

## Conference Paper

# The Effect of Moringa Leaf Capsule on the Hemoglobin Levels in Young Women at Smp Sabbihisma Padang

Wiwi Sartika, Herwati, and Yossi Suryarinilsih

Department of Nursing of Polytechnic Health of the Ministry of Health, 25169 Padang, Indonesia

## Abstract

In adolescents, the iron not only functions as energy metabolism in the body but also helps to improve learning achievement. Iron deficiency can lead to fatigue, and the concentration, memory and learning abilities can be disrupted. It can also lead to anemia, especially in young women. The purpose of this study was to determine the effect of leaf moringa capsules on the hemoglobin levels in adolescent girls in Sabbihisma Junior High School. This research used a quasi method of pretest and posttest experiment with control group design. The sample of the study were 32 people, 16 cases (moringa leaf capsule) and 16 control groups. Data collection was done through observation and laboratory examination of hemoglobin levels before and after treatment. The data were tested with paired sample t-test. The results showed that there was a significant difference in female hemoglobin levels in the case group with  $p = 0,000$ , while the control group was not significant with  $p = 0,091$ .

**Keywords:** moringa leaf capsule, hemoglobin level, female adolescent

Corresponding Author:

Wiwi Sartika  
wiwisartika71@gmail.com

Received: 23 September 2019

Accepted: 18 November 2019

Published: 22 December 2019

Publishing services provided by  
Knowledge E

© Wiwi Sartika et al. This article is distributed under the terms of the [Creative Commons Attribution License](#), which permits unrestricted use and redistribution provided that the original author and source are credited.

Selection and Peer-review under the responsibility of the ICHHP Conference Committee.

## 1. Introduction

As with any other nutrient, the need for iron in adolescents increases with the rapid growth and increased muscle mass and blood volume. Iron serves as an energy metabolism in the body. In adolescent, iron also serves to improve learning achievement because some parts of the brain have high iron content obtained from iron transports that are affected by receptors transformation. As a result of iron deficiency leads to fatigue, concentration, memory and learning ability are disrupted and can also lead to iron deficiency anemia especially in adolescent girls (Almatsier, 2012).

Young women are one of the groups who are prone to iron deficiency problems. The iron in the blood can be known through hemoglobin levels. Normal Hb level in adolescent girls is 12,1 gr / dl.

Young women are said to be anemic if the Hb content  $<12$  g / dl. Anemia occurs due to insufficient hemoglobin levels for oxygen and carbon dioxide exchange functions

## OPEN ACCESS

in the tissues (Proverawati & Asfuah, 2011). Studies showed that the negative effects of iron deficiency have an effect on optimizing the growth and development of adolescents, lowering learning achievement due to fatigue, loss of passion and inability to concentrate (Asrori, 2005). The long-term consequences of iron deficiency anemia in adolescent girls is that if the teenage daughter later becomes pregnant, she will not be able to meet the nutrients for herself and the fetus in her womb and during her pregnancy. This anemia can increase the frequency of complications, the risk of maternal death, prematurity, LBW and perinatal mortality (Hayati R, M. 2010). Young women are susceptible to anemia because in general, Indonesian people consume more vegetable foods with less iron content, compared with animal foods, so the body's need for iron is not met.

Young women usually want to look slim, thus limiting food intake. Every day humans lose 0.6 mg of iron in excretion, especially through feces (stool), and girls experience menstruation every month, where the loss of iron  $\pm$  1.3 mg per day, so the need for iron more than men (Mahfudz, et al. 2009)

According to data from Ministry Of Health RI in 2009, anemia patients were found in female teenager amounted to 33,7% in Indonesia (Hayati R, M. 2010). Whereas in 2010, the government has set a target to decrease the prevalence rate of anemia in adolescents up to 20%. However, from the Riskesdas data on 2013, the prevalence of anemia in Indonesia is still high at 21.7%, with the proportion of 20.6% in urban areas and 22.8% in rural areas as well as 18.4% male and 23.9% female. Based on the age group, 5-14 years old anemia patients were 26.4% and 18.4% in the 15-24 year age group (Kemenkes RI, 2013). One effort made to prevent anemia in young women is to utilize local plants that exist in the community that is moringa leaf. Moringa leaves have a high content of iron and vitamins. Moringa leaf is a leaf from Moringa tree that contains various macro and micro nutrients as well as active ingredients that are as antioxidants. Contains essential nutrients such as iron (fe) 28.2 mg, calcium (ca) 2003.0 mg and vitamin A 16.3 mg rich in  $\beta$ -carotene, protein, vitamins A, C, D, E, K, and B (thiamine, riboflavin, niacin, pantothenic acid, biotin, vitamin B6, vitamin B12, and folate) (Almatsier, 2010). Studies on anemia and Leaf of Moringa include: Yulianti, et al (2015): the consumption of Moringa leaf extract in adolescent girls in SMU Muhammadiyah Kupang can increase Hemoglobin, Sylvie S, Ponombon, 2013: Leaf marmilla supplements effectively increase the Hb level of pregnant women the Anemia in Menado, Sartika, W, (2015) iron intake of mostly young women with deficit categories (80%) in Sabbihisma Junior High School - Padang, and Maifah Rissa, et al (2016) most of the anibal Hb levels of anemic pregnant women increased by providing leaf moringa capsules in the city of Pariaman.

## 2. Methods

This type of research is a quasi experiment or quasi experiment pretest and posttest with control group design that is used to determine the effect of moringa leaf capsule on hemoglobin level in female adolescent. Place and time of research The study was conducted in Sabbihisma Junior High School from April to November 2017. The study population was all girls in SMP Sabbihisma Padang which amounted to 78 people. The sample amounted to 16 people for the case group and 16 people for the control group, so all the samples were 32 people. Characteristic data of adolescent girls and consumption of iron and vitamin c were collected by interview and food recall, while the data collection of Hb levels of adolescent girls was done by observation of the results of laboratory tests before and after being given leaf moringa capsules. Data analysis technique was done by using Univariate and bivariate analysis. Univariate analysis was done to describe the research variables by making the table of frequency distribution and distribution of data in tabular form. Bivariate analysis was done on two variables to know the existence of correlation or correlation, difference. The test used was Paired Samples T-test, used to compare the average of two sets of data (data before and after) pairwise.

## 3. Result

### 3.1. Characteristics of Respondents

Age between 12-15 years, and most have experienced menstruation (96,7%). The frequency of eating is 3x a day (90.8%), whereas iron intake is only 38.6 mg and vitamin c 19 mg on average per day of adolescent girls at SMP Sabbihisma Padang.

### 3.2. Respondent Hb Levels

Respondent Hb Levels Before Treatment in Case and Control of Young Women in Sabbihisma Junior High School of Air Padang Children in 2017, describe in table below.

TABLE 1: Distribution of Respondent Hb Levels Before Treatment in Case and Control of Young Women in Sabbihisma Junior High School of Air Padang Children in 2017.

Hb Levels	Mean	Minimum	Maximum	Std. Deviation
Case Group	10.631	7.0	14.3	1.5339
Control Group	11.931	9.0	14.1	1.4907

TABLE 2: Distribution of Hb Rate of Respondents After Treatment in Case and Control of Young Women in Sabbihisma Junior High School of Air Padang Children in 2017.

Hb Levels	Mean	Minimum	Maximum	Std. Deviation
Case Group	13.225	10.2	15.0	1.1457
Control Group	12.288	10.0	14.1	1.2323

### The The Differences of HB Levels of Before and After Treatments

TABLE 3: The Differences of HB Levels of Before and After Treatments in Case Group of Young Women in Sabbihisma Junior High School of Air Padang Children in 2017.

Hb Levels	Mean	Minimum	Maximum	p-value
Before	16	10,63	1,53	0.000
After	16	13,22	1,14	

TABLE 4: The Differences of HB Levels of before and After Treatments of Control Group of Young Women Sabbihisma Junior High School of Air Padang Children in 2017.

Hb Levels	Mean	Minimum	Maximum	p-value
Before	16	11,93	1,49	0.091
After	16	12,28	1,23	

## 4. Discussion

The results showed that female adolescent girls' Hb levels before treatment averaged 10.63gr / dl in case group and 11.93 gr / dl in the control group. Both show Hb status with mild anemia (Hb 10-11,9gr / dl). This is in line with the results of Yulianti et al (2015) where the average Hb rate of 10.37 was obtained before the application of Moringa leaf extract in adolescent girls at SMU Muhammadiyah Kupang. However, the minimum value of Hb 7mg / dl in case group and 9mg / dl in the control group showed Hb status with severe anemia (<8mg / dl) and moderate (8-9.9mg / dl) before treatment in Sabbihisma junior high school Padang. Hemoglobin levels are the size of respiratory pigments in blood granules. Hemoglobin (Hb) is a protein rich in iron has a finality (oxygen) to oxygen and oxygen will form oxihemoglobin in red blood cells. The cause of anemia is caused by several factors. namely the loss of iron during menstruation, malnutrition, vitamins especially vitamin B12 and minerals, and iron deficiency caused by lack of iron in food (Citrakes umasari, 2012).

After the application of leaf moringain leaf capsules (2 capsules of moringain / hari) in the case group for 4 weeks there was an average increase of Hb level to 13.23mg / dl, while in the control group was not given moringain also increased to 12.29mg / dl. Hb

becomes normal after 4-10 weeks of intervention (Bakta, 2007). The result of statistical test with T-test showed that there was a significant difference mean of Hb levels before and after treatment in case group ( $p = 0,000$ ), and there was no significant difference mean of Hb level before and after in control group ( $p = 0.091$ ). This is also in line with Yulianti's (2015) results, where the test shows that there is a significant difference between female and female Hb levels before and after morph leaf extract intervention ( $p = 0.00$ ). Higher results were obtained for the average Hb of pregnant women in Pariaman in leaf capsule supplements compared with the average Hb content on Fe tablets (Rissa, et al, 2016). The results showed that in the case group that consumed moringa leaf extract can further increase blood levels of Hb, compared with the control group, so that leaf moringa leaf capsules are good in giving to teenage girls especially who have anemia. If there is anemia, there is an increase in iron absorption due to the high demand so that there is an increase after the intervention in the form of Moringa leaves capsule containing iron and vitamin C content that helps in the absorption of iron (Wibowo et al., 2013 and Almatsier, 2010).

## 5. Conclusions and Recommendations

Based on this research, it can be concluded that moringa leaf capsule can increase the Hb level of adolescent girl, especially for anemia. It is suggested to SMP Sabbihisma to further improve the supply of iron and vitamin C in the girls' dormitory menu, as well as to inform parents about the efficacy of leaf moringa in preventing and overcoming anemia in adolescent girls. To program planners, cross-sectoral cooperation is required to popularize moringa as a natural and safer alternative to chemical drugs to raise hb levels in achieving lower prevalence of anemia, especially in young women.

## References

- [1] Adriani dan Wirjatmadi, 2010 dalam Anonim, 2012. Persepsi tentang Anemia Gizi pada Remaja Putri di SMA 10 Makasar. Universitas Hasanuddin Makasar.
- [2] Almatsier.(2010). *Prinsip Dasar Ilmu Gizi*. Gramedia Pustaka Utama, Jakarta.
- [3] Almatsier, S., Soetardjo, S., Soekarti, M. 2011. *Gizi Seimbang Dalam Daur Kehidupan*. Jakarta: PT. Gramedia Pustaka Utama.
- [4] Anita, 2007 dalamFebriany, Nunung dan Sophie Devita Sihotang. 2012. Pengetahuan Dan Sikap Remaja Puteri Tentang Anemia Defisiensi Besi di SMA Negeri 15 Medan.[Jurnal KTI]. Fakultas Keperawatan Universitas Sumatera Utara: Medan.

- [5] Asrori M.(2005).*Psikologi Remaja Perkembangan Peserta Didik* , PT. Bumi Aksara, Jakarta. Bakta IM. *Hematologi Klinik Ringkas*, Jakarta : EGC;2007
- [6] Citrakesumasari.(2012). *Anemi gizi, Masalah dan Pencegahannya*. Kalika, Yogyakarta.
- [7] Dharmadi, dkk, 2011 dalam Febriany, Nunung dan Sophie Devita Sihotang. 2012. *Pengetahuan Dan Sikap Remaja Puteri Tentang Anemia Defisiensi Besi di SMA Negeri 15 Medan.*[Jurnal KTI]. Fakultas Keperawatan Universitas Sumatera Utara: Medan.
- [8] Dinas Kesehatan Kota Padang. 2014. *Hasil Skreening Kesehatan Murid SMP Puskesmas Se Kota Padang*. Dinas Kesehatan Kota Padang: Padang.
- [9] Fikawati S, Syafik A., & Nurjaida S.(2011).*Pengaruh Suplementasi Zat Besi satu dan dua kali per minggu terhadap kadarhemoglobin pada siswi yang enderita anemia.*Jurnal universa medicine Vol.24.No.4.
- [10] Hayati, RM. 2010. *Pengetahuan dan Sikap Anemia Defisiensi Besi dan Dampaknya terhadap Kesehatan Reproduksi di MAL IAIN Medan Tahun 2009/2010*. Medan: Universitas Sumatera Utara. 12
- [11] Istiqomah, G.A., Rinayati., Zulaika, C., Wahyudi, D. 2012. *Hubungan Antara Kadar Hemoglobin Dengan Prestasi Belajar Mahasiswa Program Studi DIII Kebidanan Stikes Widya Husada Semarang Tahun 2012*. *Prosiding*. SNST ke-4 Tahun 2013 Fakultas Teknik Universitas Wahid Hasyim Semarang. Program Studi D3 Kebidanan STIKES Widya Husada. Semarang.
- [12] Kemenkes RI.(2013). *Riset Kesehatan Dasar*([http://www.kemendes.laporan\\_Riskesda2013.pdf](http://www.kemendes.laporan_Riskesda2013.pdf)).Jakarta. diakses tanggal 11 februari 2015.
- [13] Proverawati A. & Asfuah S. (2011).*Buku Ajar Gizi dan Kebidanan*, Nuha Medika,Yogyakarta.
- [14] Mardhani, E, 2011, *Manfaat Penyuluhan dengan Media Buku Saku dalam upaya meningkatkan Pengetahuan Remaja di SMA Negeri Colomadu*, Skripsi, Fakultas Ilmu Kesehatan, UMS,Surakarta. *meningkatkan Pengetahuan Remaja di SMA Negeri Colomadu*, Skripsi, Fakultas Ilmu Kesehatan, UMS,Surakarta.
- [15] Notoatmodjo,S. 2012. *Promosi Kesehatan dan Perilaku Kesehatan*, Jakarta : Rineka Cipta.
- [16] Nurbaiti. 2013. *Faktor-faktor yang Berhubungan dengan Anemia Pada Remaja Putri di SMA Negeri 11 Banda Aceh Tahun2013*. *Jurnal*. Banda Aceh. StiKes Ubudiyah Banda Aceh.
- [17] Nurhayati A.(2006). *Hubungan Pola Makan, Tingkat Kecukupan Protein, Besi, dan vitamin c dengan kadar hemoglobin pada remaja putri*. Semarang. Jurnal.

- [18] Permaesih, D. 2003. *Status Gizi Remaja dan Faktor-faktor yang Mempengaruhinya*. Bogor: Puslitbang Gizi.
- [19] Poltekkes Depkes Jakarta I. 2010. *Kesehatan Remaja Problem dan Solusinya*. Jakarta.
- [20] Puslitbangkes. *Riset Kesehatan Dasar 2013*. Jakarta: Kementerian Kesehatan Republik Indonesia.
- [21] Santrock J.W.(2003). *Adolescence Perkembangan Remaja*, Erlangga, Jakarta.
- [22] Sartika, W, 2015. *Faktor-faktor yang Berhubungan dengan Asupan Zat Besi Remaja Putri di SMP Sabbihisma Anak Air Padang*. Penelitian Pengembangan Dosen Prodi Keperawatan Padang Politeknik Kesehatan Kemenkes RI Padang.
- [23] Sasmita, A S. 2015. *Peningkatan pengetahuan anemi dan perilaku makan pada remaja putrid sesudah diberikan pendidikan gizi dengan media Komik*. Skripsi. Prodi Ilmu Gizi Fakultas Ilmu Kesehatan Universitas Muhammadiyah Surakarta.
- [24] Soetjningsih.(2004). *Tumbuh Kembang Remajadan Permasalahannya*, Sagung seto. Jakarta.
- [25] Wibowo CDT., Notoatmojo H., & Rohamani A. (2013). *Hubungan Antara Status Gizi dengan Anemia pada remaja Putri di SMP Muhammadiyah 3 Semarang*, Jurnal Kedokteran Muhammadiyah Vol.1. No.2.
- [26] Yulianti H, dkk, 2015. *Pengaruh ekstrak daun moringa terhadap peningkatan kadar hemoglobin pada remaja putri di SMU Muhammadiyah Kupang*, Jurnal JST Kesehatan Juli 2016, vol6 n0 3 Universitas Hasanuddin.
- [27] Zulaekah, S. 2007. *Efek Suplementasi Besi, Vitamin C dan Pendidikan Gizi Terhadap Perubahan Kadar Hemoglobin Anak Sekolah Dasar yang Anemia di Kecamatan Kartasura Kabupaten Sukoharjo*. Tesis. Universitas Diponegoro. Semarang.
- [28] Zulaekah, S. 2012. *Pendidikan Gizi dengan Media Booklet terhadap Pengetahuan Gizi*. Jurnal KEMAS 7 (2): 123-133.