness) was found in 48.19%, *Ashraddha* (aversion to food) in 46.49% and *Sada* (slowness) in 31.32% of the patients. In *Raktavaha Srotodushti Lakshanas*, *Annapanasya Vidaha* (burning sensation after some time of taking food due to improper digestion) was found in 84.34%; *Ati Daurbalya* (weakness) in 69.09%; and *Lavanasyata* (salty taste sensation) in 42.17% of patients was also observed. In *Annavaha Srotodushti Lakshanas*, *Avipaka* (indigestion) was found in 6.24% of patients. In *Majjavaha Srotodushti Lakshanas*, *Bhrama* (giddiness) was found in 84.33% and *Tamodarshana* (black out) in 50.60%, and in *Medovaha Srotodushti*, *Alasya* (sloth) was observed in 49.40% patients. About 70% of patients were obese with majority of them (40%) exhibiting grade II (BMI >27 kg/m^2) obesity [Table 3].[8]

Discussion

Hypertension is a *Vata-Pitta Pradhana Tridoshaja Vyadhi* with *Dushya* being *Rasa-Rakta-Meda Dhatu*. Therefore all the etiological factors causing vitiation of *Vata- Pitta Dosha*, and *Rasa-Rakta- Meda Dhatu* can be enlisted as the etiological factors for the disease. On analysis, main etiological factors for the disease were observed to be predominant factors in diet of the patients. Constant exposure to these etiological factors augments the process of development of disease.

Agni is the most important factor, which regulates all metabolic processes at *Dhatu* as well as *Mahabhuta* level and thus maintains overall healthy status. According to Charaka, *Bala* (power), *Swasthya* (health), and *Utsaha* (enthusiasm) depend on status of *Agni*.[9] Thus if *Agni* is impaired, grossly the body functions are impaired. The study had supported this theory of "cause and effect" by the finding that most of the patients were having *Mandagni*. *Ama* is the pathogen resulting due to disturbance of *Agni*. *Mandagni* and *Vishamagni* are the prime causes of *Ama*.[10] This leads to *Srotasavarodha* (obstruction of channels) which is a prime factor in vitiating *Vata Dosha*, the main *Dosha* involved in the pathogenesis of hypertension. In normal state, *Vyana Vayu* performs its *Rasa-Rakta Vikshepana Karma* normally.[11] But if it vitiates, *Dhamani Sankocha* (contraction of vessels) occurs due to its *Ruksha* (dryness), *Shita* (cool), and *Khara* (rough) *Guna*, resulting in the reduction of *Srotovivara* (lumen of the channels). Due to this narrowed pathway, *Avarodha* (obstruction) occurs

Table 2: Chief complaints observed in hypertensive patients (*n*=120)

Chief complaints observed	No. of patients	%
Shirah shoola (headache)	62	51.67
Akshiraga (redness of eyes)	52	43.33
Bhrama (vertigo)	69	57.50
Tamodarshana (blackouts)	38	31.67
Krodhaprachurata (excess anger)	46	38.33
Arati (restlessness)	46	38.33
Alpanidra (less sleep)	40	33.33
Anidra (lack of sleep)	15	12.50
Tandra (lassitude)	25	20.83
Swedadhikya (excess perspiration)	50	41.67
Feeling of tension	46	38.33
Palpitation	39	32.50
Tingling	29	24.16
Breathlessness on exertion	54	45.00
Santapa (rise of temperature)	40	33.33
Klama (fatigue/easy fatigability)	70	58.33
Shrama (fatigue)	50	41.67
Mada (excess lust)	10	8.33
Buddhisammoha (confusional state)	15	12.50
Alasya (sloth)	45	37.50
Gurugatrata (heaviness in body)	49	40.83
Pipasa (excess thirst)	32	26.67

Table 3: Geriatric signs and symptoms observed in hypertensive patients (*n*=120)

Chief complaints	No. of patients	%
Twak Parushata	36	30.00
Shlatha Sara	86	71.67
Shlatha Mamsa	81	67.50
Shlatha Asthi	85	70.83
Shlatha Sandhi	95	79.17
Dhatu Kshaya	82	68.34
Kayasya Avanamana	9	7.50
Vepathu	12	10.00
Khalitya	96	80.00
Vali	75	62.50
Palitya	98	81.67
Kasa	19	15.84
Shwasa	53	44.17
Medha Hani		
Grahanahani	38	31.67
Dharanahani	48	40.00
Smaranahani	65	78.31
Vijnanahani	9	7.50
Vachanahani	1	0.84
Utsaha Hani	63	52.50
Parakrama Hani	93	77.50
Drishti Hras	65	54.17
Karmendriya Hani	27	22.50
Buddhi Hani	21	17.50

in *Rasa-Rakta-Vikshepana Karma*, causing forceful function of *Vyana Vayu* with increase of its *Chala Guna*. This makes the pressure to rise in the wall of *Dhamanis*. It can be stated that *Mandagni*[12] and hence *Ama* are important factors involved in the causation and exaggeration of hypertension in old age.

Koshtha determines the bowel habit of the individual. Maximum patients reported *Krura Koshtha*, denoting *Vata* dominancy.[13] *Krura Koshtha* individuals makes it a habit of not to pass the stools regularly. In hypertension, due to the underlying *Vata*-dominant pathology, *Vibandha* (constipation) may occur leading to obstruction and worsening of the condition. It is supported by the finding that most of the patients had irregular bowel habits (*Asamyak Mala Pravritti*) and constipated bowels. It is known that *Apana Vikriti* causes *Asamyak Mala Pravritti*[14] and it maintains the other four *Vayus*. *Pakwashaya* (colon) is the seat of *Apana Vayu*,[15] which is also a specific site of *Vata Dosha*.[16] The role of *Apana Vayu* in *Aharapachana* (digestion of food), is mainly due to its "*Shakrit Nishkramana Kriya*"(excretion of feces). Thus, the *Apana Vikriti* produces *Samana Vikriti* leading to *Asamyak Pachana* (improper digestion) and leading to *Asamyak Dhatu Utpatti* (improper formation of tissues) as *Samana Vata* has got predominant role in the regulation of *Jatharagni*[17] and its moieties. Thus, irregular *Mala Pravritti* (bowel habit) and constipation indirectly can aid in causing *Shonita Dushti* (blood impurities). In *Vata Vriddhi* symptoms, maximum patients had *Gadha-Varchastwam* (51.81%) and *Anaha* (66.26%). These findings also indicate towards the disturbance of *Vatanulomana* (proper circulation of *Vata*), which can lead to *Udavarta*. The data show that these factors have a role in precipitation and aggravation of the disease in old age. Moreover *Vriddhavastha*[18] is most favorable period for vitiation of *Vata* and hypertension is primarily a disease of *Vatika* disorder.

The dietary habits of a person are based on the choice, availability, and religious customs. Diet is more important than the medicine itself, which is quite evident from the famous statement that if one follows or practices the *Pathyasevana* (following suitable regimen), does not require any medication.[19] Diet depends on various factors, such as taste, mood, presentation of food, place of eating, and hunger as well. Different dietary articles due to their specific *Rasas*, properties (*Vishishta Shaktitwat Dravyanam*),[20] if consumed without following the rules of proper dietary intake (*Ahara Vidhi Visheshayatanani*), can lead to manifestation of disease by vitiating *Doshas* and deteriorating the healthy status of *Dhatus*. The *Rasas* according to the *Samanya–Vishesha Siddhanta* lead to the vitiation and pacification of corresponding *Doshas* by their *Prabhava*.[21]

Adhika Lavana Sevana (excessive intake of salt), had received a greatest attention among all. It is mentioned that, the *Bahlika, Saurashtric, Saindhava,* and *Sauvarika* people, take more intake of *Lavana* (and even consume it along with milk), which is the main etiological factor in pathogenesis of hypertension.[22] The data of study also supports this as maximum indulged in consuming *Adhik Lavana*. *Lavana Rasa* is having dominancy of *Teja* and *Jala Mahabhuta*. In small doses, salt can be used continuously in the preparations of dietary articles but continuous use in large doses is harmful. All *Lavana* are mentioned as *Ushna, Tikshna, Anatisnigdha, Anatiguru, Upakledi* (deliquescent), *Sara, Vikasi, Adha Sranshi, Avakashakara, Vishyandi, Sukshma, Saraka*, and *Mrudu* in nature.[23] *Ati-lavana* intake leads to increase of *Abhishyandi, Sukshma, Ushna*, and *Vyavayi Guna* in the body.[24] This in turn results into vitiation of *Pitta Dosha* in terms of *Ushna, Ttikshna Guna* due to *Samanagunabhuyishtata*.[25] Further aggravation of *Rakta (Raktam Vardhayati)* develops due to *Rakta-Pitta-Ashryashrayi Bhava*.[26] This effect is due to *Sukshma Guna* (penetrating power in microchannels), and *Vyavayi Guna* (spreading of the *Dravya* all over the body).[27] On the other hand, it liquefies *Kapha Dosha (Kapham Vishyandayati)* due *to Samanagunata*. The *Abhishyandi Guna* leads to obstruction in the *Rasavahi Siras*[28] causing *Vata* obstruction and hypertension. The *Vishyandana* effect (*Sravayati*) increases osmolarity and increased extracellular fluid volume with increase in calculated osmolarity. This increases blood pressure showing the way to volume-loaded hypertension. The *Vata dosha* due to *Viparita Gunata* is unable to pacify efficiently with the changes (*Vata-Sneha-Gaurava-Alpatwat*).[29]

Excessive use of *Lavana* is described as the cause of *Shonitaja Roga*[30] and it causes increase the blood.[31] Likewise in *Uccharaktachapa* (raised blood pressure), *Rakta* is also vitiated. It is also perceptible that *Lavana Rasa* is mentioned under the articles, which are specially indicated for not to be consumed in excess and for longer duration.[32] When excessively used, it produces fatigue, lassitude, and weakness of the body,[33] which are the symptoms observed in the patients of hypertension. People who are accustomed to excessive use of salt, suffer from premature baldness, greying of hairs, and wrinkles in the skin. Excessive use of *Lavana Rasa* thus can hasten the aging process aggravating the course of hypertension in geriatric people.

Even a small increase in extracellular fluid and blood volume, can often increase arterial pressure greatly. It ultimately leads to increase in cardiac output, which in turn increases arterial pressure through its direct as well as indirect effect. This leads to secondary increase in total peripheral resistance resulting from the autoregulation mechanism. It greatly elevates the arterial pressure than it is expected. The amount of salt that accumulates in the body is the main determinant of the extracellular fluid volume. Even a small amount of extra salt in the body can lead to considerable elevation of arterial pressure. As the salt is not excreted so easily like water, it accumulates in the body. Excess salt in the body produces increased osmolarity thereby stimulates the thirst centre, making the person to drink more amount of water to dilute extracellular salt to a normal concentration, thus indirectly leading to increase in extracellular volume. This is also achieved by another mechanism through stimulation of hypothalamic–posterior pituitary gland secretary mechanism in response to the increased osmolarity in the extracellular fluid. This leads to secrete increased quantities of antidiuretic hormone, which causes the kidneys to reabsorb greatly increased quantities of water, thereby diminishing the volume of urine while increasing the extracellular volume.[34]

Excessive *Katu* (pungent) *Rasa* intake leads to fainting (*Murchha*), vertigo (*Bhrama*), thirst, tremor,[35] and contraction of blood vessels.[36] The *Mahabhautik* composition of *Katu rasa* is *Vayu* and *Agni Bhuta* dominant. *Katu Rasa* dominant *Dravyas* are usually having *Katu Vipaka* and *Ushna Virya* and thus leading to *Pitta Prakopa*. As we know the *Pitta*

and *Rakta* live symbiotically, the *Pitta* vitiation thus leads to *Rakta Dushti*. Thus, it can be inferred that the *Katu Rasa* and *Ushna Virya* are one of the causes of *Shonita Dushti*. Also due to its *Laghu* and *Ruksha Gunas* excessive consumption of *Katu Rasa* can cause the vitiation of *Vata Dosha*. This *Vita-Pitta* vitiation and *Rakta Dushti* is the basic pathology involved in the causation of hypertension.

Excessive *Madhura Rasa* (sweet taste) intake leads to diseases related to *Medasa*, *Shleshma*, obesity, loss of appetite, coma, diabetes,[37] heaviness, and weakness.[38] Obesity was observed as major concomitant factor in 70% patients among whom 40% were having grade II obesity with body mass index between 27 and 40 kg/m^2. This finding is suggestive of probable friendship of hypertension and obesity. *Madhura* (sweet), *Guru* (heavy), and *Snigdha* (unctuous) articles of the food are predominant in the qualities of *Prithvi* and *Apa Mahabhuta*. Thus these articles, being suppressors of appetite by nature impair, the digestive power, and are extremely harmful, if taken in excess. There is a need of strong digestive power and metabolism achieved by physical exercise.[39] Thus excessive intake of such articles can aid in provocation of hypertension in senile people.

Excessive *Amla* (sour) rasa intake leads to *Kapha*, *Pitta*, and *Asra Prakopa*, *Shaithilya* (loss of function), Vertigo,[40] *Raktadushti*.[41] It is also having *Ushna virya*, which again causes *Pitta* vitiation and ultimately *Rakta dushti*. The *Mahabhautik* composition of *Rakta dosha* is predominantly *Jala* and *Agni Mahabhuta*. *Guru*, *Snigdha*, and *Ushna Virya Dravyas* are mentioned as to cause *Shonita Dushti*.

The *Abhishyandi* dietary articles, such as *Dadhi*, produce *Gaurava* and *Karshya*[42] in the body by obstructing the channels of circulation of rasa (*Rudhwa Rasavaha Siraha*) due to their *Picchila* and *Guru Gunas* (properties). The continuous and at a time (*Ekakala/Yugapat*) circulation of *Rasa Dhatu* is carried out by the normal functioning of *Vyana Vayu* all over the body.[43] Hence nourishment of all *Dhatus* (tissues) take place continuously and in circulatory fashion (*Parivruttistu Chakravat*). By obstructing the channels of circulation (*Srotorodha*), these articles cause vitiation of *Vata* leading to improper circulation of *Rasa (Ahara Rasa)* resulting in emaciation (*Dhatukshayam/Karshyam Karoti*), which again hastens the process of aging and degeneration. This again leads to *Vata Prakopa*. In this way, the vicious cycle develops and all the factors again ultimately precipitate hypertension in *Vata pradhana* life span, that is, old age.

Faulty dietary habits, such as *Adhyashana*, *Ajirnashana*, *Vishamashana* (taking compatible and incompatible food at wrong time), *Anashana* (not taking food when needed) were found in maximum. The dietary habit is regulated mostly by behaviour and life style pattern. Diet has got direct impact in causing *Mandagni*, thereby *Ama* production. All of the above habits lead to improper digestion of food, vitiation of *Agni*[44] itself leading to *Grahani Dosha* resulting into *Ama*, which is the most important causative factor in the pathogenesis of disease. This formation of *Ama*, impairment of *Agni*, also creates the obstruction in the normal circulation of *Vyana Vayu*. Improper quantity food is again of two types *Hinamatram* (deficient in quantity) and *Atimatram* (excessive in quantity).[45] The *Anashana* habit also leads to *Mandagni*, as long waiting for food increases gastric secretions more, resulting in the increased quantity of *Drava Rupa Pitta*, which is ineffective to digest the food, directing *Mandagni* and consequently *Amotpatti*.[46]

Ati-Ahara Sevana leads to *Yugapata Tridosha Prakopa*.[47] Gastric juice varies in both amount and composition with the food taken. The duration of secretion and the time during which food remains in the stomach also becomes longer as the quantity of the food increases (*Adhyashana*).[46] *Adhyashana*, *Ajirnashana*, and so on are mentioned in *Rakta dushtikara nidana*.[48] It is always customary that one should take the food only when the previous food is digested. If the person indulges in *Ajirnashana*, that is, taking food before the digestion of previous meal, the digestive product of previous meal (undigested *Rasa*) gets mixed up with the product of food taken afterward, resulting in the provocation of all the *doshas* instantaneously, which can aggravate the manifestation of the disease.[49] *Vishamashana*, that is, irregular timings and quantity of the food leads to indigestion. Thus due to the impaired digestion, the *Ardhapakva*, *Apakva*, and *Pakva Aahara Rasa* produce *Vidagdhavastha* (*Shuktata*).[50] This *Shuktata* produces *Pitta Kopa* and consequently *Shonita Dushti*. *Viruddhashana* is being directly accepted as a cause of *Shonita dushti*.[48] Thus the data shows that these improper habits and dietary articles can aid to cause *Shonita Dushti* and hence precipitating the occurrence of the disease.

These dietary factors hasten the progressive changes of aging observed through signs and symptoms enlisted in the Tables 2 and 3. These ultimately worsen the degenerative pathologic changes in hypertensive patients. Hypothetically it can be stated that the aggravated *Vata* and *Pitta* in case of hypertension hastens aging process, but the relationship between hypertension as provoking factor to enhance aging is essential to be supported by robust clinical data.

The triad of chief complaints, that is, *Shirah shoola* (headache), *Bhrama* and *Klama* (fatigue/easy fatigability), which are found most prevalently are supportive to the underlying pathologic status of *Vata-Pitta* dominancy and thus also proves the theory of cause and effect (*Karya-Karanavada*) of Ayurveda as most of the etiologic factors are found to be causing the vitiation of *Vata* and *Pitta*. These symptoms can be considered as the cardinal signs and symptoms of hypertension. *Aruchi* and *Udgarabahulya* are indicative of *Ama* dominant obstruction and disturbances in *Vatanulomana* in underlying pathology.

Thus the present article establishes the fact that the faulty dietary habits, such as *Ajirnashana*, *Adhyashana*, and certain dietary qualities, such as excess intake of salt, pungent items can vitiate the *Rasa*, *Rakta* owing to disturbance in *Agni* and formation of *Ama*. This obstructs the channels and leads to vitiation of *Vata-Pitta Dosha*. Thus it disturbs the normal circulatory functioning of *Vata* particularly *Vyana Vata* resulting into hypertension. The pathogenesis of hypertension in Ayurveda and above relevant discussion is presented in Figure 1.

Conclusion

The present survey study supported the facts described in Ayurveda that the dietary etiologic factors, such as much intake of *Lavana*, *Amla*, *Katu*, *Tikshna*, *Ushna*, *Vidahi*, *Viruddha*, *Snigdha*, *Abhishyandi*, *Madhura*, *Guru* dietary substances can lead to vitiation of *Rakta Dhatu* as well as *Pitta Dosha* in the body leading to disorders, such as hypertension. Hypertension in old age is found to be a disease of *Vata-Pitta Pradhana*

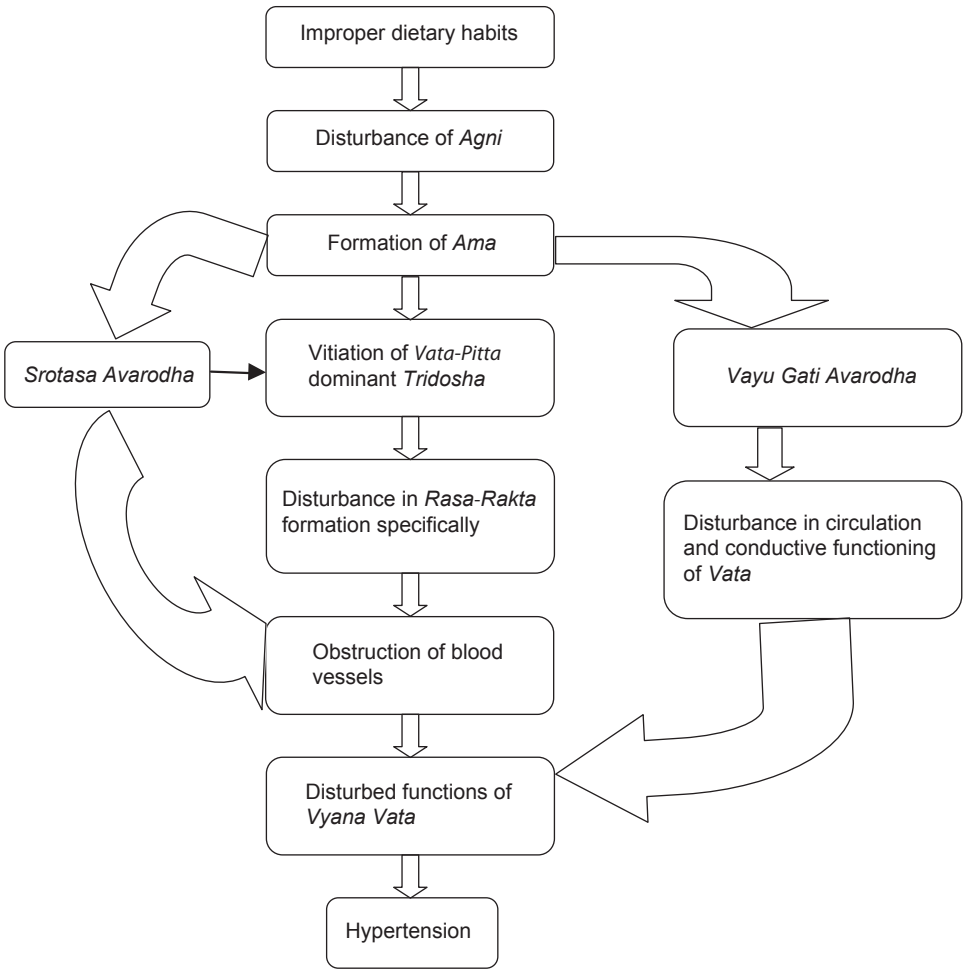

Figure 1: Pathogenesis of hypertension in Ayurveda

Doshik vitiation, *Rasa*, *Rakta*, *Meda* being main *Dushyas* involved. Various dietary factors and habits enlisted can contribute to hypertension specifically in old age. The etiologic factors observed in the present study can have the role in the pathogenesis of hypertension and can be used as guidelines for deciding the Ayurvedic principles of management for hypertension accordingly. Healthy dietetics and healthy life style as per the *Prakriti* of an individual along with the possible use of medications will certainly bestow the tangible results because both are complementary and supplementary to each other. The study conveys the message that Ayurvedic dietary guidelines are to be followed and adopted in order to prevent hypertension in geriatric population. Also in known hypertensive patients, this will be helpful to control the blood pressure within range and to minimize the medication. This article substantiates the Ayurvedic references with data.

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हिन्दी सारांश

वृद्धावस्था में उच्चरक्तचाप पीड़ितरुग्णों में आहारज हेतुओं का निरीक्षणात्मक अध्ययन

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प्रस्तुत अध्ययन उच्चरक्तचाप पीड़ित रुग्णों में विशेष आहारज हेतुओं का विवरण करने के लिए किया गया । विश्व स्वास्थ्य संगठन के मानक को ग्रहित कर उच्चरक्तचाप पीड़ित रुग्णों को पंजीकरण करने के बाद आहारज हेतुओं का अध्ययन किया गया । प्राप्त परिणामों के अनुसार अत्याधिक लवण, अम्ल, कटु, तीक्ष्ण, उष्ण, विदाही, विरुद्ध, स्निग्ध, अभिष्यन्दि आहार का सेवन, अजीर्णाशन, अध्यशन, आदि विपरीत आहार शैली उच्चरक्तचाप में कारण है । यह आहारज हेतु रस–रक्त धातु और वात–पित्त दोषों को प्रकुपित कर वृद्धावस्था में उच्चरक्तचाप उत्पन्न कर सकते हैं ।