Research Article

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A COMPARATIVE STUDY ON THE EFFECT OF DASHANG GUGGULU AND BILVADI KWATH IN THE MANAGEMENT OF STHAULYA WITH REFERENCE TO OBESITY

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ABSTRACT

Introduction: Obesity results from excess calorie consumption and reduced physical activity in a person. Obesity is the commonest lifestyle disorder in the present urbanized world and is the 5th leading cause of global death and 2nd preventable cause of death next to smoking. Objective: to evaluate the clinical efficacy of *Dashang Guggulu* and *Bilvadi Kwath* in the management of *Sthaulya*. Methods and Materials: After approval from the IEC committee, an interventional study was carried out on obese individuals for three months by giving in 2 drugs in different groups, namely *Dashang Guggulu* and *Bilvadi Kwath*, comparing it with a third placebo group. Patients were evaluated on subjective parameters, anthropometric measurements, and lipid profile values. Result: On inter-group comparison, *Bilvadi Kwath* showed results in reducing body measurements like body weight and BMI. No changes in subjective symptoms except *Javoparodha* symptoms (loss of enthusiasm) and lipid profile were noted. Conclusion: *Bilvadi Kwath* was found to be more effective than *Dashang Guggulu*.

Keywords: *Sthaulya, Bilvadi Kwath, Dashang Guggulu*

INTRODUCTION

Obesity is the abnormal growth of adipose tissue due to the enlargement of fat cell sizes (hypertrophy), an increase in fat cell number (hyperplastic), or a combination of both.[1] Obesity is a multi-factorial chronic disease developing from the interactive influences of numerous factors. In 2016, more than 1.6 billion adults aged 18 years or older were overweight, and 650 million were obese. In India, obesity is around 11.8-31.3% prevalent. [2] Primary obesity has no apparent cause other than an imbalance between energy intake (more calorie intake) and expenditure (reduced physical activity). It has been seen that a daily 100 Kcal excess intake from the required diet leads to an increase of 5 kg in a year. Secondary obesity develops with a known underlying cause, whether genetic, endocrinal, physiological, psychological or through drugs. Many epidemiological determinants play a role in its causation. [3] Studies have shown if both parents are obese, there is an 80% chance of a child being obese. Obesity occurs more commonly in middle-aged persons (> 30 years), females, persons with sedentary occupations, high socioeconomic status (in developing countries), during emotional disturbances and due to trauma to the hypothalamus. Obesity can be easily accessed through an eyeball test. If a person looks fat, he is overweight. Excess body fat is mainly accumulated under the skin (50%), in the omentum, liver and muscle tissues. Males have an android distribution of fat, i.e., fat around the waist (central obesity) associated with metabolic diseases, and females mostly have gynoid distribution of fat, i.e., fat around buttocks and hips (below waist) related to mechanical problems[4]. Objectively degree of fatness can be measured by measuring body weight, body mass index (BMI), waist circumference (WC), waist-to-hip ratio (WHR) and skin fold thickness (SKT). These anthropometric parameters represent stored body fat depots while circulating fats can be assessed in my lipid profile. Obesity is a risk factor for several diseases like diabetes mellitus, hypertension, hyperlipidaemia, osteoarthritis, fatty liver, infertility, cancer etc. [5] In Ayurveda, which is a holistic science, *Sthaulya* has been compared with obesity. *Acharya Charaka* mentioned that a person in whom the excessive and abnormal increase of *Medo Dhatu* along with *Mamsa Dhatu* is found, which results in a pendulous appearance of buttocks, belly and breasts and uneven deposition of fat all over the body whose increased bulk is not matched by a corresponding increase in energy is called *atisthula purusha*. [6] *Acharya Charaka* has classified *Sthaulya* under *Kaphaja Nanatmaja vikara* [7] and mentioned *Sthaulya* being a *Santarpanjanya vyadhi.* [8] There are eight doshas associated with *Sthaulya* namely *ayushorhas* (reduced life span), *javoparodha* (lack of enthusiasm/activity), *kruchravyavayata* (difficulty in sexual intercourse), *daurbalya* (fatigue), *daurgandhya* (foul body odour), *swedabadha* (excessive perspiration), *atikshudha* (increase in hunger) and *atitrushna* (Increase in thirst).[9] *A*ccording to *samprapti*, if a person indulges in frequent consumption of *shleshmala aahara* (*madhur, guru, sheet, snigdha*) without undertaking adequate physical activity and instead sleeps for a long time, his *annarasa* remains *apakva* and becomes *aam*. This *aam* is *madhur* and *atisnigdha* in character and is made available for conversion into *sneha* (*meda*) owing to its affinity to *Meda*. Such *amarasa* does not provide nutrition to other *Dhatu*, as the increased *Meda* gets deposited in various microchannels and obstructs them.[10] In a *Sthoola* person, excess of *Meda Dhatu* formation in the body causes *Avarana* (obstruction) of all the *srotas* (channels) by the *Meda*; when there is *srotorodha* (obstruction) in *koshta srotas* (body channels), there is *vruddhi* of *kosthashrit Samana Vayu*, which in turn causes *ati sandhukshan* of *Jathar Agni*. The increase in *Jathar Agni* leads to rapid digestion of consumed food and leaves the person craving more food. If at all, due to some reason, the person does not receive more food, the increased *Agni* causes *Dhatu pachana,* which may lead to various complications.[11]

MATERIALS AND METHODS

The trial got approved by A&U Tibbia College and Hospital. IEC committee dated 6 July 2019 via letter number N.F.5(283)/2013-CO/76/. The project is also registered with CTRI with registration number CTRI/2020/03/024405. The patients were selected from Kayachikitsa O.P.D of A&U Tibbia College and Hospital, Delhi, India. The sample size was calculated using the previous work's standard deviation and effect size.[12] A random allocation sequence was used, and accordingly, the cases were then randomly allocated to three groups of equal size. The 60 chosen cases were randomly assigned into three groups of 20 each. However, 6 cases (3 from group A, one from group B and two from group C) dropped out. So, the final data analysis included 54 participants.

Group A: *Dashang Guggulu* tablets 500 mg twice a day (interventional)
Group B: *Bilvadi Kwath* 30 ml twice a day (interventional)
Group C: Placebo capsule 500 mg twice a day (comparator)

Drug contents

Dashang Guggulu: This classical preparation is mentioned in *Chikitsa Sar Sangrah Vangsen Medoroga Adhyaya***.** It contains drugs *Pippali (Piper longum), Maricha* (*Piper nigrum*)*, Shunthi (Zingiber officinale), Chitrak (Plumbago zeylanicum*)*, Amalaki (Emblica officinalis*)*, Haritaki (Terminalia chebula*), *Vibhitak (Terminalia belerica*)*, Musta (Cyperus rotundus), Vidanga (Embelia ribes*) and *Guggulu (Commiphora mukul*) in equal quantities.

Bilvadi Kwath: This classical preparation is mentioned in *Sharandhar Samhita*. it contains drugs *Bilva (Aegle marmelos*)*, Agninmanth (Premna mucronata), Shyonaka (Oroxylum indicum*)*, Patala (Stereospermum suaveolens*) *and Gambhari (Gmelina arborea*) in equal quantities.

Inclusion Criteria

Patients aged between 16-60 years willing to trial with

- BMI >23 (both male and female)
- W.C >90 cm (males) and >80 cm (females)
- WHR >0.88 (males) and >0.80 (females)
- SFT >40 mm (males) and > 50 mm (females) were selected for the trial.

Exclusion Criteria

- Patients who were not willing to trial.
- The patient is below the age of 16 years and above 60 years.
- Patients suffering from stage II hypertension (≥ 160/100 mmHg) and diabetic patients having FBS > 200 mg/dl.
- Patients associated with significant medical diseases like cancer, concurrent infection like tuberculosis etc.
- Patients with a genetic and endocrinal disorder, a chronic condition like paralysis, cancer, renal failure, hepatic failure and IHD.
- Pregnant women

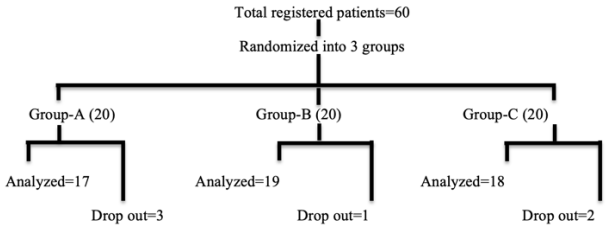
After giving consent, baseline demographic data of each patient and subjective parameters scoring was recorded in the prescribed format. Body measurements were done using a weight machine (body weight), weighing machine and Stadiometer (BMI), body measuring tape (WC and WHR) and skin calliper (SFT). A fasting blood sample for assessing lipid profile was also done.

Assessment Criteria

Patients were assessed before and after treatment for subjective scoring, anthropometric measurements, and biochemical parameters (lipid profile). Nine parameters were evaluated in subjective scoring, namely *Chala Spike-Udara-Astana* (visible movement of buttocks-abdomen and breast), *javoparodha* (lack of enthusiasm and activity/laziness), *daurbalyata* (weakness), *daurgandhya* (terrible body odour), *swedabadha* (excess sweating), *atikshudha* (excess hunger), *atipipasa* (excess thirst), *kshudrashwasa* (dyspnea on exertion) and *nidradhikya* (excess sleep). Five parameters were assessed for anthropometric measurements: body weight, BMI, WC, WHR and SFT. The fasting lipid profile was measured before and after treatment for biochemical assessment.

Statistical Analysis

Collected data were entered in Microsoft Excel and analysed using Graph Pad Prism software to conclude the effect of treatment on trial patients. For qualitative data (subjective scoring), an inter-group comparison was made by the Kruskal Wallis test, and an intra-group comparison was created using the Wilcoxon sum of the signed-rank test. For quantitative data (anthropometric measurements and biochemical parameters), an inter-group comparison was done using one-way ANOVA, and an intra-group comparison was done using paired t-test.



Sixty patients were registered in the trial, and their baseline demographic data was collected in already prepared forms. Out of 60, 6 patients (3 in group A, 1 in group B and 2 in the group C) did not come up for the follow-up, so they were considered as dropped out. The rest 54 patients were evaluated for subjective, anthropometric, and biochemical parameters. While estimating subjective parameters, within-group comparison did not show significant results in any of the nine subjective symptoms in any of the three groups except in *javoparodha* in group B. Inter-group comparison showed better results of group B in symptoms of *daurgandhya, swedabadha, atikshudha* and *atipipasa*. On anthropometric measurements, within-group comparisons showed highly significant results in all parameters in all three groups, but inter-group comparisons showed substantial results in group B in improving body weight and BMI. Biochemical values did not show any improvement in any of the groups on the inter-group comparison.

Table 1: Scoring of Subjective Symptoms

Chal Sphika-Udara-Stana (visible movement of buttocks-abdomen and breast)	
Normal movement	0
Visible movement of *Udara* only on walking	1
Visible movement of *Udara* and *Sphika* on walking	2
Visible movement of *Udara, Sphika* and *Stana* on walking	3
Visible movement on changing posture	4
Javoparodha (lack of enthusiasm)	
Normally work satisfactorily with initiation and within time	0
Doing work satisfactorily with initiation late in time	1
Doing work unsatisfactory with a lot of mental pressure and being late on time	2
Not starting any work under his responsibility, doing little work very late	3
Does not have any initiation and not wants to work even after pressure	4
Daurbalya (weakness)	
Can do vigorous exercise	0
Can do moderate exercise without difficulty	1
Can do only mild exercise but without difficulty	2
Can do gentle exercise but with difficulty	3
Cannot do even mild exercise and is prone to falls	4
Daurgandhya (bad body odour)	
No body odour	0
Body odour noticed by self only	1
Body odour noticed by others, removed by bath	2
Body odour not removed by bath, deodorants	3
Swedabadha (excess sweating)	
Sweating after heavy work and fast movement or in a scorching season	0
Profuse sweating after moderate work and movement	1
Sweating after little work and movement	2
Profuse sweating after little work and movement	3
Sweating even at rest or in the cold season	4
Atikshudha (excess hunger)	
Normal hunger	0
The appearance of hunger less than 6 hours	1
The appearance of hunger within 4-5 hours	2
The appearance of hunger within 3 hours	3
The appearance of hunger within 1-2 hour	4
Atipipasa (excess thirst)	
Normal thirst (2-3 litres of water daily)	0
Up to 1-litre excess intake of water	1
Up to 2-litre excess intake of water	2
2-3 litre excess intake of water	3
More than 3-litre intake of water	4
Kshudra-Shwasa (excess hunger)	
Dyspnea after cumbersome work (movement) but relieved soon after rest	0
Dyspnea after moderate work but relieved on rest	1
Dyspnea after little work, unable to eat and drink	2
Dyspnea in resting condition, unable to talk	3
Nidradhikya (excess sleep)	
The sleep of 6-8 hours at night	0
The sleep of > 8 hours at night with daytime sleep	1
The sleep of > 8 hours at night with daytime sleep and with heaviness in the body	2
The sleep of > 8 hours at night with daytime sleep and with heaviness in body and *Alasya* (laziness)	3

Table 2: Within-Group effect of treatment on Subjective Symptoms

SN		**Group A**			**Group B**			**Group C**		
	Subjective Symptoms	% Relief	P value	Result	% Relief	P value	Result	% Relief	P value	Result
1.	*Chala Sphika-Udara-Stana*	42	<0.05	S*	73	<0.001	HS***	33	>0.05	NS
2.	*Javoprodha*	43	>0.05	NS	69	<0.001	HS***	30	>0.05	NS
3.	*Daurbalya*	41	<0.01	S**	38	<0.05	S*	23	>0.05	NS
4.	*Daurgandhya*	57	<0.01	S**	66	<0.001	HS***	30	>0.05	NS
5.	*Swedabadha*	39	<0.01	S**	56	<0.001	HS***	21	>0.05	NS
6.	*Atikshudha*	48	<0.01	S**	48	<0.05	S*	14	>0.05	NS
7.	*Atipipasa*	43	<0.01	S**	59	<0.001	HS***	21	>0.05	NS
8.	*Kshudrashwasa*	45	<0.05	S*	45	<0.001	HS***	19	>0.05	NS
9.	*Nidradhikya*	40	<0.01	S**	79	<0.01	S**	23	<0.01	S**

S= Significant, NS= Non-significant, HS=highly significant

Table 3: Within Group effect of treatment on Anthropometric Measurements

SN	Anthropometric Parameter	Group A			Group B			Group C		
		%Diff	P value	Result	%Diff	P value	Result	%Diff	P value	Result
1	Body Weight (BW)	3.2%	<0.0001	HS****	3.7%	<0.0001	HS****	2.17%	<0.0001	HS****
2	Body Mass Index (BMI)	3%	<0.0001	HS****	3.9%	<0.0001	HS****	1.9%	<0.001	HS***
3	Waist Circumference (WC)	2.7%	<0.0001	HS****	5%	<0.0001	HS****	3.6%	<0.0001	HS****
4	Waist To Hip Ratio (WHR)	2.2%	<0.0001	HS****	4.4%	<0.0001	HS****	3.4%	<0.001	HS***
5	Skin Fold Thickness (SFT)	8.2%	<0.0001	HS****	9.8%	<0.0001	HS****	5.9%	<0.0001	HS****

S= Significant, NS= Non-significant, HS=highly significant

Table 4: Inter-Group comparison of Anthropometric Measurements

SN	Anthropometric Parameter	Comparative group	Interventional Group	Mean diff	S.E.	P value	Result
1.	Body Weight (BW)	Group C	Group A	-O.85	0.40	>0.05	NS
			Group B	-1.13	0.39	<0.05	S*
2.	Body Mass Index (BMI)	Group C	Group A	-O.22	0.16	>0.05	NS
			Group B	-0.56	0.15	<0.01	S**
3.	Waist Circumference (WC)	Group C	Group A	0.73	0.61	>0.05	NS
			Group B	-0.71	0.59	>0.05	NS
4.	Waist To Hip Ratio (WHR)	Group C	Group A	-0.005	0.072	>0.05	NS
			Group B	-0.068	0.070	>0.05	NS
5.	Skin Fold Thickness (SFT)	Group C	Group A	-1.27	0.96	>0.05	NS
			Group B	-1.49	0.93	>0.05	NS

S= Significant, NS= Non-significant, HS=highly significant

Table 5: Inter-Group comparison of Biochemical Parameters

SN	Biochemical Parameter	Comparative group	Interventional Group	S.E	P value	Result
1.	Triglyceride (TG)	Group C	Group A	7.13	>0.05	NS
			Group B	6.93	>0.05	NS
2.	Total Cholesterol (TC)	Group C	Group A	6.69	>0.05	NS
			Group B	6.50	>0.05	NS
3.	High-Density Lipoprotein (HDL)	Group C	Group A	3.82	>0.05	NS
			Group B	3.72	>0.05	NS
4.	Low-Density Lipoprotein (LDL)	Group C	Group A	7.22	>0.05	Ns
			Group B	7.03	>0.05	NS
5.	Very Low-Density Lipoprotein (VLDL)	Group C	Group A	5.07	>0.05	NS
			Group B	4.93	>0.05	NS

S= Significant, NS= Non-significant, HS=highly significant

RESULT AND DISCUSSION

Demographic data

In the maximum trial number of patients, 35% were in the age group 40-50 years. Obesity is more prevalent in middle-aged people due to less physical activity and not proportionate decrease in calorie consumption[13]. After 40, as by *Acharya Sushruta,* the *'Haani'* phase of the human body sets in when cells and tissues start ageing. Weight gain as age advances is a natural phenomenon due to the replacement of muscle tissues by fat cells. 80% of enrolled patients were female. Women have a higher rate of obesity than men. Women in phases of puberty, pregnancy, and menopause gain weight due to hormonal changes and cyclic oedema in the body.

Women's BMI increases with successive pregnancies; on average, women gain one kg per pregnancy. [14] Maximum number of patients were from the Hindu community (76%). Of the maximum number of registered patients, 80% were married. Obesity being prevalent more in married people may be a fact due to more responsibilities and high-stress levels in a person's life after marriage. Maximum patients were residing in urban areas, 54%. People living in urban areas are more capable of monetary support, so they can consume energy-dense food leading to early weight gain. By occupation, all registered patients were involved in sedentary employment, but homemakers constituted around 50% of registered patients. Homemakers, in general, are primarily associated with low physical activities, and the habit of eating leftover food children often leads to weight gain. 41% of patients belonged to the lower middle socio-economic class. 74% of enrolled patients were obese from 0-5 years. A plateau effect is often seen in obese patients where the patient's weight stabilises after gaining a certain amount of weight, so maximum patients had a history of weight gain in the last 0-5 years. Registered patients were also suffering from other associated diseases like hyperlipidaemia (22% of patients), diabetes mellitus (18% of patients), and osteoarthritis (22%) patients. Obesity is a risk factor for many metabolic disease and physical disabilities; an obese person often develops complications like diabetes, hypertensive, and dyslipidaemia or may present with other physical health conditions like back pain, osteoarthritis, varicose veins etc. [15]

Personal profile

The maximum number of patients in the trial, around 54%, were taking a mixed diet, predominantly non-vegetarian diet. The high intake of the non-vegetarian diet seen in the trial is consistent with the more calories present in the latter.65% of patients had normal appetite. 62% of patients had *samagni*. Although, according to texts, obese people experience *tikshagni*, this happens in later stages of the disease with obstruction of *koshta* body channels by fat[16]. So, *samagni* and *mandagni* experienced by maximum patients of trial may be due to vitiated *Meda Dhatvagni*. 65% of patients registered in the trial had *madhyam koshta. Madhyam koshta* in the maximum number of patients registered in the trial

is due to the predominance of *Kapha* in *koshta* [17]. 65% of patients had a low level of physical activity. Low level of physical fitness in patients was due to their occupation or lethargy, secondary to increased *Kapha* and *Medo Dosha* in the body. Also, physical activity and fitness are important modifiers of mortality and morbidity and comorbidity related to overweight and obesity, for example, in athletes when they retire and in young people who sustain injuries.

Physical inactivity may cause obesity which in turn restricts activity. This is a vicious circle. So, it is the reduced energy output that is probably more important in the aetiology of obesity than used to be thought.[18] 93% of patients were experiencing good quality sleep in the evening, 50% were sleeping for around 7-8 hours in the night regularly, and 54% experienced daytime sleepiness. Patients having an increased amount of sleep in the night hours, with also daytime napping, is evident by *Ayurvedic* texts that excess of *Kapha* in body channels produce heaviness, *alasya* and sleep in a person.[19] 59% of patients were addicted to excess tea, coffee and other beverages. It adds up to a person's weight by increasing the sugar intake in the drinks. Maximum patients (59%) were in a happy state of mind, supported by the *Nidana* of *Sthaulya* as *achintanaat* and *harshanitya* factors.[20]

Constitutional profile

51% of patients were of *Kapha-Vata prakriti,* and 43% were *Tamasika manasa prakriti*. It is due to increased *Tamo Guna* in *Mana*, one of the aetiologies of *Sthaulya,* as per *Acharya Bhavmishra*. 78% of registered patients were *avara sara (Meda* and *Mansa sara*), 50% were *avara samhanana*, 41% of *madhyam sattva*, 57% of *madhyam satmya*, 63% of *madhyam abhyavharan shakti*, 43% of *madhyam jaran-shakti* and 50% with *avara vyayama shakti*.

Subjective parameters

While assessing the symptom *Chala Sphika-Udara-Stana,* there was 73% relief before and after administration of *Bilvadi Kwath* in patients in group B, 42% relief in group A (*Dashang Guggulu*) and only 33% relief in group C (placebo). In *javoparodha,* there was 69% relief by *Bilvadi Kwath* and 43% by *Dashang Guggulu*. Only 33% of relief was observed by placebo. In *daurbalya* experienced by patients, there was 41% relief by *Dashang Guggulu*, 38% relief by *Bilvadi Kwath* and 23% relief by placebo. In subjective symptom *daurgandhya*, there was 66% relief by *Bilvadi Kwath*, 57% by *Dashang Guggulu,* and 30% by placebo. While assessing *swedabadha* experienced by patients, there was 56% relief by *Bilvadi Kwath*, 39% by *Dashang Guggulu,* and only 21% by placebo. *atikshudha* or excessive hunger in *Sthaulya* patients got 48% relief by both interventional groups and only 14% relief by the comparative group, i.e. placebo. *Atipipasa* in *Sthaulya* patients had 59% relief by *Bilvadi Kwath*, 43% relief by *Dashang* Guggulu and 21% relief by placebo. *Kshudrashwasa* or dyspnoea experienced by patients got better by around 45% in both interventional groups and only by 19% in the comparator group. Lastly, while assessing symptoms of *nidradhikya* in *Sthoola*, patients got 79% relief by giving *Bilvadi Kwath*, 40% by giving *Dashang Guggulu,* and 23% by giving a placebo. (Table 1 and 2)

Anthropometric parameters

Body weight measurement in registered patients before and after the trial showed 3.7% relief on giving *Bilvadi Kwath*, 3.2% on giving *Dashang Guggulu,* and 2.17% on giving a placebo. All results are statistically highly significant. On measuring the BMI of patients, there was 3.2% relief on giving *Dashang Guggulu*, 3% relief on giving *Bilvadi Kwath* and 1.9% relief on giving a placebo, and all are highly significant statistically. On measuring waist circumference (WC) in registered patients, 5% relief on giving *Bilvadi Kwath*, 3.6% relief on placebo and 2.7% relief on placebo was observed, which was highly significant statistically. Waist-to-hip ratio (WHR) had 4.4% relief on giving *Bilvadi Kwath*, 3.4% on giving *Dashang Guggulu* and 2.2.% on giving a placebo, which was again highly significant statistically. On measuring skin fold thickness (SFT) by skin calliper, it was observed 9.8% relief on giving *Bilvadi Kwath,* 8.2% relief on giving *Dashang Guggulu* and 5.9% relief on placebo. All results were highly significant statistically. (Table 3 and 4)

Biochemical parameters

In the study, lipid profile was measured before and after treatment to measure circulating fat in the body. On triglyceride content in the blood profile, there was 8.6% relief on giving *Bilvadi Kwath,* 9.4% on placebo, and 3.2% on providing *Dashang Guggulu*. All results were non-significant statistically. On measuring blood cholesterol, there was 7.4% relief on giving *Bilvadi Kwath* and 14% relief on giving a placebo; both are significant statistically, and 6.6% relief on providing *Dashang Guggulu,* which is non-significant. Changes in high-density lipoprotein (HDL) is 3.8% on giving *Bilvadi Kwath* and 13.4% on giving a placebo; both are significant, and 1.7% relief on giving *Dashang Guggulu,* which is non-significant. Changes in low-density lipoprotein (LDL) were 8% on giving *Bilvadi Kwath*, 17% on giving a placebo, both of which are significant, and 3.1% on giving *Dashang Guggulu,* which is non-significant. Finally, changes in very low-density lipoprotein (VLDL) were 11% on giving *Bilvadi Kwath*, 6.1% on giving *Dashang Guggulu* and 7.2% on giving a placebo. All results were non-significant statistically. (Table 5)

Mode of action of drugs

Dashang Guggulu

Dashang Guggulu has ten contents, all in equal quantity, namely *Guggulu, Triphala*, *Trikatu and Trimada. Guggulu* has *tikta, kashaya rasa, ruksha, laghu, vishada* and *sara guna* and *ushna virya,* which pacifies *Kapha* and *Vata* in the body and increases *Pitta Dosha. Purana Guggulu* (more than one-year-old) helps correct *Meda, Meha* and *Kleda dosha* in the body. *Triphala,* made up of *Amalaki, Vibhitaka,* and *Haritaki,* restores all three (*Vata Pitta Kapha) Dosha* in the body, has *deepana* and *meha, kushta hara* properties which are *santarpanjanya vikara. Trikatu* made up of *Shunthi, Maricha,* and *Pippali* has more of *Vata Kapha shamak* and a little of *Pitta vardhak* properties (due to *Maricha*), is also *deepana* and has *Kapha Medo hara* properties. *Trimada* made up of *Chitraka, Mustaka,* and *Vidanga* is also *Vata Kapha shamaka* and has a little of *Pitta vardhak* properties due to *Chitraka*. It is widely used in anti-obesity measures.

So, the chosen drug *Dashang Guggulu* directly affects *Meda Dhatu* in the body, as stated by *Ayurvedic* texts. It has *Kapha Vata shamaka* properties to correct increased *Kapha Dosha* in the body and *Pitta vardhak* properties which help in *Agni deepana* to repair *Medadhatwagni mandya* and reduces *Aam* formation and reduces stored and circulating *Meda* (fat) in the body. *Dashang Guggulu* also has anti-hyperlipidaemic and anti-obesity action that reduces atherosclerosis in the body and regulates adipogenesis (fat cell formation).

Brihat Panchmoola

Brihat Panchmoola Kwath given in trial has five ingredients in equal amounts: *Bilva, Shyonaka, Agninmanth, Patala* and *Gambhari*. On the evaluation of *Rasa panchaka* of the trial drug, it was found that *Brihat Panchmoola* is *Kashaya Tikta rasa*

Pradhan, has *Laghu, Ruksha Guna*, *Ushna Virya*, with *Katu Vipaka* and *Vata Kapha shamaka* properties with more of *Pitta shamak* properties. *Kashaya Rasa* helps in *shoshana* of increased *Kapha Pitta* and *Kleda* in the body as it has *Khara, Vishada* and *Ruksha Guna,* which does *lekhan* (scrapping), *kshalan* (clearing) and *Shoshana Guna*. *Tikta Rasa* has *Ruksha, Shita* and *Laghu Guna,* which helps in *deepana, pachana, lekhan karma* and *shoshana* of increased *Kleda, Meda, Lasika, Sweda, Pitta* and *Kapha* in the body. *Laghu* and *Ruksha Guna* bring lightness and dryness to the body, decreasing the excess of *Kapha Dosha* and *Meda Dhatu*. *Ushna Virya* does *Agni deepana* to correct *Meda Dhatvagni mandya. Katu (Vipaka*) has *Deepana* properties, corrects increased *Abhishyandi Guna, Sneha, Sweda* and *Kleda* in the body, does *Mansa Lekhan* and clears body channels (*Margaan Vivrunoti*) with *Shleshma Shoshan*a. So, *Brihat Panchmoola* affects both *agnimandya janya aam* in body and *Meda Dhatu*. Corrected *Agni* and *aam* formation halt the progress of the disease, and *lekhan* and *shoshana* properties of the drug reduce the present increased *Meda Dhatu. Brihat Panchmoola* has anti-inflammatory, anti-hyperlipidemic/anti-cholesterol, and gastric and duodenal ulcer protective properties.

CONCLUSION

Though highly significant results were obtained within-group comparison of all three groups, the inter-group comparison revealed that out of both interventional groups, wherever effective, *Bilvadi Kwath* showed more results than *Dashang Guggulu* tablets in comparison with the placebo group. *Bilvadi Kwath* showed significant results in *Chala Sphika-Udara-Astana, javoparodha, daurgandhya, swedabadha, atipipasa*, and *kshudrashwasa* and significant results in symptoms of *atikshudha, daurbalya*, and *nidradhikya*, reduced body weight and BMI.

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