Original Research Article

Effect of moringa oleifera leaves juice to increase the haemoglobin level among anemic females

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A B S T R A C T

Anemia is considered as the most common cause of malnutrition and it has great significance in public health affecting children, adolescents and reproductive age group women in worldwide. One of the major health issues in adolescent girls is an Iron Deficiency Anemia, which can be reduced by consumption of Drumsticks leaves. The World Health Organization global estimates of anemia prevalence averaged 56%, with a range of 35%–75% depending on geographic location. In India, the prevalence of anemia is 52%. The study aim to assess the effect of Moringa Oleifera leaves juice to increase the haemoglobin level among anemic females. Quantitative research approach was adopted and quasi experimental research design was used for the study. Data was collected from 30 anemic females (15-24 years of age) by using non probability purposive sampling technique. It is concluded that Moringa Oleifera leaves juice is effective to increase the haemoglobin level among anemic females.

1. Introduction

According to United Nations - World Population Prospects (2022) the current population of India in 2022 is 1,406,631,776, a 0.95% increase from 2021, population 1,393,409,038. According to UNICEF India has the largest adolescent population in the world, 253 million. India stands to benefit, socially, politically and economically if this large number of adolescents are safe, healthy, educated for the nation of 1.39 billion. WHO defines 'Adolescents' as individuals in the 10-19 years age group and 'Youth' as the 15-24 years age group.[1]

Adolescent period is signalized by marked physical activity and rapid growth spurt; therefore, they need additional nutritional supplements and are at utmost risk of developing nutritional anaemia. Nutritional anemia is a worldwide problem, with the highest prevalence in developing countries. Anemia occurs when the number of healthy red blood cells is insufficient to meet the body's physiological needs for oxygen delivery to the brain, heart, muscles and other vital tissues. Hemoglobin is the primary oxygen-carrying molecule within red blood cells, so anemia is most typically measured in terms of hemoglobin content of the blood rather than red blood cell volume. Anemia is considered as the most common cause of malnutrition and it has great significance in public health affecting children, adolescents and reproductive age group women in worldwide. Anaemia play a major role in affecting the adolescents especially girls. The World Health Organization global estimates of anemia prevalence averaged 56%, with a range of 35%–75% depending on geographic location. In India, the prevalence of anemia is 52%.[2]

A major problem of a girl is a menstrual period. During this period a girl used to lose approximately 45 ml of blood i.e. 22 mg of iron which leads most of the girls to get affect with anemia.[3]

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Sunuwar D. R., Singh D. R., Chaudhary N. K., Pradhan P. M. S., Rai P. & Tiwari K. (2020) results from multiple logistic regression suggest that likelihood of anemia is significantly higher among younger women (15–24 years), women with primary or no education, women from the poorest wealth quintile, women without toilet facilities. [4]

One of the major health issues in adolescent Girls is an Iron Deficiency Anemia, which can be reduced by consumption of Drumsticks leaves. Drumstick leaves (DL) with its high beta carotene content (19690 mcg/100g) along with vitamin C from lemon juice may have a positive impact in the mobilization of stored iron and increase hemoglobin levels of anemic subjects. Vitamin C is a well known enhancer of iron bioavailability. Moringa oleifera tree is of sub-Himalayan origin requires very little attention and can survive in arid regions. The transcriptome data indicates multiple stress-responsive genes such as C2H2 and Myb gene families. Together, it provides compelling evidence that this plant is a 'superfood' and can provide nutritional sustenance. Studies show that the leaves of Moringa oleifera tree contain 30 times more iron and 100 times more calcium than spinach. "Indeed, iron, zinc and magnesium transporters were found to be highly abundant in the roots and stem parts of this tree." says Dr. Naseer Pasha. [5]

1.1. Statement of the problem

A study to assess the effect of Moringa Oleifera leaves juice to increase the haemoglobin level among anemic females in selected rural areas of Indore, M.P.

2. Objective of The Study

1. Assess the pre test hemoglobin level among anemic females in experimental and control group.
2. Determine the effect of Moringa Oleifera leaves juice to increase the haemoglobin level among anemic females.

2.1. Research hypothesis

H_1:- There will be significant difference between pre-test and post-test hemoglobin level with the effect of Moringa Oleifera leaves juice among anemic females in experimental and control group at 0.05 level of significance. [6]

3. Materials and Methods

3.1. Research approach

Quantitative research approach was used to assess the effect of Moringa Oleifera leaves juice to increase the haemoglobin level.

3.2. Research design

Quasi experimental non randomized control group design (non-equivalent control group design) was adopted to assess the effect of Moringa Oleifera leaves juice.

3.3. Variables under study

1. Independent variable: Moringa oleifera leaves juice
2. Dependent variable: Hemoglobin level

3.4. Research setting

The study is conducted in Bawliya Khurd and Bawliya Bujurg of Indore, M.P.

3.5. Population

Anemic females in selected rural areas of Indore, M.P.

3.6. Sample and sample size

30 Anemic females (15-24 years of age) in selected rural areas of Indore, M P

3.7. Sample techniques

Non probability purposive sampling was used to select the samples.

3.8. Criteria for sample selection

Inclusion criteria: Anemic females who are,

1. Available at the time of data collection.
2. Willing to participate in the study.

3.9. Exclusion criteria: anemic females who are,

1. Pregnant.
2. Having any other blood disorders like sickle cell anemia, hemophilia and thrombocytopenia.
3. Under any treatment.

4. Data Analysis and Interpretation

Section-I: Distribution of anemic females according to their demographic variable.

Distribution of anemic females according to their demographic variables shows that maximum of the sample (40%) were in 22-24 years of age in experimental group whereas in control group there was equal distribution of sample in all the age categories. In both the experimental group and control group (100%) of the sample were Hindu in religion. [7] In education of samples (66.7%) and (60%) in experimental and control group were having high school and higher secondary education. In experimental group majority (66.7%) and (60%) in control group were single in marital status. In both the experimental and control

Table 1: Frequency and percentage distribution of anemic females in experimental and control group according to their demographic variables N=15

Characteristics	Category	Respondents	
		Experimental group Frequency & %	**Control group** Frequency & %
Age	a. 15-18 years	5 (33.3)	5 (33.3)
	b. 19-21 years	4 (26.7)	5 (33.3)
	c. 22-24 years	6 (40)	5 (33.3)
Religion	a.Hindu	15 (100)	15 (100)
	b.Christian	0	0
	c. Muslim	0	0
	d. Others	0	0
Education	a. Primary school	5 (33.3)	5 (33.3)
	b. High school & higher secondary	10 (66.7)	9 (60)
	a. Graduate and above	0	1 (6.7)
Marital status	a. Single	10 (66.7)	9 (60)
	b. Married	5 (33.3)	6 (40)
	c. Divorced / separated	0	0
Occupation	a. Student	5 (33.3)	7 (46.7)
	b.Labour	3 (20)	4 (26.7)
	c. Home maker	4 (26.7)	2 (13.3)
	d. Employed	3 (20)	2 (13.3)
Type of family	a. Nuclear	6 (40)	5 (33.3)
	b.Joint	7 (46.7)	7 (46.7)
	c. Extended	2 (13.3)	3 (20)
Monthly income of the family	a. Less than Rs 8000	2 (13.3)	1 (6.7)
	b.Rs.8001- 16000		
	c. Rs.16001 and above	4 (26.7)	2 (13.3)
	d.	9 (60)	12 (80)
Source of information regarding anemia	a. Mass media	2 (13.3)	0
	b. Books and magazine	2 (13.3)	2 (13.3)
	c. Relatives and Peer group	10 (66.7)	10 (66.7)
	d. Health personnel	1 (6.7)	3 (20)
Family history of anemia	a. Yes	3 (20)	4 (26.7)
	b. No	12 (80)	11 (73.3)
Any medical person in the family	a. Yes	2 (13.3)	2 (13.3)
	b. No	13 (86.7)	13 (86.7)
Age at Menarche	a.10-12 years	2 (13)	2 (13)
	b.13-15 years	13 (87)	13 (87)
	c. 16-18 years	0	0
Pattern of menstruation	a. Regular	12 (80)	12 (80)
	b.Irregular	3 (20)	3 (20)
Flow of Menstruation	a. Normal	11 (73.3)	12 (80)
	b.Heavy	3 (20)	1 (6.7)
	c. Scanty	1 (6.7)	2 (13.3)
Days of menstruation	a. 1-2 days	1 (6.7)	1 (6.7)
	b.3- 5 days	14 (93.3)	14 (93.3)
	c. 6 & above days	0	0
Type of diet	a. Vegetarian	10 (66.7)	7 (46.7)
	b. Mixed vegetarian	5 (33.3)	8 (53.3)
Intake of beverages Coffee/ Tea/ milk	a. Yes	15 (100)	12 (80)
	b. No	0	3 (20)

Table 2 Cont...

Deworming practices before	a. Yes	0	0
	b. No	15 (100)	15 (100)
If Yes, Frequency of deworming practice	a. Never	0	0
	b. Twice a year	0	0
Walk barefoot outside home & toilet	a. Yes	2 (13.3)	1 (6.7)
	b. No	13 (86.7)	14 (93.3)
Practice of washing hands with soap after each defecation	a. Yes	15 (100)	15 (100)
	b. No	0	0
Practice of washing hands with soap and water before each meals	a. Yes	12 (80)	10 (66.7)
	b. No	3 (20)	5 (33.3)
Trimming and keeping nails short regularly.	a. Yes	5 (33.3)	2 (13.3)
	b. No	10 (66.7)	13 (86.7)

group majority of the samples (33.3%) and (47.7%) were students. In relation to type of family, mostly (47.7%) belongs to joint family in both experimental and control group. Regarding monthly income of the family, maximum (60%) and (80%) family of the samples had an income between Rs. 16001 and above in experimental and control group respectively. in both experimental and control group (66.7%) get information regarding anemia from relatives and peer group.[8] Most of the samples (80%) in experimental and (73.3%) in control group had no family history of anemia. In both the groups mostly (86.7%) of samples had no medical person in the family and maximum (87%) of their menarche age is between 13-15 years. With regards to the pattern of menstruation majority of the samples (80%) had regular menstruation in both the groups. Concerning the flow of menstruation largest number (73.3%) & (80%) of them had normal flow and (93.3%) in 3-5 days of menstruation in experimental and control group. Mostly (66.7%) of them belongs to vegetarian in experimental group whereas (53.3%) belongs to mixed vegetarian type of diet in control group. Almost all (100%) and (80%) of them had intake of beverages in experimental and control group. In both the groups no samples practice deworming. Largest number of samples (86.7%) & (93.3%) had not walk barefoot in experimental & control group respectively.[9] All the samples (100%) has practice of washing hands with soap after each defecation. Regarding hand washing practice maximum (80%) & (66.7%) of them use to wash hands with soap and water in experimental & control group respectively. Majority of the samples (66.7%) and (86.7%) has no habit of trimming and keeping nails short regularly in experimental & control group.[10]
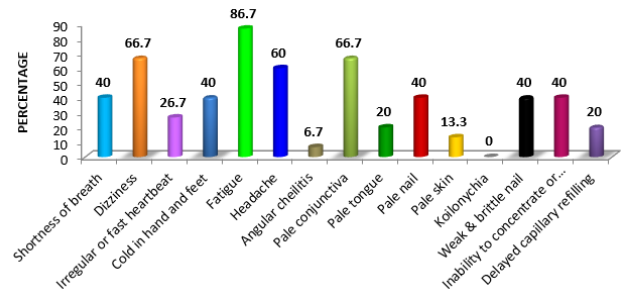
Section-II: Distribution of anemic females according to observational checklist.

Section III: Assessment of pre-test and post-test hemoglobin level among anemic females in experimental group.

The data in the table reveals that among anemic females in experimental group, 8 (53.3 %) had mild level of anemia and 7 (46.7 %) had moderate level of anemia in pre-test
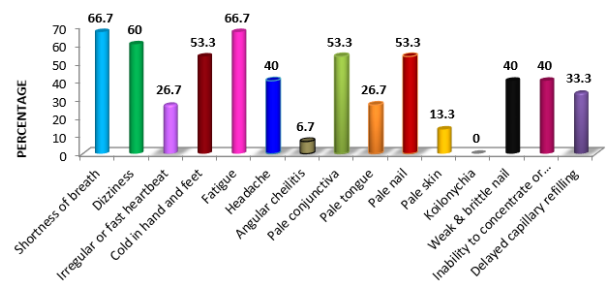
Graph 1: Percentage distribution of anemic females in experimental group according to observational checklist.

Graph 2: Percentage distribution of anemic females in control group according to observational checklist

and 10 (66.6 %) had mild level of anemia, 1 (6.7 %) had moderate level of anemia and 4(26.7%) had no anemia in post-test.

Section IV: Assessment of pre test and post test hemoglobin level among anemic females in control group

Section V: Comparison of mean and standard deviation of hemoglobin level in experimental and control group.

The data in the table reveals that among anemic females in control group, 9 (60 %) had mild level of anemia and 6 (40 %) had moderate level of anemia in pre-test and 8 (53.3 %) had mild level of anemia, 6 (40 %) had moderate level of anemia and 1 (6.7%) had no anemia in post-test.

Table 2: Frequency and percentage distribution of anemic females in experimental and control group according toobservational checklist.

		Respondents	
S.No.	Clinical Symptoms	Experimental group Frequency & %	Control group Frequency & %
1.	Shortness of breath	10 (66.7)	6 (40)
2.	Dizziness	9 (60)	10 (66.7)
3.	Irregular or fast heartbeat	4 (26.7)	4 (26.7)
4.	Cold in hand and feet	8 (53.3)	7 (40)
5.	Fatigue	10 (66.7)	13 (86.7)
6.	Headache	7 (40)	9 (60)
7.	Angular cheilitis(inflammatory lesions at the mouth's corners)	1 (6.7)	1 (6.7)
8.	Pale conjunctiva	8 (53.3)	10 (66.7)
9.	Pale tongue	4 (26.7)	3 (20)
10.	Pale nail	5 (33.3)	6 (40)
11.	Pale skin	2 (13.3)	2 (13.3)
12.	Koilonychia(spoon-shaped nails)	0 (0)	0 (0)
13.	Weak & brittle nail	7 (40)	7 (40)
14.	Inability to concentrate or think	6 (40)	7 (40)
15.	Delayed capillary refilling	5 (33.3)	3 (20)

Table 3: Frequency and percentage distribution ofpre-test and post-test hemoglobin level among anemic females in experimental group N = 15

Lvel of Hemoglobin	Moderate		Mild		Normal		Mean	S.D.
	Frequency	%	Frequency	%	Frequency	%		
Pre test	7	46.7	8	53.3	0	0	9.6	0.98
Post test	1	6.7	10	66.6	4	26.7	10.9	1.03

Table 4: Frequency and percentage distribution of pre test and post test hemoglobin level among anemic females in control groupN = 15

| Lvel of Hemoglobin	Moderate		Mild		Normal		Mean	S.D.
	Frequency	%	Frequency	%	Frequency	%		
Pre test	6	40	9	60	0	0	9.6	0.97
Post test	6	40	8	53.3	1	6.7	9.9	0.96

Table 5: Comparision of mean and standard deviation of hemoglobin level to assess the effecte of Moringa Oleifera leaves juice to increase the haemoglobin level among anemic N = 15

Group		Mean	Mean difference	Standard deviation	't' value
Experimental group	Pre test	9.6	1.33	0.98	10.6* Df 14
	Post test	10.9		1.03	
Control group	Pre test	9.6	0.3	0.97	2.3 Df 14
	Post test	9.9		0.96	

*Significance at $p < 0.05$ level

The data in the table acknowledge that the mean score and standard deviation between pre test and post test haemoglobin level among anemic females, in experimental group the mean score was increased from 9.6 to 10.9 and showing the mean difference of 1.33. This shows that there is a significant difference between the mean score after the intervention. And the "t" value was found to be significant at $p < 0.05$ level of significance. And in control group the mean score was increased from 9.6 to 9.9 and showing the mean difference of 0.3. The reason of the mean difference might be due to extraneous variable (increase dietary intake of iron rich diet other than Moringa Oleifera leaves juice). It is inferred that the administration of the Moringa Oleifera leaves juice among anemic females had a significant increase in post test haemoglobin level. [11-13]
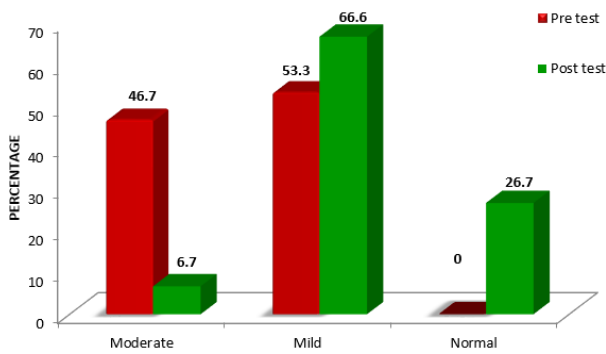
Graph 3: Bar diagram showing frequency and percentage distribution of pre test and post test hemoglobin level among anemic females in experimental group.
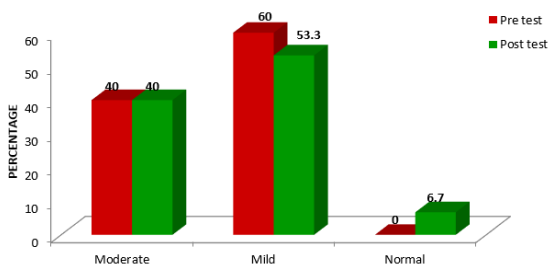
Graph 4: Bar diagram showing frequency and percentage distribution of pre test and post test hemoglobin level among anemic females in control group.

5. Source of Funding

None.

6. Conflict of Interest

None.

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