

Clinical Evaluation of *Emblica Officinalis* (Amla) Fruit Juice in Obesity

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Abstract

Objective: Obesity major health problem of the modern world because of the consequent life-threatening complications like diabetes, hypertension, ischemic heart disease etc. The prevalence of obesity is increasing day by day across the world irrespective of their economic and developmental condition which is an alarming sign. Preventive measures include dietary restriction, exercise, and antiobesity medicine. The medications used for this disorder cause hazardous side effect on the body on long term use. Keeping above facts in the center a research work has been framed to evaluate the role of an ancient, popular and safe ayurvedic plant drug, *Emblica officinalis* (Amla) fruit juice in Obesity.

Methodology: In this present study, total 30 obese individuals were randomly selected from Varanasi and nearby districts. All the obese subject were advised to take 20 ml of fresh fruit juice of *Emblica officinalis* (Amla) empty stomach at morning and evening mix with lukewarm water. Improvement assessed on the basis of change in weight, waist circumference, body mass index (BMI) and Lipid profile. The total duration of study is 45 days with follow-up of 15 days.

Result: Significant change in weight, waist circumference, body mass index and Lipid profile level observed in all subjects.

Conclusion: *Emblica officinalis* (Amla) fruit juice effectively controls obesity and related symptoms. It is a cheap and effective therapeutic measure for obese individuals.

Keywords: Obesity, overweight, *Emblica officinalis*, Amla, BMI

Introduction

Obesity as an abnormal growth of adipose tissue due to an enlargement of fat cell size or an increase in fat cell number or a combination of both. Obesity has become a big problem for the modern world. The world population is estimated at about 7.4 billion [1] in 2016. WHO global estimates that in 2014, more than 1.9 billion adults aged 18 years and older were overweight. Overall, about 13% of the world's adult population (11% of men and 15% of women) were

obese, 39% of adults aged 18 years and over (38% of men and 40% of women) were overweight. The worldwide prevalence of obesity more than doubled between 1980 and 2014. In 2014, an estimated 41 million children under the age of 5 years were overweight or obese. Now overweight and obesity is equally prevalent in the high-income country, low- and middle-income countries, particularly in urban life [2]. Obesity increases the future risk of various diseases, particularly heart disease, type 2 diabetes, obstructive sleep apnea, certain types of cancer, and osteoarthritis. [3] Lee . 2009 [4], Haslam. 2005 [3], Victoria et al. 2009 [5] and Bray. 2004 [6] reported that the health consequences of obesity are type 2 diabetes mellitus, nonalcoholic fatty liver disease, hypertension and coronary heart disease that adversely impact the quality of life. All these diseases ultimately lead to premature death if not properly treated.

Overweight and obesity are linked to more deaths worldwide than underweight. 65% of the world's population live in a country where overweight and obesity kills more people than underweight. Globally, 44% of diabetes, 23% of ischaemic heart disease and 7–41% of certain cancers are attributable to overweight and obesity [2].

The main etiological factor behind obesity is an imbalance between calories consumed and calories expended, extra calories accumulated in the form of fat in adipose tissues. The preventive measures for obesity and overweight are Maintainance healthy weight, reduced consumption of saturated fats, carbohydrates, sugar and salt, increase consumption of fruit, vegetables, pulses, whole grains, nuts etc. and regular physical activity or exercise. Apart from lifestyle modifications antiobesity and hypolipidemic medicines are used in advance obese subjects also to minimize future complications such cases like orlistat, lorcaserin and a combination of phentermine and topiramate [7] but due to remarkable side effects of modern synthetic antiobesity and hypolipidemic agents, [8][9] there is an urgent need to develop eco-friendly, bio-friendly plant based products to replace synthetic chemicals particularly. Ayurveda has listed a number of medicinal plants with their antidiabetic, antiobesity and hypolipidemic properties, the *Emblica officinalis* (Amla) are one of them. It

possesses very good anti-diarrhoeal, antiemetic, digestive, carminative, laxative, hepatoprotective, cooling, stomachic, tonic, anabolic, diuretic, antidiabetic, antioxidant, immunomodulator, anti-ageing, anti-inflammatory, antipyretic, analgesics, antitumor, anticarcinogenic, antibacterial, antiviral, antifungal, expectorant, antispasmodic anti sclerotic, hypolipidemic, antiulcerogenic, adaptogenic and cardiac stimulant properties.[10] Keeping in view the above concept, the present research work was carried out at OPD, Department of Kaya Chikitsa, Dr. Vijay Ayurvedic Medical College Hospital, and Research Center, Kaithi, Varanasi, Uttar Pradesh, India to evaluate the therapeutic role of an ayurvedic plant *Emblica officinalis* (Amla) in obese individuals.

Objective

To evaluate the role of *Emblica officinalis* (Amla) fruit juice in Obese individuals.

Material and Methods

Total 30 obese subjects were selected for the present study from the Kayachikitsa OPD of Dr. Vijay Ayurvedic Medical College Hospital and Research Center, Kaithi, Varanasi, Uttar Pradesh, India. The case selection was random regardless of age, sex, occupation and socio-economic conditions. Patients fulfilling the diagnostic criteria of obesity were included in the present study. The study was undertaken in the duration of December 2015 to March 2016. All the obese subjects were registered with the care of inclusion and exclusion criteria has been taken. Before registration of the case, all the individuals were subjected to repeat diagnostic screening for obesity based on the physical parameter. The cases were recorded with the help of a special proforma prepared for this purpose.

Body mass index(BMI)

According to the World health organization, BMI is defined as the subject's weight divided by the square of their height and is calculated as follows.

$$BMI = \frac{\text{Weight in kilogram}}{(\text{Height in meter})^2}$$

BMI (kg/m ²)	Classification[19]
<18.5	Underweight
18.5-25.0	Normal Weight
25.1-30.0	Overweight
30.1-35.0	Class I Obesity
35.1-40.0	Class II Obesity
>40.0	Class III Obesity

Inclusion criteria

All subjects fulfilling WHO criteria to define overweight and obesity were included in the study.

- Age between: 18-60 years of either sex.
- BMI > 25

Exclusion criteria

- Age <18yrs. and >60yrs.
- BMI <25
- Subjects with an associated disease like Diabetes Mellitus (NIDDM), Hypertension, Heart disease etc.
- Subjects who are taking any kind of antiobesity or hypolipidemic medicines.
- Certain genetic syndromes e.g. Down's syndrome, Klinefelter's syndrome, Turner's syndrome etc.
- Patients suffering from other severe systemic diseases.

Dosing of *Emblica officinalis* Juice

All the Subjects were advised to take 20 ml of fresh fruit juice of *Emblica officinalis* (Amla) empty stomach at morning and evening mix with equal amount of luke warm water. Improvement assessed on the basis of change in weight, waist circumference, body mass index (BMI) and Lipid profile. The total duration of study is 45 days with follow-up of 15 days.

Parameter of assessment

Weight (W), Waist Circumference (WC), Body Mass Index (BMI), Lipid profile (Cholesterol, LDL, VLDL, HDL & Triglyceride)

Statistical Analysis

The data obtained was processed on a computer with the help of "SPSS: 16" software package of statistical analysis. Standard statistical methods were used to determine the mean, standard deviation (SD) and the range. Paired t-test was used to compare the results of various biochemical parameters among the patients in the four groups. All value quoted as the mean ± SD and a p-value of < 0.05 was considered to be statistically significant and p-value of <0.01 or p < 0.001 was considered to be statistically highly significant.

Observation

Table 1. Mean change in different Biophysical parameters [n=30]

Groups	BT ^s	FU1 ^{ss}	FU2	FU3
W* (Kg)	85.33 ±12.45	79.97 ±14.25	80.23 ±12.96	78.48 ±10.90

WC** (cm)	86.90 ±12.21	84.36 ± 11.51	85.38 ±11.40	83.78 ±11.43
BMI*** (Kg/m ²)	32.54 ±4.31	31.34 ±3.48	30.07 ±3.35	28.81 ±5.57

Table 2. p and t value [n=30]

Groups	Paired 't' test BTvs FU3 Mean±SD ^{§§§}	t value	p value
W* (Kg)	6.86±11.49	3.27	0.003
WC** (cm)	3.12±4.59	3.72	0.001
BMI*** (Kg/m ²)	3.73±6.93	2.95	0.006

Table 3. Mean change in different Biochemical parameters [n=30]

Groups	BT [§]	FU3
CHOL [†]	230.17±84.90	201.57±69.83
LDL ^{††}	134.70±63.72	119.07±61.38
VLDL [‡]	44.57±19.62	40.83±14.26
HDL [¶]	40.40±9.91	42.83±7.97
TG ^{¶¶}	200.47±68.98	167.40±42.56

Table 4. p and t value [n=30]

Groups	Paired 't' test BTvs FU3 Mean±SD ^{§§§}	t value	p value
CHOL [†]	28.60±53.18	2.95	0.006
LDL ^{††}	15.63±16.37	5.23	0.001
VLDL [‡]	3.73±14.42	1.42	0.17
HDL [¶]	-2.43±4.74	2.81	0.009
TG ^{¶¶}	33.07±62.01	2.92	0.007

[*W- Weight, **WC- Waist circumference, ***BMI- Body Mass Index, §B.T=Before treatment, §§FU- Follow up, §§§S.D=Standard deviation †CHL= Cholesterol, ††LDL=Low density lipoprotein, ‡VLDL=Very low-density lipoprotein, ¶HDL=High density lipoprotein, ¶¶TG=Serum Triglycerides,]

Result

In the entire course of study, the weight significantly decreased in all subjects (t=3.27 & p<0.01). After the course of study waist, circumference is also significantly decreased in the obese subjects (t=3.72 and p<0.01). A similar result has been observed in BMI level, which is

significantly decreased in all subjects (t=2.95 & p<0.01). The Same progression observed in lipid profile levels, where most of the lipoproteins (Cholesterol, LDL, VLDL, and Triglyceride) significantly decreased (p<0.01) where as HDL level significantly increased (p>0.05) after study. All the results indicate that *Emblica officinalis* fruit is a novel ayurvedic plant drug for obesity prevention

Discussion

Emblica officinalis Gaertn or *Phyllanthus Emblica* Linn, commonly known as Indian gooseberry or amla or dhatriphala or Amalaki in Ayurveda. It contains many important phytoconstituent like gallic acid, gallotanin, ellagic acid, corilagin etc. possess many therapeutic effects including anti obesity, anti-inflammatory, anti-diabetic effects acting through their antioxidant and free radical scavenging properties. This study has been framed to evaluate the possible role *Emblica Officinalis(Amla) juice* in obese individuals. The overall study showed significant improvement in all the biophysical indices after treatment with *Emblica officinalis juice* after 45 days of the study period. As we see here in the results a significant reduction in Weight, Waist circumference, and Body Mass Index noted after study in all the subjects (p<0.01). A similar type of study has been carried out by, S Khanna et al. 2015[20] where they determine the effect of oral supplementation of a standardized extract of *Phyllanthus Emblica*(CAPROS) on cardiovascular disease (CVD) risk factors in overweight adult human subjects from the US population. Overweight/Class-1 obese (body-mass index: 25–35) adult subjects received 500 mg of CAPROS supplement b.i.d for 12 weeks. In this study, a significant reduction in BMI noted in all the subjects after 12 weeks *Phyllanthus Emblica* (CAPROS) therapy.

In my study, a significant regression in Cholesterol, LDL, VLDL, Triglyceride level and a significant increase noted in HDL level after study. A similar type of result obtained by B Antony et al, 2008 [21] where they found a significant reduction in TC, LDL, VLDL & TG whereas there was a significant elevation in the HDL level after treatment with *Emblica officinalis* in obese subjects. The same type of study carried out by Anju Lama et al.2013[22] in their study they showed a significant increase in all the lipid parameters (p < 0.01) except HDL level following administration of high-fat diet. It was also seen that administration of the extract of *Emblica officinalis* at a dose of 1 g/kg body weight along with high-fat diet in the experiment animals, showed a significant decrease in all the lipid parameters (p < 0.01) with a significant rise in the value of HDL (p <0.01). In human subject similar study has been carried out by A Jacob et al. 1988

[23] in which he observed that Indian gooseberry (amla) fruit extract in obese human subjects significantly reduces triglycerides and total cholesterol levels ($P < 0.05$) in blood and a significant increase in HDL reported in the same manner. All the above study proves the potential role of *Emblica officinalis* juice in obese human subjects but the exact mechanism of action is still not very clear probably it brings positive change in lipid profile via several mechanism by inhibition of HMG-CoA reductase activity, interference with cholesterol absorption and an increase in lecithin cholesterol acyl transferase activity.[24] There are numerous phytoconstituent found in *Emblica Officinalis* fruit out of them Tannins and Gallic acid works like statins in the body. Like Statin, *Emblica Officinalis* inhibits HMG-CoA reductase activity. Ellagitannins and Ellagic acid these two chemicals obtained on hydrolysis of tannins. it inhibits epoxidase enzyme, a rate limiting enzyme of cholesterol biosynthesis.[25,26]

At last, we can say that *Emblica officinalis* (Amla) juice possesses all the miraculous potential which can prevent the process of fat accumulation by modulating lipid metabolism via different pathways in the body.

Conclusion

Obesity is common but complex multifactorial disorder which develops due to long-term energy imbalance due to excessive calorie consumption, insufficient energy output characterized by excessive, abnormal and unhealthy fat accumulation in body. Excessive weight gain can lead to major health problems such as Hypertension, Diabetes, nonalcoholic fatty liver disease, malignancies and coronary heart disease. Dietary restriction, exercise, and antiobesity medications are major preventive pillars to combat overweight and obesity. *Emblica officinalis* (Amla) an ayurvedic plant possess all the novel quality to treat obesity naturally and without any side effects. In this study *Emblica officinalis* (Amla) juice has been screened for their antiobesity effect in obese human subjects. A significant decline observed in weight, waist circumference, BMI, Cholesterol, LDL, VLDL and Triglyceride level and a significant enhancement in good lipid level (HDL) in the individuals taking Amla juice. So we can conclude that *Emblica officinalis* (Amla) juice contains all the possible active ingredients which antagonize the process of fat accumulation in adipose tissue.

Limitation of Study

The present study is basically a time bound and preliminary educational pilot study cannot be finally conclusive. This wholesome natural approach of *Emblica officinalis* (Amla) juice used in this study

seems to be effective. We sincerely hope that the present study would be a pioneer as an ideal research work in the field of Metabolic obesity and related disorders and would provide a useful lead for coming generations and future research workers.

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