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Review Of Untoward Effects Of Impure And Malprocessed *Bhasma* And Their Management

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ABSTRACT: *Rasashastra* plays an important role in *Ayurveda*. It's a pharmaceutical branch of indian system of medicine. It deals mainly with various metals, minerals, mercury, animal products and other substances. In this text different types of *shodhana* and *marana* process are described for *rasa*, *maharasa*, *uprasa*, *sadharana rasa*, *ratna*, *dhatu*, *upratnas* etc. *Bhasma* is prepared by the *marana* process and it helps in easy absorption and assimilation due to micro fine element particles and does not produce any side effects in the human body, incinerated dravya will eradicate jara(old age), and diseases. Hence *bhasma pareeksha* like *rekhapurana*, *apunarbhava*, *nirutha* etc are also described in this text. Due to increase demand of *rasaushadhis* and commercialization, pharmaceutical companies are compromising with quality and standard of *bhasma* to prepare them in a short span of time, because processing of *bhasma* involves heavy labour and lot of tedious procedures like *shodhana*, *mardana*(*bhawana*), *marana*. If the *shodhana* process of metals and minerals is not done properly, then it acts as poison and reveals different types of complications in the human body like *jwara*, *bhrama*, *vamana*, *kushtha*, *shool*, *mrityu* etc. So in this article I described comparative analysis of heavy metal poisoning and its treatment. Comparative analysis of heavy metal poisoning and its treatment are mentioned in this article.

Keywords:- *Ashuddha*, *Apakwa*, *Bhasmadosha*, *Chikitsa*

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INTRODUCTION:

Ayurveda is one of the best ways to treat diseases and lead a healthy lifestyle in ancient india. *Ayurvedic* formulations are divided into two groups:-*Kashthaushdhi* and *Rasaushadhi*. *Rasaushadhi* are important formulations in *ayurvedic* therapeutics due to lesser quantity of dose, quicker action, palatability, and more shelf life. *Bhasmas* are unique preparations made by metals and minerals with the help of *bhavana* procedure and *puta*. *Shodhana* and *Marana* processes play a vital role in the *bhasmas* preparation. *Marana* process divided into 3 stages: *purva karma*, *pradhan karma*, *paschat karma*. In *purva karma* included *shodhana*, *bhavana*, *chakrikakarana*, *samputikarana* and other *pradhan karma* included *puta* and *paschat karma* included *bhasma pareeksha* like *rekhapurna*, *varitara*, *niruttha*,

apunarbhava, *uttama*. To the contrary, *ashodhita* and *apakwabhasmas* revealed different types of complications in the human body like *jwara*, *bhrama*, *vamana*, *kushtha*, etc. So the treatment of above such conditions is done by specific medicament and various types of antidotes and *shamanopayachikitsa*.

MATERIAL AND METHODS

our ancestors of Rasashastra quoted the number of herbomineral formulations for the treatment of *sadhya* and *asadhya* diseases. They were used them after proper processing including purification, trituration and incineration because they knew very well that Consumption of metal in its raw form or impure form causes harmful effects in living organisms.

Therefore in our classics mentioned different doshas produced after intake of ashuddha and apakva bhasma as well

as their management also but these are found in scattered form so a table is prepared for combining them.

Table – 1- Showing untoward effects of ashuddha apakwabhasma and their management

<i>BhasmaSevana</i>	<i>AshuddhaBhasmaJanya Vikara^{3,4}</i>	<i>ApakwaBhasmaJanya Vikara^{3,4}</i>	<i>Management^{3,4}</i>
<i>Parada</i>	<i>Visha-Maran</i> <i>Vanhi-Santap</i> <i>Mala-Murcha</i> <i>Nag-Jadyata</i> <i>Vanga-Aadhman¹</i> <i>Chapalya-Beejnasha</i> <i>Garal-Mrityu</i> <i>Giri-Sphota</i> <i>Asahyagni-Moha²</i>	<i>Murcha, shok,</i> <i>bhram,</i> <i>chardi,moha,</i> <i>jwar, hikka,</i> <i>vepathu,</i> <i>kampa, shool,</i> <i>nidra,</i> <i>aalasya,</i> <i>aruchi,</i> <i>lingstambh,</i> <i>atisar, kasa,</i>	<i>1.Ghee</i> <i>+Milk+ShodhitaGan</i> <i>dhaka with</i> <i>nagvalliswarasa for 2</i> <i>to 4 days</i> <i>2.Sajjikshar, karela</i> <i>juice, gomutra,</i> <i>saindhav pan with</i> <i>kanji</i> <i>3.Kakarashtak sevan</i> <i>4.Sauvarchal</i> <i>namak+shunthi and</i> <i>Saindhav+nimbuswa</i> <i>rasa pan</i> <i>5.Sharpunkha or</i> <i>devdali or kakmachi</i> <i>or patolbeej any one</i>

			<p>drug swarasa/kwatha for 1 week</p> <p>6. Shudha gandhak- 1/2 tola with cow ghee and 500ml cow milk and sugar drinking for 7 days⁷</p>
Abhraka	<p>Pinakabhrak- malbaddhata</p> <p>Nag abhrak- mandalkushtha</p> <p>Mandukaabhrak- ashmari¹</p> <p>Dardurabhrak- mrityu</p> <p>vata-kaphakarak, mandagni, krimikarak⁶</p> <p>kushtha, kshaya, pandu, shotha, hridroga, hridyashool, parshvashool, mandagni, aayukshaya⁸ guru, vatakapha nashak⁷</p>	<p>Chandrikayuk tabhasma se mrityu¹</p> <p>Udararoga(V yaghrarom vat)^{3,7}</p>	<p>Atsibeej(umaphala) rub with water and drinking for 3 days^{1,3,7}</p>
Vaikranta	<p>Kilas, kushtha, daah, pandu, parshvashul^{7,8}</p>		<p>Kulathakwatha use</p> <p>Vajrasamchikitsa</p>
Makshika	<p>Mandagni, balahani, kossthava ddhata, halimaka, netraroga, kushtha, gandmala, kshya, krimiroga, vrana, gatra ruja^{4,2}</p>	<p>Different types of kushtha and roga³, mrityu⁷</p>	<p>Meshshringiswaras a+madhu for 3 days</p>

			<i>Kulathakwatha or Dadimtwakkwatha for drinking^{4,3,7}</i>
Vimala		<i>Different types of vikara</i>	<i>Meshsshringichurna + sharkara for 3 days^{7,3}</i>
Shilajatu	<i>Shopha, loss of appetite, daah, murcha, vivandh, bhram, raktstrav, raktapitta³</i>		<i>Marichachurna with ghritha for 7 days^{4,3,7}</i>
Sasyaka	<i>Ativamaka, vaman, bhrama⁷</i>		<i>Jambiranimbuswarasa and dhaanlajmanda drinking for 3 days^{4,3,7}</i>
Rasaka	<i>Vamana, bhrama^{7,8}</i>		<i>5-5 tola gomutra/ week⁷</i>
Gandhaka	<i>Kushtha, bhrama, pittaruja, rup, sukha, virya, balanash, santap^{4,8}</i>		<i>100 gm cow ghee and mishri add in 1 litre milk for 2 week^{4,7}</i>
Kasisa		<i>Always use niramla bhasma, otherwise due to taste of amlata, tikshnata and kashayatvava</i>	<i>Sasyakasam chikitsa</i>

		<i>makadosha generate</i>	
Haritala	<i>Ayunash, mrityu, kapharoga, vataroga, sharer santap, jwara, daah, sphot, snayu sankoch⁴</i> <i>Tatkaldehnasha, kushtha, pangutwa, vatapitta roga^{3,7,1}</i>	<i>Angsankochpi da, kaphvatajaroga, kushtha</i>	<i>Sharkara +jeerachurna/madhu³+kushmanda swarasa each 50 gm and take T.D.S for 3 days^{4,7}</i>
Manahshila	<i>Ashmari, mutrakricha, mandagni, malbandha, mutraroga, sharirsundarta nasht⁴</i> <i>Krimiroga, sharkara roga^{3,1,7}</i>		<i>250 gm madhu add in ½ lit. cow milk and drinking for 3 days^{4,3,7}</i>
Kankushtha (kashthaaushdhi no bhasma)	<i>Atiatisaar, dehydration</i>		<i>Jeera, suhaga, chini add in babul multwakkwathafor drinking^{1,7}</i>
Kampillaka	<i>Atirechaka</i>		<i>Cow Ghee and coconut oil</i>
Gauripashana	<i>Mrityu when use the dose of this more than 1 ratti⁷</i>		<i>Jauaata with madhu</i> <i>Ghritapan</i> <i>Andekijardi+ ghritapan</i> <i>Kalatil+makkhan+m ishri</i>

			<p><i>Suhaga+karelajuice</i> <i>+ghrita,mishri,milk</i></p> <p><i>Hydrade ferric oxide</i></p> <p><i>BAL</i></p> <p><i>Calaside magnesia</i></p> <p><i>Demer captal⁷</i></p>
Hingula	<p><i>Aandhya , ksheena, durbala,</i> <i>klam, bhrama, prameha roga^{4,8}</i></p> <p><i>Napunsakta, moha^{3,7}</i></p>		<p><i>Remedied in the same</i> <i>way as prescribed in</i> <i>the case of mercury³</i></p>
Swarana	<p><i>Different types of roga³</i></p>	<p><i>Balaviryannash</i> <i>and mrityu,</i> <i>asaukya^{4,7}</i></p>	<p><i>Haritaki+ sita- 3days</i></p> <p><i>Amlakichurna+mad</i> <i>hu- 3days³</i></p> <p><i>Marichachurna+</i> <i>ghrita</i></p>
Rajata	<p><i>Pandu, kandu, galgraha,</i> <i>malbandha, viryanash,</i> <i>balahani, santap, shiroruja³</i></p>	<p><i>Sharirsantap,</i> <i>vidvaddhata,</i> <i>shukranash,</i> <i>balaviryashar</i> <i>irpushtinash,</i> <i>maharoga⁷</i></p>	<p><i>Sharkara+ madhu for</i> <i>3 days³</i></p>
Tamra	<p><i>8 doshas</i></p> <p><i>Bhrama, murcha, vidah,</i> <i>sweda,kleda, vanti, aruchi,</i> <i>chitta santap⁷</i></p>	<p><i>Virechana,</i> <i>bhram, daah,</i> <i>moha, ubkai(5</i> <i>durdhardosha</i> <i>)</i></p>	<p><i>Munibrihi paste with</i> <i>water add mishri for</i> <i>drinking</i></p>

			<i>Add mishri in dhaniyakwatha drinking for 3 days^{3,7}</i>
Loha	<i>Guruta, jadyata, avsaad, hast pad daah, ashmari, sharir daurgandhya⁸</i>	<i>Hritpida, agnimandhya, maharoga, kushtha, napunsakta, hridroga, shool, ashmari, mrityu⁵</i>	<p>1. triturate the vidang with the juice of agastya patra and dry this mixture in the sunlight and then take it with the sufficient quantity of agastya patra swarasa in ashuddha lohajanya vikar.</p> <p>2. Aaragvadha majja for rechan karma in krimi dosha shanti..if Diarrhoea occurs then drink milk.</p> <p>3. Udarshool cured by</p> <p>a. using ginger and vidanga for 3 days with vidanga juice</p> <p>b.Elachurna+ khandgud or madhu⁵</p>

Vanga	<i>Kushtha, kilas, gulma, prameha, kshya, pandu, kaphajajwar, bhagandar, shukrashmari, raktavikar, hridroga, kasa, shwasa, arsha, vamana, vat rakta, shotha^{5,7}</i>	<i>Daah, ashmari, shotha, shwitra, apache, pandu, kshya, shool, bhagandar, kaphvata vikara, vidradhi, mutrakricha⁷</i>	<i>Meshshringichurna+ Mishri twice a day till 3 days^{5,3,7}</i>
Naga	<i>Kushtha, gulma, aruchi, kshaya, kapharoga, pandu, raktavikara, shool, bhagandara, ashmari^{3,7}</i>	<i>Prameha, kshya, kamla, sandhishuladi roga, pakshaghata, gulma, bhagandara, mrityu</i>	<i>Suwarna bhasma1/8 ratti+haritaki churna1 masha with shakkar for 3 days^{5,3,7}</i>
Yashada	<i>Shool, vivandha, aatop</i>	<i>Prameha, ajirna, vaman, bhrama, updansh⁵</i>	<i>Balachurna+haritaki churna+mishri for 3 days^{5,3,7}</i>
Pittal	<i>Different types of roga, bhrama, arsha, bhagandara, prameha⁷</i>	<i>Prananashak</i>	

<i>Vajra</i>	<i>Kushtha, parshvashool, pandu, shotha⁵</i>	<i>Gatraguruta, santap, jadyata</i>	<i>Cow's milk with sugar for 7 days Honey and clarified butter⁵</i>
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Modern view of heavy metal poisoning and their management:-

Heavy metal poisoning means accumulation of the metals in the human body. Symptoms of these metals vary according to the metals accumulated in the body tissues. small amounts of these metals like zinc, copper, chromium, lead are essential to the body function, but if they accumulate in more concentrations cause poisoning, and then serious damage may occur in the body. Heavy metal poisoning caused by the air or water pollution, foods, improperly coated food containers, medicines and industrial chemicals, ingestion of lead based paints etc.

Table 2- Showing heavy metal poisoning and their management according to modern-

Heavy metal	Symptoms^{8,9,10,11,12}	Diagnosis ^{8,9,10,11,12}	Treatment ^{8,9,10,11,12}
Mercury	<p>Anxiety, depression, irritability, tremors, memory problems, tremors</p> <p>In adult- hearing and speech difficulties, muscle weakness, vision changes, nerve loss in hand and face, brain and kidney damage</p> <p>In children and infants- delay in such conditions like cognition, fine motor skills, speech and</p>	<p>Diagnosed with a physical exam, lifestyle and dietary pattern, blood and urine test</p>	<p>1.Symptomatic treatment</p> <p>2.Chelation therapy</p> <p>3.Stop the intake of mercury exposure</p>

	language development, visual spatial awareness		4.Intake healthy and nutritional diet
Lead	<p>In newborn- born prematurely, lower birth weight</p> <p>In children- delay in development, irritability, loss of appetite, weight loss, learning difficulties, abdominal pain, vomiting, constipation, hearing loss, seizures</p> <p>In adults- high B.P, joint and muscle pain, headache, mood disorder, reduced sperm count, miscarriage, difficulty in concentration, fanconi syndrome</p>	Blood test, elevation of free erthrocytic protoporphyrin,	<ol style="list-style-type: none"> 1.Remove the source of the contamination 2.Chelation therapy 3.EDTA chelation therapy 4.Maintain nutrient sufficiency 5.Symptomatic treatment
Chromium	Lung cancer, respiratory irritation, pulmonary congestion and edema, nausea vomiting, liver and kidney damage, diarrhea, skin irritation	CBC, Blood urea nitrogen test(BUN) test, LFT, urine analysis, chest radiography and pulmonary function test	<ol style="list-style-type: none"> 1.Symptomatic treatment 2.Removal from the toxic source of exposure 3. Flushing of the eyes with water acco. to symptoms 4.Intake fluids and electrolytes

			<p>5.If the lungs are damaged then provided breathing assistance</p> <p>6.For cancer-surgical and radiation therapy</p>
Zinc	<p>Nausea, vomiting, pain, cramps, diarrhea, flu like symptoms, low HDL level, copper deficiency, frequently infections, Hypogeusia(tastelessness), jaundice, seizures</p>	<p>By instrumental method like XRF, ICP-AES, Mass spectroscopy, blood and urine test</p>	<p>Suggest to drink milk</p> <p>In severe condition chelating agent use</p> <p>Symptomatic treatment</p> <p>Removal from the toxic source of exposure</p>
Cadmium	<p>Fatigue, headache, nausea, vomiting, abdominal cramps, fever, emphysema, pulmonary edema, dyspnea, anaemia, cyanosis, renal tubular dysfunction, protienuria, osteomalacia</p>	<p>Chest x-ray, measurement of oxygen saturation, blood test, RFT and LFT, BUN test, serum creatinine</p>	<p>1.Plasma exchange-hemodialysis-plasmapheresis,</p> <p>2.Dimercaprol, BAL,</p>

			3.Chelating agent
Gold	Dermatitis, nephritis, vasculitis, lymphadenopathy, pruritis or itching, proteineuria, low BP, nausea, chrysiasis(skin color blue-grey), hepatitis, mouth sores, bone marrow depression, jaundice	Physical examination, MRI, CT(Computed tomography), tissue biopsy	1.Symptomatic treatment 2. Stop the intake of gold 3. BAL
Silver	Liver and kidney damage, irritation of the eyes, skin, respiratory d intestinal tract, changes in blood cells		
Copper	Vomiting, hematemesis, hypotension, melina, coma, jaundice, gastrointestinal distress, liver and kidney damage, metal fume disease, disturbance of blood	Blood test, urine test, hair test, nail test	1.Penicillamine drug of choice 2.Dimercaprol 3.Chelating agent 4.Symptomatic treatment 5.Removal from the toxic source of exposure
Iron	Nausea, abdominal pain, vomiting, dehydration, melina, low BP, headache, dyspnea,	Blood test, CBC, X-RAY	1.Cleaning the iron from blood

	jaundice, seizures, grayish and bluish color of the skin		<p>2. Use chelating agent such as deferoxamine</p> <p>3. Symptomatic treatment</p> <p>4. Removal from the toxic source of exposure</p>
Arsenic	Headache, drowsiness, seizures, life threatening complications, encephalopathy, hemorrhages, loss of myelin, skin probe like mee's line in nails, edema, gastroenteritis, fever, diarrhea, vomiting, hemolysis, anemia, hypotension, and garlic like odor on the breath, hyperkeratosis, hyper pigmentation, exfoliative dermatitis, cardiomyopathy, polyneuritis, renal tubular acidosis	Detect of increased arsenic level in hair, nail, urine, abdominal x-ray, LFT	<p>1. Remove the source of contamination</p> <p>2. Stomach wash with the help of milk and warm water</p> <p>3. For Gastric lavage use 1% sodium thiosulphate in water</p> <p>4. Ghee and barley water use</p> <p>5. Purgatives like castor oil and magnesium sulphate use</p>

			6.Chelation therapy 7.Using mineral supplements 8.Blood transfusion
Cobalt	Nausea, vomiting, anorexia, tinnitus, nerve damage, respiratory diseases, goiter	Blood and urine test, x-rays, ECG	1.Symptomatic treatment 2.Removal from the toxic source of exposure
Tin	GIT symptoms, headaches, irritability, psychomotor disturbances including coma, tremor, hallucinations, convulsions, renal, neurological and symptoms		1.Symptomatic treatment 2.Removal from the toxic source of exposure

DISCUSSION

Many types of formulations are described in *ayurveda* like herbal, mineral, herbomineral. *Rasaushadhi* are best prepared medicine which are come to force from 8th century. *Bhasma* is a unique preparation because of easy absorption, assimilation, tastelessness, less dose etc. properties. When the metallic *bhasma* are

well prepared according to their standard method which are mentioned in classical text, then these prepared *bhasma* use for therapeutic purposes. If they are not prepared properly then they may produce harmful effect on the body like *jwara*, *pandu*, *kushtha*, *shool*, *vamana*, *bhrama*. To control the harmful effect of

the *bhasmas* some important antidotes/*prativisha* are described in classical text. Different types of antidotes are mentioned in our text like milk, *haridra*, *tankana*, honey etc. In this text we can see different types of antidotes are mentioned for the *ashuddha* and *apakwabhasmajanya dosha*, *Haritala bhasma* we use *kushmanda swarasa* and *sharkara*, *Gandhaka shodhana* use milk and ghee, *Rajatabhasma* use *sharkara* and *madhu*, *Swarnabhasma* use *madhu* and *amlaki churna* etc, these antidotes are eradicates the toxic symptoms of *ashuddha-apakwabhasma* by inhibit the accumulation and increase excretion. For example we use cow ghee in the Sulphur toxicity because it contains saturated fats and has a good source of CLA (conjugated linoleic acid). CLA is a natural fatty acid that has anti-cancer and anti-oxidant properties that helps in digestion (by stimulating the secretion of stomach acid), immune systems etc. cow ghee helps in the balance of *vata*, *pitta*, *kapha*. In the treatment of *Makshika* toxicity use the *madhu* and *meshashringi*, because *madhu* has antibacterial, antiseptic properties so it helps in wound healing. *Meshashringi* has hepatic stimulation property therefore it increases digestive fire (*Deepana karma*)⁹,

so it cures diseases like *mandagni*, *koshthabadhata*. In *Shilajita* toxicity use the *maricha*, because of its antioxidant, anti-inflammatory property and its aid to detoxification. It has hepatic stimulant and also has *deepana* and *pachana* properties because of its *teekshna guna*, so it helps in *aruchi* and *vivandha*. Because of its thermogenic effect it metabolises food. For example Mercury ions produce toxic effects by enzyme inhibition, protein precipitation, and corrosive action. Mercuric salt form (Hg¹⁺) is found in inorganic mercury which is highly toxic and corrosive. It is accessed in the body by orally and dermally and is absorbed in the body. It has a non-uniform mode of distribution, poor lipid solubility, and accumulates in the kidney, causing renal damage. According to modern, Lead toxicity competes with other minerals specially zinc, calcium in cellular systems. and these minerals disrupt the cellular processes. Zinc and calcium inhibit the two major enzymes which are involved in hem-synthesis. Lead inhibits the mitochondrial function and calcium uptake, and calcium dependent protein kinase C, which is essential for the brain. The children absorb five times more lead than adults, it affects the growing nerve cells so the neurological

developmental problems are generated in children. In ayurveda, impure lead intake may result in the *sandhishuladi roga*, *pakshaghata* which are correlated in the modern as neurological disorder. Arsenic interferes with cellular respiration and combines with Pyruvate dehydrogenase enzyme, which catalyzes the oxidation of pyruvate to acetyl-coA, thus the energy system of the cell is disrupted resulting in cellular apoptosis. Interferes with fatty acid oxidation, It combines with globin proteins, and stimulates the production of hydrogen peroxide after that hydrogen peroxide reacts with metals and releases hydroxyl radical. Copper toxicity is defined as a metabolic disorder, the major target of copper toxicity is the liver. Resulting breakdown of the liver cells and releases a very large amount of copper into the circulation, then damaging red blood cells and causing the acute haemolytic anemia. When serum copper concentration is increased as a result of cancer. 90% of serum copper is associated with ceruloplasmin and it increases at times of stress. Copper generates oxygen radicals

that might damage proteins, lipids, and DNA.

CONCLUSION

Bhasma are highly valued and complex material and have their own importance in *ayurveda*. Preparation of the *bhasma* is not a single process. There are different processes like *shodhana*, *marana*, *bhavna* etc. These processes to be performed to remove the impurities of mineral/ metal and to increase therapeutic efficacy. If *bhasma* is not prepared properly as per classical method, then different types of complications manifested out of *ashuddha* and *apakwabhasma sevana*, it's similar to in modern acute and chronic toxicity due to access accumulation of the heavy metals in our body. According to this study we can say that *shodhana dravya* usage in treatment of *bhasma dosha* is an antidote.

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REFERENCES

1. Dattatreya Anant Kulkarni. RasratnaSamuchchaya (VigyanBodhini).Vol.1st. New delhi: MeharchandLakshmandas Publications. P. 20, 53, 92, 207, 208
2. Pandit Kashinath Shastri. Rasa Tarangini.11thed. 1979. Delhi: Motilal Banarsidas. P. 520
3. Pandit Dattaram Chowey. Brihad Rasraj Sunder. Third ed. 2000. Varanasi:Chaukhamba orientalia. P. 64,68,69,74,78, 82, 83, 107, 143, 159, 168, 172, 182
4. Bhudev Mookerjee. Rasa -Jala- Nidhi. Vol. 2nd. Third ed. 1998. Varanasi: Chaukhambaorientalia. P. 65,77,103, 115,132,146,157,193,198,201,232,241,276
5. Bhudev Mookerjee. Rasa -Jala- Nidhi. Vol. 3rd. Fourth ed. 2004. Varanasi: Chaukhamba orientalia. P. 4,88,101,110,120,140,169,190
6. Indradev Tripathi. Rasendrasar Sangrah.Reprint ed. 2010. Varanasi: Chaukhamba orientalia. P. 39,40
7. Dr.siddhi nandan mishra. Ayurvediya rasashastra. Reprint ed. 2015.Varanasi: Chaukhamba orientalia. P. 160, 161, 282, 283, 308, 309, 315, 324, 328, 336, 341, 347, 345,356, 370, 373, 378, 380, 388, 396, 404, 424, 431, 447, 459, 467, 470,471, 478, 484, 489
8. Shri Gul raj sharma Mishra. Aayurved prakash. Reprint ed. 2016. Varanasi: Chaukhamba Bharti Academy. P. 260, 274, 284, 328, 392, 480
9. Acharya Priya vrat sharma. Dravyaguna vigyan.Vol.2nd.Reprint ed. 2018. Varanasi: Chaukhamba Bharti Academy. P. 104, 364
10. Google- www.healthline.com
11. <https://www.mayoclinic.org>
12. www.dovemad.com
13. Google- Wikipedia
14. <https://www.ncbi.nlm.nih.gov>
15. Dr. Kavya shree B.P. and Dr. V. Shree shananda Sharma. A critical analysis of Bhasma Sevana Doshas and it's management