

Moringa oleifera Teabags Increase Hemoglobin in Adolescent Females

by Martha Korompis

Submission date: 05-Oct-2021 12:20PM (UTC+0700)

Submission ID: 1665710616

File name: leifera_Teabags_Increase_Hemoglobin_in_Adolescent_Females_01.pdf (328.67K)

Word count: 2679

Character count: 14097



Moringa oleifera Teabags Increase Hemoglobin in Adolescent Females

Gusti Ayu Tirtawati*, Kusmiyati Kusmiyati, Atik Purwandari, Amelia Donsu, Martha Korompis, Wahyuni Wahyuni, Fonnice Kuhu, Femmy Keintjem, Sjenny Tuju, Robin Dompas, Agnes Montolalu

Department of Midwifery, Poltekkes Kemenkes Manado, Manado, North Sulawesi, Indonesia

Abstract

AIM: The study aims to determine the effect of *Moringa oleifera* teabags on increased Hemoglobin (Hb) in adolescent girls.

METHODS: The research method used in this research was a pre-post-test one group design, a research design to determine the cause and effect or effect of an intervention. The treatment was carried out by giving *M. oleifera* teabags 2 times. Specifically, one sachet (3 g) in the morning and one sachet (3 g) in the afternoon, dipped in 250 ml hot water, and added two teaspoons granulated sugar. The treatment was given for 30 days.

RESULTS: An increase in the average of Hb (mean) before the intervention was 10.71 g/dl. After 15 days of the intervention, it was 11.03 g/dl. Subsequently, after 30 days of intervention, the average Hb value (mean) was 11.63 g/dl, then the p-value $\leq \alpha$, which was 0.000 ($p < 0.05$), and these results indicated a significant difference between Hb before and after the intervention.

CONCLUSION: There was a significant difference between Hb before and after the intervention, meaning that there was an effect of *Moringa* leaf teabags on the increase in Hb in adolescent females.

Edited by: Sinisa Stojanoski
Citation: Tirtawati GA, Kusmiyati K, Purwandari A, Donsu A, Korompis M, Wahyuni W, Kuhu F, Keintjem F, Tuju S, Dompas R, Montolalu A. *Moringa oleifera* Teabags Increase Hemoglobin in Adolescent Females. Open Access Maced J Med Sci. 2021 Jun 16; 9(A):393-396. https://doi.org/10.3889/oamjms.2021.6270
Keywords: Teabags; *Moringa* leaves; Hemoglobin levels; Adolescent females ***Correspondence:** Gusti Ayu Tirtawati, Poltekkes Kemenkes Manado, Manado, North Sulawesi, Indonesia.

E-mail: tirtagustiayu@gmail.com

Received: 25-Apr-2021

Revised: 16-May-2021

Accepted: 06-Jun-2021

Copyright: © 2021 Gusti Ayu Tirtawati, Kusmiyati Kusmiyati, Atik Purwandari, Amelia Donsu, Martha Korompis, Wahyuni Wahyuni, Fonnice Kuhu, Femmy Keintjem, Sjenny Tuju, Robin Dompas, Agnes Montolalu

Funding: This work was supported by a grant from Poltekkes Kemenkes Manado

Competing Interests: The authors have declared that no competing interests exist **Open Access:** This is an open-access article distributed under the terms of the Creative Commons AttributionNonCommercial 4.0 International License (CC BY-NC 4.0)

Introduction

Adolescents are undergoing various transitional period changes, both from a biological, psychosocial, intellectual, and economic perspective [1]. This change makes adolescents vulnerable to nutritional problems because they are experiencing rapid growth [2]. Their activities are increasing so that they require more energy and nutrients. Therefore, it deserves special attention because it affects the growth and development of the body and adulthood's current and future health.

A nutritional problem that is often experienced by adolescents is anemia. Anemia can reduce the body's resistance so that it is susceptible to disease; reduce activity and fitness, thereby hindering youth achievement and productivity [3]. Anemia often affects young women than men [4]. It is due to stress, menstruation, or eating late [5].

One of the efforts to overcome anemia in adolescent girls is to increase the intake of nutrients from local foods to meet their nutritional needs, such as *Moringa oleifera* leaves [6]. *M. oleifera* leaves are

known to have various kinds of nutritional content, that is, iron,

Open Access Maced J Med Sci. 2021 Jun 16; 9(A):393-396.

protein, Vitamin A, Vitamin C, potassium, calcium, and antioxidants [7]. *Moringa* leaves contain higher iron than other vegetables, about 26 mg/100 g [8].

Several other studies have also shown that giving *Moringa* leaves in tea to anemic adolescents is considered high effectiveness [9], [10]. Therefore, this study aims to determine the effect of *M. oleifera* teabags on increased hemoglobin (Hb) in adolescent girls.

Methods

The research method used in this research was a pre-post-test one group design, a research design to determine the cause and effect or effect of an intervention/treatment. The pre- and post-test was conducted in one group, involving about 100 female adolescents. The treatment was carried out by giving *M. oleifera* teabags 2 times. Specifically, one sachet (3 g) in the morning and one sachet (3 g) in the afternoon, dipped in 250 ml hot water, and added two teaspoons granulated sugar. The treatment was given for 30 days.

Data analysis was Paired t-test with a significant level of $p < 0.05$ and used SPSS. The protocol of this study had been approved by the Ethical Committee of Manado Health Polytechnic Ministry of Health (No. KEPK.01/04/025/2020).

Results

Univariate analysis

Table 1 shows that adolescent women involved in this study were mostly 15 years old (42.5%), and the rests were 14 years old (39.0%) and 13 years old (19.0%).

Based on Hb, Table 1 also shows that 25 respondents (25.0%) before the intervention were in anemia, and 75 (75.0%) were not in anemia. It changed after the 15 days intervention, about 12 respondents (12.0%) were anemic, and about 88 respondents (88.0%) did not experience anemia. Interventions continued for 30 days and showed a significant change. It appeared that there was no anemia in adolescent girls (100%) after 30 days of intervention.

Table 1: Respondent Characteristics (n=100)

Characteristics	n	%
Ages		
13 years	19	19.0
14 years	39	39.0
15 years	42	42.0
Hb		
Before intervention		
Anemia	25	25.0
Non-anemia	75	75.0
After intervention (15 days)		
Anemia	12	12.0
Non-Anemia	88	88.0
After intervention (30 days)		
Anemia	0	100.0
Non-anemia	100	100.0

Hb: Hemoglobin.

Bivariate analysis

Table 2 shows an increase in the average of Hb (mean) before the intervention was 10.71 g/dl. After 15 days of the intervention, it was 11.03 g/dl. Subsequently, after 30 days of intervention, the average Hb value (mean) was 11.63 g/dl, then the p -value $\leq \alpha$, which was 0.000 ($p < 0.05$), and these results indicated a significant difference between Hb before and after the intervention.

Table 2: Differences in Hb before and after the intervention

Hb	Mean	SD	95% confidence interval of the difference		p-value
			Lower	Upper	
Before intervention	10.71	1.04469	8.40	12.60	0.000*
After 15 days intervention	11.03	1.05282	9.30	12.80	
After 30 days intervention	11.63	0.89498	9.80	13.00	

Hb: Hemoglobin.

Discussion

One of the preventions of anemia in young women is to utilize local plants in the community, such as *M. oleifera* leaves. *Moringa* leaves contain high enough iron and vitamins suitable for improving Hb function [11]. Hb in blood cells functions to bind oxygen, oxygen bound, and carried by Hb in red blood cells. Oxygen supply to various places throughout the body will also be achieved, reducing the risk of ischemia, leading to dysmenorrhea in anemic adolescent [12], [13].

This study uses *Moringa* leaves packaged in tea bags, making it easy to consume, more safety, and increase shelf life. The results showed that according to Hb, about 88 (88%) female adolescents after 15 days of intervention were not anemic while those experiencing anemia had decreased, were 12 respondents (12%). Even after 30 days of intervention, there was a significant increase; about 100 respondents (100%) were not anemic. Before the increase in Hb mean before the intervention was 10.71 g/dl. After 15 days of intervention, the average Hb was 11.03 g/dl. After 30 days of intervention, the average was 11.63 g/dl with p -value $< \alpha$, which was 0.000 ($p < 0.05$). These results indicated there was a significant difference between Hb before and after the intervention.

Consuming *Moringa* leaf extract can increase Hb levels in the blood [14]. *Moringa* leaf extract is suitable for adolescent girls, especially those with anemia [15]. When anemia occurs, there is an increase in iron absorption due to high demand. There is an increase after intervention in giving *Moringa* leaf extract contains iron and Vitamin C, which can help iron absorption. Based on laboratory analysis results, the nutritional composition of *Moringa* leaf extract (Sulawesi varieties) includes 25.25% protein, 91.72 mg iron, 33.991.51 ug Vitamin A, 1125.71 mg Vitamin C, and 3.34% Vitamin E in every 100 g of material. *Moringa* leaves contain 773 mg of Vitamin C for every 100 g of dry matter.

Various studies have also stated that *M. oleifera* leaves have various kinds of nutritional content easily digested by the human body. Some of them are iron, protein, Vitamin A, Vitamin C, potassium, calcium, and antioxidants. *Moringa* leaves contain higher iron than other vegetables, which is 26 mg/100 g. The iron (Fe) content in dried *Moringa* leaves or *Moringa* leaf flour is equivalent to 25 times higher than spinach [7], [16].

Moringa leaves have considerable potential for nutrients, various macro and micronutrients, and active ingredients act as antioxidants. Furthermore, it contains essential nutrients such as 28.2 mg Fe, 2003.0 mg calcium, and 16.3 mg Vitamin A. Other nutrients include protein, C, Vitamin D, Vitamin E,

iron absorption [14]. *Moringa* is also used as the main ingredient in hundreds of medicines, both for prevention and treatment [17].

Based on various studies, tea in *Moringa* leaves is very nutritious, and nutritionists and dietitians have recognized its benefits. *Moringa* leaf tea's recommended dose is 5 g/day, about one tea bag (2.5 g) in the morning, and one tea bag in the evening. The use of *Moringa* leaf dosages is adjusted to research considerations safe for consumption by young women. However, this *Moringa* leaf tea can be a source of oxidants, anti-inflammatory, and high nutrients [18].

Hundred grams of *Moringa* powder contain many amino acids that can help prevent the polymerization process and iron precipitation. Furthermore, *Moringa* contains ascorbic acid, a potent iron absorption stimulant. It functions as a reducing agent, converts ferric into ferrous oxide, maintains intestinal pH, and preventing iron precipitation. Besides, it may act as a chelator to forms iron-ascorbate; make it more easily absorbed by the body.

Moringa leaves are useful for anemic patients in low and relatively high doses. The significant increase in the number of red blood cells (erythrocytes) and white blood cells (leukocytes) with *Moringa* leaves' treatment shows that it is suitable as a dietary supplement and a drug for anemia patients [19].

Conclusion

Hb before the intervention was 10.71 g/dl on average. Hb levels after 15 days of the intervention were 11.03 g/dl on average, with an increase of 0.32 g/dl. After 30 days of intervention, the average Hb average was 11.63 g/dl, with an increase of 0.6 g/dl from the first intervention (15 days intervention) and an increase of 0.92 g/dl from before the intervention (0 days). There was a significant difference between Hb before and after the intervention, meaning that there was an effect of *Moringa* leaf teabags on the increase in Hb in adolescent girls. It is expected that young female is drinking *Moringa* leaf teabags diligently to prevent anemia.

References

1. National Academies of Sciences, Engineering, and Medicine, Health and Medicine Division, Division of Behavioral and Social Sciences and Education, Board on Children, Youth, and Families, Committee on the Neurobiological and Socio-behavioral Science of

Adolescent Development and Its Applications, Backes EP, et al., editors. The Promise of Adolescence: Realizing Opportunity for all Youth. Washington, DC: National Academies Press (US); 2019. <https://doi.org/10.17226/25388>

2. Christian P, Smith ER. Adolescent undernutrition: Global burden, physiology, and nutritional risks. *Ann Nutr Metab*. 2018;72(4):316-28. <https://doi.org/10.1159/000488865> PMID:29730657
3. Abbaspour N, Hurrell R, Kelishadi R. Review on iron and its importance for human health. *J Res Med Sci*. 2014;19(2):164-74. PMID:24778671
4. Alvarez-Uria G, Naik PK, Midde M, Yalla PS, Pakam R. Prevalence and severity of anaemia stratified by age and gender in rural India. *Anemia*. 2014;2014:176182. <https://doi.org/10.1155/2014/176182> PMID:25614831
5. Chaparro CM, Suchdev PS. Anemia epidemiology, pathophysiology, and etiology in low-and middle-income countries. *Ann N Y Acad Sci*. 2019;1450(1):15-31. <https://doi.org/10.1111/nyas.14092> PMID:31008520
6. Nadimin, Hadju V, As S, Buchari A. The extract of moringa leaf has an equivalent effect to iron folic acid in increasing hemoglobin levels of pregnant women: A randomized control study in the coastal area of makassar. *Int J Sci Basic Appl Res*. 2015;22(1):287-94. <https://doi.org/10.5958/0976-5506.2019.00102.5>
7. Gopalakrishnan L, Doriya K, Kumar DS. *Moringa oleifera*: A review on nutritive importance and its medicinal application. *Food Sci Human Wellness*. 2016;5(2):49-56. <https://doi.org/10.1016/j.fshw.2016.04.001>
8. Aminah S, Ramdhan T, Yanis M. The nutritional content and functional properties of the *Moringa (Moringa oleifera)*. *Bul Pertanian Perkotaan*. 2015;5(2):35-44.
9. Suzana D, Suyatna FD, Azizahwati A, Andrajati R, Sari SP, Mun'im A. Effect of *Moringa oleifera* leaves extract against hematology and blood biochemical value of patients with iron deficiency anemia. *J Young Pharm*. 2017;9(1):S79-84. <https://doi.org/10.5530/jyp.2017.1s.20>
10. Shija AE, Rumisha SF, Oriyo NM, Kilima SP, Massaga JJ. Effect of *Moringa oleifera* leaf powder supplementation on reducing anemia in children below two years in Kisarawe District, Tanzania. *Food Sci Nutr*. 2019;7(8):2584-94. <https://doi.org/10.1002/fsn3.1110> PMID:31428346
11. Mustapa Y, Hadju V, Indriasari R, Hidayanti H, Sirajuddin S, Russeng SS. The effect of *Moringa oleifera* to hemoglobin levels of preconception women in the health center Tibawa district Tibawa, Gorontalo. *Open Access Maced J Med Sci*. 2020;8(T2):104-8. <https://doi.org/10.3889/oamjms.2020.5201>
12. Bobak. *Buku Ajar Keperawatan Maternitas*. Jakarta: EGC; 2004.
13. Kusumawardan PA, Cholifah S. The relations between anemia and female adolescent's dysmenorrhea. In: Universitas Ahmad Dahlan International Conference on Public Health. Yogyakarta: Universitas Ahmad Dahlan; 2018. p. 190-5. <https://doi.org/10.29333/iji.2019.12139a>
14. Anisa N, Wahyuni S, Rahayu S, Choirunnisa A, Eko Martanti L. Effect of moringa leaves and Vitamin C capsule combinations in increasing hemoglobin levels of young women with anemia. In: Proceedings of International Conference on Applied Science and Health. Thailand: Mahidol University; 2019. p. 565-70.
15. Sartika W, Suryarinilsh Y, Herwati. The effect of moringa leaf capsule on the hemoglobin levels in young women at SMP

- Sabbihisma Padang. KnE Life Sci. 2019;2019:158-64. <https://doi.org/10.18502/kls.v4i15.5753>
16. Rockwood JL, Anderson BG, Casamatta D. Potential uses of *Moringa oleifera* and an examination of antibiotic efficacy conferred by *M. oleifera* seed and leaf extracts using crude extraction techniques available to underserved indigenous populations. Int J Photother Res. 2013;3:61-71.
17. Matic I, Guidi A, Kenzo M, Mattei M, Galgani A. Investigation of medicinal plants traditionally used as dietary supplements: A review on *Moringa oleifera*. J Public Health Afr. 2018;9(3):841. <https://doi.org/10.4081/jphia.2018.841>
- PMid:30854178
18. Vergara-Jimenez M, Almatrafi MM, Fernandez ML. Bioactive components in *Moringa oleifera* leaves protect against chronic disease. Antioxidants (Basel). 2017;6(4):91. <https://doi.org/10.3390/antiox6040091>
- PMid:29144438
19. Samuel SA, Francis AO, Onyinyechi U, Ayomide O. Effects of *Moringa oleifera* leaf extract on red and white blood cells counts. Int J Curr Med Pharm Res. 2015;1(9):150-61.
-

Moringa oleifera Teabags Increase Hemoglobin in Adolescent Females

ORIGINALITY REPORT

0%

SIMILARITY INDEX

0%

INTERNET SOURCES

0%

PUBLICATIONS

0%

STUDENT PAPERS

PRIMARY SOURCES

Exclude quotes On

Exclude matches < 96%

Exclude bibliography On