



Research Article

ROLE OF KANA KAJJALI IN THE MANAGEMENT OF AJEERNA (INDIGESTION): AN OPEN CLINICAL STUDY

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ABSTRACT

Ajeerna (Indigestion) is the state of unfinished process of digestion of ingested food. *Kana Kajjali* is a classical formulation indicated in the treatment of *Ajeerna*. It is prepared by *Kana* (*Piper longum*)- a herbal drug and herbomineral preparation *Kajjali* (Black sulphide of mercury). In the present study, an effort has been made to assess the effect of herbomineral formulation *Samaguna* (Hg:S=1:1) *Kana Kajjali* and *Shadadguna* (Hg:S=1:6) *Kana Kajjali* (Black sulphide of Mercury with *Piper longum*) on indigestion.

Materials and methods: The study was carried out on 83 patients of indigestion. Patients were divided into three groups with simple random sampling method: Group A was treated with *Samaguna Kana Kajjali* tablet at the dose of 125 mg; Group B was treated with *Kana* tablet 250 mg; while group C was treated *Shadadguna Kana Kajjali* tablet at the dose of 125 mg; twice a day after meal. Duration of the treatment was 10 days. Assessment was done on the basis grading of classical signs and symptoms of the disease with application of paired t- test.

Results: Highly significant ($p < 0.001$) effect was seen in *Samaguna Kana Kajjali* group on symptoms like *Angamarda*, *Tiktoamlodgara* and *Shadadguna Kana Kajjali* on one *Vataja* symptom viz. *Pravahanam* and three *Kaphaja* symptom viz. *Utlesha*, *Arochaka* and *Avipaka* with best result with *Shadadguna Kana Kajjali* especially on *Kaphaja* symptoms.

Conclusion: Above study confirms that an increase in the concentration of *Gandhaka* in *Parada* enhances the therapeutic efficacy of the later drug.

KEYWORDS: *Kajjali*, *Murchhna*, *Samaguna Kajjali*, *Shadadguna Kajjali*, *Kana Kajjali*, *Ajeerna*, Indigestion.

INTRODUCTION

Acarya Charaka says that food can nurture *Deha* (Physical), *Dhatu* (Tissues) and *Ojas* (vigour) etc only when it has been properly processed on by *Agni*.^[1] Digestion of food (*Aahaara-pachana*) is a very complex phenomenon that requires exact and accurate conglomeration of so many factors that in Ayurveda includes the quality of food, codes and conducts of food consumption. Thus, right from the type of the food to the condition of consumer, *Agni* is predominant for proper digestion and metabolism of food. If at any stage, *Agni* balance is troubled it will certainly lead to improper digestion and metabolism which will ultimately result into release of biotoxins (*Aamotpatti*) and genesis of various disorders. *Ajeerna* is the condition of incomplete state of digestion of ingested food due to *Mandagni*.^[2] *Ajeerna anna*, partially digested, sour in taste and toxic in nature is termed as *Annavisha* also which produces

the diseases according to associated *Doshas*. Indigestion, or dyspepsia, is a term frequently used to describe a variety of symptoms generally appreciated as distress associated with the intake, of food. To some patients indigestion refers to actual abdominal pain, pressure, or heartburn. Others may use the term to describe a sense of abdominal fullness or a vague feeling that digestion has not proceeded naturally. Still others may use it to describe belching, a feeling of excessive gas, or flatulence. Symptoms of dysphagia, anorexia, and nausea and vomiting etc are closely related to indigestion.

Kajjali (black sulfide of mercury) is a preparation which is made either triturating *Parada* (Mercury) with *Gandhaka* (Sulphur) alone in different proportions or *Parada* (Mercury) with *Gandhaka* (Sulphur) along with other metals and minerals without using any liquid and is converted into very

soft powder, just like collyrium.^[3] The *Kajjali* when used properly along with other metals or herbs can cure all the diseases, pacify all the three humors (*Tridoshahara*), increases *Shukradhatu* (*Vrishya*), immediately spreads in the body when consumed, clears the obstructed channels at the diseased organ, and enhances the properties of other metallic or herbal medication when taken along with proper *Anupana*.^[4]

Hundreds of formulations are explained in classical texts with the permutation combination of *Kajjali* which is combination of Sulphur and Mercury in varying proportion along with/ without other metals/minerals or herbal ingredients.^[5] *Kana Kajjali*, is a one such example of herbomineral formulation containing *Kajjali* and herbal drug *Kana* (*Piper longum*)^[6] and is indicated in the treatment of *Ajeerna*. In the present research work *Kana Kajjali* has been trialed to check its efficacy in the mentioned clinical condition.

Aims and Objectives

- To assess the effect of *Samaguna Kana Kajjali* tablet (Black sulphide of Mercury, Hg: S=1:1), *Kana* tablet (*Piper longum*), *Shadadguna Kana Kajjali* tablet (Black sulphide of Mercury, Hg: S=1:6) in patients of *Ajeerna* (Indigestion).
- To assess the role of Sulphur in *Kana Kajjali* in the patients of *Ajeerna*.
- To assess role of quantity of Sulphur in *Kajjali* in treatment of the disease.

Materials and Methods

Patients having classical signs and symptoms of *Ajeerna*, attending the OPD and IPD of Rishikul Govt. Ayurveda College, Haridwar and Govt. Ayurveda College, Bolangir, Odisha were selected without any bar of cast, religion, occupation, and sex.

Test drug: *Kana Kajjali* is a formulation consisting of herb *Kana* (*Piper longum*), *Kajjali* triturated in *Adraka* (*Zingiber officinalis*) Swaras. All the drugs were procured from authentic sources. In *Samaguna*

Table No-1

Group	Drug	Form of Drug	Dose	Time	Anupana	No. of Pts
A	<i>Samaguna Gandhaka Jarita Kana Kajjali</i>	Tablet	125 mg	After meals- twice a day	<i>Takra</i>	27
B	<i>Kana</i> Extract tab.	Tablet	125 mg	After meals- twice a day	<i>Takra</i>	27
C	<i>Shadaguna Gandhaka Kana Kajjali</i>	Tablet	125 mg	After meals- twice a day	<i>Takra</i>	29

Assessment criterion

Assessment criteria were based on subjective parameters of *Ajeerna* (Indigestion). All clinical manifestation was categorized in accordance to *Doshika* involvement as *Vataja*, *Pittaja*, *Kaphaja* and gradations of each manifestation were made as under.

Kana Kajjali ratio of mercury to sulphur is 1:1 triturated with *Adraka swaras* while in *Shadaguna Kana Kajjali* it was 1:6. Both the formulations were levigated with *Adraka swaras* in accordance to the reference text *Siddha Bhaishya Manimala*. *Kana* extract tablet was prepared as per reference of API.

Research design

It was an open clinical trial (study).

Statistical design

Paired "t" test was used to assess the effect of therapy in each group. The results were interpreted at $p < 0.05$, $p < 0.01$ and $p < 0.001$ significance levels. The obtained results were interpreted as: Insignificant if P value is not < 0.1 Significant $P < 0.05$, $P < 0.01$ highly significant $P < 0.001$

Inclusion criteria

- Patients suffering from *Ajeerna* (Indigestion) – chronicity of maximum 2 weeks.
- Patients with decreased *Agni-Bala* (digestive power).
- Patients between 18 to 60 years of age.

Exclusion criteria

- Sufferers from diseases other than *Ajeerna* (Indigestion).
- Patients with the symptoms > 2 weeks.
- Patients on drugs causing hyperacidity.

Grouping and posology

Patients were randomly divided into three groups:

1. **Group A:** Treated with *Samaguna Kana Kajjali* tablet 125 mg; 1 tablet twice a day after meal with *Takra*.
2. **Group B:** *Kana* extract tablet 125 mg; 1 tablet twice a day after meal with *Takra*.
3. **Group C:** Treated with *Shadaguna jarita Kana Kajjali* 125 mg; 1 tablet twice a day after meal with *Takra*.

Patients of all groups were treated for duration of 15 days.

Vataja Symptoms

1. *Vishtambha* (Severe Constipation)

Symptom	Grade
Not at all	: 0
Occasionally/at 1 meal time per 24 hrs without trouble	: 1
For first 24 hrs with trouble	: 2
For > 24 hrs with marked trouble	: 3

2. *Sadanam* (Loss of Physical activities)

Symptom	Grade
Not at all	: 0
Able to carry out all types of activities but feeling of “well-being” is lost	: 1
Able to carry out only routine activities	: 2
Not able to carry out even routine activities	: 3

3. *Angamarda* (Bodyache)

Symptom	Grade
Not at all	: 0
Mild bodyache, not alarming	: 1
Mild to moderate body ache, alarming	: 2
Severe body ache	: 3

4. *Prushthagraha* (Stiffness in Lumber area)

Symptom	Grade
Not at all	: 0
Occasional and bearable	: 1
Often and unbearable	: 2
Daily and unbearable	: 3

5. *Katigraha* (Stiffness in Low back area)

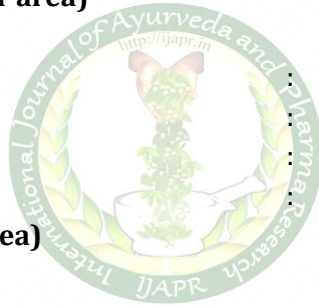
Symptom	Grade
Not at all	: 0
Occasional and bearable	: 1
Often and unbearable	: 2
Daily and unbearable	: 3

6. *Shiraso ruk* (Headache)

Symptom	Grade
Not at all	: 0
Occasional but not troubling	: 1
Occasional, troubling to some extent, no need of medication	: 2
Often/daily, medication needed	: 3

7. *Pravahanam* (Straining at the time of defecation)

Symptom	Grade
Easy defecation	: 0
Needs to make some efforts for defecation	: 1
Needs to make great efforts for defecation, Purgatives needed occasionally	: 2
No defecation without taking purgatives	: 3



8. Vibandha (Constipation)

Symptom	Grade
Defecation : daily, stool consistency- semisolid	: 0
Defecation : daily, stool consistency- solid	: 1
Defecation : 1time/2days, stool consistency- solid and hard	: 2
Defecation: 1time/>2days, stool consistency- solid and very hard	: 3

Pittaja Symptoms**9. Pravritti (Defecation frequency)**

Symptom	Grade
Defecation frequency: Normal as per <i>Prakriti</i>	: 0
Defecation frequency: Occasional increased with/without change in stool consistency	: 1
Defecation frequency: Often increased with loose motion	: 2
Defecation frequency: Daily increased with loose motion /Watery diarrhea	: 3

10. Jvara (Fever)

Symptom	Grade
Not at all	: 0
Feverish feel only, No need to take medicine	: 1
Mild to moderate raise in body temperature, Occasionally takes medicine	: 2
High grade fever, needs to take medicine regularly	: 3

11. Bhrama (Giddiness)

Symptom	Grade
Never feels giddy	: 0
Occasional feels giddy on standing or walking for a long time	: 1
Often feels giddy, even on changing body position	: 2
Daily feels giddy, even in supine position	: 3

Kaphaja Symptoms**12. Guru udarava (Heaviness in Abdomen)**

Symptom	Grade
No complain of heaviness in abdomen	: 0
Heaviness of abdomen most of the times a day	: 1
Rarely heaviness of abdomen	: 2
Heaviness of abdomen everyday	: 3

13. Utklesha (Nausea)

Symptom	Grade
No feeling of Nausea	: 0
Feeling of Nausea only	: 1
Nausea with occasional vomiting, fequency:1 to 2 times/ day	: 2
Daily vomiting, frequency:> 2 times/ day	: 3

14. Arochaka (Loss of appetite)

Symptom	Grade
Good appetite	: 0
Decreased appetite but food-intake is normal	: 1
Loss of appetite with decreased intake of solid food	: 2
Complete loss of appetite, can take liquid diet only	: 3

15. Avipaka (Indigestion)

Symptom	Grade
Normal food digestion	: 0
Occasional indigestion	: 1
Often indigestion	: 2
Daily indigestion	: 3

16. Tikta Amla Udgara (Sour and Bitter Belching)

Symptom	Grade
No sour and bitter belching	: 0
Sour and bitter belching after taking some spicy food	: 1
Sour and bitter belching after taking any type of food	: 2
Sour and bitter belching having no relation with food intake	: 3

Criteria for assessment of overall effect of therapy:

Total effect of therapy was assessed by taking into account the overall fall in the grades of *Ajeerna* (Indigestion) and improvement in the signs and symptoms of the same disease after treatment. Overall effect of therapy was determined by measuring the obtained results according to the grades mentioned below:

Relief (in %)	Overall effect of therapy
100	Cured/complete remission
>75	marked improvement
50-75	Moderate improvement
25-50	Mild improvement
<25	Unchanged/no improvement

Table 2: Showing data regarding effect of Samaguna Kana Kajjali on patients of Ajeerna (Indigestion) - Group-A

Symptom	No. of pt	BT mean	AT Mean	% imp	SD	SE	t	P
<i>Vataja</i>								
<i>Vishtambha</i>	05	1.80	1.40	22.22	0.54	0.24	1.63	<0.1
<i>Sadanam</i>	09	1.77	1.55	12.42	0.44	0.14	1.5	<0.1
<i>Angamarda</i>	22	1.54	0.90	41.55	0.49	0.10	5.79	<0.001
<i>Katigraha</i>	07	1.57	0.71		0.69	0.26	3.28	<0.01
<i>Shiraso ruk</i>	12	1.83	1.33	27.32	0.79	0.23	2.17	<0.05
<i>Pravahanam</i>								
<i>Pravahanam</i>	16	1.50	1.31	12.66	0.40	0.10	1.86	<0.05
<i>Vibandha</i>	22	1.90	1.40	26.31	0.85	0.18	2.73	<0.01
<i>Pittaja</i>								
<i>Pravritti</i>	02	1.00	0.5	50	0.70	0.50	1	<0.1
<i>Amlodgara</i>	16	1.81	1.31	27.62	0.51	0.12	3.87	<0.05
<i>Bhrama</i>	18	1.77	1.50	15.25	0.57	0.13	2.05	<0.05
<i>Kaphaja</i>								
<i>Utklesa</i>	22	1.90	1.50	21.05	0.56	0.12	2.62	<0.01
<i>Gurutwa</i>	22	2.65	2.03	24.23	1.16	0.35	1.80	<0.1
<i>Arochaka</i>	18	1.94	1.50	22.68	0.70	0.16	2.67	<0.01
<i>Avipaka</i>	18	1.94	1.50	22.68	0.70	0.16	2.67	<0.01
<i>Tikto amlodgara</i>	12	1.90	1.13	40.52	0.61	0.13	5.92	<0.001

Table 3: Showing data regarding effect of Kana tablet in patients of Ajeerna (Indigestion)-Group-B

Symptom	No. of pt	BT mean	AT mean	% imp	SD	SE	t	P
Vataja								
Vishtambha	08	1.50	1.00	33.33	0.53	0.18	2.64	<0.05
Sadanam	12	1.15	1.08	6.08	0.51	0.14	2.8	<0.05
Angamarda	12	1.41	0.91	35.46	0.52	0.15	3.31	<0.01
Katigraha	09	1.55	0.88	43.22	0.70	0.23	2.82	<0.05
Shiraso ruk	08	1.62	1.50	7.40	0.82	0.29	1.22	<0.1
Pravahanam	06	1.66	1.10	33.73	0.51	0.21	3.16	<0.05
Vibandha	05	1.4	1.2	14.28	0.44	0.20	1.0	<0.1
Pittaja								
Pravritti	04	1.75	1.25	28.57	0.57	0.28	1.73	<0.1
Amlodgara	05	1.2	1.0	16.66	0.44	0.20	1.00	<0.1
Bhrama	05	1.4	1.0	28.57	0.54	0.24	1.63	<0.01
Kaphaja								
Utklesa	23	2.04	1.69	17.15	0.64	0.13	2.57	<0.01
Gurutwa	15	1.53	1.40	8.49	0.35	0.09	1.46	<0.1
Arochaka	20	2.0	1.6	20.00	0.68	0.15	2.62	<0.01
Avipaka	24	2.0	1.66	17.00	0.63	0.13	2.56	<0.01
Tikto mlodgara	06	1.28	0.57	55.46	0.48	0.18	3.87	<0.01

Table 4: Showing data regarding effect of Shadaguna Kana Kajjali in patients of Ajeerna (Indigestion) Group-C

Symptom	No. of pt	BT mean	AT mean	% Imp	SD	SE	t	P
Vataja								
Vishtambha	08	1.87	0.87	53.47	0.92	0.32	3.05	<0.01
Sadanam (Loss of physical activities)	10	1.80	0.80	55.85	1.05	0.33	3.00	<0.01
Angamarda	16	1.62	1.18	27.16	0.62	0.15	2.78	<0.01
Katigraha	14	1.64	1.28	21.95	0.63	0.16	2.11	<0.05
Shiraso ruk	12	1.66	0.83	50.00	1.02	0.29	2.80	<0.01
Pravahanam	12	2.00	1.25	37.50	0.45	0.13	5.74	<0.001
Vibandha	11	1.90	1.27	33.15	0.67	0.20	3.13	<0.01
Pittaja								
Pravritti	04	1.5	1.0	33.33	0.57	0.28	1.73	<0.1
Amlodgara	08	1.87	0.75	59.81	0.88	0.29	3.81	<0.01
Bhrama	14	1.83	1.16	36.61	0.77	0.22	2.96	<0.05
Kaphaja								
Utklesa	22	2.22	1.59	28.37	0.72	0.15	4.10	<0.001
Gurutwa	10	1.70	1.00	41.17	0.67	0.21	3.28	<0.01
Arochaka	22	2.09	0.9	56.93	0.79	0.16	6.97	<0.001
Avipaka	29	2.17	1.72	20.73	0.68	0.12	3.52	<0.001
Tiktoamlodgara	22	1.90	1.50	21.05	0.56	0.12	2.62	<0.01

Observations and Results

A total 102 patients were registered, out of which only 83 completed the trial while 19 dropped out. In the present clinical trial, maximum of patients i.e. 33.73% were of 40-50 years of age group and male(71%). Due to their irregular food habits, excessive intake of oily, fried spicy food, Consumption of alcohol, cigarette smoking etc, and more male population was found to be effective from the disease. Out of total number of patients, 83.13% were Hindu while 14.45% were Muslims. Maximum no. of patients i.e. 39.75% had *Sama Agni, Madhyam Kostha* (54.21%) and were vegetarian (83.13 %). Maximum number of patients were having the habits of *Viruddhashana* (37.34%) followed by *Vishamashana* (31.32%). 56.62% were predominately taking *Katu rasa ahara*; 62.65% were having dominance of *Guru guna* followed by *Snigdha guna* (57.83%). 61.44% were consuming more water intake while maximum 34.9% patients were in habit of consuming tea more than 3-4 times a day. Only 4.81% patients were taking excessive tea (more than 10times). 61.4% patients were indulged in *Divaswapna*, 46.98% were having the habit of suppressing urge of urination, 59.03% patients had never done *Vyayama*. All the patients registered in the trial were having *Sama mala pravritti*. Maximum 32.53% patients were of *Vata-Pitta Prakriti* followed by 21.68% patients having *Vata-Kapha Prakriti*. *Vata dosha* is responsible for power of *Agni* or normal condition of *Agni* and its vitiation leads to *Ajeerna*. Maximum 71.08% were having *Avara Sara* while *Madhyama Samhanana, Madhyama Satva* and *Madhyam Abhyavaharana Shakti* was recorded in 67.4%, 55.42% and 60.24% patients respectively. Maximum 81.92% patients were having *Avara Jarana Shakti*. 51.80% were having *Avara atura bala*. 60.24% and 63.85% patients were in the habit of *Ajeerna bhojana* and *Guru bhojana* respectively. Patients indulged in *Vishamashana, Asatmya bhojana, Sheeta bhojana* and *Atirooksha-bhojana* were 43.37%, 26.50%, 16.86% and 12.04% respectively while 53.01% patients had habit of *Atyambupana*. All patients i.e. 100% patients *Rasavaha srotodushti* was seen followed by 92.5% patients having *Dushti* of *Annavaha srotasa*. *Pureeshavaha, Udakavaha Mootravaha srotodushti* was seen involved in 77.10%, 45.78%, 28.91% patients respectively. Minimum 9.63% patients were showing characteristics of *Mamsavaha srotodushti*. *Rasavaha srotasa dushti* may be due to vitiation of *Agni* and *Samana Vayu*. *Annahavaha sroto dushti* may be due to consumption of etiological factors which vitiate *Agni* and *Pitta* produced these symptoms. Also drinking excessive water is a causative factor for *Ajeerna* as it suppresses the activity of digestive enzymes.

Results

Group-A (*Sama guna jarita Kana Kajjali*): Group-A has shown significant effect on symptoms of *Kapha* i.e. *Utklesha, Arochaka, Avipaka* ($p<0.01$), while on two out of three *Pittaja lakshanas* viz. *Brama* and *Amlodgara* ($p<0.05$). Similarly, the effect of *Sama guna Kana Kajjali* was significant on *Vibandha, Katigraha*, ($p<0.01$); *Shirosoruk, Pravahanam* ($p<0.05$). Out of 15 symptoms, one *Vataja* symptom viz., *Angamarda* and one *Kaphaja* symptom viz. *Tiktoamlodgara* were found to be statistically highly significant ($p<0.001$). *Vatika* symptom *Vishtambha, Sadanam, Pattika* symptom *Pravritti* and *Kaphaja* symptom *Gurutwa* were improved non-significantly ($p<0.1$).

Group B (*Kana tablet treated group*): The effect of group B (*Kana tablet treated group*) was found to be significant ($p<0.01, p<0.05$) on all symptoms except two *Vatika* symptoms i.e. *Shirosoruka* and *Vibhandha*; two *Pattika* symptoms viz. *Amlodgara* and *Pravritti* and one *Kaphaja* symptom i.e. *Gurutawa* ($p<0.1$). None of the symptom was improved to highly significant level. (Table no-3)

Group C (*Shada guna Jarita Kana Kajjali*): In this group, significant improvement was seen in 2 symptoms of *Kapha* i.e. *Gurutwa* and *Tikatamlodgara* ($p<0.01$); two out of three *Pittaja lakshanas* viz. *Brama* ($p<0.05$) and *Amlodgara* ($p<0.01$). Similarly, the effect of *Sadaguna jarita Kana Kajjali* was significant on *Vishtambha, Sadanam, Angamarda, Shirosoruk, Vibandha* ($p<0.01$) and *Katigraha* ($p<0.05$). Only one *Pattika* symptom viz. *Pravritti* was improved non-significantly ($p<0.1$). Out of 15 symptoms, one *Vataja* symptom viz. *Pravahanam* and three *Kaphaja* symptom viz. *Utklesha, Arochaka and Avipaka* were found to be statistically highly significant ($p<0.001$).

DISCUSSION

Ajeerna is the state of incomplete state of digestion of ingested food.^[7] The main reason for indigestion is the deranged functions of *Agni*. Persons who consume food in excessive quantities irresponsibly prone for the progress of *Ajirna* which may lead progress of many diseases.^[8] Undigested food leads to genesis of *Aama* which means raw or undigested food. Functionally weak *Agni* i.e., *Mandagni*, causes improper digestion of ingested food, which leads to *Ama Dosha*.^[9] This *Ama Dosha* is a root cause of most of the diseases. It has pivotal importance in the pathogenesis of every *Roga*.^[10] Any disease has two stages: *Amavastha* and *Niramavastha*. If the disease is in *Amavastha*, first line of the treatment is to remove *Ama* and make the disease *Nirama*, and then after that the particular treatment of the disease should be applied.

Highly significant effect was seen in *Samaguna Kana Kajjali* group on symptoms like *Angamarda*, *Tiktoamlodgara* and *Shadguna Jarita Kana Kajjali* on one *Vataja* symptom viz. *Pravahanam* and three *Kaphaja* symptom viz. *Utlesha*, *Arochaka* and *Avipaka* as shown in table no 2 and 4 respectively. Here, Sulphur acts by its *Ushna Virya*, *Amadosa Nasaka* property, *Yogavahi*, *Rasayana*, *Deepana*, *Sita Saman*, *Vrihana*, *Balya*, *Tikshna* reducing *Vata kapaha dosha* helps in correcting *Agni* and thereby the condition of *Ajeerna*. According to the *Samanya– Vishesa* principle *Samaguna Kana Kajjali* and *Shadguna Jarita Kana Kajjali* with its *Tikshna Guna* causes *Bhedana* of *Kapha* in *Ajirna*, which is stuck to the *Srotasa* by *Picchila* and *Sandra Guna*. Once the *Dosha* is separated from the *Srotasa*, the *Ushna Guna* of *Samaguna Kana Kajjali* and *Shadguna Kana Kajjali* causes *Vilayana* of *Kapha*. *Kaphasthivana* causes *Srotoshuddhi* and hence, *Vata Sanga* and *Vimarga-gamana* are corrected leads to *Ajeerna Shamana*. This correction is even more pronounced in *Shadadguna Kana Kajjali* group because concentration of Sulphur is even more as compared to *Samaguna Kana Kajjali*. Above finding also confirms the ancient concept of potency of Mercury in terms of Sulphur assimilation. More the ratio of *Gandhaka* (Sulphur) digested in Mercury better will be its therapeutic strength and wider will be its therapeutic application. The mercury digested with six times of *Suddha Gandhaka* (Purified sulphur) not only gains therapeutic potency but exhibits the rejuvenation properties.^[14] The idea could be to prevent oxidation as well as to make available more sulphur. Many biomolecules such as methionine, cysteine, cystin, taurine, and antioxidant enzymes such as glutathione (GSH) and many more, contain sulphur.^[12] *Samaguna Kana Kajjali* or *Shadguna Kana Kajjali* may induce excess synthesis of Sulphur containing biomolecules in human systems. The biomolecules themselves could be the curative agents in *Ajeerna* while mercury could serve as a transient catalyst^[13] in *Ajeerna*. Trituration of *Pippali* with *Samaguna Kajjali* and *Shadguna Kajjali* brings out the structure of the amalgam as different layers of herbal medical principles with inert molecular layer of *Kajjali*.^[14] *Pippali* is known as bioavailability enhancer.^[15] Thus, combination of *Samaguna Kajjali* and *Shadguna Kajjali* with *Pippali* further enhance the therapeutic value. This might be the reason behind the result obtained in only *Pippali* treated group as compared to other two groups. In *Shadadguna Kana Kajjali* contains six parts of Sulphur which was in organic form important in secreting many digestive enzymes. *Samaguna Kana Kajjali* or *Shadguna Kana Kajjali* has properties like *Rasayana* (antiageing) and *Yogavahi* (as catalyst),

Sarvaamayahara (broad spectrum). These properties of *Kajjali* are necessary to improve efficacy and potency of *Pippali*. *Yogvhitwa* property has worth in pharmacokinetics of drug as it drags *Pippali* towards the target tissue down in to the deeper and most out of reach parts of the digestive system. *Shadadguna Kana Kajjali* have the supremacy of *Katu*, *Tikta rasa*, *Ushna veerya* and *katu vipaka* may increase *Agni*. This shows that *Shadadguna Kana Kajjali* has augmenting effect on *Agnidipana* according to the *Rasa*, *Vipaka* and *Virya*. The micro particle size of *Shadadguna Kana Kajjali* coordinates well with the colloidal size and this propose the possibility that these colloidal particles are get connected to the human digestive tract and provide a large surface zone subsequently increasing the assimilation of *Kana* (*Piper longum*). In *Samaguna Kana Kajjali* and *Shadguna Kana Kajjali* levigation with ginger improves the digestion helping bowel movements and relaxing the muscles controlling the digestive system. Ginger is considered as an adjuvant in many Ayurvedic formulas in which it enhances absorption and prevents gastrointestinal side effects.^[16] Elements present in *Samaguna Kana Kajjali* and *Shadadguna Kana Kajjali* may have neuro-chemical irritant action in intestinal mucosa not get absorbed through the intestinal tract because of its negative zeta potential and furthermore because of its insolubility. This might be the reason the medication is said to be non-poisonous.^[17]

CONCLUSION

The present clinical study clearly confirmed the positive effects of both the *Kana Kajjali* in *Ajeerna* (Indigestion) as evidenced by highly significant effect was seen in *Samaguna Kana Kajjali* group on symptoms like *Angamarda*, *Tiktoamlodgara* and *Shadguna Kana Kajjali* on one *Vataja* symptom viz. *Pravahanam* and three *Kaphaja* symptom viz. *Utlesha*, *Arochaka* and *Avipaka*. Above study confirms that an increase in the concentration of *Gandhaka* in *Parada* enhances the therapeutic efficacy of the later drug. No significant adverse effects were either reported or observed during the entire study period and in general observance to the treatment was good. Therefore, it can be concluded that *Shadguna Kajjali* is clinically effective more to two other groups *Samaguna Kajjali* and *Kana* extract and safe in the management of *Ajeerna*.

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