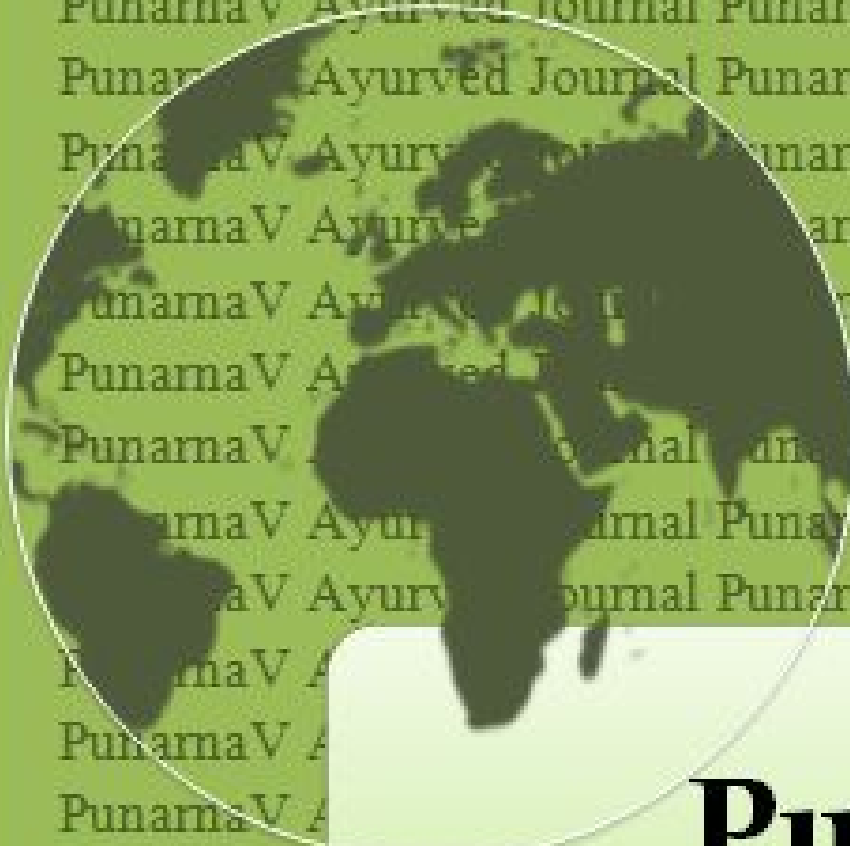


MONTH: MAR: APR -2016

VOLUME: 4, ISSUE: 2

ISSN: 2348-1846



Punarna V

TITLE

**EFFICACY OF ŚATĀVARĪ CŪṚṅA AND KAPARDA BHASMA IN MANAGEMENT OF
POSTMENOPAUSAL OSTEOPOROSIS**

VIBHA SOOD¹, K. L. MEENA², GOVIND PAREEK³

**AN INTERNATIONAL PEER REVIEWED AYURVED JOURNAL
ON LINE BI-MONTHLY AYURVED JOURNAL**

www.punarnav.com

Email: explore@punarnav.com, punarnav.ayu@gmail.com



EFFICACY OF ŚATĀVARĪ CŪRṆA AND KAPARDA BHASMA IN MANAGEMENT OF POSTMENOPAUSAL OSTEOPOROSIS

VIBHA SOOD ¹, K. L. MEENA ², GOVIND PAREEK ³

¹ M.D. SCHOLARS, ² ASSOCIATE PROFESSOR & HOD, ³ ASSISTANT PROFESSOR DEPARTMENT OF BASIC PRINCIPLES, NATIONAL INSTITUTE OF AYURVEDA, JAIPUR, RAJASTHAN, INDIA.

ABSTRACT:

Osteoporosis is a metabolic disorder, in which bones become thin, weak and fragile and more likely to breakdown. In women, after menopause due to hormonal insufficiencies tendency to fall into the disease is very high. In Āyurveda, the disease is not mentioned as such; but signs and symptoms of Asthi- Kṣaya are found very similar to osteoporosis. Asthi- kṣaya is mentioned as a vāta related disorder. Aggravation of vāta is told responsible for Asthi- Kṣaya. In Caraka Saṁhitā, the categorical principle of treatment is mentioned as, “Samānaguṇābhyaṣo Hi Dhātūnām Vṛddhi Kāraṇam”. According to this principle, the things which contain similar properties to a particular dhātu of body can be helpful to increase that one dhātu if they are used in a practice. Properties of the drugs like Śatāvarī and Kaparda bhasma are very similar to asthi dhātu. A clinical trial of śatāvarī cūrṇa in the dose of 5gm. and kaparda bhasma 1 gm. was conducted in 30 female patients of 40 to 60 years age group. After 60 days, general sign and symptoms of asthi- kṣaya improved significantly in group A and value of bone mineral density and serum calcium improved by 49.83% and 18.63% respectively and value of serum phosphorus reduced by 43.51%. No side effect of therapy was observed. Further, experimental and clinical study for longer duration on large number of patients in appropriate form is required to establish the bone forming properties of śatāvarī cūrṇa and kaparda bhasma.

KEY WORDS: *Asthi- kṣaya, kaparda bhasma, postmenopausal osteoporosis, śatavari cūrṇa*

INTRODUCTION

**CORRESPONDENT:
DR. VIBHA SOOD
M.D, SCHOLAR
DEPARTMENT OF BASIC
PRINCIPLES ,
NATIONAL INSTITUTE OF
AYURVEDA,
JAIPUR,
RAJASTHAN, INDIA.**

In present era where population is growing very fast, struggle to survive for basic needs have become very tough. People are neglecting their daily routine and dietary habits. So no wonder if life style disorders become very common now. Osteoporosis is one among them. It is a metabolic disorder. World health organization defines osteoporosis as a “progressive systemic skeletal disease characterized by low bone mass and micro architectural deterioration of bone tissue with a consequent increase in bone fragility and susceptibility to fracture”. Osteoporosis, the term is given by *Pommer* which means porous bones. Due to Osteoporosis bones become thin, weak and fragile and more likely to break. It is called silent disease because it can develop gradually over many years without causing any symptoms. Although the disease affects both sexes and all races to different degrees, women suffer from it a lot due to

their genetic phenomena. Since menopause is a transition period of hormone imbalances, women are at greater risk for osteoporosis at the onset of this period. A major cause behind it is that women’s bodies produce less oestrogen after menopause, and oestrogen hormone plays an important role in preventing bone loss. Hence, older women have a much higher rate of osteoporosis than younger women. Based on 2011 census, India has around 90 million elderly constituting 20 percent of the total population. Nearly two-thirds of the elderly report suffering from at least one chronic ailment, in which women have higher prevalence rates of chronic conditions than men. Osteoporotic fractures are a major cause of morbidity and mortality in the elderly.

In *Āyurveda*, old age is considered prone to *Vāta* related disorders. Many of them are related to bones. This is because of the unique relationship between *Vāta* and *Asthi*, called *Āsraya- Āsrayi Bhāva* (*A. Hṛ. Sū. 11/26-29*). In classics, the term osteoporosis has not mentioned as such, but similar clinical entity has been mentioned. After reviewing all the essential factors described in *saṁhitā*, *asthi kṣaya* may be taken into consideration in regard to osteoporosis.

As per the principle “*Samānaguṇābhyāso Hi Dhātūnām Vṛddhi Kāraṇam*” (*Ca. Sū.*

12/5), *dravyas*, which are *snigdha*, *śoṣāṇa* and *khara* in *guṇa* causes *vṛddhi* of *asthi* as *asthi* is *khara* in nature. *Guṇa* of *Śatāvarī* and *Kaparda Bhasma* are found very similar to the *guṇa* of *asthi dhātu*. This disease falls under *jarāvasthā*. *Jarā* is classified under *svabhāvaja vyādhi* which becomes *yāpya* by *rasāyana* treatment [Su. Sū.1/25(4)]. *Śatāvarī* is a well-known female rejuvenative. Its beneficial effect on women during fertile i.e. reproductive life is well established. *Kaparda bhasma* is natural rich source of calcium and has similar *guṇa* to *asthi*.

AIMS AND OBJECTIVES

The present research work was planned with following aims and objectives:

- 1) To explore the *asthi-kṣaya*, its clinical consequences and comparative symptomatology of *asthi-kṣaya* and postmenopausal osteoporosis.
- 2) To assess the scope of *Āyurvedic* fundamental principles in treatment of postmenopausal osteoporosis.
- 3) To evaluate safety and efficacy of *kalpita yoga* prepared by *śatāvarī* and *kaparda bhasma* in *asthi-kṣaya* with special reference to postmenopausal osteoporosis.

MATERIALS AND METHODS

Selection of Patients:

A total of 30 patients were selected for the present study from the Out Patient Department and In Patient Department of National Institute of Ayurveda, Jaipur, Rajasthan, India irrespective of their caste and religion using randomized comparative clinical study.

Inclusion Criteria

- 1) Women of age group 40 to 60 years (perimenopausal and postmenopausal age group).
- 2) Presenting one or more risk factors for developing osteoporosis.
- 3) Patient having classical subjective symptom of *asthi kṣaya*.

Exclusion Criteria:

- 1) Patients below 40 and above 60 years of age.
- 2) Hyperparathyroidism.
- 3) Patient having chronic diseases.
- 4) Patient suffering from any life threatening diseases

Ethical Approval

The research protocol was approved by the "Institutional Ethical Committee" N.I.A. Jaipur, Rajasthan, India. (Ethical Clearance No F10 (5)/ EC/ 2014/ 7225)

Trial Groups

In the present clinical study a total number of 30 patients were randomly divided into two groups. Among them, in group A 15 patients were administered *Kalpita yoga* made up from 1g. of *Kaparda Bhasma*

along with 3 gm of Śatavarī Cūrṇa, twice daily with warm milk. In group B 15 patients were administered single drug Kaparda Bhasma 1g. twice daily with warm milk.

Duration of trial and Follow Ups:

Duration of treatment was sixty days. Patients were instructed to visit the OPD for follow up in each 15 days. Data were collected on first day and sixtieth day only. In whole study none of the patient dropped out.

Preparation of drug:

In present study, drug śatāvarī cūrṇa was prepared by from its roots in the pharmacy of NIA, Jaipur by using pulverizing method. The drug Kaparda Bhasma was prepared in pharmacy of NIA, Jaipur as per classical method. Śodhana was performed by boiling kapardikā shells in kañjī for 3 hours by using dolā yantra. Then one puta was given with kumāri svarasa for māraṇa purpose. After that it was powdered and kept in water for whole day. Then it was left dried.

1. Pharmacodynamics of Śatāvarī Cūrṇa:

Latin Name: *Asparagus racemosus*

Rasa: madhura, tikta

Guna: guru, snigdha

Vīrya: śīta

Vipāka: madhura

Prabhava: Rasāyana

Doshaghnatā: Kaphavātaghna, pittahar

Karma: Śukrala, balya, hr̥dya, medhya, rasāyana, vṛṣya, stanyajanana, mutrala, chakṣuṣya, śūlahara, agnipuṣṭikara¹

Active Chemical Constituents of Śatāvarī Cūrṇa

1) **Steroidal saponins:-** Known as shatavarin I to IV. Shatavarin I is the major glycoside with 3 glucose and rhamnose moieties attached with sarsasapogenin. Shatavarin IV contains alkaloids, proteins, starch and tannin.

2) **Isoflavones**

3) **Asparagamine:-** A polycyclic alkaloid

4) **Racemosol:-** A cyclic hydrocarbon

5) Polysaccharide and mucilage present in roots.

Steroidal saponins are classified under Phytoestrogens.^{2,3,4}

2. Pharmacodynamics of Kaparda Bhasma:

Latin Name: *Cyprea moneta*

Rasa: Kaṭu, Tikta

Guna: Laghu, Rukṣa, Tikṣna

Vipaka: Kaṭu

Virya: Uṣṇa

Doshaghnata: Kaphavātaghna

Āyurvedic Properties:^{5,6}

Lekhana, śothahara, dīpana, pāchana, bhedana, grāhī, vṛṣya, netrya, rasāyana, śukrakara.

Chemical Composition:

The ash form of *Cyprea moneta* known as cowrie bhasma contains phosphate fluoride and carbonate of calcium, magnesium and manganese. It contains calcium phosphate, calcium carbonate, calcium fluoride, magnesium phosphate, manganese chloride and sodium chloride. The analysis of the *kapardikā bhasma* shows that the overall process of the formation of *kapardikā bhasma* involves decarbonation of calcium carbonate in agonite form and reformation of the calcium carbonate in the calcite form. This

transformation occurs via formation of calcium hydroxide and calcium oxide as the intermediates. *Kapardikā bhasma* is thus highly crystalline calcium carbonate in the calcite form with presence of trace elements like Mg, Al, K, Fe and Zn.⁷

Clinical Assessment Criteria:

1) General observations:

Various demographic parameters i.e. Age, educational status, socio- economic status etc. along with specific features of *daśavidha parīkṣā* and *aṣṭavidha parīkṣā* were evaluated in total patients.

2) Subjective assessment:

All the patients registered for clinical trial were evaluated as per the classical clinical manifestations of *asthi -kṣaya* with the help of scientific scoring pattern as recorded in research proforma. In addition to it symptoms of *vāta vṛddhi* that mentioned in classics, were also assessed without framing any grade system.

Scoring pattern for *Asthi- Kṣaya*:-

1. *Asthi Śūla* (Pain): Score

No pain	0
Mild pain after exaggerated by movement and subside by rest	1
Moderate degree of pain, not relieved by rest but not disturbing sleep or other routine activities	2
Severe degree of pain, disturbing sleep and other routine activities	3
Severe degree of pain, disturbing sleep and other routine activities and relieved by analgesic	4

2. Kaṭī Vedanā (Backache):

No backache	0
Occasionally and subsided by taking rest	1
Occasionally and relives by medicine	2
Occurs daily and subsides by rest	3
Dependent on pain killer	4

3. Danta-Nakha Bhaṅga (Splitting of Teeth and Nail):

No splitting	0
Splitting due to injury	1
Splitting due to mild hit	2
Splitting during routine work	3
Splitting without any injury/work	4

4. Raukṣya (Dryness of Skin):

No dryness	0
Dryness during winter disappears after applying moisturizer	1
Dryness during winter, but no longer effect of moisturizer	2
Dryness during winter, but no effect of moisturizer	3
Dryness during humid climate, no effect of moisturizer	4

5. Śrama (Fatigue):

No effect	0
Fatigue due to Exercises	1
Fatigue after walking, but not during routine work	2
Fatigue after routine work, subside after taking rest	3
Fatigue during rest	4

6. Keśa Patana (Falling of Hair All over Body):

No hair fall	0
Hair fall on washing	1
Hair fall on combing	2
Hair fall on simple stretching	3

3) Objective Assessment:

These investigations were carried out for the evaluation of Postmenopausal Osteoporosis:-

1. Serum Calcium
2. Serum Phosphorus
3. Routine Blood
4. Bone Mineral Density Test

Criteria for Assessment of Overall Effect of Therapy:

Data obtained from the subjective parameters of assessment, before and after therapy were utilized to evaluate the overall effect of therapy:

- Complete Improvement 76% to 100% relief
- Moderate improvement 51 to 75% relief
- Mild improvement 26 to 50% relief
- No improvement < 25% relief

Interpretation of 'p' Value:

Insignificant result (NS) - $P > 0.05$

Significant result (S) - $P < 0.05$

Very significant (VS) $P < 0.01$

Highly significant (HS) $P < 0.001$

Extremely significant (ES) $P < 0.0001$

Observations and Results:

Presented study was carried out to study the *asthi- kṣaya*, its clinical outcomes and comparative symptomatology of *asthi- kṣaya* and postmenopausal osteoporosis. The clinical utility of principle “*Samānaguṇābhyāso Hi Dhātūnām Vṛddhi Kāraṇam*” was also considered in treatment of postmenopausal osteoporosis. The study of *asthi- kṣaya* was conducted in women of perimenopausal and postmenopausal age groups.

Majority of the patients i.e. 43.33% belonged to the age group of 40-45 years. Education wise only 10% patients were found illiterate. Rest were literate. Habitat wise 63.33% patients were from urban area. 60% patients were found from middle class.

53.33% patients were found of postmenopausal age group. In 46.66% patients duration of menopause was found less than 2 years. Menopausal age was found maximum between 40 to 45 years in 40% of patients. Age at menarche was between 11 to 14 years in 70% patients.

70% patients had scanty menses and 2-3 months interval between two cycles was found in 53.33 % of patients. 90% patients were found multipara.

Majority of patients were addicted to tea i.e. 93.33%. Most of the patients i.e. 60%

EFFICACY OF ŚATĀVARĪ CŪRṅA AND KĀPARDA BHASMA IN MANAGEMENT OF POSTMENOPAUSAL OSTEOPOROSIS

were vegetarian. In *vyāyāma* wise distribution, equal percentage of patients (40%) was found for *Avyāyāma* and *Alpa vyāyāma* each. In *koṣṭha* wise distribution maximum patients i.e. 43.33% were found of *krūra koṣṭha*. Maximum number of patients i.e. 50% were having *viṣama agni*. Maximum patients were of *Vāta-Pitta*

Prakṛti (50%). Majority of patients (76.66%) presented *avara sāra*. *Avara Samhanana* was observed in 70% of patients. *Vāta-pittaja nānī* was observed in 53.33% patients. *Sparśa* was measured *rūkṣa* in 53.33 % patients. *Pāṇdura drka* were observed in 70% of Patients.

Table No (1) Effect of Therapy on *Asthi- Kṣayātmaka Lakṣaṇa* in Group A

<i>Asthi-Kṣayātmaka Lakṣaṇa</i>	Mean		Mean Diff.	Relief %	SD	SEM	P Value	Sig.
	BT	AT						
<i>Śūla</i>	1.73	0.40	1.33	76.92	0.8997	0.2323	0.0002	HS
<i>Kaṭi Vedanā</i>	1.36	0.79	0.53	39.30	0.5164	0.1333	0.0078	VS
<i>Danta-Nakha Bhagna</i>	0.00	0.00	0.00	-----	0.0000	0.0000	----	--
<i>Raukṣya</i>	1.07	0.67	0.40	37.50	0.6325	0.1633	0.0625	NS
<i>Śrama</i>	2.00	0.47	1.53	76.67	0.9904	0.2557	0.0005	HS
<i>Keśa Patana</i>	1.67	0.27	1.40	84.00	1.1832	0.3055	0.0010	VS

Table No (2) Effect of Therapy on *Asthi- Kṣayātmaka Lakṣaṇa* in Group B

<i>Asthi-Kṣayātmaka Lakṣaṇa</i>	Mean		Mean Diff.	Relief %	SD	SEM	P Value	Sig.
	AT	BT						
<i>Śūla</i>	1.73	1.07	0.67	38.46	0.4880	0.1260	0.002	VS
<i>Kaṭi Vedanā</i>	1.33	0.93	0.40	30.00	0.6325	0.1633	0.0625	NS
<i>Danta-Nakha Bhagna</i>	0.53	0.20	0.33	62.50	0.6172	0.1594	0.125	NS
<i>Raukṣya</i>	0.80	0.73	0.07	8.33	0.2582	0.0667	>00.9999	NS
<i>Śrama</i>	1.86	1.36	0.47	25.13	0.6399	0.1652	0.0313	S
<i>Keśa Patana</i>	1.00	0.36	0.60	60.00	0.8281	0.2138	0.0313	S

**EFFICACY OF ŚATĀVARĪ CŪRṅA AND KAPARDA BHASMA IN MANAGEMENT OF
POSTMENOPAUSAL OSTEOPOROSIS**

Table No (3) Comparative Effect

Group A Vs Group B	Group A	Group B	P Value	Sig
<i>Śūla</i>	1.33	0.67	0.0329	S
<i>Kaṭi Vedana</i>	0.53	0.40	0.4621	NS
<i>Danta-Nakha Bhagna</i>	0.00	0.33	0.0996	NS
<i>Raukṣya</i>	0.40	0.07	0.1443	NS
<i>Śrama</i>	1.53	0.47	0.0037	S
<i>Keśa Patana</i>	1.40	0.60	0.0428	S

Table No (4) Total Effect of Therapy

Overall Assessment	Group A	Group B
No Relief	22.58	42.86
Mild Relief	20.97	33.93
Moderate Relief	1.61	3.57
Complete Relief	54.84	19.64

Table No (5) Effect of Therapy on Objective Parameters in Group A

Group A	Mean		Mean Diff.	%	SD	SEM	T Value	P Value	Sig.
	BT	AT							
S. Calcium	8.19	9.72	-1.53	-18.63	1.72	0.443	-0.290	0.0003	HS
S. Phosphorus	4.83	2.73	2.10	43.51	1.45	0.374	0.178	0.0008	HS
B.M.D	-3.96	-1.99	-1.97	49.83	0.84	0.217	-0.110	<0.0001	ES

Table No (6) Effect of Therapy on Objective Parameters in Group B

Group B	Mean		Mean Diff.	%	SD	SEM	T Value	P Value	Sig.
	BT	AT							
S. Calcium	8.75	9.63	-0.88	-10.05	0.71	0.183	-0.208	0.0027	S
S. Phosphorus	3.88	3.05	0.83	21.48	0.68	0.176	0.211	0.0016	S
B.M.D.	-3.24	-2.25	-0.99	30.66	0.88	0.228	-0.230	0.0062	S

Table No (7) Results of Comparative Effect on Levels of Bone Markers

Between Group A And Group B

Group A Vs Group B	Group A	Group B	P Value	Sig
S. Calcium	-1.53	-0.88	0.0201	S
S. Phosphorus	2.10	0.83	0.0072	S
B.M.D.	-1.97	-0.99	0.0015	S

RESULTS

Effect of Therapy on *Asthi- Kṣayātmaka Lakṣaṇa*:

Group A: Combination of *śatāvarī cūrṇa* and *kaparda bhasma* showed highly significant results ($P < 0.001$) on *asthi śūla* and *śrama*. In *kaṭivedanā* and *keśa patana* very significant results ($P < 0.01$) were seen. In *rauḥsya* results were found non-significant.

Group B: In group B very significant results ($P < 0.01$) were observed in *asthi śūla*. In *keśa patana* and *śrama* results were significant ($P < 0.05$).

Comparative Effect:

Comparison between both groups on *asthi-kṣayātmaka lakṣaṇa* indicates that combination of both drugs worked better on most of the symptoms than group B.

Total Effect of Therapy:

In present study four categories were divided to assess the relief in patients. After therapy it was concluded that in group 'A' 54.84% patients showed more than 75% relief or complete relief in their symptoms. Moderate relief was observed in 1.61% patients. Mild relief was found in 20.97% patients. 22.58% of patients did not respond to therapy or less than 25% relief in their symptoms.

In group B 19.64% patients showed complete relief (75%), 3.57% patients showed moderate relief, mild relief was seen in 33.93% patients.

Effect of therapy on Objective Parameters in Group A:

In group A combination of *śatāvarī cūrṇa* and *kaparda bhasma* revealed extremely significant result on bone mineral density ($P < 0.0001$). Highly significant results

were found on bone markers S. Calcium and S. Phosphorus ($P < 0.001$). Significant results were found on Hb% ($P < 0.01$). It shows that combination of *śatāvarī cūrṇa* and *kaparda bhasma* is very effective to improve bone markers ratio in body. Śatāvarī enhances bone formation as well as decreases bone resorption. Śatāvarī acts on both ways and balances bone remodelling and bone resorption. Hence can prevent bone loss and help in increasing bone mass.

Effect of therapy on Objective Parameters in Group B:

In group 'A' *kaparda bhasma* exhibited significant result ($P < 0.01$) on bone markers like BMD, S. Calcium and S. Phosphorus. Rest objective parameters were found non-significant. It shows that *kaparda bhasma* itself has a good impact to improve the bone markers values. On Hb% no significant result was found.

Results of Comparative Effect on Levels of Bone Markers in Group A and Group B:

Significant changes were noticed in the levels of S. Calcium, S. Phosphorus and BMD in group A when compared to group B. It shows that efficacy of combined drugs is more than only single drug *kaparda bhasma*.

Efficacy of drugs:

In present study two drugs *śatāvarī cūrṇa* and *kaparda bhasma* were selected to evaluate their efficacy on *asthi- kṣaya* in postmenopausal women. Both drugs in combination showed better results. In another group *kaparda bhasma* itself showed considerable outcome.

1) Śatāvarī:

Efficacy of *śatāvarī* is based on its *pañcamahābhūta* composition which can be discussed under its *guṇa, rasa, vipāka, karma* and *prabhāva*.

i) Guṇa:

Śatāvarī has *guru* and *snigdha guṇa*. *Guru guṇa* is found in *dravya* dominant in *pārthiva mahābhūta*. Ācārya Caraka has described the characteristics of *pārthiva dravya* that substances that are *guru* (heavy), *khara* (tough), *kaṭhina* (hard), *manda* (dull), *sthira* (stable), *viśada* (non-slimy), *Sāndra* (dense), *sthūla* (gross) and *gandha yukta* (abounding the quality of smell) are dominated by *prthvī*. They promote *upacaya, saṁghāta, gourava* and *sthairya* in body (*Ca. Sū.26/11*). Hence it is clear that these all characteristics are similar to *asthi dhātu* and can be helpful its quantity in body. *Snigdha guṇa* is told contrary to *rukṣa guṇa* of *vāyu*.

ii) Rasa:

In the aspect of *rasa* it has *madhura* and *tikta rasa*. *madhura rasa* is composed of *pr̥thvī* and *jala mahābhūta*. It is mentioned as *sarvadhātuvṛddhikara, balya* and *sthairyakara, kṣīṇa-kṣata-sandhānkara*. *Tikta rasa* is composed of *vāyu* and *ākāśa mahābhūta* which are contrary to *asthi dhātu*. But it has *khara guṇa* and *śoṣaṇa karma* which help to promote *asthi* in body. (A.Hr. Sū.11/31)

iii) Vīrya: Śīta

iv) Vipāka: Its *vipāka* is told *madhura*.

v) Doṣaghnaṭā: *Pittahar, kapha-vātaghna*

vi) Prabhāva:

It is placed under *rasāyana*. *Rasāyana* are told helpful to promote all *dhātus* in body (Ca. Ci. 1/1/5-7). This is achieved by improving digestion and metabolism, leading to enriched nutritional status at the level of *dhātus*. *Rasāyana* increases endurance and sustaining capacity of individuals by promoting *deha bala*.

These all properties of *Rasāyana* herbs delays aging phenomena. Hence, *śatāvarī* promotes *asthi Poṣaṇa* and prevents *asthi kṣaya* in old age by counteracting the vitiation of *vāta*. Inhibiting the tissue depletion (*dhātukṣaya*), maintaining the qualities of tissues (*Prasasta dhātus*),

enhancing the strength (*bala*) and promoting digestion and metabolism. (*Jāṭharāgni* and *dhātvāgni*)

2) Kapardikā bhasma:

Kapardikā is a shell of marine animal *cypraea moneta*. The ash form of it contains highly crystalline calcium carbonate with other trace elements. It is very similar to *asthi dhātu* of human. Its *ras pañcaka* is given below:

i) Rasa: *kaṭu*

ii) Guṇa: *rukṣa, tīkṣṇa*

iii) Vipāka: *kaṭu*

iv) Vīrya: *uṣṇa*

v) Prabhāva: *vṛṣya, rasāyana*

vi) Doṣaghnaṭā: *kapha-vātaghna*

Rukṣa guṇa is composed of *pr̥thvī* and *anil mahābhūta*. *Tīkṣṇatva* is due to presence of *agni mahābhūta*. Hence *kapardikā bhasma* is *pr̥thvī, anil* and *teja mahābhūta pradhāna* drug. Same these characteristics are found in *asthi dhātu*. So it can be considered under *guṇa sāmānya*. Because of this analogy between *asthi* and *kapardikā bhasma*, it was found effective in relieving symptoms of *asthi- kṣaya* and to some extent on *vātavṛddhi* symptoms.

And when it was used with *śatāvarī*, the results were found highly significant.

DISCUSSION

43.33% patients were found the age group between 40 to 45 years. This observation indicates that *prauḍhāvasthā* is the stage of beginning of *dhātu- kṣaya*.

Educational status wise observation showed mixed results. The study was projected in urban area so most of patients were found literate. Lack of awareness about calcium rich diet and exercise may be the probable reason behind that. Habitat wise 63.33% patients were found urban, 10% were from slum area. In urban area irregular life style, tendency of eating readymade food can be a probable cause of prevailing disease.

53.33% patients were postmenopausal. Lack of bone mass is commonly found after menopause. In most of patients duration of menopause was found less than two years. Also menopausal age was found between 40 to 45 years in 40% of patients. The reason behind it is that the rate of bone loss during the first few years is maximum. Early menopause creates much fall in bone density. In 70% patients, age of menarche was found between 11 to 14 years. Women with late onset of menarche have been reported to have significantly reduced peak bone mass and increased fracture risk in prior studies. Here this could not be found. It may be due to

women having early menarche are found ending in early menopause. Delayed menses (in 2 to 3 months) were found in 53.33% patients. Scanty menses were observed in 70% patients. Its occurrence for only 1 to 3 days was found in 60% patients. Lack of oestrogen secretion is responsible for all these factors.

Majority of the patients were observed multipara. Multiparity cannot be established as a risk factor. **It may be because pregnancy has a protective effect on BMD** (compensatory mechanism in intestine increases the absorption of calcium from gut). More over nutritional intake is higher in pregnant women than other women. In these patients late weaning might be affected bone density due to loss of calcium through milk.

Most of patients were found habitual to tea more than 2 times a day. Addiction has an adverse effect on body in the form of increase excretion of calcium through urine. In total registered patients 60% patients were vegetarian. Vegetarian diet has positive effect on BMD if it is high in protein. Here in vegetarian patients quality of food might not be rich in protein. Most of registered patients were having sedentary life style. Bone strength is increased by *vyāyāma*. *Vyāyāma* is

responsible for positive changes on mechanical environment of bone.

Koṣṭha: Most of patients were found of *krūra koṣṭha*. With increasing age, aggravation of *vāta* was the possible reason behind that.

Agni: *Viṣama agni* is found in 50% of patients. *Vāta prakopa* is responsible for it.

Śārīrīka Prakṛti: Maximum number of patients were of *Vāta-Pitta Prakṛti* i.e. 50%. Dominant *vāta* is responsible for *asthi-kṣaya*. *Pitta* was found in combination due to *prauḍhāvasthā*.

Sāra: Among *daśavidha parīkṣya bhāva*, *sāra parīkṣā* showed that most of the patients had *avara sāra*. *Sāra* shows *pramāṇa* of *bala*. *Avara sāra* shows decrease of *bala* in patients.

Samhanana: *Avara Samhanana* was seen in 70% of patients. *Avara Samhanana* shows improper or lack of distribution of *asthi dhātu*.

Nānī: *Vāta-pittaja nānī* was observed in 53.33% patients. This shows the state of *doṣa* in body which were favourable for occurrence of disease.

Sparśa: *Sparśa* was felt *rūkṣa* in 53.33% patients. This showed the excess of *vāyu* in body.

Dr̥ka Parīkṣā: Pallor in eyes was seen in 70% patients. It indicated that most of patients were suffering from anemia. Iron deficiency induces bone resorption which leads to osteoporosis.

Ākṛti Parīkṣā: *Kṛṣa ākṛti* (lean and thin body) is considered as a risk factor for developing osteoporosis which was found in 16.66% of patients. In remaining patients, 50% patients were of *madhyama ākṛti* and 33.33% patients were found of *sthūla ākṛti*.

Asthi- Kṣayātmaka Lakṣaṇa:

Among total registered patients *sūla* was observed in 96.66% patients, *kaṭi vedanā* was found in 76.66% patients, *dant- nakha bhaṅga* was observed in 13.33% patients, *rauḥya* was presented in 50% of patients, *śrama* was found in 90% patients and *keśa patana* was observed in 70% of patients.

Asthi toda and *kaṭiśūla* are early symptoms of bone loss. They arise because of *Racanātmaka Vikṛti* in *asthi dhatu*. Later because of excess *asthi dhātu kṣaya*, along with *kṣaya* of other *dhātu*, symptoms of *balakṣaya* – extreme fatigue arise. Falling of hair indicates that mala of *asthi dhātu* are also affected because of poor formation of *asthi dhātu*.

Biochemical Bone Markers:

In 36.66% of patients level of Serum Calcium was observed below the normal range. Serum Phosphorus level was noticed more than normal limit in 20% of

patients. Bone Mineral Density was found under osteoporotic range in all registered patients.

Efficacy of Drug from Modern Point of View

Phytoestrogens are naturally occurring compounds which are weak estrogenic in nature and are adaptogenic. Phytoestrogens acts like SERMS's— Selective Estrogenic Receptor Modulators with desirable properties of being anti estrogenic on breast and uterine tissue and being post estrogenic on bone and brain and lipid metabolism. This ideal set of

properties confers protection against cardiac diseases, osteoporosis and Alzheimer's disease without increasing the risk of hormone dependent cancers like breast and uterine cancer.

Phytoestrogens stimulate osteoblastosis and suppress osteoclastosis and thus help in preventing bone loss.

CONCLUSION

Asthi kṣaya is mentioned in 18 types of *kṣaya* by *Ācārya Caraka*. Occurrence of *asthi kṣaya* in perimenopausal and postmenopausal women can be termed as *Rajaonivṛttijanya Asthi- Kṣaya*. During postmenopausal stage provoked *vāta* results in *asthi- kṣaya*. *Śatāvarī* has the *kapha* dominant properties (*pṛthvi + jala*) which help in stimulating binding capacity of *asthi dhātu* (due to *śliṣa āliṅgana guṇa*

dharmā of *kapha*). *Varātikā* is a rich source of calcium and by *dravya sāmānya* and *guṇa sāmānya guṇa dharmā* it enhances *asthi dhātu*. So the combined effect of *kapardikā bhasma* (by *sāmānya vṛddhi karma*) and *śatāvarī (śliṣa āliṅgana)* was found more enthusiastic. Thus for better results in this disease the drugs should be used in combined form.

REFERENCES

1. API, e-book, Vol-4, P. 122-123.
2. Dahanukar S.A., Date S. G., Karandikar S. M., Cytoprotective effect of *Terminalia chebula* and

Asparagus racemosus on gastric mucosa. Indian Drugs 1983; 21: 442-445.

3. Singh K.P., Singh R. H., Clinical trial on Satavari (Asparagus racemosus Willd.) in duodenal ulcer disease. J. Res. Ay. Sid. 1986; 7:91-100.
4. H.A.Oketch-Rabah, Phytochemical Constituents of the Genus *Asparagus* and their biological activities. Hamdard; 1998, 41: 33-43.
5. Sharma Acharya P.V., *Dravyaguṇavijñāna*, Choukhamba Bharat Academy, Varanasi, Reprint Edit. 2013; Vol-3, p.61.
6. Joshi Damodar. Ras Sastra. Chaukhamba Orientalia, Varanasi. 2006; p. 240.
7. Mishra Siddhinandan. *Ānanand Kand*. Chaukhamba Orientalia, Varanasi, 2007; p. 252, 330-331.

