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A RANDOMIZED COMPARATIVE CLINICAL TRIAL OF SWARNMAKSHIKA BHASMA AND COMPOUND (SWARNMAKSHIKA BHASMA AND YASHADA BHASMA) IN THE MANAGEMENT OF PANDU WITH SPECIAL REFERENCE TO IRON DEFICIENCY ANEMIA

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ABSTRACT

Iron deficiency anemia (IDA) is most prevalent nutritional deficiency worldwide. Anemia generally manifests as easy fatigability, exertional dyspnoea, palpitations, body aches and giddiness depending upon its severity, rapidity of onset and underlying pathology. Treatment of iron deficiency anemia mainly involves correction by iron supplementation but constipation, diarrhea, nausea, epigastric discomfort etc. are frequently encountered as side effects during clinical practice. Pandu has been described in Ayurvedic texts under which all types and causes of anemias can be incorporated. Pitta and rakta are considered main vitiated entities in Pandu. Swarnmakshika and Yashada bhasmas are described to have pandu roga shamak (drugs mitigating anemia) properties hence were selected for the study. Total 30 patients were registered for the trial, 28 completed the trial who were randomly distributed in two groups. Group-I was given Swarnmakshika bhasma and Group-II was given the compound bhasma (Swarnmakshika bhasma + Yashada bhasma) to compare the efficacy of both the formulations. Results were statistically significant in both the trial groups but objective parameters showed better results in trial group-II. Hence it can be concluded that both the formulations have definite hematinic effect but addition of Yashada bhasma with Swarnmakshika bhasma increases its efficacy.

Keywords: Pandu, Anemia, Swarnmakshika, Yashada, Bhasma, Hematinic

INTRODUCTION

Iron deficiency anemia is prevalent throughout the world as most common nutritional deficiency but prevalence is more in developing countries.[1] The WHO global database on anemia for 1993-2005 covering almost half the world's population, estimated the prevalence of anemia worldwide at 25 %.[2] Africa and Asia account for more than 85 % of the absolute anemia burden in high risk groups. India is one of the countries with very high prevalence of anemia in the world and contributes to about 80 % of the maternal deaths due to anemia in South Asia. Nutritional anemia is major public health problem in India and is primarily due to iron deficiency. The National Family Health Survey-3(NFHS-3) data suggests that anemia is widely prevalent among all age groups, and is particularly high among the most vulnerable age groups nearly 58 percent among pregnant women, 50 percent among non-pregnant non-lactating women, 56 percent among adolescent girls, 30 percent among adolescent boys and around 80 percent among children under three years of age.[3] Anemia is a reduction in the oxygen carrying capacity of blood, which usually stems from a reduction of the total circulating red cell mass causing fall in hemoglobin (Hb) to below normal amounts resulting in tissue hypoxia. Anemia can result from excessive bleeding, increased red cell destruction or decreased red cell production.[4] Clinical consequences of anemia are determined by its severity, speed of onset and underlying pathology. If the onset is slow, cardio-respiratory and other metabolic adjustments take place that partially compensate for the deficit in oxygen carrying capacity and the patient doesn't develop symptoms of anemia till Hb falls as low as 7- 8 g/dl. Anemia is generally manifested as easy fatigability, exertional dyspnoea, palpitations, body aches, giddiness etc.[5] without treatment anemia can worsen and become underlying cause of ill health. Treatment of iron deficiency anemia mainly involves correction by iron supplementation but side effects of this therapy such as constipation, diarrhea, nausea, vomiting, epigastric discomfort etc. are frequently encountered during clinical practice.[6] Ayurvedic scholars of present era are making their earnest efforts to find satisfactory treatment for anemia which not only corrects iron deficiency but also have no or fewer side effects. Around 211 clinical studies were recorded on pandu across India in various Ayurvedic institutes.[7] A disease namely pandu (~anemia) has been described in Ayurvedic texts under which all types and causes of anemias can be incorporated. As mentioned in the Ayurvedic texts pitta and rakta (~blood tissue) are main dosha (humor) and dushya (~vitiated entity) of pandu roga respectively.[8] Therefore while aiming at the treatment of pandu, pitta and rakta should be specifically considered. Swarnmakshika bhasma (calcined chalcopyrite) as described in rasa texts has the pitta shamak (pitta pacifying) and pandu roga shamak properties[9] and similarly yashada bhasma (calcined zinc) possesses the kapha pitta shamak and pandu roga shamak properties.[10] As both bhasmas have pandu roga shamak properties hence were selected for clinical trial to establish their hematinic effect and to study whether addition of yashada

bhasma to swarnmakshika bhasma has any difference in results. Swarnmakshika is chemically chalcopyrite ($CuFeS_2$) having copper, iron and sulphur as main chemical constituents whereas yashada is chemically zinc. As the ultimate aim of any drug formulation is to mitigate the disease of a person, so both these formulations were given to the patients of pandu to evaluate their efficacy and safety to fight this disease in ailing humanity. The trial was done on two different groups out of which group-I was given swarnmakshika bhasma and group-II was given the compound (Swarnmakshika bhasma + Yashada bhasma) to compare the efficacy of both the formulations.

MATERIALS AND METHODS

Study design and selection of the patients

A parallel group open randomized controlled trial was conducted on patients presenting with symptoms of pandu and fulfilling the criteria's of inclusion. Patients were selected for the trial after written informed consent. Institutional Ethics Committee approval was taken for the clinical trial.

Criteria for selection of patients

The patients were preliminary diagnosed on the basis of signs and symptoms of pandu which was further confirmed by haematological indices of anemia i.e. Hb g%, total red blood corpuscles (TRBC), packed cell volume (PCV), mean corpuscular volume (MCV), mean corpuscular haemoglobin (MCH), mean corpuscular haemoglobin concentration (MCHC) and peripheral blood film (PBF).

Inclusion criteria

- Patients in the age group of 18-50 years of age.
- On the basis of signs and symptoms of Pandu.
- Patients with Hb % ranging from 6-10 g %.
- Microcytic hypochromic red blood corpuscles (RBCs) in peripheral blood film.

Subjective criteria's

Patients were selected on the basis of following signs and symptoms of pandu roga described in the text i.e. panduta (~pallor), hritdrava (~palpitation), alpa medasyata (~loss of subcutaneous fat), alpa raktata (~deficiency of blood tissue), shithilindriyatva (~impaired sensorium), karnshveda (tinnitus), daurbalaya (weakness), annadvesha (anorexia), gatra shoola (body aches), bhrama (giddiness), shwasa (dyspnoea), akshi koot shoth (~periorbital swelling), ksheena lomta (loss of hairs), hat prabhatva (loss of lusture), kopnatva (irritability), pindikodveshtana (cramps in calf muscles), katipadururuk (pain in back, feet and thighs), urupadsad (~numbness in thighs and feet), nidra adhikya (excessive sleep).

Objective criteria's

Haematological investigations like haemoglobin (Hb), total leucocyte count (TLC), differential leucocyte count (DLC), erythrocyte sedimentation rate (ESR), PCV, TRBC, MCV, MCH, MCHC, and PBF were taken as objective parameters. Other biochemical investigations like liver function tests (LFT), renal function tests (RFT), blood sugar, uric acid and urine–routine and microscopic examinations were also done to exclude other systemic or organic pathologies and to know the untoward effects of trial drug on these parameters. Among hematological criteria's Hb % was the main criteria. All the investigations of the patients were done in pathology and biochemistry department of the institute. Investigations like serum ferritin level, serum iron level and total iron binding capacity could not be done due to resource constraint.

Exclusion criteria

- Patients not willing for the trial.
- Patients not fulfilling the criteria of inclusion.
- Anemia associated with other systemic diseases, hemorrhagic causes, bone marrow insufficiencies and haemoglobinopathies.
- Showing any allergy to trial drug.

Trial group

Present study was done on two trial groups. Total 30 patients were registered in the trial after their written informed consent. Out of 30, 16 patients selected randomly were kept in first group and 14 patients in second group. The study was carried out at Rajiv Gandhi Govt. Post Graduate Ayurvedic College Paprola, H.P., India

Trial drug and mode of administration

Trial group I

Patients registered in this group were given one capsule containing 60 mg of Swarnmakshika bhasma twice a day orally with water empty stomach.

Trial group II

Patients registered in this group were given one capsule containing 60 mg of compound (30 mg Swarnmakshika + 30 mg Yashada) bhasma twice a day orally with water empty stomach. Trial drugs used in both the groups were self prepared at college pharmacy using standard operating procedures (SOPs) described in classical texts of Ayurveda for bhasma preparation.

Physico-chemical characterization of trial drug

Trial drug was subjected to various physico-chemical analytical tests at authorized drug testing laboratory to evaluate the standards of drugs. (Table 1)

Duration of the trial - The total duration of the trial was 30 days.

Follow-up

The patients were advised to come for follow up after 15 days of initiation of trial and at the end of trial to observe the effects and adverse effects of trial drug.

Criteria of assessment

Assessment of the results obtained was done on the basis of improvement in subjective criteria's which were assigned different grades and on the basis of objective criteria's. Effect of the therapy was assessed by statistical analysis of scores before and at the end of trial.

Statistical analysis

The scores of criteria of assessment were analyzed statistically in terms of mean score B.T. (Before treatment), A.T. (After treatment), (B.T. – A.T.) difference of mean, S.D. (Standard Deviation) and S.E. (Standard Error). Student's 't' test was carried out at $p < 0.05$ and $P < 0.001$. The results were considered significant or insignificant depending upon the value of p.

- Highly significant - $p < 0.001$
- Significant - $p < 0.05$
- Insignificant - $p > 0.05$

Overall Effect of Therapy

Overall results were established in terms of percentage relief obtained in criteria's of assessment and rise in Hb % level.

Excellent Improvement

More than 75 % relief in signs and symptoms of subjective criteria's and rise in Hb % level between 2.2-3 g% over the value at the time of registration for objective criteria's.

Moderate Improvement

50-75 % relief in signs and symptoms of subjective criteria's and rise in Hb % level between 1.5-2.1 g% over the value at the time of registration for objective criteria's.

Mild Improvement

25-50 % relief in signs and symptoms of subjective criteria's and rise in Hb % level between 0.8 -1.4 g% over the value at the time of registration for objective criteria's.

No improvement

Less than 25 % relief in signs and symptoms of subjective criteria's and rise in Hb % less than 0.8 g% over the value at the time of registration for objective criteria's.

OBSERVATIONS AND RESULTS

Total 30 patients were registered for the trial, 16 in group-I and 14 in group-II. Two patients in trial group one didn't complete the course of treatment hence were considered dropout and results were analyzed on total 28 patients, 14 in each group. During study it was observed that maximum number of patients i.e. 53.33 % (16) were in age group 21-30 years, 70 % (21) were females, 50 % (15) were married, 96.67 % (29) patients were of Hindu religion, 70 % (21) were from rural habitat, 36.67 % (11) patients were students, 33.33 % (10) were graduates, 60 % (18) patients belong to middle class, 56.67 % (17) were vegetarian, 73.33 % of the patients were having sedentary lifestyle, 63.33 % (19) were having no addiction, 50 % (15) were having madhyam koshtha, 63.33 % (19) of the patients were having agnimandya (~reduced digestive power), 53.34 % of the patients were having vata-pittaj prakriti (type of body constitution), 60 % of the patients were not having satisfactory hygiene. Symptoms like pandutva, daurbalya, shwasa, alparaktata and pindikodveshtana were present in 100 % (28) patients. Shithilindriyatva, hriddrava, bhrama and kopnatva were present in 96.43 % (27), 92.86 % (26), 89.29 % (25), 89.29 % (25) patients respectively. 19 (67.86 %) patients had katipadururuk, 12 (42.86 %) were having karnshveda whereas katipadurusada was present in 11 (39.29 %) patients (Table 2 and 3). Statistically highly significant improvement ($p < 0.001$) was observed in all the subjective parameters except karnshveda ($p < 0.05$ in Group I and $p > 0.05$ In Group II) and uru kati pada sada ($p < 0.05$ in Group I and II) in both the groups (Tables 2 and 3). On intergroup comparison no significant difference was observed in effect of the therapy on these symptoms except pandutva, hridrava, shithilindriyatva and annadvesha where intergroup comparison showed significantly different results. Statistical analysis of objective criteria's revealed extremely significant effect of the trial drugs in both the groups (Table 4). Mean haemoglobin level changed from 9.4 g% to 11 g% after treatment showing a change of 17.02 % in 1st group whereas the change in 2nd group was from 8.9 to 10.7 g% i.e. 20.22 %. But intergroup comparison showed no significant difference. Rise in TRBC over initial value was extremely significant ($p < 0.001$) in both the groups but efficacy of the drug used in trial group II was more than the drug used in trial group-I on the basis of percentage change. Rise in PCV, MCV, MCHC and TLC in both the groups was found to be extremely significant ($p < 0.001$) but inter group comparison showed no significant difference in the efficacy of drugs used in both the trial groups. Decrease in the ESR in trial group-I was highly significant with percentage change of 49.2 % whereas in trial group-II it was not significant with 35.35 % change. (Table 5)

Overall effect of Therapy

Overall effect of therapy showed excellent improvement (100 %) on subjective parameters in both the trial groups.

(Table 6) On objective parameters in trial group I, 7.14 % patients showed excellent improvement whereas in trial group II, 37.14 % patients showed excellent improvement. 64.29 % and 50 % patients in trial group I and II showed moderate improvement respectively. In trial group I, 28.57 % patients had mild improvement and 14.29 % patients in trial group II showed mild improvement. (Table 7)

DISCUSSION

It is evident from pathogenesis of pandu roga that pittapradhan dosha prakopa leads to rasavaha srotodushti and raktadushti (vitiation of blood tissue) leading to raktalpata, dhatu kshaya (~loss of body tissues) and ojo kshaya (immunodeficiency).[8] Up to some extent body is capable of compensating these changes but when condition of raktakshaya (~decrease in Hb concentration) progresses further then clinical features of pandu become evident. Swarnmakshika bhasma is described to have madhur (sweet), tikta (bitter), tridoshahar (one that pacifies three doshas), yogvahi and pandurogashamak properties,[9] whereas yashada bhasma is kashaya (astringent), katu rasa (pungent) and shita guna yukta. It is kapha, pitta and vata shamak.[10] Being tridoshashamak, yogvahi and rasayan guna yukta, the trial drugs used here mitigate pandu. It can be explained further in the light of contemporary medical science that RBCs containing hemoglobin are responsible for oxygen supply to body tissues. Iron is very important for formation of Hb and with the onset of negative iron balance; iron stores are mobilized to maintain the normal levels of Hb, tissue iron and plasma iron. This is the stage of pre latent iron deficiency. Iron stores are gradually depleted leading to reduction in plasma iron and increase in serum tranferrin resulting in onset of iron deficient erythropoiesis.[11] With decrease in number of RBCs, cardiac output decreases and respiratory rate increases to meet out the lack of oxygen in blood and other tissues leading to hyperdynamic circulation resulting in hritdrava, karnshveda, shwasa and other features of pandu roga. Due to less oxygen supply to the tissues, other features like fatigability, giddiness, impaired sensorium etc. are produced. Out of above mentioned clinical features majority of them were relieved within few days of starting the therapy even before any increase in hemoglobin level. This observation can be attributed to improvement in the iron concentration at tissue level. The efficacy of the trial drug can also be attributed to presence of zinc and copper in the trial drug as these are required for enzymatic reactions during haem synthesis. Along with iron, zinc plays important role in haem synthesis as it is a constituent of many enzymes present in erythrocytes such as carbonic anhydrase and superoxide dismutase.[12] ALA dehydratase is a zinc containing enzyme which favors condensation of two molecules of ALA to form two molecules of water and one molecule of porphobilinogen. Condensation of four molecules of porphobilinogen forms a cyclic tetrapyrole i.e. a porphyrin which is a constituent of haem.[13] Similarly copper is also important for haem formation as copper helps in iron transport during haem formation. Ceruloplasmin, a copper binding plasma protein containing about 8 atoms of copper per mole, functions as a ferroxidase enzyme during iron transport. Deficiency of copper leads to decreased synthesis of ceruloplasmin resulting in hypoferrimia which further leads to inefficient production of haem, and a hypochromic anaemia not responding to iron.[14]

Table 1: Physico-chemical characterization of trial drugs

S. No.	Tests	Yashada Bhasma	Swarnmakshika Bhasma
1	Appearance	Fine Powder	Fine Powder
2	Color	Pale Yellowish	Maroon
3	Odor	Odourless	Odorless
4	Taste	Tasteless	Tasteless
5	pH	7.02	6.88
6	Total ash	98.64%	98.64%
7	Acid-insoluble ash	72.47%	72.47%

Table 2: Effect of Swarnmakshik Bhasma on subjective criteria in trial group I

S. No	Signs/ Symptoms	N	Mean score		Inter group comparison	% relief	+ S.D.	+ S.E.	t	p
			BT	AT						
1	Pandutva	14	1.29	0	1.29	100	0.47	0.13	10.24	< 0.001
2	Hridrava	12	1.42	0.25	1.17	82.39	0.76	0.22	5.32	< 0.001
3	Alparaktata	14	1.5	0	1.5	100	0.52	0.14	10.71	< 0.001
4	Shithilindriyatva	13	1.93	0.31	1.62	83.94	0.69	0.19	8.48	< 0.001
5	Karnshveda	4	2	0.25	1.75	87.5	3.23	1.62	1.08	< 0.05
6	Daurbalya	14	2.21	0.5	1.71	77.38	0.61	0.16	10.49	< 0.001
7	Annadvesha	14	1.5	0	1.5	100	0.65	0.17	8.62	< 0.001
8	Bhrama	13	1.69	0.46	1.23	72.78	0.70	0.19	6.34	< 0.001
9	Shwasa	14	1.85	0.21	1.64	88.64	0.50	0.13	12.24	< 0.001
10	Kopnatva	11	2.28	0.55	1.73	75.88	1.31	0.40	4.38	< 0.001
11	Pindiko-dveshtana	14	1.57	0.36	1.21	77.07	0.80	0.21	5.65	< 0.001
12	Kati Pada Uru Ruk	9	1.66	0.33	1.33	80.12	1.36	0.45	2.96	< 0.001
13	Uru kati pada Sada	4	1.25	0	1.25	100	2.33	1.17	1.072	< 0.05

N: Number, BT: Before Treatment, AT: After Treatment, SD: Standard Deviation, SE: Standard Error

Table 3: Effect of compound bhasma (Swarnmakshika + Yashada Bhasma) on subjective criteria in trial group II

S. No	Signs/ Symptoms	N	Mean score		Inter group comparison	% relief	+ SD	+ SE	t	p
			BT	AT						
1.	Pandutva	14	2.07	0.14	1.93	93.24	0.48	0.13	14.85	< 0.001
2.	Hridrava	14	2.15	0.6	1.79	83.18	0.70	0.19	9.42	< 0.001
3.	Alparaktata	14	1.86	0.29	1.57	84.41	0.51	0.14	11.21	< 0.001
4.	Shithilindriyatva	14	2.64	0.71	1.93	73.11	0.27	0.07	27.57	< 0.001
5.	Karnshveda	8	2.15	0.25	1.88	88.26	1.93	0.68	2.76	> 0.05
6.	Daurbalya	14	2.65	0.79	1.86	70.08	0.53	0.14	13.29	> 0.001
7.	Annadvesha	12	2.5	0	2.5	100	1.46	0.42	5.94	< 0.001
8.	Bhrama	12	2.17	0.42	1.75	80.65	1.03	0.30	5.83	< 0.001
9.	Shwasa	14	2.07	0.21	1.86	83.86	0.66	0.18	10.57	< 0.001
10.	Kopnatva	14	2	0.21	1.79	89.5	0.70	0.19	9.57	< 0.001
11.	Pindikodveshtana	14	1.71	0.21	1.5	87.72	0.52	0.14	10.80	< 0.001
12.	Kati Pada Uru Ruk	10	2.3	0.6	1.7	73.91	1.32	0.42	4.08	< 0.001
13.	Uru kati pada Sada	7	1.85	0.14	1.71	92.43	2	0.76	2.27	< 0.05

N: Number, BT: Before Treatment, AT: After Treatment, SD: Standard Deviation, SE: Standard Error

Table 4: Effect of trial drugs (Group 1 and 2) on objective parameters

Parameter	Group	N	Mean Score		% Change	S.D.+	S.E.+	t	p	Inter group comparison
			BT	AT						
Hemoglobin	I	14	9.4	11	17.02	0.34	0.09	17.78	< 0.001	t = 1.26
	II	14	8.9	10.7	20.22	0.48	0.13	13.85	< 0.001	p = > 0.05
TRBC	I	14	3.98	4.15	4.2	0.11	0.03	5.67	< 0.001	t = 3.25
	II	14	3.7	4	8.1	0.1	0.027	11.1	< 0.001	p = < 0.01
PCV	I	14	30.7	33.56	9.3	1.05	0.28	10.21	< 0.001	T = 1.68
	II	14	28.9	32.6	12.8	1.59	0.43	8.61	< 0.001	p = > 0.05
MCV	I	14	77.14	81.99	6.2	3.43	0.92	5.27	< 0.001	t = 0.039
	II	14	78.35	83.25	6.25	3.4	0.92	5.33	< 0.001	p = > 0.05
MCH	I	14	24.25	27.05	11.55	0.75	0.2	14	< 0.001	T = 1
	II	14	24.18	27.38	13.2	1.3	0.34	9.41	< 0.001	p = > 0.05
MCHC	I	14	30.8	31.8	5.8	1.08	0.29	6.21	< 0.001	T = 0.6
	II	14	30.92	33	6.8	1.78	0.46	4.57	< 0.001	p = > 0.05

N: Number, BT: Before Treatment, AT: After Treatment, SD: Standard Deviation, SE: Standard Error, TRBC: Total red blood corpuscles, PCV: Packed cell volume, MCV: Mean corpuscle volume, MCH: Mean corpuscular hemoglobin, MCHC: Mean corpuscular hemoglobin concentration

Table 5: Effect of trial drugs on other hematological investigations

Investigation	Group	Mean Score		% Relief	S.D.+	S.E.+	t	p	Intergroup comparison
		BT	AT						
TLC	I	7621.4	8364.4	9.75	365.3	95.12	7.8	< 0.001	t = 0.04
	II	7628.6	8364.3	9.6	541.5	144.8	5.08	< 0.001	p = > 0.05
DLC (N)	I	62.5	6.2	1.12	0.6	0.16	4.3	< 0.001	
	II	60.79	62.19	2.3	1.51	0.4	3.5	< 0.01	
DLC (L)	I	31.5	31	1.58	0.65	0.17	2.94	< 0.05	
	II	33.79	31.29	7.3	2.44	0.65	3.85	< 0.01	
DLC (M)	I	1.2	0.86	53.3	1.01	0.26	2.46	< 0.05	
	II	1.43	2	39.86	0.75	0.20	2.85	< 0.05	
DLC (E)	I	2.2	1.5	31.8	0.73	0.19	3.68	< 0.01	
	II	2.29	3.15	37.5	1.02	0.28	3.07	< 0.01	
DLC (B)	I	0	0	0	0	0	0	0	
	II	0	0	0	0	0	0	0	
ESR	I	10.36	5.26	49.2	5.2	1.36	3.75	< 0.01	t = 0.029
	II	15.5	10	35.48	10.99	2.94	1.87	> 0.05	p = > 0.05

BT: Before Treatment, AT: After Treatment, SD: Standard Deviation, SE: Standard Error, TLC: Total leucocyte count, DLC: Differential leucocyte count, N: Neutrophils, L: Lymphocytes, M: Monocytes, E: Eosinophils, B: Basophils, ESR: Erythrocyte sedimentation rate

Table 6: Overall effect of the therapy on subjective criteria's

Overall effect of therapy	Trial Group I		Trial Group II	
	Number of Cases	%	Number of Cases	%
Excellent Improvement	14	100	14	100
Moderate Improvement	0	0	0	0
Mild Improvement	0	0	0	0
No Improvement	0	0	0	0

Table 7: Overall effect of the therapy on objectives criteria's

Overall effect of therapy	Trial Group I		Trial Group II	
	Number of Cases	%	Number of Cases	%
Excellent Improvement	1	7.14	5	35.71
Moderate Improvement	9	64.29	7	50
Mild Improvement	4	28.57	2	14.29
No Improvement	0	0	0	0

CONCLUSION

From these observations we can conclude that both the formulations viz. swarn makshika bhasma and compound bhasma (Swarnmakshika and Yashada bhasma) have excellent effect on pandu roga. No immediate or delayed side effects were observed in both the trial groups. Compound bhasma (Swarnmakshika and Yashada bhasma) has shown more promising results on objective parameters as compared to swarnmakshika bhasma whereas statistical effect of both the formulations were same on subjective parameters. Hence it can be concluded that both the formulations were well tolerated, clinically safe and have definite haematinic effect but addition of yashada bhasma with swarnmakshika bhasma increases its efficacy in improving objective criteria's.

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