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Research Article

TO STUDY THE EFFECT OF *KUTAJA GHANA* IN *ATISAR VEGAVASTHA* (ACUTE DIARRHEA)

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ABSTRACT

Diarrhea is a major disease in India. To avoid heavy economic burden for its treatment it is necessary to introduce a drug which is easily available, also cost effective and having quick result. So *Kutaja Ghana* is made as drug prepared by method given in *Rasoddhar tantra*. We found that percentage of total alkaloids increased after preparation of *Kutaja Ghana*. Connesine is active ingredient of *Kutaja*, its confirmation done by NMR and mass index study. Chromatograph of chloroform soluble extract of *Kutaja* powder shows 55.32% of connesine and that of *Kutaja Ghana* shows 99.10% of connesine. Also clinical trial of 60 patients confirmed its efficacy to treat diarrhea. Random selection of 60 patients from IPD or OPD of Ayurveda seva sangha hospital Nashik had done. 250 mg three times a day was the dose of group A patients treated with *Kutaja ghana*. Duration of treatment was three days. Group B was treated with *Sanjivani vati* 250mg three times a day. Thus probability of occurrence of value obtained by chance is much less than 0.05, the critical of 5%level of significance. The difference is real in 98% experiments hence highly significant. Statistical Analysis of the Data to Verify Difference Between the Effect of Drugs *Kutaja Ghana* and *Sanjivani vati.*

KEYWORDS: Diarrhoea, *Atisar*, Alkaloid, Connesine, *Kutaja Ghana*, *Hollharhena antidysentrica*.

INTRODUCTION

Diarrhoea disease causes heavy economic burden on health services, as the disease occupy 1/3rd of hospital beds. UK, USA proved that many of the patients in outpatient clinics belong to gastroenterology section. Diarrhea diseases are major cause of illness and death in most of the developing countries. In some countries up to 40% of deaths among children under age of 5 years are diarrhea related, more than 2 million under 5 years in the world's poorest countries still die needlessly every year of diarrhea related dehydration.

There is definite relation between food habits, nutrition, and poor sanitation practice. Poor nutrition may lead to certain diseases as kwashiorkor, sprue, celiac disease, and pellagra which are associated with diarrhea. Diarrhea starts with frequent occurrence of watery stool in large quantity. If it is not treated in this stage, because of loss of water and minerals through stool, patient gets dehydrated. Primarily dryness of mouth, dyspnoea on exertion, and latter on condition worsens to cause more and more dehydration skin turgor lost, body temperature get minimizes, thready pulse, low B.P. etc, this may leads to acute renal failure. At this stage if patient is not treated properly then he may have hypovolumic shock and latter on because of dis-electrolitemia patient dies.

Materials and methods

MATERIALS

Kutaja

Family-Apocynaceae
Name-*Hollarhena antidycentrica*
White kuda

Bark of white *Kuda* is used for this study. It is bitter, pungent and astringent by taste. It's *Vipak* (post digestion taste) is *Katu* and *Veerya* (potency} is hot. It is *Pitta* and *Kapha* pacifying drug. It is *Agnidipan*, *Grahi* and *Pachan* (it ignites digestive fire helps in digestion and solidifies stool). Standardization of white *Kutaja* bark was done by microscopic examination, in which it is that found stone cells in groups rectangular to elongated, also thin walled cork cells and calcium oxalate crystals, few starch grains are seen as identification characteristics.

Chromatograph of chloroform soluble extract of *Kutaja* powder shows 55% of connessine. Confirmation of connesine was done by NMR study and mass index study. Total alkaline percentage was 3.5 % Total ash was 5.82%. Collection of *Kutaja* bark was done soon after rainy season from old white *Kutaja* plant, it was dried in shadow to preserve its active principle. After drying fine powder is prepared in grinder of *Aushadhi bhavan Nashik*.

Method to prepare *Kutaja Ghana*

With this standardized white *Kutaja* powder with standardized text method *Kutaja* extract was prepared as described in '*Rasoddhaar tantra'.*

Take 2 *Prastha* (1280 gms) *Kutaja* powder add 24 *Prastha* (15380 liters) of water in it boil it on dim fire to preserve essential ingredients still it remains 3 *Prastha* (1920 liters) filter it with muslin cloth, After this boil the decoction by indirect heat in water bath, so that water gets evaporated. To get totally water free powder, keep it in oven at 100 degree Fahrenheit for 4 hours. Make fine even powder by grinding it in a mixer, thus we get small granules of *Kutja Ghana*. From 4 kg of *Kutaja* powder we get 500gms of *Kutja Ghana* powder. Then 250mg powder filled gelatin capsules are prepared.

Disintegration time of *Kutaja Ghana* capsules is approx 20 minutes and dissolution time is 30 minutes. Almost all Ghana gets dissolved to attain it's maximum concentration.

Chromatograph of chloroform soluble extract of *Kutaja Ghana* shows 99.10% of connesine. Total alkaloid percentage is 10.7%. Total ash 8.25%. NMR and mass index study identified connesine percentage. I found that all the classics repeatedly mentioned that use of '*Kutaja* 'in *Atisar* is effective remedy. Charak told that it is a drug of choice whenever we expect immediate treatment to stop watery stools. It is a single drug therapy so we can easily find its efficacy in acute diarrhea patients. Also I had tried to find out active ingredient percentage of *Kutaja* powder and Ghana formed, on the basis of modern parameters.

METHODS

Random selection of 60 patients from IPD or OPD of Ayurveda seva sangha hospital Nashik had done. 250 mg three times a day was the dose of group A patients treated with *Kutaja ghana*. Duration of treatment was three days. Group B was treated with *Sanjivani vati* 250mg three times a day. Patients in age group 6 yrs to 60yrs with more than three times watery stools were selected. Patient were examined for frequency and interval between two subsequent motions. Faecal material was examined for quantity, odour, colour, and *Samata* of stool. Also some associated symptoms like *Aruchi* (tastelessness), loss of appetite, pain in abdomen, nausea, flatulence, headache and also patients were examined for symptoms related to signs of dehydration. Tongue examination, B.P., pulse, weight, and abdominal examination was done. Lab investigations done for haemogram, microscopic and Ayurvedic stool examination were done. Separate case proforma was prepared and a criterion for cure of each symptoms its grade was decided.

OBSERVATIONS

Maximum incidence of *Atisar* found in patients belonging to age group 50-60 yrs, more of them i.e. 83% were married. Housewives and workers 38% were commonly affected. It is irrespective of *Prakruti* but *Vata dosha* plays prominent role in *Samprapti* of *Atisar*. 43% *Vataja Atisar* is more common *Katu* (pungent) spicy food was major cause found to cause *Atisar* (20 patients), after that heavy food is important cause (12 patients). In primitive symptoms (*Purvarupa*) *Udar tod* (slight pain in abdomen) and *Avipak* (undigested food) were common Most common symptom of *Atisar* is definitely frequency of watery stools with the pain in abdomen, dryness of mouth, thirst, loss of appetite are also some of the common symptoms. 46% of patients reduced number of motions on first day itself. Complete cure found within 1 day after using *Kutaja Ghana*, while in group B mild to moderate cure possible on first day. Majority of patient get cured within 2 days of treatment.

Table 1: Symptoms wise improvement in the treatment of Group A and Group B

Symptoms	Complete cure		Moderate cure		Mild cure		Uncured	
	Gr A	Gr B	Gr A	Gr B	Gr A	Gr B	Gr A	Gr B
Reduced no of motions 1st day	12	3	14	11	3	12	1	4
Reduced no of motions 2nd day	20	7	2	6	7	16	1	1
Increased interval between 2 motions	12	3	7	13	4	9	2	5
Increased interval of motions 2nd day	22	9	7	8	6	13	0	0
Consistency 1st day	29	10	0	0	0	0	1	20
Cons 2nd d	30	25	0	0	0	0	0	9
Micturation and defecation same time reduced 1st day	13	11	0	0	0	0	7	12
Micturation and defecation reduced 2nd day	20	16	0	0	0	0	0	7
Loss of appetite reduced	9	6	2	12	15	8	0	4
Pain in abdomen reduced	16	10	4	12	6	3	3	4
Headache	19	13	0	9	2	1	1	4
Skin turgor regain	5	8	0	0	1	0	3	3
Shabdasahishnuta (reduced capacity to hear sound)	20	16	1	0	4	7	1	5
Samata of stool	3	6	0	0	0	0	10	6
Samata of tongue	9	3	2	0	0		0	5

Statistical Analysis of the Data

Table 2: Data to judge effectiveness of *Kutaja Ghana*

S.No	Name of Varient	N1	SD	Mean	SE	T Value	Table value	conclusion
1	1 st day motion	30	2.975	5.1	0.441209	11.55915	1.699	significant
2	2nd day motion	30	3.8	5.8	0.499194	11.6161873	1.699	significant
3	Interval increased day 1	30	7.468	7.51	0.641566	11.7057	1.699	significant
4	Interval increased day 2	30	12.55	14.63	1.228304	11.9162	1.699	significant

Thus probability of occurrence of value obtained by chance is much less than 0.05, the critical of 5%level of significance. The difference is real in 98% experiments hence highly significant.

Statistical Analysis of the Data to Verify Difference Between the Effect of Drugs *Kutaja Ghana* and *Sanjivani vati*

Total population divided into two groups

Group 1-treated with *Kutaja Ghana*

Group B treated with *Sanjivani vati*

H0- it is assumed that there is no real difference between the effect of both drugs

H1-*Kutaja ghana* is better to cure symptoms than *Sanjivani vati*

Table 3: Unpaired t-test is applied for quantitative symptoms

Symptoms	SD	SE	DF	Mean A	Mean B	Calculated D Value	Table Value	Conclusion
1st day motion	4.9758	1.28	58	5.1	2.766	1.8167	1.672	Real difference
2nd day motion	6.1223	1.58	58	5.8	4.2	1.0122	1.672	No difference
Increased interval 1st day	8.1103	2.09	58	-7.51	-2.216	-2.5281	1.672	No difference
Increased interval 2nd day	15.19	3.92	58	-14.63	-5.983	-2.2047	1.672	No difference

There is no difference between the effect of *Kutaja* Ghana and *Sanjivani vati* in all symptoms except number of motions after one day treatment, *Kutaja Ghana* is more useful to reduce number of motions within one day.

Chi square test is for independence of attributes for qualitative symptoms

Table 4: Showing improvement in *Aruchi*

Cure grade	Complete	Moderate	Mild	Uncured	Total
Kutaja ghana	10	13	3	1	27
Sanjivani vati	5	7	12	3	27
Total	15	20	15	4	54
V1			10.117		
V2			7.82		

Kutaj is more effective to cure *Aruchi* than *Sanjivani vati*

Table 5: Showing improvement in *Jivha samats*

Cure grade	Complete	Moderate	Uncured	total
Kutaja ghana	9	9	12	30
Sanjivani vati	3	11	16	30
Total	12	20	28	60
V1		3.7713		
V2		5.99		

Both drugs are equally effective to cure *Jivha samata*

Table 6: Showing improvement in Cure micturation and defecation at the same time

Cure grade	Cure	Uncured	Total
Kutaja ghana	20	0	20
Sanjivani vati	13	7	20
Total	33	7	40
V1		8.6277	
V2		3.84	

Kutaja Ghana is more effective than *Sanjivani vati* to cure this symptom

Table 7: Showing improvement in Stool consistency 1st day

Cure grade	Cure	Uncured	Total
Kutaja ghana	29	1	30
Sanjivani vati	20	10	30
Total	49	11	60
V1		9.0167	
V2		3.84	

Thus stool consistency is effectively treated by *Kutaja ghana* within one day than *Sanjivani vati*

Table 8: Showing improvement in Stool consistency cured on 2 nd day

Cure grade	Cure	Uncured	Total
Kutaja ghana	30	0	30
Sanjivani vati	25	5	30
Total	55	5	60
V1		5.6545	
V2		3.84	

Thus *Kutaja* Ghana is more effective to improve stool consistency on 2 nd day.

Table 9: Showing improvement in *Samata* of stool

Cure grade	Cure	Uncured	Total
Kutaja ghna	3	10	13
Sanjivani vati	6	6	12
Total	9	16	25
V1		0.3963	
V2		3.84	

Both drugs are equally effective to cure *Samata* stool

Table 10: Showing improvement in Cured grade of cyst of EH

Cure grade	Cure	Uncured	Total
Kutaja ghana	2	9	11
Sanjivani vati	1	5	6
Total	3	14	17
V1		0.3963	
V2		3.84	

Both drugs are equally effective to cure cyst of EH in stool

Table 11: Showing improvement in Cure grade of *Kshudhamandya* (loss of appetite)

Cure grade	Complete	Moderate	Mild	Uncured	Total
Kutaja ghana	9	15	2	0	26
Sanjivani vati	6	8	12	4	30
Total	15	23	14	4	56
V1			14.042		
V2			7.82		

Kutaj ghana is more effective to cure loss of appetite

Table 12: Showing improvement in Cure grade of udarshula

Cure grade	Complete	Moderate	Mild	Uncured	Total
Kutaja ghana	16	6	4	3	29
Sanjivani vati	10	3	12	4	29
Total	26	9	16	16	58
V1			6.7814		
V2			7.82		

Both drugs are equally effective to cure pain in abdomen (Udarshul)

Table 13: Showing improvement in Cure grade of headache

Cure grade	Complete	Moderate	Mild	Uncured	Total
Kutaja ghana	19	2	0	1	22
Sanjivani vati	13	1	9	4	27
Total	32	3	9	5	49
V1			12.721		
V2			7.82		

Kutaja Ghana is more effective to cure headache.

Table 14: Showing improvement in Cure grade of Annadwesh food hatred-

Cure grade	Complete	Moderate	Mild	Uncured	Total
Kutaja ghana	16	1	0	4	21
Sanjivani vati	12	0	7	5	24
Total	28	1	7	9	45
V1			9,7681		
V2			7.82		

Kutaja Ghana is more effective to cure *Annadvesh*

Table 15: Showing improvement in Cure grade of *Utklesh* (nausea)

Cure grade	Complete	Moderate	Mild	Uncured	Total
Kutaja ghana	12	1	1	1	15
Sanjivani vati	10	0	0	4	14
Total	22	1	1	5	29
V1			6.2442		
V2			7.82		

Both drugs are equally effective to cure *Utklesh*

Table 16: Showing improvement in Cure grade of skin turgor

Cure grade	Complete	Moderate	Mild	Uncured	Total
Kutaja ghana	5	0	1	3	9
Sanjivani vati	8	0	0	3	11
Total	13	0	1	6	20
V1			2.4434		
V2			7.82		

Both drugs are equally effective to cure skin turgor

Table 17: Showing improvement in Cure grade of *Bhrama*

Cure grade	Complete	Moderate	Mild	Uncured	Total
Kutaja ghana	5	0	1	3	9
Sanjivani vati	8	0	0	3	11
Total	13	0	1	6	20
V1			2.4434		
V2			7.82		

Both drugs are equally effective to cure *Bhrama* (giddiness)

Calculated T Value in this experiment is higher than the higher value obtained by chance hence probability of occurrence (p) of value obtained by chance is much less than 0.05 the critical or 5% of significance. The difference is real in 98% experiments, hence highly significant. For quantitative symptoms compared to 't' test is applied. *Kutaja* is more effective to cure number of motions after one day treatment. Chi square test is applied to attributes for qualitative symptoms. In qualitative symptoms both drugs are equally effective to cure *Samata* of tongue, stool and EH cyst in stool, pain in abdomen etc. All other symptoms are better cured with *Kutaja Ghana*, this is statistically proven.

CONCLUSION

Kutaja is cost effective and easily available drug throughout India. *Kutaja* contains alkaloids which are responsible for its action on *Atisar*. Connesine is important alkaloid among them. *Kutaja* powder collected soon after rainy season from 8-10 yrs old plant is good for its medicinal value, it contains 3.5% of total alkaloids and *Kutaja Ghana* prepared from it by Ayurvedic authentic method contains 10.7 % of total alkaloids and also in analysis it was found with less impurities in Ghana preparation. Chromatograph of chloroform soluble extract of *Kutaja* powder shows 55.32% of connesine and that of Ghana is 99% connesine. In market preparations we found very less percentage of connesine as they may not follow proper collection and preparation method so this method we can use for standardization of *Kutaja Ghana*. Connesine can be identified or confirmed by NMR and mass index study. *Kutaja* is drug of choice for *Pittaja atisar*. Some OPD patients who are suffering from *Atisar* since many days or months and have tried lots of medicine are also relieved from the symptoms within 2 days with *Kutaja Ghana*.

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