



A Pilot Study to Compare the Therapeutic Effects of Karanj (Pongamia pinnata (Linn.) Merr.) Bark Lepa and Karanj (Pongamia pinnata (Linn) Merr.) Seed Oil in the Management of Vicharchika w.s.r. to Eczema

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Background: Till today, an instant and effective remedy for eczema is still a major clinical need. Bark powder and seed oil of Karanj (Pongamia pinnata (Linn) Merr.) have been efficient results on skin diseases in Ayurveda. Ayurveda consider Vicharchika (eczema) condition under the Kshudra Kustha.

Aim: To evaluate efficacy of Karanj (Pongamia pinnata (Linn) Merr.) bark powder Lepa and Karanj (Pongamia pinnata (Linn) Merr.) seed oil in the management of Vicharchika.

Materials and Methods: A randomize parallel group trail (pilot study) was performed to assess the efficacy of both formulation in Vicharchika. The trail formulation was prepared in GMP Certified Pharmacy. Total 19 patients, diagnosed as Vicharchika was treated by applying dose of both formulations twice a day (externally) for continuous 28 days. Response to the treatment in all patients was recorded on 7th, 14th, 21th and 28th days.

Result: Karanj (Pongamia pinnata (Linn) Merr.) seed oil was effective (74.25%) as compared to Karanj (Pongamia pinnata (Linn) Merr.) bark Lepa (28.88%).

Conclusion: Karanj (Pongamia pinnata (Linn) Merr.) seed oil more effective as compared to Karanj (Pongamia pinnata (Linn) Merr.) bark Lepa. So Karanj (Pongamia pinnata (Linn) Merr.) seed oil can be alternative formulation against Karanj (Pongamia pinnata (Linn) Merr.) bark Lepa in the management of Vicharchika w.s.r. to Eczema.

Keywords: Eczema, Karanj, Pongamia pinnata (Linn) Merr.), Kshudra Kustha, Skin diseases, Vicharchika

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Introduction

Twak (skin) occupies a pivotal role, not only as a physical covering but also as a functional interface for sensation, thermoregulation, immunity, and cosmetic appeal. In Ayurveda, all skin diseases are under the term of *Kustha*.^[1] All *Kustha* are classified into two categories as *Maha Kustha* and other is *Kshudra Kustha*.^[2,3] *Vicharchika* is mentioned in *kshudra kustha*. *Vicharchika* have symptoms like *Kandu*, *Daha*, *Srava*, *Rukshata*, *Pidikotpatti*, *Vaivaranyata* and *Raji*. These symptoms are similar as of Eczema in modern science.^[4] Although all types of *Kustha* involve the three *doshas*, the specific characteristics of skin diseases vary according to the predominance of each *Dosha*.^[5] Worldwide 10% of adult & 4 to 8% of children are affected by eczema. In India, at least one in five children suffers from eczema and near 10% of Indian adults suffer from eczema.^[6] *Acharya Charak* recommended *Karanj* (*Pongamia pinnata* (Linn) Merr.) bark *Lepa*^[7] and *Acharya Sushruta* recommended *Karanj* (*Pongamia pinnata* (Linn) Merr.) seed oil for external application.^[8] *Karanj* (*Pongamia pinnata* (Linn) Merr.) is a commonly available plant either cultivated or wildely grow, considered as botanical source of *Karanj* (*Pongamia pinnata* (Linn) Merr.) in API.^[9]

We still need better treatment for eczema, and it's very important right now, *Karanj* (*Pongamia pinnata* (Linn) Merr.) bark *lepa* & *Karanj* (*Pongamia pinnata* (Linn) Merr.) seed oil as a single drug formulation has not been comparatively evaluated in the management of *Vicharchika*. Hence, *Karanj* (*Pongamia pinnata* (Linn) Merr.) bark powder and *Karanj* seed oil was trail drug for the management of *Vicharchika*. *Karanj* (*Pongamia pinnata* (Linn) Merr.) bark powder and *Karanj* (*Pongamia pinnata* (Linn) Merr.) seed oil has not yet been properly compared as a single medicine for treating *Vicharchika* (eczema).

So, in this study, *Karanj* (*Pongamia pinnata* (Linn) Merr.) bark *Lepa* and *Karanj* (*Pongamia pinnata* (Linn) Merr.) seed oil was tested for managing *Vicharchika*.

Aim and Objectives

Aim: To clinically compare the efficacy of *Karanj* (*Pongamia pinnata* (Linn) Merr.) Bark *Lepa* and *Karanj* (*Pongamia pinnata* (Linn) Merr.) Seed Oil in *Vicharchika* (Ezema).

Objectives:

To find out the efficacy of *Karanj* (*Pongamia pinnata* (Linn) Merr.) Bark *Lepa* and *Karanj* (*Pongamia pinnata* (Linn) Merr.) Seed Oil in *Vicharchika* (Ezema) as alternate management for *Vicharchika*. And, to find out which is more potent formulation in the management of *Vicharchika* w.s.r. to Eczema.

Materials and Methods

Study design

The study was conducted as a randomized, parallel trial, at institutional outpatient department. The study protocol was approved by Institutional Ethical Committee SKAU/Acad/2024/10718 and University Ethical Committee SKAU/Acad/2024/129070. The study was conducted according to good clinical practices and registered in the clinical trial registry; India vide CTRI Reg. No. CTRI/2024/07/071379. The written informed consent was obtained from each of the patient prior to enrollment.

Study Participants

Total 14 patients (7-7 in each group A and group B) of *Vicharchika*, 14 patients fulfilling inclusion criteria were randomly selected.

Inclusion Criteria

1. Individual who are willingly ready to follow the procedure.
2. Patients with classical sign and symptoms of *Vicharchika* (eczema).
3. Patients from the age group of 16-70 years will be selected.

Exclusion Criteria

1. below the age of 16 yrs and above 70 yr.
2. Patient having concomitant illness like Diabetes mellitus, AIDS, auto immune disorders.
3. Patient with evidence of any malignancy.
4. Any drug addiction and drugs reactions.
5. Patient having illness like Scabies, Psoriasis, Leucoderma and diagnosis chronic illness.

Withdrawal Criteria

1. During trial if any serious condition or any serious adverse effect occurs which require urgent treatment.
2. Patient himself / herself wants to withdraw from clinical trials.

Posology

Both formulations selected for on the skin lesions of *Vicharchika* patient. The patient group A are advised to apply *Karanj* (*Pongamia pinnata* (Linn) Merr.) bark *Lepa* and group B were advised to apply *Karanj* (*Pongamia pinnata* (Linn) Merr.) seed oil twice a day for 28 days, there were no internal treatment during this period.

Method of preparation of trial drug formulation

Karanj (*Pongamia pinnata* (Linn) Merr.) bark powder was prepared in the Department of Rasashastra and Bhaishajya Kalpana following guidelines of GMP mention in AFI (Ref no. 218).

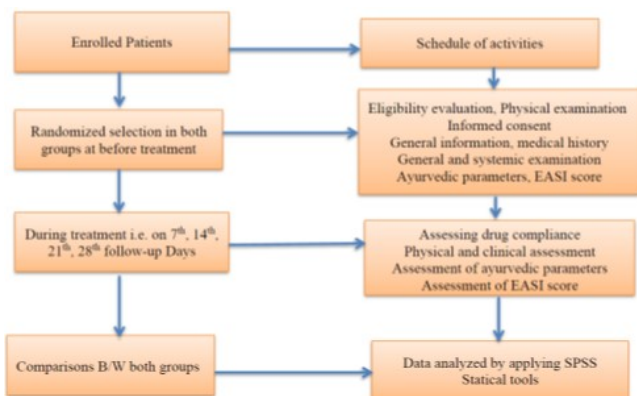
Karanj (*Pongamia pinnata* (Linn) Merr.) seed oil (cold pressed method) was prepared in Nidaan Herbals pharmacy Jind (ref. no. NHFP/06022/05).

Study Procedure

Eligibility of patients for the study was checked and recorded in a case proforma.

On the enrollment at visit, the demographic profile medical history, general and systemic examination Ayurvedic parameters and Eczema Area and Severity Index (EASI) score were recorded.

Follow-up has been done on 7th, 14th, 21th and 28th days, and assessment was done on every visit on the basis of parameters. (Flow chart 1)



Flow chart 1

Criteria for assessment

The assessment of *Vicharchika* was done before and after the treatment. Grading of the signs and symptoms of *Vicharchika* is shown in Table 1.

Scoring criteria followed for assessment EASI score is shown in Table 2.

Table 1: Scoring of sign and symptoms for *Vicharchika*

SN Symptom (Lakshana)	Grade 0	Grade 1	Grade 2	Grade 3
1. Kandu (Pruritis / Itching)	No itching	Mild itching not disturbing normal activity	Occasional itching disturbing normal activity	Continuous itching disturbing even sleep
2. Daha (Burning Sensation)	No burning	Mild burning not disturbing normal activity	Occasional burning disturbing normal activity	Continuous burning disturbing even sleep
3. Srava (Oozing /No Discharge)	No discharge	Occasional discharge after itching	Occasional oozing without itching	Excessive oozing making clothes wet
4. Ruksha (Dryness)	No dryness	Dryness with rough skin (Ruksha)	Dryness with scaling (Khara)	Dryness with cracking (Parusha)
5. Pidikotpatti (Eruptions)	No eruption	Scanty eruptions in few lesions	Scanty eruptions in at least half of the lesions	All lesions full of eruptions
6. Vaivarnyata (Discolouration of Skin)	Nearly normal skin colour	Brownish red discolouration	Blackish red discolouration	Blackish discolouration
7. Raji (Thickening of Skin)	No thickening	Thickening without criss-cross marking	Thickening with criss-cross marking	Severe lichenification

Table 2: Area score and severity score based on EASI parameters

EASI Score[10]

An EASI score is a tool used to measure the extent (area) and severity of atopic eczema (Eczema Area and Severity Index)

A. Body Region as Percent of Body Surface Area

Body Region	Code	% Body Surface Area
Head and neck	H	Face - 33% (each side - 17%) Neck - 33% (each side 17%) Scalp - 33%
Trunk includes (genital area)	T	Front - 55% Back - 45%
Upper limb	U	Each arm - 50% (front - 25% back - 25%)
Lower limb	L	Each leg - 45% (front - 22.5% back - 22.5%, buttocks 10%)

B. Extent of Body Region Affected

% Area Affected	Area Score
0%	0
1-9%	1
10-29%	2
30-49%	3
50-69%	4
70-89%	5
90-100%	6

C. Extent of Severity

Severity score is recorded for each of the four regions of the body. The severity score is the sum of the intensity scores for four signs. The four signs are

1. Redness (erythema, inflammation)
2. Thickness (induration, papulation, swelling-acute eczema)
3. Scratching (excoriation)
4. Lichenification (lined skin, furrowing prurigo nodules- chronic eczema)

Intensity of Redness Thickness Scratching and Lichenification Score	
Absent	0
Mild	1
Moderate	2
Severe	3

Severity Score = redness intensity + thickness intensity + scratching intensity + lichenification intensity

For each region, multiple the severity score by the area score and by a multiplier. The multiplier is different for each body site.

- Head and neck: severity score x area score x 1
- Trunk: severity score x area score x 3
- Upper limbs: severity score x area score x 2
- Lower limbs: severity score x area score x 4

Add up the total scores for each region to determine the final EASI score

Data presentation and Statically analysis

At the study site, data of all the patient were recorded in case proforma and were also entered in master chart design in excel with many data validation check to ensure correct data entry.

Outcome measures were analyzed as a mean change in response from baseline to 4th week.

The parameters of Group A (*Karanj (Pongamia pinnata* (Linn) Merr.) bark *lepa*) and Group B (*Karanj (Pongamia pinnata* (Linn) Merr.) seed oil) were analyzed using the Friedman test to compare the before treatment (BT) scores with those recorded at the first, second, third and fourth follow-ups (FU1, FU2, FU3, FU4). (Table 5, 6) And for both groups Post-hoc analysis using the Wilcoxon signed-rank test was performed to identify pairwise differences among the time points. (Table 7,8)

And The Mann-Whitney U test was applied to assess differences between Group A (*Karanj (Pongamia pinnata* (Linn) Merr.) bark *Lepa*) and Group B (*Karanj (Pongamia pinnata* (Linn) Merr.) seed oil) at the 4th follow-up across all parameters. In all analyzes, p value < 0.05 was considered as significant. And systemic relief was assessed as percentage change in terms of presence of any symptoms from baseline to the last follow-up and the end of 5th week. (Table 9)

All statistical analysis was performed using SPSS software with appropriate statistical methods with the help of Statistics expert.

Observation and Results

In total 19 patients were registered in both groups out of which group A contains 10 and group B contains 9 patients and out of total 19 patients 5 patients (group A- 3, group B- 2) discontinued due to personal reasons and 14 patients completed trial.

After follow-up assessment changes in the result were found in its symptoms associated with *Vicharchika* like *Kandu* (Pruritus), *Daha* (Burning), *Srava* (Oozing), *Rukshata* (Dryness), *Pidikotpatti* (Eruption), *Vaivaranyata* (Discolouration), *Raji* (Thickening of skin) and EASI Score.

In group A (*Karanj (Pongamia pinnata* (Linn) Merr.) bark powder) showed substantial improvements across all clinical parameters, with improvements observed in *Daha* (50%), *Srava* (50%), *Kandu* (30.95%) and less improvement in *Vaivaranyata* (7.14%), *Raji* (20%) & EASI score (11.07%). (Table 3). Group B (*Karanj (Pongamia pinnata* (Linn) Merr.) seed oil) showed substantial improvements across all clinical parameters, with the highest improvements observed in *Daha* (95.23%), *Srava* (87.5%), *Kandu* (80.95%), *Vaivaranyata* (52.38%), *Raji* (73.80%) and EASI score (61.32%). (Table 4).

Table 3: Percentage improvement in Group A

Group A	Mean Percentage improvement	Standard Deviation of Percentage improvement
Kandu	30.95	22.41
Daha	50	50
Srava	50	50
Rukshata	30.95	22.41
Pidikotpatti	30.95	22.41
Vaivaranyata	7.14	18.89
Raji	20	44.72
EASI	11.07	4.30
Overall	28.88	29.39

Table 4: Percentage improvement in Group B

Group B	Mean Percentage improvement	Standard Deviation of Percentage improvement
Kandu	80.95	17.81
Daha	95.23	12.59
Srava	87.5	25
Rukshta	76.19	16.26
Pidikotpatti	66.66	16.66
Vaivaranayata	52.38	11.50
Raji	73.80	25.19
EASI	61.32	19.33
Overall	74.25	18.04

Table 5: Friedman test was used to assess changes across BT, FU1, FU2, FU3 and FU4 in Group A.

Group A	Median	IQR	Sample Size n1	Friedman test Statistics	P-Value	Result
	BT AT (4th Follow Up)	BT AT (4th Follow Up)				
Kandu	2 2	1 1	7	15.71	0.0034	Significant
Daha	0 0	1.5 0.5	7	8	0.0915	NS
Srava	0 0	1.5 0.5	7	5.6	0.2310	NS
Rukshta	2 2	1 1	7	16.31	0.0026	Significant
Pidikotpatti	2 1	0.5 1	7	15.14	0.0044	Significant
Vaivaranayata	2 2	0 0	7	4	0.406	NS
Raji	1 1	0.5 1	7	4	0.406	NS
EASI	22 19	19 17.1	7	27.82	1.3*10 ⁻⁵	Significant

Table 6: Friedman test was used to assess changes across BT, FU1, FU2, FU3 and FU4 in Group B.

Group B	Median	IQR	Sample Size n2	Friedman test Statistics	P-Value	Result
	BT AT (4th Follow Up)	BT AT (4th Follow Up)				
Kandu	3 1	0 1	7	25.78	3.5*10 ⁻⁵	Significant
Daha	2 0	0.5 0	7	20.27	0.00044	Significant
Srava	1 0	1 0	7	13.33	0.0097	Significant
Rukshta	3 1	0 0.5	7	23.25	0.00011	Significant
Pidikotpatti	3 1	1 0	7	24.06	7.73*10 ⁻⁵	Significant
Vaivaranayata	2 1	1 0	7	20.88	0.000334	Significant
Raji	2 1	0 1	7	23.78	8.8*10 ⁻⁵	Significant
EASI	31 8.5	8.2 12.8	28		1.24*10 ⁻⁵	Significant

Table 7: Post-hoc analysis using the Wilcoxon Signed-Rank Test was performed to identify pairwise differences among the time points. (Group A)

Group A Parameter	Group1	Group2	n1	Wilcoxon signed-rank test statistic	p- value	Statistical Significance
Kandu	BT	FU4	7	15	0.037	significant
	FU1	FU4	7	15	0.037	significant
Rukshta	BT	FU4	7	15	0.037	significant
	FU1	FU4	7	15	0.037	significant
	FU2	FU4	7	15	0.037	significant
Pidikotpatti	BT	FU4	7	15	0.037	significant
	FU1	FU4	7	15	0.037	significant
EASI	BT	FU1	7	21	0.036	significant
	BT	FU2	7	28	0.016	significant
	BT	FU3	7	28	0.016	significant
	BT	FU4	7	28	0.022	significant
	FU1	FU2	7	28	0.022	significant
	FU1	FU3	7	28	0.022	significant
	FU1	FU4	7	28	0.016	significant
	FU2	FU3	7	28	0.022	significant
	FU2	FU4	7	28	0.022	significant
	FU3	FU4	7	28	0.022	significant

Table 8: Post-hoc analysis using the Wilcoxon signed-rank test was performed to identify pairwise differences among the time points. (Group B)

Group B Parameter	Group1	Group2	n2	Wilcoxon signed-rank test statistic	p-value	Statistical Significance
Kandu	BT	FU2	7	21	0.02	significant
	BT	FU3	7	28	0.018	significant
	BT	FU4	7	28	0.018	significant
	FU1	FU3	7	28	0.011	significant
	FU1	FU4	7	28	0.011	significant
	FU2	FU4	7	28	0.019	significant
	FU3	FU4	7	28	0.011	significant

Group B Parameter	Group1	Group2	n2	Wilcoxon signed-rank test statistic	p-value	Statistical Significance
Daha	BT	FU1	7	15	0.037	significant
	BT	FU3	7	28	0.019	significant
	BT	FU4	7	28	0.018	significant
	FU1	FU3	7	15	0.037	significant
	FU1	FU4	7	21	0.026	significant
	FU2	FU4	7	15	0.048	significant
Rukshta	BT	FU1	7	21	0.02	significant
	BT	FU2	7	28	0.021	significant
	BT	FU3	7	28	0.021	significant
	BT	FU4	7	28	0.018	significant
	FU1	FU3	7	15	0.048	significant
	FU1	FU4	7	28	0.019	significant
Pidikotpatti	BT	FU2	7	15	0.037	significant
	BT	FU3	7	28	0.019	significant
	BT	FU4	7	28	0.019	significant
	FU1	FU3	7	21	0.02	significant
	FU1	FU4	7	28	0.011	significant
	FU2	FU3	7	15	0.037	significant
Raji	FU2	FU4	7	21	0.02	significant
	BT	FU2	7	15	0.037	significant
	BT	FU3	7	28	0.015	significant
	BT	FU4	7	28	0.019	significant
	FU1	FU3	7	28	0.011	significant
	FU1	FU4	7	28	0.018	significant
EASI	FU2	FU4	7	15	0.037	significant
	BT	FU1	7	28	0.016	significant
	BT	FU2	7	28	0.016	significant
	BT	FU3	7	28	0.022	significant
	BT	FU4	7	28	0.016	significant
	FU1	FU2	7	28	0.022	significant
	FU1	FU3	7	28	0.016	significant
	FU1	FU4	7	28	0.022	significant
	FU2	FU3	7	28	0.022	significant
	FU2	FU4	7	28	0.022	significant
	FU3	FU4	7	28	0.022	significant

Table 9: The Mann–Whitney U test was applied to assess differences between Group A (*Karanj (Pongamia pinnata (Linn) Merr.)* bark *Lepa* and Group B (*Karanj (Pongamia pinnata (Linn) Merr.)* seed oil at the 4th follow-up across all parameters.

Parameter	Group	N	Mean Percent	SD Percent	Mann- Whitney U Statistics	p- value	Statistical Significance
Kandu	Group A	7	30.95	22.41	43	0.0131	Significant
	Group B	7	80.95	17.81			
	Total	14					
Daha	Group A	7	50	50	39.8	0.048	Significant
	Group B	7	95.23	12.59			
	Total	14					
Srava	Group A	7	50	50	28.5	0.533	NS
	Group B	7	87.5	25			
	Total	14					
Rukshta	Group A	7	30.95	22.41	41.5	0.0187	Significant
	Group B	7	76.19	16.26			
	Total	14					
Pidikotpatti	Group A	7	30.95	22.41	38.5	0.05	Significant
	Group B	7	66.66	16.66			
	Total	14					
Vaivaranayata	Group A	7	7.14	18.89	42.5	0.0124	Significant
	Group B	7	52.38	11.50			
	Total	14					
Raji	Group A	7	20	44.72	39.3	0.049	Significant
	Group B	7	73.80	25.19			
	Total	14					
EASI	Group A	7	11.07	4.30	40.2	0.045	Significant
	Group B	7	61.32	19.33			
	Total	14					

Figure 1: Effect of Karanj (*Pongamia pinnata* (Linn) Merr.) bark Lepa (Group A) on Patient of Vicharchika.



(A) Affected area before treatment



(B) Affected area after treatment

Fig. 2: Effect of Karanj (*Pongamia pinnata* (Linn) Merr.) Seed oil (Group B) on Patient of Vicharchika.



(C) Affected area before treatment



(D) Affected area after 4th Follow-up of trail

Discussion

After follow-up assessment, it was found that there was improvement in both groups.

Group A:

Kandu: Significant differences were observed between BT vs FU4 and FU1 vs FU4 ($p = 0.037$), indicating that itching reduced significantly by the 4th follow-up compared to baseline and early follow-up.

Rukshta: Significant improvement was seen across several comparisons: BT vs FU4, FU1 vs FU4, and FU2 vs FU4 ($p = 0.037$ for all). This shows a consistent reduction in dryness symptoms by the 4th follow-up.

Pidikotpatti: Significant reduction was observed in BT vs FU4 and FU1 vs FU4 ($p = 0.037$), suggesting clear improvement in poplar lesions after treatment.

EASI: Highly significant differences were found across multiple comparisons. Scores at baseline were significantly higher than at FU1, FU2, FU3, and FU4 (p -values between 0.016–0.036). Additionally, differences persisted across follow-up stages (e.g., FU1 vs FU2, FU1 vs FU3, FU2 vs FU4, etc.), all with $p \leq 0.022$. This indicates a progressive and sustained reduction in overall disease severity throughout the treatment period. (Table 5,7)

Group B:

Kandu: Significant improvements were observed between multiple stages including BT vs FU2, FU3, FU4 and also among follow-ups (FU1 vs FU3, FU1 vs FU4, FU2 vs FU4, FU3 vs FU4), all with $p \leq 0.02$. This reflects a progressive and consistent reduction in itching severity over time.

Daha: Significant changes were detected in BT vs FU1, FU3, FU4 and also in later comparisons (FU1 vs FU3, FU1 vs FU4, FU2 vs FU4) with p values between 0.018–0.048, showing gradual improvement in burning sensation across follow-ups.

Rukshta: Strong significance was observed in BT vs FU1, FU2, FU3, FU4 and additional improvements in FU1 vs FU3 and FU1 vs FU4 ($p \leq 0.048$). This indicates continuous & steady reduction in dryness by later follow-ups.

Pidikotpatti: Statistically significant improvement was found in BT vs FU2, FU3, FU4 and also among several follow-up comparisons (FU1 vs FU3, FU1 vs FU4, FU2 vs FU3, FU2 vs FU4), with $p \leq 0.037$, confirming progressive reduction in popular lesions.

Raji: Differences were significant in BT vs FU2, FU3, FU4 and also in FU1 vs FU3, FU1 vs FU4, FU2 vs FU4 ($p \leq 0.037$), indicating a consistent decrease in erythema/rash severity throughout treatment.

EASI: Highly significant improvements were noted at all stages, including BT vs FU1, FU2, FU3, FU4 and across follow-ups (FU1 vs FU2, FU1 vs FU3, FU1 vs FU4, FU2 vs FU3, FU2 vs FU4, FU3 vs FU4), with p values ranging from 0.016–0.022. This demonstrates strong, continuous, and sustained overall improvement in disease severity in Group B (*Karanj* (*Pongamia pinnata* (Linn) Merr.) seed oil). (Table 6,8)

Conclusion

Both the formulation (*Karanj* (*Pongamia pinnata* (Linn) Merr.) bark *Lepa* and *Karanj* (*Pongamia pinnata* (Linn) Merr.) seed oil) were showing its effect on *Vicharchika*. *Karanj* (*Pongamia pinnata* (Linn) Merr.) bark *Lepa* (overall improvement - 28.88%) has a mild improvement in reducing symptoms of *Vicharchika* while *Karanj* (*Pongamia pinnata* (Linn) Merr.) seed oil (overall improvement - 74.25%) has moderate to good improvement in reducing symptoms of *Vicharchika*.

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