

ORIGINAL RESEARCH ARTICLE

A Conceptual Study on *Meda Vikara* and the Applied Aspects of *Udvartana* with Reference to “*Udvartanam Kaphaharam Medash Prabilayanam*” by Certain Drugs

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ABSTRACT

Background: *Sthoulya* (obesity) is such a disease which provides the platform for so many hazards such as hypertension and diabetes mellitus as well as psychological disorders such as stress. The mortality and morbidity rates are higher in obese persons. It is one of the most common, yet among the most neglected public health problems in the present world.

Materials and Methods: Thirty patients were taken for the study and all patients were divided into two equal groups, that is, Group A and Group B. Group A: 15 patients were given Guduchyadi Churna Udvartana for 15 days. Group B: 15 patients were given Guduchyadi Churna Udvartana along with internal use of the same churna for 15 days. A comparison was done between Group A and Group B and the assessment was made before and after treatment.

Result and Discussion: During the entire duration of therapy, there was not any adverse/untoward effect or adverse drug reactions observed for both the trial groups. Here, Group B showed better result in overall total parameters.

Conclusion: The effect of the medicine, that is, Guduchyadi Churna is more significant in reducing the subjective and objective parameters and significant in reducing the elevated lipids (serum cholesterol, LDL, and triglycerides) and elevating the HDL.

1. INTRODUCTION

In classics, *Sthoulya* (obesity) is described under the santarpanjanya vikara and in *bahudoshavastha visesa*. Ayurvedic treatment aims not only at the radical removal of the causative factors of the disease but also at the restoration of Doshik equilibrium. There are two main parts of sodhana therapy Bahya Sodhana (external purification), that is, Udvartana, Udgharsana, Ushhadana, etc., and Abhyantara Sodhana (internal purification) which include pancha sodhana. It is seen that Bahya Sodhana (Udvartana) is having the efficacy over sthoulya.^[1]

The procedure of massaging the whole body below the neck in a direction opposite to the orientation of hair with some pressure^[2] with the help of Ausadha kalka is called Udvartana. It is also called Shareera Parimarjan.^[3]

Chakrapani defined it as a procedure done after abhyanga in the context of a daily regimen.^[3] In the context of Vyayama, Gatramardna is the term used by Dalhana.^[4] For the treatment of Medaroga (Obesity), a specific principle of treatment has been depicted by Maharshi Vagbhata, that is, “Udvartanam Kaphaharam Medash Prabilayanam.”^[5] If we will consider the etiopathogenesis of manifestation of Medaroga, then certainly the principle of treatment as mentioned by Maharshi Vagbhata is justified. Taking into considerations of the principle of treatment of medavikar narrated by Vagbhata, the present study will be designed and carried out to establish the justification and efficacy of the treatment principle.

1.2. Aim and Objective of Study

The objectives of this study were as follows:

1. A detailed literature study of the concepts of *Medo Vikaras*, both from ancient and modern science

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2. Applied aspects of *Udvartana* in *Medo Vikaras* w.s.r. to “*Udvartanam kaphaharam medash pravilayanam.*”
3. To compare the efficacy of *Guduchyadi Churna Udvartana* and *Guduchyadi Churna Udvartana* along with oral use in *Medo vikaras*.

2. MATERIALS AND METHODS

- Source of patients: Patients were selected from OPD and IPD of Government Ayurvedic College and Hospital, Balangir and Saradeswari Government Ayurvedic Hospital, Balangir
- Method of collection of patients: A pro forma was prepared which includes details of history taking, physical signs and symptoms, and subjective and objective parameters. With this pro forma, 30 patients were randomly scrutinized and selected for a clinical study.

2.1. Ethical Clearance

With due approval by the Institutional Ethical Committee (IEC), Government Ayurvedic College and Hospital, Balangir, the study has been conducted among the patients registered for the purpose. Written consent was obtained from each patient who participate in the study with prior proper information.

2.2. Study Design and Grouping

2.2.1. Methodology-(Single-blind study)

- Thirty patients were taken for the study and all patients were divided into two equal groups, that is, Group A and Group B
- Group A: 15 patients were given *Guduchyadi Churna Udvartana* for 15 days.
- Group B: 15 patients were given *Guduchyadi Churna Udvartana* along with internal use of the same *churna* for 15 days
- A comparison was done between Group A and Group B and the assessment was made before and after the treatment
- Duration-15 days.

3. RESULTS

Mann–Whitney U-test is carried out as a comparison between Group A and Group B. There is a significant difference between Group A and Group B. Further, we observed that the mean rank for Group B is greater than Group A. We concluded that the effect observed in Group B is better than Group A. The comparison between subjective parameter is shown in Table 1.

From Table 2 and Chart 1, it has been observed that in Group A before treatment mean score of BMI was 2.87 which reduced to 2.73 with a 4.65% mean percentage of improvement after treatment. In Group B, before treatment mean score of BMI was 2.47 which reduced to 1.87 with a 24.32% mean percentage of improvement after treatment. *P*-value for Groups A and B is <0.05. Hence, it concluded that the effect of BMI observed in both groups is significant.

Since observations are on an ordinal scale (gradations), we have used the Wilcoxon Signed-Rank Test to test efficacy in Group A and Group B. From above Table 2, we can observe that *P*-value for Group A and Group B is <0.05. Hence, we can conclude that the effect observed in Group A and Group B is significant.

From Table 3 and Chart 2, it has been observed that in Group A before treatment mean score of abdominal circumference was 3.20 which reduced to 2.53 with a 20.83% mean percentage of improvement after treatment. In Group B, before treatment mean score of abdominal

circumference was 2.80 which reduced to 1.67 with a 40.48% mean percentage of improvement after treatment. *P*-value for Groups A and B is <0.05. Hence, it concluded that the effect of abdominal circumference observed in both groups is significant.

Since observations are on an ordinal scale (gradations), we have used the Wilcoxon Signed-Rank test to test efficacy in Group A and Group B. From the above table, we can observe that *P*-value for Group A and Group B is <0.05. Hence, we can conclude that the effect observed in Group A and Group B is significant.

From Table 4 and chart 3, it has been observed that in Group A before treatment mean score of buttock circumference was 3.40 which reduced to 3.00 with a 11.76% mean percentage of improvement after treatment. In Group B, before treatment mean score of buttock circumference was 2.60 which reduced to 1.67 with 35.90% mean percentage of improvement after treatment. *P*-value for Groups A and B is <0.05. Hence, it concluded that the effect of buttock circumference observed in both groups is significant.

Since observations are on an ordinal scale (gradations), we have used the Wilcoxon Signed-Rank test to test efficacy in Group A and Group B. From the above table, we can observe that *P*-value for Group A and Group B is <0.05. Hence, we can conclude that the effect observed in Group A and Group B is significant.

- Mann–Whitney U-test is carried out a comparison between Group A and Group B.
- From Table 5, we can observe that *P*-value for all parameters is <0.05.
- Hence, there is a significant difference between Group A and Group B.
- Further, we can observe that the mean rank for Group B is greater than Group A.
- Hence, we can conclude that the effect observed in Group B is better than Group A.

From above Table 6 and Chart 4, it has been observed that in Group A before treatment mean score of body weight was 87.99 which reduced to 84.70 with a 3.74% mean percentage of improvement after treatment. In Group B, before treatment mean score of body weight was 85.71 which reduced to 81.10 with a 5.39% mean percentage of improvement after treatment. *P*-value for Groups A and B is <0.05. Hence, it concluded that the effect of body weight observed in both groups is significant.

Since observations are quantitative, we have used a Paired t-test to test efficacy in Group A and Group B. From the above table, we can observe that the *P*-value for Group A and Group B is <0.05. Hence, we can conclude that the effect observed in Group A and Group B is significant.

From Table 7 and Chart 5, it had been observed that in Group A, before treatment mean score of serum cholesterol was 219.93 which reduced to 216.75 with a 1.45% mean percentage of improvement after treatment. In Group B, before treatment mean score of serum cholesterol was 211.69 which reduced to 206.55 with a 2.42% mean percentage of improvement after treatment.

Since observations are quantitative, we have used a Paired t-test to test efficacy in Group A and Group B.

From the table, we can observe that *P*-value for Group A and Group B is <0.05. Hence, we can conclude that the effect observed in Group A and Group B is significant.

From the Table 8 and Chart 6, it had been observed that in Group A, before treatment mean score of HDL was 38.03 which are increased to 39.15 with a 2.93% mean percentage of improvement after treatment. In Group B, before treatment mean score of HDL was 42.80 which are increased to 44.77 with a 4.60% mean percentage of improvement after treatment.

Since observations are quantitative, we have used a Paired t-test to test efficacy in Group A and Group B. From the above table, we can observe that *P*-value for Group A is >0.05 and Group B is <0.05. Hence, we can conclude that the effect observed in Group A is not significant and Group B is significant.

From Table 9 and Chart 7, it had been observed that in Group A, before treatment mean score of LDL was 110.27 which reduced to 107.55 with a 2.47% mean percentage of improvement after treatment. In Group B, before treatment mean score of LDL was 114.47 which reduced to 109.46 with a 4.37% mean percentage of improvement after treatment.

Since observations are quantitative, we have used a Paired t-test to test efficacy in Group A and Group B. From the above table, we can observe that *P*-value for Group A and Group B is <0.05. Hence, we can conclude that the effect observed in Group A and Group B is significant.

From Table 10 and Chart 8, it had been observed that in Group A, before treatment mean score of triglyceride was 131.40 which reduced to 129.33 with a 1.57% mean percentage of improvement after treatment. In Group B, before treatment mean score of triglyceride was 132.40 which reduced to 128.40 with a 3.02% mean percentage of improvement after treatment.

Since observations are quantitative, we have used a Paired t-test to test efficacy in Group A and Group B. From the above table, we can observe that *P*-value for Group A is >0.05 and Group B is <0.05. Hence, we can conclude that the effect observed in Group A is not significant and Group B is significant.

From Table 11 and Chart 9, it had been observed that in Group A, before treatment mean score of VLDL was 30.29 which reduced to 29.23 with a 3.31% mean percentage of improvement after treatment. In Group B, before treatment mean score of VLDL was 40.16 which reduced to 38.81 with a 3.35% mean percentage of improvement after treatment.

Since observations are quantitative, we have used a Paired t-test to test efficacy in Group A and Group B. From the above table, we can observe that *P*-value for Group A is >0.05 and Group B is <0.05. Hence, we can conclude that the effect observed in Group A is not significant and Group B is significant.

- The unpaired t-test is carried out comparison between Group A and Group B
- From above Table 12, we can observe that *P*-value for weight and cholesterol is <0.05
- Hence, there is a significant difference between Group A and Group B
- Further, we can observe that the mean difference for Group B is greater than Group A
- Hence, we can conclude that the effect observed in Group B is better than Group A.

It has been revealed that in Group A, no patient had shown marked improvement, 3 (20.00%) shown moderate improvement, 10 (66.67%) showed mild improvement, 2 (13.33%) showed unsatisfactory effect,

and, in Group B, 3 (20.00%) were shown marked improvement, 8 (53.33%) were shown moderate improvement, 4 (26.67%) were shown mild improvement, and no patient had shown unsatisfactory result as shown in Table 13.

4. DISCUSSION

4.1. Probable Mode of Action of Guduchyadi Churna

4.1.1. According to Rasadi properties

According to *Vagbhata*, a Drug acts by its *Rasa*, *Vipaka*, *Virya*, *Guna*, and *Prabhava*. The probable effects of Guduchyadi Churna produced by its various properties are summarized below:

4.1.1.1. Tikta Rasa

Tikta Rasa is mainly *Deepana*, *Pachana*, *Lekhana*, *Upashoshana*, *Srotoshodhana*, and *Sthirakarana* in nature. *Tikta* is the most *Laghu* among the six *Rasas* thereby relieving the symptom *Gaurava*. It is also *Ruksha* and *Sheeta* in nature. The *Tikta Rasa* by its *Deepana* property leads to augmentation of *Jatharagni* leading to subsequent increase in the *Medodhatvagni* leading to formation of optimal *Medo Dhatu*. By its *Pachana* property, it leads to digestion of *Ama* at the *Jatharagni* level producing an optimal *Rasadi dhatu*s. By its *Amapachana* quality, it relieves to the *Srotorodha* caused by *Ama*. The *Lekhana* property leads to depletion of *Kapha*, *Meda*, *Sweda*, and *Kleda*, thus relieving the *Atipravritti*. The *Ruksha Guna* leads to *Upashoshana* property of *Tikta Rasa* resulting in absorption of *Kleda*, *Meda*, *Vasa*, *Mutra*, and *Kapha Doshas*. *Tikta Rasa* also performs the action of *Srotoshodhana* by digesting *Doshas* present in the *Ayana Mukha*, thus relieving the *Sanga* pathology.

4.1.1.2. Kashaya Rasa

Kashaya Rasa^[6] is the most *Ruksha* among the six *Rasas*. By the virtue of its *Shoshana* property, it absorbs the *Medo Dhatu*, *Kleda*, *Sweda*, and *Kapha Doshas*, thus relieving the *Atipravritti* pathology. It also aids in removing excess *Kleda* present in the body thus performing *Kledaharana*. It also augments the digestive fire leading to subsequent optimal *Medo Dhatu* formation. It also performs *Annashoshana* or proper absorption of the ingested food leading to formation of *Nirama Rasa dhatu* which eventually forms optimal *Medo Dhatu*.

4.1.1.3. Katu Rasa

Katu Rasa due to its *Agni* and *Vayu* dominancy augments the digestive fire leading to augmentation of the *Medo-dhatvagni*, thereby resulting in the proper quantity and quality of both *Sthayi* and *Asthayi Medo Dhatu*s. It leads to proper absorption of the ingested food. It also depletes the *Sneha*, *Sweda*, *Kleda*, and *Mala* and also decreases the *Mamsa* and *Medo Dhatu*. It also relieves the obstructions to the channels in the body thus relieving the *Sanga* pathology and leading to proper formation of the *Dhatu*s as well as their proper nutrition.

4.1.2. Guna Karma

4.1.2.1. Ruksha

Ruksha Guna is the opposite to *Snigdha Guna* which is the dominant *Guna* of *Medo Dhatu*. It causes *Stambhana* (obstruction) and *Kharatva* (roughness), thereby bringing about a reduction in the excessively produced *Medo Dhatu*. It causes the absorption of excess *Kapha Doshas*, *Rasadi Dhatu*s, and *Malas*. It is known to be dominant in *Vayu* and *Agni Mahabhuta* which results in alleviation of the vitiated *Kapha* which is the main *Dosha* responsible for the pathogenesis.

4.1.2.2. Laghu

Laghu Guna is known for its action of *Laghavakara* (lightness), *Kaphaghna* (alleviating *Kapha Doshas*), and *Shighrapakitva* (quickly

digestible). *Laghu Guna* also causes *Lekhana* (removes corpulency) and *Ropana* (it heals the scars). Its *Panchbhautika* dominancy is of *Akasha*, *Agni*, and *Vayu*. This results in the alleviation of aggravated *Kapha* and augmentation of *Vata*, thereby reducing *Gaurava* (heaviness). It also causes *Apatarpana*^[7] (depletes the *Sharir Dhatu*), *Karshana* (brings about leanness), and *Lekhana* (causes lightness in the body). It also aids in *Deepana* (augmentation of the digestive fire), *Pachana* (digestion), *Rukshana* (dryness), and *Vaishadya* (it cleanses the body). It may hasten the metabolism and absorption of the drug at a cellular level.

4.1.2.3. Virya Karma

The *Virya* of the total drug is *Ushna* as it has 60% of the ingredients having *Ushna Virya* and 40% of drugs are having *Sheeta Virya*.

4.1.2.4. Vipaka Karma

Guduchyadi Churna possesses *Madhura Vipaka* which is the finally converted *Rasa* after metabolism by *Agni*.

4.1.2.5. Doshakarma

Maximum ingredients of Guduchyadi Churna show *Tridoshashamka* property, especially *Kapha Vata Shamaka* property. Thus, it corrects the vitiated *Kapha* and *Vata Dosha* thereby normalizing them.

4.2. Probable Mode of Action of Guduchyadi Churna Udvartana in Medo vikara

- Although *Udvartana* possesses *kapha-medohara* property also in Guduchyadi Churna that maximum drugs were having *rukshya guna* in nature
- *Medadhatu* and *kapha* have *ashraya-ashrayibhava*^[8] (connection or correlation between *khapha* and *medadhatu*). They have *snigdha*,^[9] *sheeta*, *guru*, *sthira*, and *picchila guna* (properties). The selected drug Guduchyadi Churna has *katu*, *tikta rasa ushna virya*, *ruksha*, and *laghu guna* which are quite opposite to that of *Medo Dhatu* and *kapha*^[10]
- Due to *kleda srotas*^[11] (channels) get obstructed and *abaddha medadhatu* (loose fat) is formed. This may lead to *dhatuagnimandya* (decreased molecular level fire of *medadhatu*). Due to *ushna*, *tikshna*, and *laghu* property of Guduchyadi Churna, it acts as a *srotogami* and *medogami*. Due to *ruksha guna* of *dravya* and *ruksha udvartana*, *kleda* gets absorbed; thus, *abaddhatva* of *medha* and *kapha* might have reduced
- Due to *Dipana*, *Pachana karma* of Guduchyadi Churna, there may be increase in *Medodhatwagni*.

In *Medo*, *vikara medovaha srotos* is obstructed by *vikrita medadhatu*. Guduchyadi Churna removes the obstruction and clears the path of *medovahasrotos* due to *katu rasa (Margan vivrunoti)*.^[12] When the data were analyzed for the overall result of therapy, the following observations were made. Marked improvement was not seen in any patient, in Group A and 3 patients (20.00%) in Group B. Moderate improvement was seen in 3 patients (20.00%) in Group A and 8 patients (53.33%) in Group B. Mild improvement was observed in 10 patients (66.67%) in Group A and 4 patients (26.67%) in Group B. No improvement was observed in 2 patients (13.33%) in Group A and no patient in Group B. Overall, three patients, that is, 10.00% were got marked improvement, 11 patients, that is, 36.66% were got moderate improvement, 14 patients, that is, 46.66% were got mild improvement, and two patients, that is, 6.66% got no improvement as a result of the final outcome of this clinical study as shown in Chart 10. During the entire duration of therapy, there was not any adverse/untoward effect or adverse drug reactions observed for both the trial groups. Here Group B showed better result in overall total parameters.

5. CONCLUSION

The effect of the medicine, that is, Guduchyadi Churna is more significant in reducing the subjective and objective parameters and significant in reducing the elevated lipids (serum cholesterol, LDL, and triglycerides) and elevating the HDL. Finally, it can be concluded that Guduchyadi Churna *Udvartana* with internal use gives better result, as compare to Guduchyadi Churna *Udvartana*. For further study, duration of the therapy should be minimum of up to 2–3 months along with larger samples that could be more effective.

6. ACKNOWLEDGMENT

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7. AUTHORS' CONTRIBUTIONS

All the authors contributed equally in design and execution of the article.

8. FUNDING

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9. ETHICAL APPROVALS

Approval by the IEC, Government Ayurvedic College and Hospital, Balangir.

10. CONFLICTS OF INTEREST

Nil.

11. DATA AVAILABILITY

This is an original manuscript and all data are available for only research purposes from principal investigators.

12. PUBLISHERS NOTE

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Table 1: Comparison between Group A and Group B on subjective parameters comparison between Group A and Group B (AT-AT)

Variable	Group	N	Mean Rank	Sum of Ranks	Mann–Whitney U	P-Value
ATI Sweda	Group A	15	14.60	249.00	96.0000	0.0046
	Group B	15	16.40	216.00		
	Total	30				
ATI Kshudha	Group A	15	14.00	255.00	90.0000	0.0032
	Group B	15	17.00	210.00		
	Total	30				
ATI Pipasa	Group A	15	14.33	245.00	100.0000	0.0058
	Group B	15	16.67	220.00		
	Total	30				
ATI dourgandhya	Group A	15	13.93	256.00	89.0000	0.0030
	Group B	15	17.07	209.00		
	Total	30				

Table 2: Effect of Guduchyadi Churna on BMI of patients

BMI	Mean	Median	SD	SE	Wilcoxon W	P-value	% Effect	Result
Group A								
BT	2.87	3.00	0.64	0.17	-1.414 ^b	0.01573	4.65	Sig
AT	2.73	3.00	0.59	0.15				
Group B								
BT	2.47	2.00	0.74	0.19	-2.585 ^b	0.00833	24.32	Sig
AT	1.87	2.00	0.64	0.17				

BT: Before treatment, AT: After treatment, P: Probability of W values at 14 degrees of freedom, Sig: Significant, NS: Not significant

Table 3: Effect of Guduchyadi Churna on abdominal circumference of patients

Abdominal circumference	Mean	Median	SD	SE	Wilcoxon W	P-value	%Effect	Result	
Group A									
BT		3.20	3.00	0.56	0.14	-2.887 ^b	0.00389	20.83	Sig
AT		2.53	3.00	0.52	0.13				
Group B									
BT		2.80	3.00	0.77	0.20	-3.276 ^b	0.00105	40.48	Sig
AT		1.67	2.00	0.82	0.21				

BT: Before treatment, AT: After treatment, P: Probability of W values at 14 degrees of freedom, Sig: Significant, NS: Not significant

Table 4: Effect of guduchyadi churna on buttock circumference of patients

Buttock circumference	Mean	Median	SD	SE	Wilcoxon W	P-Value	% Effect	Result
Group A								
BT	3.40	3.00	0.63	0.16	-2.449 ^b	0.01431	11.76	Sig
AT	3.00	3.00	0.93	0.24				
Group B								
BT	2.60	2.00	0.74	0.19	-3.051 ^b	0.00228	35.90	Sig
AT	1.67	2.00	0.72	0.19				

BT: Before treatment, AT: After treatment, P: Probability of W values at 14 degrees of freedom, Sig: Significant, NS: Not significant

Table 5: The comparison between Group A and Group B on objective parameters: Comparison between Group A and Group B (AT-AT)

Variable	Group	N	Mean Rank	Sum of Ranks	Mann-Whitney U	P-Value
BMI	Group A	15	16.00	225.00	105.0000	0.0063
	Group B	15	15.00	240.00		
	Total	30				
Abdominal circumference	Group A	15	17.20	207.00	87.0000	0.0022
	Group B	15	13.80	258.00		
	Total	30				
Buttock circumference	Group A	15	17.30	199.50	79.5000	0.0012
	Group B	15	13.70	265.50		
	Total	30				

Table 6: Effect of Guduchyadi Churna on body weight of patients

Body weight	Mean	N	SD	SE	t-Value	P-Value	% Change	Result
Group A								
BT	87.99	15	6.45	1.66	11.682	0.0000	3.74	Sig
AT	84.70	15	6.70	1.73				
Group B								
BT	85.71	15	10.78	2.78	3.412	0.0042	5.39	Sig
AT	81.10	15	9.70	2.50				

BT: Before treatment, AT: After treatment, P: Probability of W values at 14 degrees of freedom, Sig: Significant, NS: Not significant

Table 7: The effect of Guduchyadi Churna on serum cholesterol of patients

S. Cholesterol	Mean	N	SD	SE	t-Value	P-Value	% Change	Result
Group A								
BT	219.93	15	12.17	3.14	5.591	0.0001	1.45	Sig
AT	216.75	15	11.97	3.09				
Group B								
BT	211.69	15	14.10	3.64	7.942	0.0000	2.42	Sig
AT	206.55	15	14.08	3.63				

BT: Before treatment, AT: After treatment, SD: Standard deviation, SE: Standard error, P: Probability of t values at 14 degrees of freedom, Sig: Significant, NS: Not significant

Table 8: The effect of Guduchyadi Churna on HDL of patients

HDL	Mean	N	SD	SE	t-value	P-value	% Change	Result
Group A								
BT	38.03	15	3.31	0.85	-1.554	0.1424	2.93	NS
AT	39.15	15	4.23	1.09				
Group B								
BT	42.80	15	3.90	1.01	-2.578	0.0219	4.60	Sig
AT	44.77	15	3.79	0.98				

BT: Before treatment, AT: After treatment, SD: Standard deviation, SE: Standard error, P: Probability of t values at 14 degrees of freedom, Sig: Significant, NS: Not significant

Table 9: The effect of Guduchyadi Churna on LDL of patients

LDL	Mean	N	SD	SE	t-Value	P-Value	% Change	Result
Group A								
BT	110.27	15	16.06	4.15	3.974	0.0014	2.47	Sig
AT	107.55	15	16.33	4.22				
Group B								
BT	114.47	15	11.04	2.85	6.505	0.0000	4.37	Sig
AT	109.46	15	11.28	2.91				

BT: Before Treatment, AT: After Treatment, SD: Standard deviation, SE: Standard error, P: Probability of t values at 14 degrees of freedom, Sig: Significant, NS: Not significant

Table 10: The effect of Guduchyadi Churna on triglyceride of patients

TGS	Mean	N	SD	SE	t-value	P-value	% Change	Result
Group A								
BT	131.40	15	39.94	10.31	1.667	0.1178	1.57	NS
AT	129.33	15	38.77	10.01				
Group B								
BT	132.40	15	39.95	10.31	2.815	0.0138	3.02	Sig
AT	128.40	15	38.57	9.96				

BT: Before treatment, AT: After treatment, SD: Standard deviation, SE: Standard error, P: Probability of t values at 14 degrees of freedom, Sig: Significant, NS: Not Significant

Table 11: The effect of Guduchyadi Churna on VLDL of patients

VLDL	Mean	N	SD	SE	t-Value	P-Value	% Change	Result
Group A								
BT	30.23	15	17.65	4.56	1.201	0.2496	3.31	NS
AT	29.23	15	17.94	4.63				
Group B								
BT	40.16	15	21.73	5.61	2.677	0.0181	3.35	Sig
AT	38.81	15	20.66	5.33				

BT: Before treatment, AT: After treatment, SD: Standard deviation, SE: Standard error, P: Probability of t values at 14 degrees of freedom, Sig: Significant, NS: Not significant

Table 12: The comparison between Group A and Group B on body weight and lipid profile

Variable	Group	N	Mean Diff	SD	SE	t-Value	P-Value
Body weight	Group A	15	3.29	1.09	0.28	5.839	0.000
	Group B	15	4.62	0.75	0.19		
S. Cholesterol	Group A	15	3.19	2.21	0.57	-2.259	0.032
	Group B	15	5.13	2.50	0.65		
HDL	Group A	15	2.43	1.64	0.42	-1.295	0.206
	Group B	15	3.17	1.46	0.38		
LDL	Group A	15	3.25	1.90	0.49	-1.921	0.065
	Group B	15	5.01	2.98	0.77		
TGS	Group A	15	4.33	2.74	0.71	-0.329	0.745
	Group B	15	4.80	4.77	1.23		
VLDL	Group A	15	2.60	2.05	0.53	1.058	0.299
	Group B	15	1.93	1.32	0.34		

BT: Before treatment, AT: After treatment, SD: Standard deviation, SE: Standard error, P: Probability of t values at 14 degrees of freedom, Sig: Significant, NS: Not significant

Table 13: The overall effect of Guduchyadi Churna in patients

Overall effect	Group A		Group B	
	n	%	n	%
Marked improvement	0	0.00	3	20.00
Moderate improvement	3	20.00	8	53.33
Mild improvement	10	66.67	4	26.67
Unsatisfactory	2	13.33	0	0.00
Total	15	100.00	15	100.00

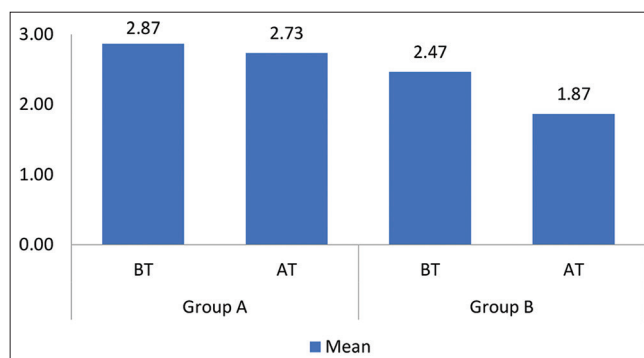


Chart 1: Effect of Guduchyadi Churna on BMI of patients

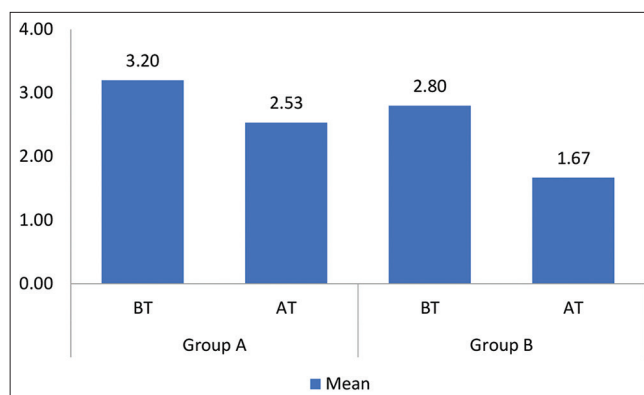


Chart 2: Effect of Guduchyadi Churna on abdominal circumference of patients

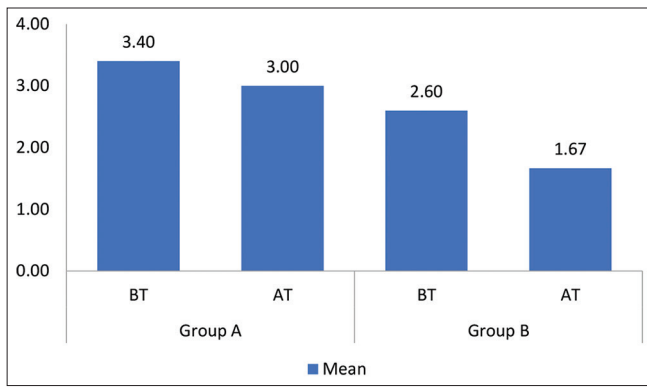


Chart 3: Effect of Guduchyadi Churna on buttock circumference of patients

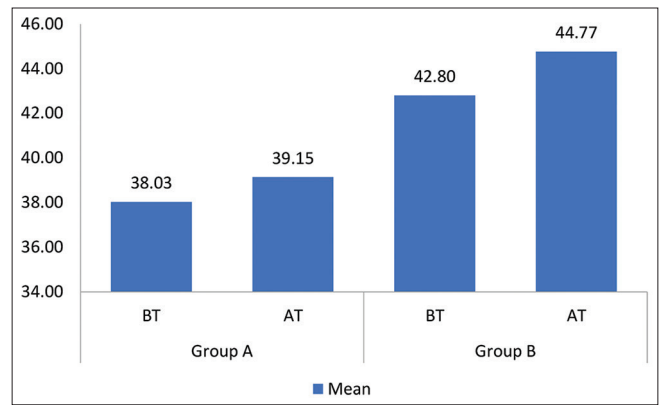


Chart 6: The effect of Guduchyadi Churna on HDL of patients

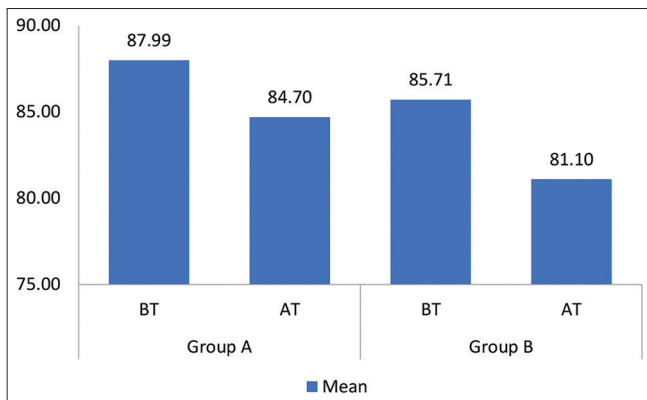


Chart 4: Effect of Guduchyadi Churna on body weight of patients

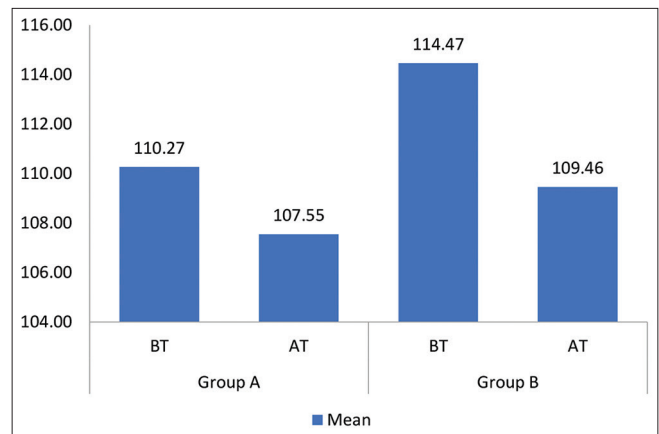


Chart 7: The effect of Guduchyadi Churna on LDL of patients

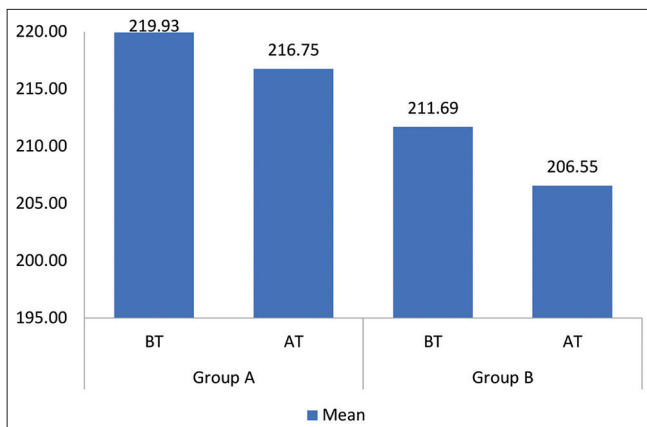


Chart 5: The effect of Guduchyadi Churna on serum cholesterol of patients

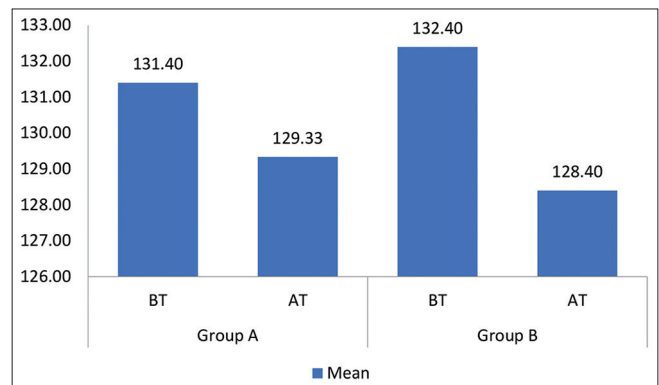


Chart 8: The effect of Guduchyadi Churna on triglyceride of patients

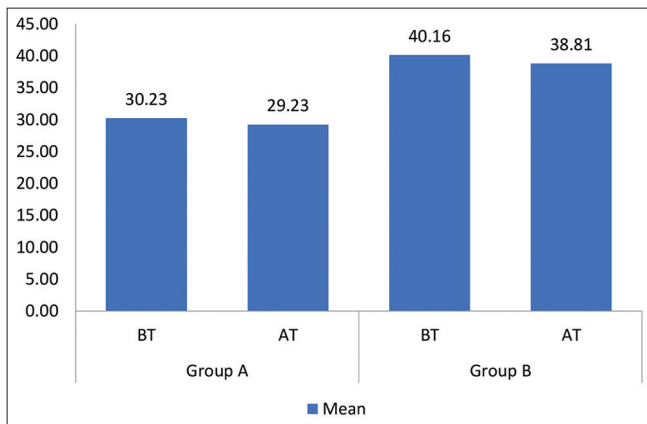


Chart 9: The effect of Guduchyadi Churna on VLDL of patients

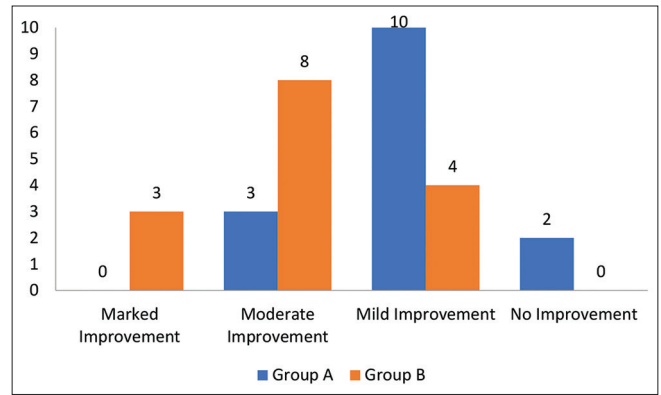


Chart 10: The overall effect of Guduchyadi Churna in patients