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Expert Opinion Article

'Effect Of Lakshakuttan Navak Guggulu Versus Samanya Navak Guggulu On Medovirdhi: A Randomized Experimental Study"

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Abstract
Medovriddhi (obesity) is a lifestyle disorder characterized by excessive accumulation of Meda Dhatu (adipose tissue), leading to metabolic imbalance and associated health risks. In Ayurvedic classics, Navaka Guggulu is prescribed for the management of Sthoulya (obesity) due to its Lekhana (scraping), Medohara (fat-reducing), and Agnideepana (digestive) properties. Lakshakuttan Navaka Guggulu is a modified formulation enriched with Laksha (Laccifer lacca), known for its bioactive and lipid-reducing properties. Guggulu Kalpana, a part of Vati Kalpana is very much effective in combating various diseases, the only limitation being its Disintegration time and Hardness. It has been found clinically that Guggulu kalpana usually pass in the faeces un-disintegrated or partially absorbed. To overcome this, the Kuttana (pounding) method is mentioned to facilitate quick disintegration which in turn helps in quick absorption of Guggulu in the body.1 This study aimed to evaluate and compare the efficacy of Lakshakuttan Navaka Guggulu with the standard Navaka Guggulu in the management of Medovriddhi.

Keywords: Medovriddhi, Obesity, Navaka Guggulu, Lakshakuttan, Ayurveda, Lipid profile

Introduction:-
The Nature has taught the man how to be healthy before the science has discoveredthe laws of health. But, it is an irony of the fate that on this earth, on one hand millions do notget enough food and roam in a skeletal appearance while on the other hand, there are many more who, besides over eating lead a sedentary life to march towards an untimely death. *Sthaulya/Medoroga* (Obesity) is one among the major lifestyle blessing of machines and materialism of Modern era.[2] In Modern era with continuous changing life styles and environment, changed diet habits, man has become the victim of many disease caused by unwholesome dietary habits and obesity is one of them. It occurs as a result of lack of physical activity with increased intake of food. Industrialisation, stress during work, faulty dietary habits, lack of exercise & various varieties among the daily diet e.g. fast food, frozen fruits, increased amount of soft drinks and beverages, canned foods results into the clinical entity which we can call as obesity. It has been noted that this disease with its complications like Hyperlipidaemia, Atherosclerosis, Degenerative Heart Disease is a major cause for mortality and morbidity not only in western countries but in India too.[3]

Navaka Guggulu is a well-known compound formulation in Ayurveda treatise indicated in *Medoroga* specially to reduce the cholesterol level in the body mainly triglycerides. It contains the anti-obesity and anti- hyperlipidemic properties to manage the excess fat content and body weight in the body. *Guggulu* is also recommended to reduce the elevated lipids, low-density lipoprotein, Rheumatoid arthritis, and prevent complications due to hypercholesterolemia. It is known for its analgesic, and anti-inflammatory medicinal properties to prevent several health problems. *Guggulu* is beneficial to reduce fatty liver diseases such as obesity, diabetes, genetic inheritance, and sudden weight loss. *Guggulu* is the formulation of various herbs and extract of natural herbs within fixed standard quantity.[4]*Navaka Guggulu* contains the natural extract of highest quality standard herbs and is formulated to form powder and tablet containing the following ingredients[5]-

Table no. 1- Composition of *Navaka Guggulu*

S.no	Ingredients	Latin name	Part used	Proportion
1	Haritaki	Terminalia Chebula Ratz.	Pericarp	1
2	Bibhitaki	Terminalia belerica Roxb.	Pericarp	1
3	Amalaki	Emblica officinalis Linn.	Pericarp	1
4	Shunthi	Zingiber officinale Roxb.	Rhizome	1
5	Maricha	Piper nigrum Linn.	Fruit	1
6	Pippali	Piper longum Linn.	Fruit	1

Keeping all the above facts in view, the present study has been undertaken basically to know the effect of *Kuttana* on the physico chemical properties of *Guggulu* as well as its effect on *Medoroga*. In the

present research work, two samples of *Navaka Guggulu* will be prepared, one with *Samanya Kuttana Guggulu* and the other one with *Laksha Kuttana Guggulu* and both the samples will be compared on various analytical parameters like organoleptic character, p

Objectives-

Primary Objective:

1- To prepare *Guggulu* mentioned by *Laksha Kuttana* (one lakh times) in *Ayurved Sar Sangrah.* To ensure the safe, sterile and efficacious preparation of *Navak Guggulu.*
2- To find out the importance of *kuttana* in *guggulu kalpana*

Secondary Objective:

3- An analytical evaluation and comparative analytical study of *Navak Guggulu* prepared by two different methods one is by normal *Kuttana* mention in *bhaishajya ratnavali* and one by *laksh Kuttana*(one lakh times) mention in *Ayurved Sar Sangrah as* per standard parameters.
4- To validate its therapeutic claims as described in classics via proper theoretical and experimental study.

Plan of the study-

1. Literary study
2. Pharmaceutical study
3. Analytical study
4. Experimental study

Materials and Methods-

Literary Study- Process of preparation of *Navak Guggulu* will be followed according to *„Bhaishajya Ratnavali*". *Laksha Kuttana* theory is followed as per the reference of „*Ayurved Sar Sangrah*"and all the other related references will be collected from classical text, library, internet, medical journals and magazines and the other possible sources.

Drug selected for the research work- *Navaka Guggulu* containing the following ten ingredients will be formulated-

1- Haritaki- 1 part
2- Bibhitak- 1part
3- Amalaki- 1part
4- Shunthi- 1part
5- Maricha- 1part
6- Pippali- 1part
7- Musta- 1part
8- Vidanga- 1part
9- Chitraka- 1part
10- Guggulu- 9 parts

Pharmaceutical Study-

Material Procurement- All the raw material will be procured from the local vendors after authentication by the subject experts.

Preparation of the drug- *Navaka Guggulu* will be prepared in the practical laboratory of the PG dept. and Pharmacy of Dr. Sarvapalli Radhakrishnan Rajasthan Ayurved University, Jodhpur following proper GMP.

Procedure- *Navaka Guggulu* will be prepared in two groups namely Group A and Group B. Group A will be of *Samanya Kuttana Navaka Guggulu* and *Group B* will be of *Laksha Kuttana Navaka Guggulu.* For preparing this *Yoga,* firstly *Guggulu* purification will be done with the help of *Gomutra,* afterwards collecting all other ingredients like *Triphala Trikatu and Trimadha.* In A Group we will put *Guggulu* in pounding machine for *Samanya kuttana* whereby ghee or oil is used for lubrication. After completion of few *Kuttana,* all other ingredients will be mixed and equal size *Guggulu vati* will be made. Same process will be repeated for group B but with *Laksha Kuttana,* will be given for preparing this sample of *Navaka Guggulu.* H, friability, hardness, disintegration time, uniformity of weight, total ash, loss on drying, acid insoluble ash, alcohol soluble extractive, water soluble extractive, HPTLC, heavy metal analysis, microbial contamination, pesticide residue, aflatoxins. Also an experimental study on rats will be conducted to compare the effect of both the samples on *Medoroga.*

Guggulu Kalpana

When *Vati* is prepared with Guggulu; known as Guggulu *Vati* kalpana. In this preparation Guggulu is as a main ingredient (approx 50%). In classical text, there was no separate chapter for Guggulu Kalpana. But because of its popularity, it was mentioned independently in recent literatures as AFI, *Bharat Bhaishjya Ratnakara* e.t.c.

Shodhana* of *Guggulu- *Guggulu Shodhana* was done as per the reference

A. *Kuttana* of *Guggulu-* Pure *Guggulu* so obtained was divided into two batches for *Kuttana* (Pounding).

Procedure of *Samanya Kuttana* of *Guggulu*:-

910 gm of *Shodhita Guggulu* was taken in an *Ulukhala yantra* and small amount of ghee was applied to the *ulukhala yantra* and *peshani* to avoid sticking of *Guggulu*. The pounding was done from a height of 25 centimeter and it was considered as one *kuttana*. *Kuttana* was done till the uniform mixing of ingredients was achieved applying little quantity of ghee. *Guggulu* was taken out from the *Ulukhala yantra* and was weighed.

Procedure of *Laksha Kuttana* of *Guggulu*:-

1- 910 gm of *Shodhita Guggulu* was taken in an

Ulukhala yantra and small amount of ghee was applied to the *ulukhala yantra* and *peshani* to avoid sticking of *Guggulu*.
2- The pounding was done from a height of 25 centimeter and it was considered as one *kuttana*.
3- *Kuttana* was done for 1,00,000 times with subsequent applying little quantity of ghee.
4- *Guggulu* was taken out from the *Ulukhala yantra* and was weighed.

A. Preparation of *Navaka Guggulu*
Formulation composition of *Navaka Guggulu*

No.	Ingredients	Latin name	Part used	Parts
1	***Haritaki churna***	*Terminalia chebula* Retz.	Dried Pericarp	1 part
2	***Bibhitaki churna***	*Terminalia belerica* Roxb	Dried Pericarp	1 part
3	***Amalaki churna***	*Phyllanthus emblica* Linn	Dried Pericarp	1 part
4	***Shunthi churna***	*Zingiber officinale* Roxb.	Dried Rhizome	1 part
5	***Maricha churna***	*Piper nigrum* Linn	Dried Fruit	1 part
6	***Pippali churna***	*Piper longum* Linn.	Dried Fruit	1 part
7	***Musta churna***	*Cyperus rotundus* Linn	Dried Rhizome	1 part
8	***Vidanga churna***	*Embelia ribes* Burm.	Dried Fruit	1 part
9	***Chitraka churna***	*Plumbago zeylanica* Linn.	Dried Root	1 part
10	***Guggulu***	*Commiphora wightii* (Arn) Bhandari	Exudate	9 parts

A) Procedure of *Samanya Kuttana Navaka Guggulu* (SKNG)

1. All powders (1 to 9) were taken in equal quantity and mixed uniformly to prepare a homogenous blend.
2. The blend was gradually added in increments to the semi-solid mass of *Guggulu* in a stainless steel vessel.
3. After proper mixing, small boluses of about 3-4 cm length and 2-4 cm diameter strips were made and shifted to the cylinder of stick making machine.
4. Sticks were made and arranged in a row in an enamel tray sprinkled with talc to avoid sticking character.
5. The sticks were passed through pill cutter to obtain pills of uniform size of 600 mg. A little amount of talc was sprinkled over prepared pills to avoid cohesiveness.
6. Pills were allowed to oven dry at the temperature not exceeding 60 ^{0}C for 10 to 12 hours.
7. After drying, on the next day, pills were polished in polishing pan and stored in airtight plastic bottles.

B) Procedure of *Laksha Kuttana Navaka Guggulu* (LKNG)

a. All powders (1 to 9) were taken in equal quantity and mixed uniformly to prepare a homogenous blend.
b. The blend was gradually added in increments to the semi-solid mass of *Guggulu* in a stainless steel vessel.
c. After proper mixing, small boluses of about 3-4 cm length and 2-4 cm diameter strips were made and shifted to the cylinder of stick making machine.
d. Sticks were made and arranged in a row in an enamel tray sprinkled with talc to avoid sticking character.
e. The sticks were passed through pill cutter to obtain pills of uniform size of 600 mg. A little amount of talc was sprinkled over prepared pills to avoid cohesiveness.
f. Pills were allowed to oven dry at the temperature not exceeding 60 ^{0}C for 10 to 12 hours.
g. After drying, on the next day, pills were polished in polishing pan and stored in airtight plastic bottles.

Experimental study:- To believe that the use of animals is merely inhumane and immoral is only the denial of the overall benefits and substantial advances that resulted from research on animals. Despite the controversies that surround this issue, screening of different type of source material for the biological activity viz. investigative and explorative studies in the lower animals before conducting clinical trials are mandatory in order to convince the global population about the hitherto unexplored therapeutic utility of a drug as well as its safety for human use. The establishment of an alternation between the disease process in animals and human beings is of great tenor. Albeit, inference obtained by in-vivo study cannot be directly co-related with human beings but in preponderance it is possible to determine the therapeutic ability based on basic pharmacological activity.

Experimental Contrive: The present study was

planned with following aims and objectives:- 1- To evaluate the efficacy of *Samanya Kuttan Navaka Guggulu* and *Laksha Kuttana Navaka Guggulu* on *Medoroga* (Obesity).
2- To compare the efficacy of *Samanya Kuttan Navaka Guggulu* and *Laksha Kuttana Navaka Guggulu* on *Medoroga* (Obesity).

Materials and Methods: The experimental study was carried out at Drug Innovation Centre, Bilwal Medchem and Research Laboratory Pvt. Ltd, Jaipur, Rajasthan after obtaining permission from Institutional Animal Ethics Committee with

Approval number-
BMRL/DIC/CCSEA/IAEC/2024/21.
Test Drug: Sample 1- *Laksha Kuttan Navaka Guggulu* (LKNG) Sample 2- *Samanya Kuttana Navaka Guggulu* (SKNG)
Standard sample- Orlistat, batch no. P010745463, Mfg date: 02/2024, manufactured by Hetero Labs Ltd., purchased from Bilwal Pharmaceuticals, Jaipur, Rajasthan.

Study Design-
Housing and feeding conditions- The temperature in the experimental animal room had been 22ºC (+ 3ºC). Although the relative humidity had been at least 30% and preferably not exceed
70% other than during room cleaning the aim should be 50-60%. Lighting should be artificial, the sequence being 12 hours light, 12 hours dark. For feeding, conventional laboratory diets may be used with an unlimited supply of drinking water. Marking of albino wistar rat for identification:-
The albino rat was marked with Picric acid in each group as H, B, T, HB, BT and HT where:- H-stand for head of albino rat
B- stand for Back of albino rat, T-stand for Tail of albino rat
HB- stand for head back of albino rat BT- stand for Back Tail of albino rat HT- stand for head tail of albino rat.

Group design- 24 healthy albino wistar rats will receive high-fat diet for 3 months and divided in 4 groups.

Treatment regime of various experimental groups

Group No.	Group name
Group1	Obesity Induced Control (CMC Solution 5ml/kg/twice/P.O.)
Group2	Obesity Induced +Test Sample (LKNG)- 28mg/Kg/twice/P.O
Group3	Obesity Induced +Test Sample (SKNG)- 28mg/Kg/twice/P.O
Group4	Obesity Induced +Standard Drug –Orlistat 25g/kg/twicw/P.O. 2000mg/kg)

Dosing detail of each experimental group-

Group 1	Weight (gm)	Dose (1 % CMC 5 ml/kg)
H	265	1.325
B	298	1.49
T	335	1.675
HB	247	1.235
BT	245	1.225
HT	345	1.725

Group 2	Weight (gm)	***Laksha kuttana Navaka guggulu* (28mg/Kg)**	
		Dose (mg)	**Dose (ml)**
H	346	9.688	0.9688
B	365	10.22	1.022
T	374	10.472	1.0472
HB	316	8.848	0.8848
BT	296	8.288	0.8288
HT	316	8.848	0.8848

Group 3	Weight (gm)	*Samanya Kuttana Navaka guggulu* (28mg/Kg)	
		Dose (mg)	Dose (ml)
H	274	7.672	0.7672
B	352	9.856	0.9856
T	314	8.792	0.8792
HB	285	7.98	0.798
BT	268	7.504	0.7504
HT	346	9.688	0.9688

Group 4	Weight (gm)	Standard: Orlistat (25 mg/Kg)	
		Dose (mg)	Dose (ml)
H	273	6.825	0.6825
B	269	6.725	0.6725
T	356	8.9	0.89
HB	345	8.625	0.8625
BT	341	8.525	0.8525
HT	316	7.9	0.79

Parameters for assessment-

a) Body Weight
b) Serum Cholestrol
c) Serum Triglycerides
d) Serum LDL & HDL

Duration of Administration of drug: 30 days

Statistical analysis- The results are expressed as mean ± SEM Comparison between Before and after treatment were performed Student t test paired and in Comparison, between the treatment groups and control were performed by analysis of variance (ANOVA) followed by Dunnet's multiple tests.

Observation and Result-

A) Body weight

Group 1	0th Day	10th Day	20th Day	30th Day
H	265	279	285	291
B	298	315	325	334
T	335	347	352	367
HB	247	258	267	275
BT	245	259	262	271
HT	345	357	364	375

Group 2	0th Day	10th Day	20th Day	30th Day
H	346	349	341	343
B	365	378	375	379
T	374	379	381	380
HB	316	328	331	328
BT	296	299	304	301
HT	316	326	329	233

Group 3	0th Day	10th Day	20th Day	30th Day
H	274	287	291	289
B	352	350	352	350
T	314	319	314	316
HB	285	289	281	280
BT	268	269	263	261
HT	346	349	345	341

Group 4	0th Day	10th Day	20th Day	30th Day
H	273	279	271	268
B	269	274	270	272
T	356	359	359	351
HB	345	351	352	347
BT	341	349	340	339
HT	316	321	320	319

Weight Changes (gm)

	0th Day Mean±SEM	10th Day Mean±SEM	20th Day Mean±SEM	30th Day Mean±SEM
Group 1	289.17±17.897	302.50±17.825	309.17±17.962	318.83±18.876
Group 2	335.50±12.627	343.17±12.919	343.50±12.016	327.33±22.569
Group 3	306.50±14.930	310.50±13.966	307.67±14.587	306.17±14.435
Group 3	306.50±14.930	310.50±13.966	307.67±14.587	306.17±14.435
Group 4	316.67±15.407	322.17±15.376	318.67±16.161	316.00±15.236

Weight Changes (gm) (0th day -30th Day)

Marking	Group 1	Group 2	Group 3	Group 4
H	-26	3	-15	5
B	-36	-14	2	-3
T	-32	-6	-2	5
HB	-28	-12	5	-2
BT	-26	-5	7	2
HT	-30	83	5	-3
Mean	**-29.67**	**8.17**	**0.33**	**0.67**
SEM	**1.585**	**15.164**	**3.323**	**1.563**

Dunnett's multiple comparisons test	Mean Diff.	95.00% CI of diff.	Significant?	Summary	Adjusted P Value
Group 1 vs. Group 2	-37.83	-66.01 to -9.659	Yes	**	0.0075
Group 1 vs. Group 3	-30.00	-58.17 to -1.826	Yes	*	0.0355
Group 1 vs. Group 4	-30.33	-58.51 to -2.159	Yes	*	0.0333

A) Biochemical Parameters

Serum Cholesterol	Group 1	Group 2	Group 3	Group 4
H	97	26	51	41
B	91	27	38	26
T	74	46	49	34
HB	84	41	43	27
BT	97	57	57	45
HT	82	59	41	41

Serum Triglycerides	Group 1	Group 2	Group 3	Group 4
H	215	112	124	98
B	198	121	145	89
T	175	145	135	110
HB	186	98	118	126
BT	204	107	134	142
HT	176	99	141	127

LDL	Group 1	Group 2	Group 3	Group 4
H	55.21	27.13	31.25	25.65
B	41.36	31.25	21.58	34.23
T	46.25	28.65	54.23	38.65
HB	54.28	37.12	41.74	27.12
BT	49.23	21.58	35.23	21.26
HT	43.65	34.25	27.39	15.36

HDL	Group 1	Group 2	Group 3	Group 4
H	45.23	41.25	34.65	56.23
B	28.65	61.25	45.23	57.51
T	32.25	26.32	38.25	51.32
HB	45.23	45.65	41.39	46.95
BT	19.65	25.32	31.48	58.65
HT	28.35	36.35	39.32	74.35

Comparison between different groups-

Biochemical Parameters	Group 1 Mean±SEM	Group 2 Mean±SEM	Group 3 Mean±SEM	Group 4 Mean±SEM
Serum Cholesterol (mg/dl)	87.50±3.731	42.67±5.800	46.50±2.895	35.67±3.242
Serum Triglycerides (mg/dl)	192.33±6.556	113.67±7.172	132.83±4.159	115.33±8.131
LDL (mg/dl)	48.33±2.298	30.00±2.246	35.24±4.715	27.05±3.456
HDL (mg/dl)	33.23±4.156	39.36±5.473	38.39±1.987	57.50±3.814

DISCUSSION: Experimental Study

A pre-clinical study was planned to evaluate and compare the therapeutic efficacy of *Samanya Kuttan Navaka Guggulu* and *Laksha Kuttana Navaka Guggulu* on *Medoroga* (Obesity) and the same was conducted at Drug Innovation Centre, Bilwal Medchem and Research Laboratory Pvt. Ltd, Jaipur, Rajasthan after obtaining permission from Institutional Animal Ethics Committee with

Approval number-

BMRL/DIC/CCSEA/IAEC/2024/21. Diet Induced obesity (DIO) model was used in the present study whereby 24 healthy albino wistar rats received high-fat diet for 3 months and divided in 4 groups. Orlistat was used as standard anti-obesity drug.

After inducing Obesity using CMC Solution 5ml/kg/twice/P.O. in all the four groups, statistically significant increase in body weight, serum cholesterol, serum triglycerides, serum LDL and HDL levels was observed which confirmed the obesity state of rats. After that no intervention was given in group 1, Orlistat administered in a dose of 25g/kg/twice/P.O. in group 4, LKNG in a dose of 28mg/Kg/twice/P.O was used in Group 2 and SKNG in a dose of 28mg/Kg/twice/P.O was used in Group 3. Before and after treatment comparison within groups was done by paired student t- test and $p< 0.05$ is considered significant.

In group 1, no significant changes in the body weight and all other bio-chemical parameters were observed after completion of study as no intervention was given in this group. Slight increase in the body weight of rats, although non-significant with mean diff. % of 1.585 was noticed till end that that may be attributable to the normal physiological mechanism of body. In group 2, 3 and 4 significant decrease in body weight and all other bio- chemical parameters were observed after intervention with the test drugs and standard drug taken for the study.

Inter group comparison was done by **Dunnett's multiple comparison test** whereby all the groups viz standard drug and test drugs were compared with group 1 i.e. obesity control group whereby statistically significant decrease in all the parameters was observed between all the groups as discussed below.

Weight changes- Remarkable weight reduction was noticed in group 2 as compared to group 1 with adjusted p value of 0.0075 whereas reduction in group 3 and group 4 was with adjusted p value of 0.0355 and 0.0333 respectively.

Bio-chemical parameters- Highly Statistical significant reduction in serum cholesterol and serum triglyceride levels were observed in all the groups

with p value <0.0001 which shows equal therapeutic effect of test drugs and standard drug on these parameters.

Statistically significant reduction in LDL levels was observed with the Standard drug i.e. Orlistat with p value of 0.0006 whereas in group 2 and 3 the p values were found to be 0.0025 and 0.036 respectively which clearly indicates that results of LKNG was found to be better than SKNG but Orlistat is much effective than LKNG.

CONCLUSION

Guggulu has been used as *Dhoopana dravya* since Vedic period. Solid forms (*Vati*) of Guggulu are not preferred for internal administration in *Brihattrayee.* It is entered in the field of therapeutics after 11thAD (Chakradutta).Concept of *Kuttana* is mentioned in Ayurved Sara Sangrah to overcome the main shortcoming of high disintegration time with Guggulu Kalpas. *Kuttana* facilitates quick disintegration of which in turn helps in easy absorption of *Guggulu* in the body.Slight difference in % yield of both the batches (SKNG- 0.40 and LKNG-0.70) might be due to manual error during the preparation of *Vati*.On organoleptic evaluation, LKNG samples were found to be more blackish and smoother than SKNG samples attributed to more grevious *Kuttana* in LKNG samples.The pharmacological profile shows that LKNG was much effective in reducing serum cholesterol, triglycerides, LDL levels in the body but both LKNG and SKNG does not exhibited any effect on HDL level.

The overall effect of test drug on body weight and lipid profile can be attributed to presence of Guggulsterone-E and Z that are claimed as bioactive compounds of *Guggulu* with anti hyperlipidaemic effect and the difference in the result of various groups may be due to percentage variation of Guggulsterones in both the samples.

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