The Effect of Drumstick Leaves (*Moringa oleifera*) and Aonla (*Emblica officinalis*) Powder on Blood Profile and Lipid Profile

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ABSTRACT

The present study was carried out on iron deficiency anaemia and lipid profile in rural women through supplementation of drumstick leaves powder and Aonla powder. These are the richest sources of vitamins A, B1, B2, B3 and C, iron, magnesium, calcium, potassium, phosphorus, zinc, etc. and possess antioxidant, anti-inflammatory, and antibacterial properties that help strengthen the body's immune system against a wide variety of diseases. 20 subjects in the age group of 25-45 years were selected for the present study. The drumstick leaves and aonla powder was supplemented with meal 10gm per day respectively for a period of three months. After three months the blood profile and lipid profile were analyzed and recorded. The result revealed that significant improvement in average Hb level, increased cholesterol level HDL, and decreased LDL, VLDL after intervention. This simple, and low-cost technology can be promoted in society to prevent iron deficiency anemia and atherosclerosis.

Key word- *Drumstick leaves powder, aonla powder, Lipid profile, Anaemia*

Malnutrition is a rapidly growing problem throughout the country, with which the country is struggling. The main reason for malnutrition is women's ignorance and lack of knowledge about diet (*Singh et al., 2021*). However, women play multi-dimensional roles and their contribution towards the family is extraordinary (*Singh et al., 2012, Raksha and Chauhan, 2015*). Therefore, to enhance the ability and role of women, they should be provided with nutritional information. Empowering women is a pressing need of today (*Singh and Chauhan, 2004*). Good nutrition is a fundamental requirement for maintaining positive health (*Singh and Sandhu, 2014*). Drumstick has proved to have a special contribution to combating malnutrition. Drumstick also known as miracle tree,pod vegetable is made in almost every house. Everyone likes its taste when eaten, this pod and its tree also have many benefits for health. They contain most of the nutrients required to maintain good health (*Yang et al., 2006*). Moringa leaves can considered as a good source of beta-carotene, vitamin C and E and polyphenols (*Chumark et al., 2007*). Leaves can be used fresh or in powdered form as a food supplement. The stem, leaves, bark, flowers, fruits and many other parts of the drumstick can be used in different ways because the drumstick tree is very beneficial from root to fruit (*Debajyoti et al., 2017*). The leaves can be cooked and used like spinach. Apart from this, its leaves can be dried and crushed into a powder and used in soups and sauces (*Joshi & Mehta, 2010*). Antifungal, antiviral, anti-depressant and anti-inflammatory properties are also found in drumsticks.

Apart from this, drumstick is rich in minerals in many ways. It is a non-dairy source of calcium. It also contains many nutrients like potassium, zinc, magnesium, iron, copper, phosphorus and zinc, which not only keep our body fit but also help in proper development (*Falowo et al., 2018*). Drumstick has been used as a traditional medicine for many years. According to the Ayurvedic system of medicine, a drumstick is useful and helpful for various diseases due to its high nutritional value, water-holdingcapacity and purifying capacity.

Consumption of Aonla is very beneficial for heart patients. It strengthens the heart muscles so the heart

pumps blood smoothly, increases blood circulation and eliminates blockage in the tubes. Iron promotes the formation of new red blood cells, and increases circulation and oxygenation of organs and cells to maximize tissue growth and regeneration while keeping blood vessels and arteries clear (*Kavita et al., 2016*).

Moringa powder (*Moringa oleifera*) and aonla powder (*Emblica officinalis*) have been found to be very effective in controlling lipid oxidation. Moringa leaves and aonla powder significantly reduces the level of total cholesterol, triglyceride, HDL, LDL and VLDL. Hence, the present study has been undertaken to assess the effect of *M. oleifera* and *Emblica officinalis* leaves powder to improve the level of hemoglobin and total cholesterol, triglyceride, HDL, LDL and VLDL among rural women.

METHODOLOGY

The study was carried out in North Karaundia of Sidhi District, Madhya Pradesh. For the preparation of powder, Fresh leaves of Drumstick were sorted, and washed in running tap water till the removal of dirt. After these leaveswere soaked in 1% saline solution (NaCl) for 5 minutes to remove dust, pathogens as well and microbes present on the leave surface. Washed leaves were spread in the shade for shadow drying and used mixer grinder for fine grinding. Sieved the driedpowder and stored it in clean air-tight containers, protected from light and humidity, and kept below 24°C for 6 months. Aonla fruit was procured from the local market. The powder was prepared by using procedures followed by *Mishra et al. (2009*).

Pre-test and post-test pre-experimental design was used. In this study, usinga convenient sampling technique,20 rural women between the age group of 25-45 years were selected for the study. The study was conducted over a period of 3months. Before the intervention, blood profile (Hb, HCT, MCV, MCH, MCHC) and Lipid profile (HDL, LDL, VLDL, Total Cholesterol, Triglyceride) were checked. Each patient was given 10gm of supplement consisting of 5gm of drumstick leaves to powder and 5gm of aonla powder with meals per day respectively for a period of 90 days and keen follow-up was done under medical supervision. Inhibitors of iron absorption such as tea and coffee were withheld along with the dietary supplementation during the intervention. At the end of the study after 3 months blood profile and lipid profile were assessed. The results were statistically analyzed using a paired T-test to examine the differences before and after supplementation. Data was expressed as mean ± standard deviation.

RESULTS AND DISCUSSION

Table 1 shows that 60 per cent of the respondents were in the age group of 35-45 years, 50 per cent were primarily educated, and 65 per cent belonged to the nuclear family. 70 per cent were vegetarian whereas 30 per cent of respondents were non-vegetarian.

Table 1. Socio-economic profile of respondents

Variables	No.	%
Age (Years)		
25-34	8	40
35-45	12	60
Education		
Primary	10	50
High School	04	20
Intermediate	03	15
Graduate	03	15
Type of family		
Joint	7	35
Nuclear	13	65
Type of meal		
Vegetarian	14	70
Non-Vegetarian	06	30

Table 2. Comparison of serum lipid levels before and after intervention

Lipid profile (mg/dl)	Mean ± SD (n=20)		
(mg/dl)	Before	After	't' value
HDL	46.44 ± 1.57	58.36 ±2.17	36.42
LDL	169.84 ± 2.14	166.73 ± 2.24	25.18
VLDL	28.86 ± 2.08	24.37 ± 1.42	23.34
Total Cholesterol	249.26 ± 1.71	220.46 ± 2.49	145.54
Triglyceride	144.32 ± 1.58	121.84 ± 1.69	201.02

Significant at 95 % ($p < .05$).

The result obtained from the present investigation showed that the mean HDL of initial value was 46.44 and after supplementation value was 58.36 mg/dl (Table 2). There was an increase in the levels of HDL after the supplementation of drumstick leaves to powder and aonla powder. This increase was statistically highly significant at 95 % ($P< 0.05$). The priormean value of

the level of LDL was 169.84 andthe value obtained after the supplementation was 166.73 mg/dl. At the end of supplementation, there was a decrease in LDL statistically significant at 95% (P< 0.05). The mean value of VLDL, total cholesterol and triglycerides was 24.37 ± 1.42, 220.46 ± 2.49 and 121.84 ± 1.69 mg/dl were recorded at the end of 90 days. It is evident from the results that there was a marked reduction in the VLDL, total cholesterol and triglycerides after the supplementation of drumstick leave powder and aonla powder for a period of 90 days. These decreases were statistically significant at 95% (P< 0.005). A similar effect has been reported by *Yang et al. (2006*), *Ara et al. (2008*) and *Jain et al. (2010*).

The drumstick leaves powder supplementation done by *Bidwe and Khan (2017)* also reported a positive effect of moringa leaves powder in reducing total cholesterol, LDL cholesterol and triglyceride. *Babitha and Vyshnavi (2018)* also concluded that consumption of *Emblica officinalis* and *Moringa olifera* leaf powder may significantly reduce LDL, VLDL, total cholesterol, triglyceride and increase HDL cholesterol in the disease condition of atherosclerosis.

The changes in the mean values of blood profile before and after supplementation of drumstick leaves powder with aonla powder are presented in Table 3. It stated that the pre-test mean value of hemoglobin level was 10.3 g/dlwith a standard deviation of 0.38 and the post-test mean was 11.8 g/dl with a standard deviation of 0.44. The mean difference is 1.5 and the 't' value is 31.9. Similarly, supplementation increased Hematocrit count from 34.7 to 38.4 with a standard deviationfrom 0.94 to 1.63 and the mean difference is 3.7. It also elevated the mean corpuscular volume count from 87.8±0.98 to 90.8±1.92, and mean cell hemoglobin count from 26.5±1.19 to 28.1±2.10, and an increased mean cell hemoglobin concentration from 28.2 ± 2.14 to 31.3 ± 2.13. They were statistically significant at 0.05 level. It was confirmed by using a paired t-test. These results indicated more beneficial effect of supplements. The above findings are supported by *Sindhu, and Sherry (2013)*. *Chandra et al. (2015)* also found that in women of age group 15-45 years, the drumstick leaves poriyal has significant improvement in the Hb levels after supplementation.

Table 3. Comparison of blood profile before and after intervention

Variable	Pre-test		Post- test		Mean	Paired	P
	Mean	SD	Mean	SD	diff.	't-test	value
Hb (g/dl)	10.3	0.38	11.8	0.44	1.5	31.9	<.00001
HCT (%)	34.7	0.94	38.4	1.63	3.7	19.5	<.00001
MCV (fL)	87.8	0.98	90.8	1.92	3.0	6.99	<.00001
MCH (pg)	26.5	1.19	28.1	2.10	1.6	6.53	<.00001
MCHC (g/dL)	28.2	2.14	31.3	2.13	3.1	20.37	<.00001

Significant at p < .05level

CONCLUSION

In a nutshell, the results of supplementation of drumstick leave powder with aonla powder for 90 days exhibited a noticeable increase in the heamoglobin level, HCT, MCV, MCH, MCHC level and significantly reduced level of LDL, VLDL, total cholesterol and triglycerides over prior value and more importantly enhanced the level of beneficial HDL cholesterol, which is considered to be good cholesterol. So, this study confirms a significant improvement after administration of drumstick leaves powder and aonla powder in the treatment of anaemia and hyperlipidemia. This may be promoted to the economically weaker section of society as a dietary supplement.

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