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Efficacy and safety of an *Ayurvedic* regimen in *Medoroga*

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A study with an *Ayurveda* regimen consisting of *Navaka guggulu*, *Sthaulyahara kashayam*, a diet pattern and walk exercise for a treatment period of 3 *mandalam*s (120 days) in *medoroga* was conducted to probe the efficacy and safety aspects of the regimen. 71 patients of *medoroga* were recruited for the study, and 34 patients formed the sample conforming to certain inclusion and exclusion criteria. Assessment of efficacy at the end of the 120-day treatment period vis-à-vis baseline was done using a self-designed proforma considering the symptoms in accordance with the *Ayurvedic* system and the physical parameters chest (*uras*) circumference, abdomen (*udara*) circumference and hip (*sphik*) circumference as enunciated in the classical texts. Certain hepatic and renal function tests were done to examine the safety profile of the treatment regimen. At the end of the treatment period, noteworthy symptomatic improvement was found in the patients; statistically significant ($p<0.001$) reduction in the physical parameters was noticed; and values of the hepatic and renal parameters remained in their respective normal ranges. No side effects were reported by the patients over the treatment period. The study is affirmative of the efficacy and safety of the *Ayurvedic* treatment regimen when administered for a period of 120 days to patients of *medoroga*. The importance of doing exercise in addition to intake of the medicines and a diet pattern in *medoroga* is emphasized.

Keywords: *Medoroga*, *Ayurvedic drugs*, *Navaka guggulu*, Sthaulyahara kashayam
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Medoroga is described in the various classical texts of *Ayurveda* referring to excess fat deposition in the body resulting in flabby appearance[1,2]. Faulty diet pattern and lifestyle as also hereditary factors contribute to manifestation of *medoroga*[1,2]. *Medoroga*, if unattended to, leads to certain conditions like *prameha*, *jwara*, *bhagandara*, *vrana* and *vataroga*, and respective related complications[3]. Diseases/complications that occur in patients of *medoroga* are more difficult to treat than in patients who do not have *medoroga*[4]. In *Ayurveda*, traditionally polyherbal formulations such as *Navaka guggulu* (synonym: *Vyoshadi guggulu*) and *Sthaulyahara kashayam* are prescribed in *medoroga*[5]. *Navaka guggulu* consists of ten ingredients, and the role of the ingredients in *medoroga* has been delineated[6,7]. *Sthaulyahara kashayam* consists of seven ingredients[8]. No research information exist involving a regimen consisting of *Navaka guggulu* and/or *Sthaulyahara kashayam* eliciting information from a number of patients of *medoroga* for finding out the efficacy and safety aspects of the regimen. To address these issues, a study with an *Ayurvedic* regimen consisting of *Navaka guggulu*, *Sthaulyahara kashayam*, a diet pattern and walk exercise for a treatment period of 3 *mandalams* (120 days) was conducted. *Medas* (fat) is the fourth *dhatu* (tissue) in the body. *Medas* has *kapha*-like characteristics (viscous, unctuous, jelly-like) [9]. Due to vitiation of *kapha*, excess *medas* gets deposited in the body especially in the *stana/uras* (chest), *udara* (abdomen) and *sphik* (hip) regions in *medoroga*[10]. The *nidana* (aetiopathogenesis) of *medoroga* is given in the classical text *Madhava Nidana*[2].

Avyāyāmadivāswapnaslēshmalāhārasēvinah|
Madhurōnnarasah prāyah snēhānmēdah
pravardhayēt ||
Mēdasāvrutmārgatwāt pushyantyanyē na dhātavah|

In a person doing no physical exercise, enjoying day sleep, and taking *kapha*-provoking diet, sweet substances in the food juice are generally converted into *sneha* which leads to increase in the fat. Consequently, other body tissues do not get properly

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nourished in him because of the channels being blocked with fat. The *lakshana* of *medoroga* (clinical features) have been described in the *Ayurvedic* classical text *Madhava Nidana*[2].

Mēdastu chīyatē tasmādaśaktah sarvakarmasu ||
Kshudraswāsatrushāmōhaswapna krathanasādanaih |
Yuktah kshutswēdadaurgandhyairalpaprānōl-pamaithunah ||
Mēdastu sarvabhūtānāmudarēnwastishu sthitam |
At evōdarē vruddhih prāyō mēdasvinō bhavēt ||

With the accumulation of fat, the person finds difficulty in doing every type of activity. It is associated with dyspnoea on exertion, thirst, drowsiness, sleepiness, sudden (momentary) obstruction to respiration, bodyache, voracious appetite, excessive sweating and bad odour from the body. Life expectancy as well as sexual potency is decreased. Physiologically, there is a tendency for the fat to accumulate in the abdomen and in the bones (in the form of bone marrow); pathologically, there is an excessive enlargement of the belly due to fat accumulation. Sudden obstruction to respiration is related to the Sanskrit word *krathana* in the verse. The word *krathana* also means snoring as given in the classical text *Basavarajeeyam*[3]. This work forms a part of the programme of Sodhana Trust, a not-for-profit organization, currently involved in testing *Ayurvedic* medicinal practices for possible validation of classical textual claims. The aims of the study were to assess the efficacy in terms of evaluation of symptoms and physical parameters and examine the safety aspects of an *Ayurvedic* treatment regimen consisting of *Navaka guggulu, Sthaulyahara kashayam* and a diet pattern for intake and walk exercise.

Methodology

The study was designed for a treatment period of 120 days on out-patient basis. Following criteria were laid down for considering patients for the study. Inclusion criteria included patients in the age range 16–80 yrs; obvious excess deposition of fat in the chest, abdomen and hip regions; symptoms of *medoroga*; agreeable to follow the prescribed regimen continuously during the treatment period of 120 days; patients who would not take other medicines of any medical system(s) for excess fat deposition during the treatment period of 120 days; normal hepatic and renal biochemical parameters at baseline. Female patients who are pregnant or lactating; patients with known allergic conditions; patients who are mentally retarded; patients who are unable to understand the consent form and prescribed regimen; patients who entered the study initially, left for some reason but wanted to re-enter were excluded from the study. Seventy one patients responded to newspaper advertisements and distribution of pamphlets about the study by the Trust. The patients were given appointments to visit the Trust and were recruited consecutively. The patients signed Informed Consent form and voluntarily took part in the study and received no monetary compensation. The investigators included one *Ayurvedic* physician as medical supervisor; two *Ayurvedic* physicians to collect symptom details and other illness related details of the patients and to prescribe the *Ayurvedic* regimen; a clinical nutritionist for advice on diet pattern; one researcher for analysis of data and articulation of results; and an expert in medical statistics for help in interpretation of results. The investigators counseled the patients and impressed upon them to follow the prescribed regimen for a treatment period of 120 days.

A self-designed proforma was used and interview mode was employed to gather details on socio-demographic profile and illness related symptoms *kshudra swasa* (dyspnoea on minimal exertion), *krathana* (snoring), *asaktata* (lack of stamina to do any kind of activity), *swapna /moham* (sleepiness/drowsiness), *anga sadam* (body pain), *sweda* (excessive sweating), *kshuth* (excessive hunger), *daurgandhya* (body odour), *pipasa* (excessive thirst), *krathana* (obstruction to respiration)[2]. Information was obtained about personal details; status of symptoms of the illness; compliance to usage of the given medicines and diet pattern. The physicians collected information from the patients about compliance to exercise. The relevant information and data for the study from each patient were collected four times: at the time of start of the treatment (baseline), at the end of 40 days, at the end of 80 days; and at the end of 120 days (end of treatment visit–ETV). The physical parameters considered for measurement were: *uras* (chest) circumference; *udara* (abdomen) circumference; *sphik* (hip) circumference[10]. Measurements were taken for the physical parameters, in standing position of patients, in the manner detailed below for each parameter: chest circumference (in cm), taken by keeping the

measuring tape round the chest region; covering the most protruding parts of both the flanks, below the axilla; abdomen circumference (in cm), taken by keeping the measuring tape round the widest part of the abdomen; hip circumference (in cm), taken by keeping the measuring tape round the most protruding part of the hips.

Samples of blood and urine were collected from each patient for biochemical investigations including hematological tests (CBP) and complete urine examination (CUE). Tests for the hepatic parameters ALT, AST and total proteins; and tests for the renal parameters specific gravity of urine, blood urea and serum creatinine were also done for assessing safety aspects. Patients were prescribed the regimen given below, to be followed during the 120-day treatment period. *Navaka guggulu*, in pill form (nearly 8 mm in diameter), 2 pills 500 mg each, with lukewarm water, twice daily, after breakfast/lunch and after dinner[11]. The formulation *Navaka guggulu* was standardized following quality control measures including organoleptic characters, physicochemical parameters, phytochemical analysis, chromatographic pattern and microbial screening both for the material and the finished product in accordance with Good Manufacturing Practices[12]. *Sthaulyahara kashayam* prepared 50 ml of 7.5% w/v, with honey, twice daily, on an empty stomach[13]. The *churna* to prepare *Sthaulyahara kashayam* was also standardized a diet pattern (Table 1). Exercise of moderate to brisk walking for about 30 minutes, daily All participants were given instruction sheets consisting of dosage of *Navaka guggulu*; dosage of *Sthaulyahara kashayam* along with preparation details; and exercise to be done as also diet pattern to be followed. Patients were told to continue with their regular medications, if any, for conditions such as hypertension, diabetes. Statistical analysis was performed using SPSS software (version 9.05). Descriptive data were obtained in terms of percentages. Data were analyzed in terms of frequency and percentage for each symptom at baseline and at ETV (Table 2). The differences between the mean values of respective circumferences at baseline and ETV for chest, abdomen and hip were found using paired t-test and significance was set at $p<0.05$.

Results

Thirty eight patients (54%) were in the age range 40 yrs & below, and the remaining 41 yrs & above. Forty one patients (58%) were women and 30 patients (42%) men. No gender distinction in *medoroga* seems to have been made in *Ayurvedic* literature. Accordingly, in this study, patients were considered as composite sample. As regards *prakriti* (*dosha* predominance), 56 patients were found to be of *kapha* type and 15 of *pitta type*. For finding the *prakriti* of each patient, a 39-point fact sheet generally used by *Ayurvedic* physicians was employed, with interrogatory and observational modes of gathering information. Forty eight patients (67%) were found to have had the onset of *medoroga* at 30 yrs of age or below. Fifty patients (70%) had been suffering from *medoroga* for 5 yrs or more. 63% (44 out of 70 patients who responded to the query) had been engaged in work of sedentary nature. Fifty four patients (76%) reported family history of flabbiness of the body. Of the 71 patients considered for the study, 37 patients were eliminated from analysis of results due to non-adherence to intake of medicine/s, out of station, shifted to another city/country during the treatment period. Numbers of patients at each visit are as shown below.

Table 1— Diet pattern

Foods to be taken – at least 4 times in a week	Foods to be abstained from–Not to be taken more than once a week
Whole grain cereals– wheat, *+old rice Millets–ragi (finger millet, *Elusine coracana*),*+jowar (cholum, *Holchus sorghum*) etc, pulses, sprouts	Maida (refined wheat flour),*+sweets , *+new rice Bakery items cakes, pastries Fast foods – pizza, burger, spicy hot stuff, etc.
Vegetables – cabbage, cauliflower, carrots, cucumbers, beans, onion, garlic, radish, bitter gourd, salads, *leafy vegetables	Potatoes, yam, colocasia
Fruits – watermelon, apples, papaya, orange, pomegranate, sweet lime	Banana, Dry fruits–cashew nuts, dates, raisins, figs
Boiled food, steamed food, *food cooked in vegetable oils	Butter, *ghee* (clarified butter), cream, hydrogenated oil, curds, fried foods, egg yolk
Plenty of fresh water, coconut water, skimmed milk, *buttermilk	Alcohol, cool drinks, excess salt, sugar, Processed foods–canned foods, pickles etc, *+whole milk

*from *Vastuguna Deepika* + from *Bhaishajya Ratnavali*

Table 2— Symptom-wise distribution for the sample (n = 34)80

Symptom	Status	Frequency (%)			
		Severe	*Moderate*	*Mild*	*Absent*
Dyspnoea on minimal exertion	baseline	10 (35.0)	9 (15.0)	*8 (15.0)*	7 (35.0)
	ETV	--	3 (9.0)	*10 (29.0)*	21 (62.0)
		Present			*Absent*
Snoring	baseline	26 (77.0)			8 (23.0)
	ETV	10 (30.0)			24 (70.0)
Lack of stamina to do any kind of activity	baseline	19 (56.0)			15 (44.0)
	ETV	6 (18.0)			28 (82.0)
Sleepiness/drowsiness	baseline	17 (50.0)			17 (50.0)
	ETV	2 (6.0)			32 (94.0)
Body pain	baseline	15 (44.0)			19 (56.0)
	ETV	3 (9.0)			31 (91.0)
Excessive sweating	baseline	11 (32.0)			23 (68.0)
	ETV	3 (9.0)			31 (91.0)
Excessive hunger	baseline	10 (29.0)			24 (71.0)
	ETV	3 (9.0)			31 (91.0)
Body odour	baseline	9 (27.0)			25 (73.0)
	ETV	2 (6.0)			32 (94.0)
Excessive thirst	baseline	6 (18.0)			28 (82.0)
	ETV	1 (3.0)			33 (97.0)
Obstruction to respiration	baseline	6 (18.0)			28 (82.0)
	ETV	1 (3.0)			33 (97.0)

Baseline	At end of 40 days	At end of 80 days	At end of 120 days
1st Visit	2nd Visit	3rd Visit	4th Visit
drop-outs 21	11	5	(ETV)
No of patients = 71	50	39	34

Results of analysis of data for the sample (n = 34) are presented. Efficacy of the regimen was assessed in terms of symptomatic improvement and reductions in physical parameters. The symptoms were assessed in terms of their presence/absence, and the symptom 'dyspnoea on minimal exertion' was graded also in terms of levels of severity. At baseline, 27 patients reported of it. Of these, 10 patients had it at severe level, 9 patients at moderate level and 8 at mild level. At ETV, of the 27 patients, 14 patients reported it to be absent and 13 patients continued to have it. Of these 13 patients, it was reported to be moderate in 3 patients and mild in 10 patients. None had it at severe level. Of the 26 patients, who reported snoring at baseline, 16 patients reported it to be absent and 10 patients continued to have it at ETV. Of the 19 patients, who reported lack of stamina at baseline,

13 patients reported it to be absent and 6 patients continued to have it at ETV. Of the 17 patients, who reported sleepiness/drowsiness at baseline, 15 patients reported it to be absent and 2 patients continued to have it at ETV. Of the 15 patients, who reported body pain at baseline, 12 patients reported it to be absent and 3 patients continued to have it at ETV. Of the 11 patients, who reported excessive sweating at baseline, 8 patients reported it to be absent and 3 patients continued to have it at ETV. Of the 10 patients, who reported excessive hunger at baseline, 7 patients reported it to be absent and 3 patients continued to have it at ETV. Of the 9 patients, who reported body odour at baseline, 7 patients reported it to be absent and 2 patients continued to have it at ETV. Of the 6 patients, who reported excessive thirst at baseline, 5 patients reported it to be absent and 1 patient continued to have it at ETV. Of the 6 patients, who reported obstruction to respiration at baseline, 5 patients reported it to be absent and 1 patient continued to have it at ETV.

Each of the symptoms considered was assigned scores: present=1, absent=0. The symptom dyspnoea on minimal exertion was accorded a graded score pattern: severe=3, moderate=2, mild=1, absent=0. Composite symptoms score was arrived at by adding the symptom scores for each patient both at baseline and at ETV. Ranges of composite symptoms

Table 3— Comparison of measurements for physical parameters for the sample (n = 34) at baseline and at end of treatment visit (ETV)

Parameter (in cm)	At baseline Mean ± SD	At ETV Mean ± SD	Mean reduction	t value
Chest circumference	102.74 ± 10.21	95.56 ± 8.74	7.18	9.89*
Abdomen circumference	105.44 ± 17.30	92.65 ± 13.14	12.79	7.55*
Hip circumference	113.38 ± 14.42	105.21 ± 11.58	8.17	9.20*

* $p < 0.001$

score were classified as: absent, low, medium, high and assessed in terms of extent of improvement based on composite symptoms score at ETV vis-à-vis baseline score. This was done by finding out the difference between composite symptoms scores at baseline and at ETV and expressed as percentage. A decrease in the composite symptoms score from baseline to ETV was classified as complete improvement (100%), great improvement (66.7-99.9%), moderate improvement (33.4-66.6%), mild improvement (1-33.3%), and no improvement (0%). An increase in difference between the scores at baseline and ETV was considered as worsened. Of the 34 patients, 18 patients (53%) were considered to have had complete improvement, 3 patients (9%) great improvement and 5 patients (15%) moderate improvement. 7 patients (20%) were found to have had mild improvement and 1 patient (3%) no improvement. At baseline, for the sample, the circumferences recorded for the physical parameters were in the ranges: chest 84–126 cm; abdomen 74–140 cm; hip 93–140 cm. For the circumferences of physical parameters, the following changes were noticed in the sample at ETV vis-à-vis baseline. In chest, a reduction ranging from a minimum of 1 cm to a maximum of 16 cm in 33 patients; no change in 1 patient; in abdomen, a reduction ranging from a minimum of 1 cm to a maximum of 37 cm in 31 patients; an increase of 1 cm in 2 patients; no change in 1 patient; in hip; a reduction ranging from a minimum of 2 cm to a maximum of 20 cm in 32 patients; an increase of 2 cm in 1 patient; no change in another 1 patient.

The mean reduction from baseline to ETV (Table 3), for the sample, was found to be: 7.2 cm (7%) in chest circumference (t=9.89); 12.8 cm (11%) in abdomen circumference (t=7.55); 8.2 cm (7%) in hip circumference (t=9.20), and statistically significant ($p<0.001$). Safety of the regimen: The values for hepatic and renal parameters could be obtained for 30 patients of the sample at each of the four visits and they were found to be within the respective normal ranges. The mean values for these parameters at baseline and ETV are shown (Table 4). It was also possible to check for levels of albumin in urine and blood pressure across the treatment period. For albuminuria, at baseline albumin was present in 13 patients; and at ETV it was absent in 11 and present in traces in the remaining 2 patients. For blood pressure, in a group of 10 known hypertensive patients (who have been and are on antihypertensive drugs) a mean reduction of 7 mm Hg in systolic blood pressure value as also a mean reduction of 6 mm Hg in diastolic blood pressure value at ETV vis-à-vis baseline was noticed and the BP remained in normal range. No side effects (such as gastric disturbances, headache, skin rashes) were reported by the patients in the sample during the treatment period of 120 days.

Table 4— Hepatic and renal parameters for 30 patients

Parameter	*Status*	*Mean ± SD*
HepaticALT (IU/L)	baseline	23.06 ± 5.91
	ETV	21.18 ± 3.52
AST (IU/L)	baseline	22.53 ± 7.02
	ETV	21.00 ± 4.24
Total proteins (g / dL)	baseline	7.03 ± 0.52
	ETV	6.88 ± 0.32
RenalSpecific gravity of urine	baseline	1.03
	ETV	1.03
Blood urea (mg / dL)	baseline	23.88 ± 6.20
	ETV	24.36 ± 4.25
Serum creatinine (mg/ dL)	baseline	0.82 ± 0.21
	ETV	0.89 ± 0.12

Mean differences between baseline and ETV values for the parameters not significant at $p < 0.05$

According to *Ayurveda*, improper food habits and lack of exercise lead to *medoroga*. The regimen included the medicines, and a diet pattern and exercise to be complied with. It was reported that all the patients in the sample complied with the diet pattern. However, it was noticed that 21 patients (60%) were compliant to exercise in the regimen and 13 patients (40%) were non-compliant to exercise. It was thought useful to do analysis for symptomatic

improvement as also change in physical parameters with reference to exercise. Of the 21 patients in the group compliant to exercise, 15 patients (71%) were considered to have had complete improvement, 1 patient (5%) moderate improvement and 5 patients (24%) mild improvement. Of the 13 patients in the group non-compliant to exercise, 3 patients (23%) were considered to have had complete improvement, 3 patients (23%) great improvement, 4 patients (31%) moderate improvement, 2 patients (15%) mild improvement and 1 patient (8%) no improvement. For the compliant group of 21 patients, the mean reductions from baseline to ETV are 7.8 cm (8%) in chest circumference, 23.8 cm (13%) in abdomen circumference, 9.3 cm (8%) in hip circumference and statistically significant ($p<0.001$) with t values 8.68, 6.58 and 8.54, respectively. For the non-compliant group of 13 patients, the mean reductions from baseline to ETV are 11.2 cm (6%) in chest circumference ($t=5.06$, $p<0.001$), 11.2 cm (10%) in abdomen circumference ($t=3.84$, $p=0.002$) and 6.4 cm (5%) in hip circumference ($t=4.44$, $p=0.001$).

Discussion

The *Ayurvedic* medicines, *Navaka guggulu* and *Sthaulyahara kashayam* have been in practice in the last about 2,500 yrs and empirical evidence exist as regards their effect in *medoroga*. The aims of the study were to assess the efficacy and examine the safety aspects of a prescribed regimen that included the above two medicines, a diet pattern and walk exercise in *medoroga*. According to the classical *Ayurvedic* texts *Charaka Samhita* and *Madhava Nidana*, lack of physical exercise is a contributing factor for developing *medoroga*[1,2]. In the study, 70 patients (of the 71 patients recruited for the study) responded to the query regarding their nature of physical activity. Of these, 44 patients (63%) reported of being involved in work of sedentary nature. So, it is possible that lack of physical activity could lead to *medoroga*. According to *Charaka Samhita*, among other factors, *beejaswabhawat*–hereditary factor–contributes to *medoroga*[1]. Of 71 patients recruited for the study, 54 patients (76%) reported family history of flabbiness of the body. From this, it appears that flabbiness of the body could be an inherited character that shows up as increased physical parameters in patients of *medoroga*. Forty eight patients (67%) reportedly had the onset of *medoroga* at age 30 yrs or below. In these 48 patients, it was found that 38 patients (79%) have a family history of flabbiness of the body. It may now be inferred that an earlier onset of *medoroga* is forewarned if there is a family history of flabbiness of the body.

One of the aims of the study was to assess the efficacy of the prescribed *Ayurvedic* regimen over the treatment period with end-points as symptomatic improvement and reduction in physical parameters. As regards symptomatic improvement, dyspnoea on minimal exertion as a symptom was absent at severe level at ETV in those patients who reported of it at severe level at baseline. Remaining symptoms were absent at ETV in a vast majority of those patients, who reported of the symptoms at baseline. Over 60% of the sample was found to be in the complete and great improvement categories. As regards the physical parameters considered, in the sample, the respective mean reductions found from baseline to ETV were found to be statistically significant. Further, over the treatment period, the observation of reduction of a maximum of 16 cm in chest circumference (in 1 patient in the sample), 37 cm in abdomen circumference (in another 1 patient in the sample); 20 cm in hip circumference (in yet another 1 patient in the sample) is salutary and indicative of clinical significance. The fact that there is noteworthy symptomatic improvement as also appreciable reduction in the considered physical parameters in the sample reflects on the efficacy of the prescribed *Ayurvedic* regimen.

The other aim of the study was to examine the safety aspects of the prescribed *Ayurvedic* treatment regimen. During the treatment period of 120 days, the values obtained for hepatic and renal parameters in the patients remained in the respective normal ranges. This shows that the prescribed treatment regimen has not affected the routine functioning of the vital organs liver and kidney. Having considered these factors the prescribed *Ayurvedic* regimen appears to be safe. The absence of any side effects during the treatment period shows that the prescribed regimen has not led to any adversities in the functioning of the body systems. It is a known fact that cardiovascular problems, renal problems and diabetes are associated with loss of albumin in urine. In the study, albumin in the urine at ETV was found to be absent in 11 of the 13 patients with *medoroga* who had it at baseline. This goes to show that the use of this regimen in *medoroga* very likely reduces the risk factors for heart diseases, renal disorders and diabetes that may arise in *medoroga*. In a community based study on

albuminuria in obesity, it was reported that reduction in albuminuria levels reduces the risk of cardiovascular diseases, chronic kidney diseases and diabetes[14]. Over the treatment period, in the hypertensive patients, the observed mean decrease in the systolic blood pressure reading and in the diastolic blood pressure reading suggests that the present regimen in *medoroga* may help reduce overall CVD risk factors in patients of *medoroga*. Thirty four patients remained till ETV, which amounts to an attrition rate of 52%. Although the patients who dropped out were initially sufficiently enthusiastic and motivated, they became subsequently non-adherent owing to personal reasons, irregular intake of medicines, etc. However, a number of patients expressed, at the end of the treatment period, a sense of overall well-being in terms of feeling of lightness, becoming more agile, being less self-conscious about their body shape, etc. Moreover, from the results of the sub-group analysis carried out separately for the group of 21 patients compliant to exercise and for the group of 13 patients non-compliant to exercise, it was found that more percentage of patients in the compliant group have benefited than those patients in the non-compliant group in terms of symptomatic improvement and percentage reduction in the physical parameters. It is more than indicative that it is important and necessary to do moderate to brisk walk exercise for about 30 minutes daily as advised along with intake of the medicines and following the diet pattern in *medoroga*.

Apart from the considered symptoms, *Ayurvedic* physicians in their general practice identify following symptoms in patients of *medoroga* i.e., hair loss, joint pain, tiredness, excessive craving for food and headache which are not mentioned in *Ayurvedic* classical texts. Further, in *Ayurvedic* classical texts, no reference seems to have been made to 'upper arm circumference' and 'weight' in patients of *medoroga*. But 'upper arm circumference', 'weight' along with BMI for the sample were also taken and dealt with accordingly in the study. Of the 24 patients who reported of this symptom at baseline, 14 patients reported it to be absent and 10 patients continued to have it at ETV. Of the 21 patients who reported of joint pain at baseline, 13 patients reported it to be absent and 8 patients continued to have it at ETV. Of the 17 patients who reported of tiredness at baseline, 10 patients reported it to be absent and 7 patients continued to have it at ETV. Of the 15 patients who reported of excessive craving for food at baseline, 13 patients reported it to be absent and 2 patients continued to have it at ETV. Of the 14 patients who reported of headache at baseline, 11 patients reported it to be absent and 3 patients continued to have it at ETV. It now appears that the patients have benefited in terms of the above symptoms that were taken into account. Upper arm circumference was found to be in the range 26–40 cm. A reduction ranging from a minimum of 1 cm to a maximum of 7 cm in 23 patients; an increase of 1 cm in 4 patients and 2 cm in 2 patients; no change in 5 patients was noticed. Weight was found to be in the range 66–135 kg. A reduction ranging from a minimum of 1 kg to a maximum of 11 kg in 12 patients; an increase of 1 kg in 3 patients and 2 kg in 2 patients; no change in 7 patients was noticed. BMI was found to be in the range 25 – 44 kg/m^2. A reduction ranging from a minimum of 1 kg/m^2 to a maximum of 4 kg/m^2 in 17 patients; an increase of 1 kg/m^2 in 2 patients and 2 kg/m^2 in 1 patient; no change in 14 patients was noticed.

The mean reduction, for the sample, for the above physical parameters is as follows: 1.5 cm (5%) in upper arm circumference; 2.1 kg (2%) in weight measurement; 0.8 kg / m^2 (2%) in BMI. It is encouraging that there is reduction in these physical parameters. As regards status of the physical parameters for the group compliant to exercise, the mean reductions for the physical parameters are 1.5 cm (5%) in upper arm circumference, 2.5 kg (3%) in weight measurement and 0.9 kg/m^2 (3%) in BMI. As regards status of the physical parameters for the group non-compliant to exercise, the mean reductions for the physical parameters are 1.5 cm (4%) in upper arm circumference, 1.5 kg (2%) in weight measurement and 0.5 kg/m^2 (1%) in BMI. From these it could be seen that exercise as a part of the regimen also contributes to reduction in the said physical parameters[15].

Conclusion

The *Ayurvedic* regimen consisting of *Navaka guggulu*, *Sthaulyahara kashayam*, diet pattern and walk exercise when administered for a 120-day treatment period to patients of *medoroga* appears to be quite effective in terms of symptomatic improvement and reduction in physical parameters. The considered hepatic and renal parameters were found to be within the respective normal ranges over the treatment period and so the regimen can be considered to be safe. No side effects were reported by any of the patients during the treatment period.

The prescribed *Ayurvedic* regimen for a 120-day treatment period in *medoroga* was found to be effective and safe.

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