

## Clinical Study

# The effect of *Guduchyadi Churna* in the management of *Shareera Anukrama Atisneha* w.s.r Dyslipidemia - A Randomised Double Blind Controlled Clinical Study

\*Dr. Kusuma Avaradi, \*\*Dr. Sameer Naik, \*\*\*Dr. Kiran Mutnali

### Abstract:

Dyslipidemia is a serious lifestyle disorder in today's era, in which lipoproteins are abnormally elevated. It is a silent disorder with high rate of complication, morbidity like cardio vascular disease, diabetes, hypertension, atherosclerosis etc and mortality. Dyslipidemia can be studied under *medodhatu dushti* in Ayurvedic classics, which can be correlated to *Shareera Anukrama Atisneha*. *Shareera Anukrama Atisneha* is *santarpanjanya avastha*. Hence it needs *apatarpana chikitsa*. *Guduchyadi churna* explained in the context of *atisthoulya* which is supposed to get rid of *vikruta kapha* and *meda*. **Objectives:** The trail was designed to evaluate the effect of *Guduchyadi churna* in Dyslipidemia w.s.r to *Shareera Anukrama Atisneha*. **Trial Design:** Double blind randomized controlled clinical trial.

*Guduchyadi churna* has been mentioned in the *asthaniditiya adhyaya* context of *Charaka*. 30 patients attending OPD& IPD of *Kayachikitsa*, K.L.E.U. Shri B. M. Kankanawadi Ayurveda Hospital, Shahapur – Belagavi and were divided in two equal and identical groups, namely A and B consisting of 15 patients in each group by using computerised block randomisation table. Group A received 12gm Vidangadi churna for 30 days and Group B received *Guduchyadi churna* for 30 days. During follow up period both groups were received Cap-Placebo 500mg BD for 30 days. **Outcome:** Study shows there is a significant difference within both the groups ( $p < 0.0001$ ) But there was no significant difference between the groups at all the timelines. The drug effect was significant in both the groups with slightly better result in group B on all the anthropometric parameters and serum triglycerides and VLDL.

**Key-words:** *Shareera Anukrama Atisneha*, Dyslipidemia, *Medodhatu*.

### सारांश -

आजकल की आधुनिक जीवनशैली में 'डीस्लिपिडेमिया' एक गम्भीर रोग होता जा रहा है जिसमें रोगी के शरीर में 'लाइपो प्रोटीन' की मात्रा असामान्य रूप से बढ़ जाती है यह एक ऐसा रोग है जो अव्यक्त होकर कालान्तर में गम्भीर उपद्रव उत्पन्न कर सकता है जैसा की हृदयविकार, प्रमेह, उच्चरक्तचाप, अथेरोस्क्लरोसिस इत्यादि। 'डीस्लिपिडेमिया' को आयुर्वेद में मेदो धातु दुष्टि के अन्तर्गत पढा जा सकता है; जिसकी तुलना शरीर अनुक्रम अतिस्त्रेह से की गई है। शरीर अनुक्रम अतिस्त्रेह एक संतर्पणजन्य अवस्था है, इसलिये इस रोग में अपतर्पण चिकित्सा की आवश्यकता है। विकृत कफ तथा मेद के ह्रास करने हेतु अतिस्थौल्य विषय में गुडुच्यादि चूर्ण का विस्तारित विश्लेषण उपलब्ध ग्रन्थों में उपलब्ध है।

गुडुच्यादि चूर्ण का 'डीस्लिपिडेमिया' में प्रभाव देखने हेतु डबल ब्लैण्ड रेण्डमाइज्ड कन्ट्रोल क्लिनिकल ट्रायल चिकित्सा शोध की गयी जिसमें 20-60 वर्ष के पुरुष स्त्री मरीजों का लिपिड प्रोफाइल (कोई एक, स्थूल/मध्यम) बढ़ा हो उन्हें अध्ययन में सम्मिलित किया गया था। कुल 30 मरीजों को दो समूह में विभाजित किया गया था समूह 'A' में 15 मरीजों को विडंग चूर्ण 30 दिनों के लिये तथा समूह 'B' में 15 मरीजों को गुडुच्यादि चूर्ण 30 दिनों के लिये दिया गया तथा 30 दिन पूर्ण होने के पश्चात् प्लेसिबो 30 दिनों के लिये दिया गया था। शोध से यह पता चला की दोनो समूहों के रोगियों में लाभ पाया गया है परंतु समूह 'B' में 'डीस्लिपिडेमिया' के सभी लक्षणों (LDL, Sr.Cholesterol, Tryglycerides Etc.) में समूह 'A' की तुलना अधिक लाभ पाया गया है।

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### Introduction:

**Background:** Dyslipidemia is a condition of abnormally elevated levels of any or all lipids, i.e: serum cholesterol, triglycerides, low density lipoprotein and high density lipoprotein in the blood. The plasma levels of lipids and lipoproteins are reflection of various factors like food habits, lifestyle, inherent genetic characteristics, obesity, insulin resistance and presence of co-morbid condition such as diabetes mellitus, renal disease and hyper uricemia. Changes in lifestyle and food habits are thought to be the likely causes of higher incidence of Dyslipidemia. Dyslipidemia leads to coronary artery diseases, myocardial infarction and cerebro vascular accidents (CVA).

Abnormal cholesterol levels are estimated to cause 18% of the global CVDs and 56% of the global Ischemic Heart Disease (IHD). For every 1% reduction in lipid level, the risk of heart disease reduces by 2.5%. Dyslipidemia is an established risk factor for atherosclerotic disease<sup>1</sup>.

In Ayurveda, there is no such term described like Dyslipidemia. Yet, the lipids, described in modern medical science, lipid components in the body can be treated as derivatives of fat tissue (*MEDO DHATU*), which performs the function of uncton (*SNEHANA*). Since *Kapha Dosha* and *Medo Dhatu* are mutually dependent, any etiological factor (*nidana*) which provokes *Kapha Dosha* will result in the aggravation of *medo* there by resulting in Dyslipidemia.

*Medoroga* is turning out to be burning problem among all other conditions. The *Medovaha Sroto Dushti* leads to *sthoulya* as per *Acharya Sushruta* explained in the context of *Rasa Nimittaja Sthoulya*<sup>2</sup> which strikingly resembles with Dyslipidemia.

*Acharya Sushruth a* emphasizes on causative

factor viz., *Sleshmala Ahara Atisevana, Avyayama, Adhyashana* and *Divaswapna* leading to *Agnimandya*, producing *Madhuratarata Ama Annarasa*. This *Samarasa* circulates in the body vitiating the *Dosha, Dhatu, Srotas* etc. There is excessive disturbance of *medo dhatwagni*, and due to *Medo Dhatwagni Mandhya* excessive production of *Sama Medas* occurs. This *Sama Medas* circulates in the entire *Shareera (Shareera-anukrama-atisneha*<sup>3</sup>). This excessive *sneha* when retained in the body forms abnormal *medo dhatu* resulting in *Medoroga* i.e. one *avastha* of *Shareera Anukrama Atisneha*.

Here *Ayurveda* plays vital role as *Kapha Medohara Dravyas*, many properties of *Tikta rasa* have been mentioned in *Charaka Samhita* while describing the *rasa* which are suitable for the management of *Medoroga* (Dyslipidemia).

Hence present study was conducted using the *Guduchyadi Churna*<sup>4</sup> in comparison with *Vidangadi Churna*<sup>5</sup> for the research purpose.

### Objectives:

- To evaluate the effect of *Guduchyadi Churna* in the management of *Shareera Anukrama Atisneha*.
- To evaluate the effect of *Vidangadi Churna* in *Shareera Anukrama Atisneha*.
- To compare the efficacy of *Guduchyadi Churna* and *Vidangadi Churna* in Dyslipidemia.

### Methods:

**Trial design** - This is a randomised double blind controlled clinical study.

### Participants: Inclusion Criteria

1. Age group between 20 and 60 years of both the sex.

2. The patients with elevated minimum of one lipid profile with or without obese/overweight.
3. Fresh cases were included. (Newly detected cases).

### Exclusion Criteria

1. Pregnant and lactating women
2. Patients diagnosed to have major systemic disorders such as uncontrolled diabetes mellitus, uncontrolled hypertension, Psycho-Neuro-Endocrinal disorders.
3. Patients who have a past history of Myocardial infarction, Stroke or Severe arrhythmia, severe pulmonary dysfunction which interferes with the treatment.

### Diagnostic Criteria

Diagnosis was based on the following parameters of Dyslipidemia.<sup>[8]</sup>

#### 1. Objective Parameters:

- Body weight
- BMI
- Waist circumference
- Hip circumference
- Waist-Hip ratio

#### 2. Lipid Profile-(12 hrs Fasting Sample).

- Serum Cholesterol
- Serum Triglycerides
- Serum HDL
- Serum LDL
- Serum VLDL
- LDL/HDL Ratio

### Study settings:

The study was carried out at Post Graduate Department of *Kayachikitsa*, K.L.E University Ayurved Hospital, Shahapur – Belagavi, during last two year. Total 32 patients diagnosed with Dyslipidemia who come under inclusion criteria were selected.

### Intervention: (Table no: 3)

Total of 32 patients were randomly assigned into two groups, namely A & B consisting of 16 patients each. Group A patients received *Vidangadi Churna* for 30 days where as Group B patients received *Guduchyadi Churna* for 30days.

Irrespective of the group, during follow up period all the patients were administered placebo of wheat flour capsule 500mg BD for 1month.

### Diet and instructions

Patients were instructed to avoid spicy, oily and non vegetarian diet.

### Collection and Preparation of test drug

*Guduchyadi churna* is indicated in the treatment of *Atisthoulya* in *Charaka Samhita* and *Vidangadi churna* is mentioned in *Medo Rogadhikara* by *Bhaishajya Ratnavali* was prepared as per the standard protocol. All the raw materials were purchased from GMP certified KLEU's Ayurveda Pharmacy Khasbag, Belagavi. The *churna* was prepared according to the guidelines mentioned in *Ayurvedic Pharmacopoeia of India*. [Table No.1 and 2]

**Sample Size:** A total of 32 patients fulfilling the inclusion criteria were enrolled in the trial. 16 patients were registered in Group A, among them 15 patients completed the trial. In group B, a total of 16 patients registered, among them 15 patients completed the trial.

**Randomisation:** Randomised double blind controlled clinical study.

### Statistical methods:

The obtained data was analyzed statistically and presented as mean difference + standard error. The data generated during the study was subjected to Repeated Measures two-way Anova test to assess the statistical significance between the two groups.

### Ethical clearance

Institutional Ethical Committee of K.L.E.University's Shri B. M. Kankanwadi Ayurved Hospital, Shahapur, Belagavi approved the design of the study. Written consent was taken from each patient willing to participate before the start of the

trial. Patients were free to withdraw their name from the study at any time without assigning any reason.

### Results:

**Participant Flow:** A total of 32 patients attending OPD of *Kayachikitsa*, K.L.E. University's Ayurved Hospital, Shahapur – Belagavi fulfilling the inclusion criteria were enrolled in the study and randomly assigned into two groups, namely Group A consisting of 16 patients and Group B consisting of 16 patients.

**Losses and Exclusions:** A total of 30 patients completed two month study period and 2 patients dropped out prior to completion of the study. 1 patient in Group A discontinued due to unknown reason whereas 1 patients in Group B discontinued as he was staying far away from area of study.

**Recruitment:** The study was carried out during the period 2014 to 2016 and the assessment was done on baseline and on 60<sup>th</sup> day.

### Duration and follow up:

The trial drugs were administered for 30 days.

There were three follow ups as listed below:

1<sup>st</sup> follow up on 15<sup>th</sup> Day

2<sup>nd</sup> follow up on 31<sup>st</sup> Day

3<sup>rd</sup> follow up on 60<sup>th</sup> Day

During 2<sup>nd</sup> follow up both groups were given Cap-Placebo for 1month.

### Statistics Analysis:

Repeated Measures two-way Anova test

### Results:

#### Effect of *Vidangadi Churna* on Lipid profile: (Table no:4 )

**Serum Cholesterol:** In Group A, the mean of total cholesterol from 211 to 177 and 174 reduction was observed in S.Cholesterol from pre to post treatment, pre treatment to follow up and post treatment to follow up respectively.

**Triglycerides:** The mean of triglycerides from 156.9 to 146.3 and 150.5 reductions was

observed in triglycerides from pre to post treatment, pre treatment to follow up and post treatment to follow up respectively.

**Low density lipoprotein:** The mean LDL from 138.2 to 112.3 and 100.3 reduction was observed in LDL from pre to post treatment, pre treatment to follow up and post treatment to follow up respectively.

**High density lipoprotein:** The mean HDL from 42.53 to 41.40 and 41.80 reduction was observed in HDL from pre to post treatment, pre treatment to follow up and post treatment to follow up respectively.

#### Effect of *Guduchyadi Churna* on Lipid profile: (Table no: 5)

**Serum Cholesterol:** In Group B, the mean of total cholesterol from 207.3 to 182.8 and 173.5 reductions was observed in S.Cholesterol from pre to post treatment, pre-treatment to follow up and post treatment to follow up respectively.

**Triglycerides:** The mean of triglycerides 210.9 to 170.8 and 167.9 reduction was observed in triglycerides from pre to post treatment, pre-treatment to follow up and post treatment to follow up respectively.

**Low density lipoprotein:** The mean LDL from 121.1 to 103.6 and 96.5 reduction was observed in LDL from pre to post treatment, pre-treatment to follow up and post treatment to follow up respectively.

**High density lipoprotein:** The mean HDL from 42.67 to 43.47 and 42.20 reduction was observed in HDL from pre to post treatment, pre-treatment to follow up and post treatment to follow up respectively.

#### Effect of *Vidangadi Churna* on Anthropometry parameter: (Table no: 6)

**BMI:** Group A showed highly significant reduction in BMI from 28.60 to 27.99 and 28.27 reduction was observed in BMI from pre to post treatment, pre-treatment to follow up and post treatment to follow up respectively.

**Waist- Hip (W:H) Ratio:** Group A showed highly significant reduction in W:H ratio from 0.94

to 0.93 and 0.94 reduction was observed in W:H ratio from pre to post treatment, pre-treatment to follow up and post treatment to follow up respectively.

### **Effect of Guduchyadi Churna on Anthropometry parameter: (Table no: 7)**

**BMI:** Group A showed highly significant reduction in BMI from 26.82 to 26.02 and 26.19 reduction was observed in BMI from pre to post treatment, pre-treatment to follow up and post treatment to follow up respectively.

**Waist- Hip (W:H) Ratio:** Group A showed highly significant reduction in W:H ratio from 0.942 to 0.940 and 0.944 reduction was observed in W:H ratio from pre to post treatment, pre-treatment to follow up and post treatment to follow up respectively.

### **Comparative effect on objective parameters:**

There was no significant difference when Group A was compared with Group B in all the parameters. The results show that Group A and Group B do not differ significantly.

### **Discussion:**

#### **Over-all effect of therapy**

In the present study it was observed that both *Guduchyadi Churna* and *Vidangadi Churna* effectively reduced the elevated lipid profile and anthropometry parameters, both the groups have almost equal efficacy.

#### **Serum Cholesterol**

The drug effect was statistically significant in both the groups with slightly better result in group A. The effect was probably due to *Kaphavatahara*, *Lekhana* and *Amapachana* properties of the herbs.

#### **Triglycerides**

The drug effect was highly significant in both the groups with slightly better outcome in group B. The effect was probably due to activity of *Guduchyadi churna* on *Kapha*, *Meda* and *Ama* which form part of the pathogenesis. Stimulating triglyceride hydrolysis in order to diminish fat stores. The alkaloids of *Guduchyadi Churna* possess anti-inflammatory, anti stress, antioxidant, immunomodulatory, hypolipidemic, and rejuvenating properties.

#### **LDL**

The drug effect was highly significant in both the groups with slightly better result in group A. The effect was probably due to action of *Ushna Veerya* which is said to be *Kaphavata shamaka*, it may reduce *Dusta Kapha* and *Medodhatu*. It possesses reduction of LDL.

#### **HDL**

The efficacy was statistically non significant in group A & group B patients.

#### **Weight**

The drug effect was highly significant in both the groups with slightly better result in group B. The effect was probably due to *Lekhana*, *Karshanakari*, *Virukshana*, *Srotoshodana* and *Kaphamedohara*, *Agnideepana* and *Amapachana* by *Tikta Katu Rasa*, *Katu Vipaka*, *Laghu* and *Ruksha Guna* burns and metabolises the fat, improves the process of fat metabolism. Thus this formulation has definitely anti obesity activity.

#### **BMI**

The drug effect was statistically significant in both the groups with better result in group B. The effect was probably due to *Kaphavatahara* properties of the drugs. *Guduchyadi churna* having *Katu*, *Tikta* and *Kashaya Rasa*, *Laghu* and *Ruksha Guna*, *Katu Vipaka* and *Ushna Veerya* possess *Lekhana*, *Pachana*, *Deepana*, *Kaphamedohara* and *Srotoshodhana*. It improves fat metabolism by anti obesity, antioxidant properties.

### **Discussion on the probable mode of action: Ayurvedic Approach**

Dyslipidemia is the disease of *Agnivikriti* and *Dhatuvikriti*. Formation of *Ama Dosha* at different levels is the main *Samprapti* responsible for the disease. To attain *Samprapti Vighatana*, the medicines incorporated should eliminate *Ama Dosha* at various levels, correct the *Agni* and cleanse the *Srotas*. In this formulation *Guduchyadi Churna* possess *Laghu*, *Ruksha* and *Tikshna Guna*<sup>6</sup>. *Laghu guna* is *Kaphagna*, promotes *Vata Dosha* and depletes the quantum of *dhatu*s in the body<sup>7</sup>. *Ruksha Guna* also promotes *Vata Dosha* and pacifies *Kapha* and *Medodhatu*.<sup>8</sup> *Tikshna Guna* promotes *Pitta*

*dosha* pacifies *kaphavatadosha* and possesses *Srotoshodhaka* activities.<sup>9</sup> Most of the drugs of *Guduchyadi Churna* have *Katu* and *Tiktarasa*. *Katurasa* stimulates *Pachakagni* desiccates the food, removes obstruction, dilates the passages and allays *Kapha Dosha*. *Tiktarasa* is *Akasha* and *Vayu Mahabhuta Pradhana* and its main pharmacological action is *Amapachana*<sup>10</sup>. It absorbs *Kleda*, *Meda*, *Vasa* and *Kapha dosha*. All these drugs have *Katu Vipaka* which promotes *Dhatwagni*.

Trail formulation possesses *Ushna Veerya*, which helps in digestion of *Ama*, Pacifies *Kapha* and *Vata Dosha*. All these properties are opposite to *Medo Dhatu* which is *Parthiva* and *Jala Mahabhuta* predominant owing to which it functions for *Samprapti Vighatana* of *Medo Dusti* precipitated by *Dhatwagni mandyata*. All these quality help in *Amapachana* correct *Agnivikriti* all over body and eliminate *Srotoavarodha*. All drugs have *Lekhaneeya*, *Anulomana* property which keeps *Dosha* in natural *anulomana* state. All drugs are *kapha shaman* which is the origin of the disease.

#### **Discussion on the probable mode of action: Modern Approach**

According to Modern pharmacology *Guduchi* contains alkaloids, diterpenoidlactones, Steroids, Phenolics. Ethanolic extract of *Tinospora cordifolia* has lipid lowering effect.<sup>11</sup> *Musta* contains B-sitosterols and activators of B receptors exhibited lipolytic action and mobilized fat from adipose tissue.<sup>12</sup> *Triphala* contains gallic acid, ellagic acid and ellagic acid obtained on hydrolysis of tannins are inhibition of squalene epoxidase.<sup>13</sup> A rate limiting enzyme of cholesterol biosynthesis. It contains HMG CoA reductase inhibitory activity, this formulation is rich in soluble fibre which improves digestion, regulates elimination without causing any laxative dependence and rich in antioxidant<sup>14</sup>.

#### **Anti-oxidant activity**

The active principles of *Guduchi* extract have shown to inhibit the lipid peroxidation superoxide and hydroxyl radical, extract contains a polyphenol beta cell mitogen; G1-4A that enhances immune response. *T.cordifolia* elevates GSH levels, expression of the gamma-glutamylcysteine synthetase and Cu-Zn SOD genes<sup>14</sup>. Flavanoid, ascorbic acid and

polyphenol present in *Musta* scavenge free radicals from the body and reduce oxidative stress<sup>13</sup>. *Triphala* acts as a potential antioxidant and is recommended to guard against free radicals and protect cells from damage caused by excess oxidation. Gallic acid a major polyphenol of *Triphala* has strong antioxidant property<sup>13</sup>. These herbs exhibit strong free radical scavenging properties against reactive oxygen and nitrogen thus proving to possess antioxidative activity.

#### **Conclusion:**

*Shareera Anukrama Atisneha* is a disorder of *Santarpana Nidana* with the involvement of mainly *Medho Dhatu* and *Kapha Dosha*. Hence *Shareera Anukrama Atisneha* is *Santarpanotta Vyadhi* and the main line of treatment has to be *Apatarpana*. There is highly significant improvement in objective parameters like lipid profile, body circumference and BMI, in within groups. There is no significant results in between the groups. The result was statistically significant during trail period. i.e., 0-30 days in both the groups. There in there was no significant result in reduction of lipid profile during follow up period. i.e., 31- 60 days. The improvement in lipid parameters is better as seen on 30 day comparative to 60 day which is maintained but doesn't exceed the pre-treatment values.

**Table No: 1 Guduchyadi churna ingredients**

Drug	Latin Name		Part used	Proportions
<i>Guduchi</i>	<i>Tinospora cordifolia</i> Willd		Stem	1Part
<i>Musta</i>	<i>Cyperaceae rotundus</i> Linn		Tuber	1Part
<i>Amalaki</i>	<i>Emblica officinalis</i> Linn		Fruit	1 Part
<i>Haritaki</i>	<i>Terminalia chebula</i> Retz		Fruit	
<i>Bibitaki</i>	<i>Terminalia belerica</i> Roxb		Fruit	

**Table No: 2 Vidangadi churna ingredients**

Drug	Latin Name		Proportion
<i>Vidanga</i>	<i>Embelia ribes</i> Burm		1 part
<i>Nagar</i>	<i>Zingiber officinale</i>		1 part
<i>Yavakshar</i>	<i>Potasii carbonas</i>		1 part
<i>Lohabhasma</i>	<i>Calx of iron</i>		1 part
<i>Yava</i>	<i>Hordeum vulgare</i>		1 part
<i>Amalaki</i>	<i>Emblica officinalis</i> Linn		1 part

**Table No: 3 Interventions:**

Groups	Sample size	Intervention 1 <sup>st</sup> -30 <sup>th</sup> days	Dose	Anupana 31 <sup>st</sup> - 60 <sup>th</sup> days	Follow up
Group-A	N=15	<i>Guduchyadichurna</i>	6gm bd	Ushnodaka	Cap-Placebo 1BD
Group-B	N=15	<i>Vidangadichurna</i>	6gm bd	Ushnodaka	Cap-Placebo 1BD

**Table No:4 Effect of Vidangadi churna on lipid profile:**

Lipid profile	Group A	Mean 1	Mean 2	MD	SE	P value	Significant
Cholesterol	BT vs AT	211	177.8	34.00	8.114	0.0003	***
	BT vs FU	211	174.1	37.73	8.114	<0.0001	****
	AT vs FU	177	174.1	3.733	8.114	0.8901	NS
Triglycerides	BT vs AT	156.9	146.3	10.60	13.45	0.7118	NS
	BT vs FU	156.9	150.5	6.400	13.45	0.8829	NS
	AT vs FU	146.3	150.5	-4.200	13.45	0.9477	NS
LDL	BT vs AT	138.2	111.3	26.87	8.995	0.0115	*
	BT vs FU	138.2	100.8	37.40	8.995	0.0003	***
	AT vs FU	111.3	100.8	10.53	8.995	0.4753	NS

HDL	BT vs AT	42.53	41.40	1.133	1.561	0.7492	NS
	BT vs FU	42.53	41.80	0.7333	1.561	0.8858	NS
	AT vs FU	41.40	41.80	-0.400	1.561	0.9645	NS
VLDL	BT vs AT	30.87	29.00	1.867	2.661	0.7635	NS
	BT vs FU	30.87	29.73	1.133		0.9050	NS
	AT vs FU	29.00	29.73	-0.733		0.9590NS	NS

**Table No:5 Effect of *Guduchydi Churna* on lipid profile**

Lipid profile	GroupB	Mean 1	Mean 2	MD	SE	P value	Significant
Cholesterol	BT vs AT	207.3	182.8	24.53	8.114	0.0104	*
	BT vs FU	207.3	173.5	33.80	8.114	0.0003	***
	AT vs FU	182.8	173.5	9.267	8.114	0.4925	NS
Triglycerides	BT vs AT	210.9	170.8	40.07	13.45	0.0117	*
	BT vs FU	210.9	167.9	43.00	13.45	0.0064	**
	AT vs FU	170.8	167.9	2.933	13.45	0.9741	NS
LDL	BT vs AT	121.1	103.6	17.47	8.995	0.1365	NS
	BT vs FU	121.1	96.53	24.53	8.995	0.0228	*
	AT vs FU	103.6	96.53	7.067	8.995	0.7134	NS
HDL	BT vs AT	42.67	43.47	-0.800	1.561	0.8656	NS
	BT vs FU	42.67	42.20	0.4667	1.561	0.9520	NS
	AT vs FU	43.47	42.20	1.267	1.561	0.6976	NS
VLDL	BT vs AT	40.53	33.80	6.733	2.661	0.0373	*
	BT vs FU	40.53	34.53	6.000	2.661	0.0708	NS
	AT vs FU	33.80	34.53	-0.733	2.661	0.9590	NS



**Table No:6 Effect of *Vidangadi Churna* on Anthropometric parameters:**

<b>Anthropo-metric parameters</b>	<b>Group A</b>	<b>Mean 1</b>	<b>Mean 2</b>	<b>MD</b>	<b>SE</b>	<b>P value</b>	<b>Significant</b>
Weight	BT vs AT	74.47	72.98	1.487	0.2836	<0.0001	****
	BT vs FU	74.47	73.60	0.8667	0.2836	0.0156	*
	AT vs FU	72.98	73.60	-0.620	0.2836	0.8948	NS
BMI	BT vs AT	28.60	27.99	0.6140	0.1297	<0.0001	****
	BT vs FU	28.60	28.27	0.3300	0.1297	0.0605	NS
	AT vs FU	27.99	28.27	-0.284	0.1297	0.1347	NS
Waist Circ.	BT vs AT	100.3	97.40	2.867	0.4526	<0.0001	****
	BT vs FU	100.3	98.23	2.033	0.4526	0.0001	***
	AT vs FU	97.40	98.23	-0.833	0.4526	0.2616	NS
Hip Circ.	BT vs AT	105.6	103.6	1.967	0.3272	<0.0001	****
	BT vs FU	105.6	103.6	1.967	0.3272	<0.0001	****
	AT vs FU	103.6	103.6	0.0	0.3272	>0.9999	NS
W:H Ratio	BT vs AT	0.9460	0.9340	0.0120	0.0041	0.0265	*
	BT vs FU	0.9460	0.9433	0.0026	0.0041	0.9198	NS
	AT vs FU	0.9340	0.9433	-0.009	0.0041	0.1238	NS

**Table No:7 Effect of *Guduchyadi Churna* on Anthropometric parameters**

<b>Anthropo-metric parameters</b>	<b>Group B</b>	<b>Mean 1</b>	<b>Mean 2</b>	<b>MD</b>	<b>SE</b>	<b>P value</b>	<b>Significant</b>
Weight	BT vs AT	69.58	67.76	1.820	0.2836	<0.0001	****
	BT vs FU	69.58	68.21	1.367	0.2836	<0.0001	****
	AT vs FU	67.76	68.21	-0.453	0.2836	0.3851	NS
BMI	BT vs AT	26.82	26.02	0.8033	0.1297	<0.0001	****
	BT vs FU	26.82	26.19	0.6301	0.1297	<0.0001	****
	AT vs FU	26.02	26.19	-0.172	0.1297	0.5460	NS
Waist circ.	BT vs AT	97.27	94.53	2.733	0.4526	<0.0001	****
	BT vs FU	97.27	95.27	2.000	0.4526	0.0002	***
	AT vs FU	94.53	95.27	-0.733	0.4526	0.3730	NS
Hip Circ.	BT vs AT	101.9	99.60	2.267	0.3272	<0.0001	****
	BT vs FU	101.9	100.2	1.667	0.3272	<0.0001	****
	AT vs FU	99.60	100.2	-0.600	0.3272	0.3675	NS
W:H Ratio	BT vs AT	0.9427	0.9407	0.002	0.0041	0.9638	NS
	BT vs FU	0.9427	0.9440	-0.001	0.0041	0.9888	NS
	AT vs FU	0.9407	0.9440	-0.003	0.0041	0.8560	NS

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